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REDUCING BARRIERS TO PSYCHOTHERAPY AND THE SOCIOECONOMIC GRADIENT IN SECONDARY EDUCATION

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Reducing barriers to psychotherapy and the socioeconomic gradient in secondary education*

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Abstract

This study examines the impact of increased access to psychotherapy on secondary education completion among Danish youth aged 18–21. We use Danish administrative data and two complementary identification strategies that are both rooted in quasi-exogenous variation in barriers to mental health care—a reform abolishing co-payment and variation in general practitioners' (GP) referral practices. We find that reducing barriers to accessing psychotherapy increases completion of secondary education. While the co-payment reform raised completion rates mainly for women, having a GP with a relatively high tendency to refer patients to psychotherapy raises completion rates for both genders. The educational benefits of increasing access to psychotherapy are strongest among individuals from low socioeconomic backgrounds and those with a family history of mental health issues. This indicates that lowering barriers to access to psychotherapy reduces educational inequality and fosters social mobility.

Key words: Psychotherapy, Education, Co-payment

JEL codes: I12, I14, I21

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1 Introduction

Globally, a high and growing proportion of children and youth experience low levels of mental health and well-being and high levels of despair. Around 14% of 10-19 year-olds experience a mental health disorder.[1] Further, mental health problems are unequally distributed across socioeconomic groups. There is a substantial socioeconomic gradient, with the disadvantaged being more vulnerable to poor mental health (Kirkbride et al., 2024, Lesner, 2025). Mental health is also a key input into human capital formation (Currie, 2020). Children and adolescents with mental health problems, such as ADHD, anxiety and depression, experience large negative consequences in terms of educational attainment (Currie and Stabile, 2009), and studies find that child and adolescent mental health is more predictive of negative adult education, wage, and employment outcomes than common physical health problems (Goodman et al., 2011).[2] Together, these patterns indicate that mental health may play an important role in the persistence of educational inequality and social mobility. This suggests that providing better access to mental health care for low SES children and youth could potentially improve social mobility.

While it is well-established that individuals with low SES background face more barriers in access to healthcare, in particular being less likely to be referred to specialists (Cutler and Lleras-Muney, 2010, Currie et al., 2024, Doorslaer and Koolman, 2004, Bago d'Uva et al., 2011), less is known about the roots and consequences of these barriers especially for children and youth of low SES parents. A few studies focus on monetary barriers and examine the effect of reducing payments for mental health care. Currie et al. (2014) studies an expansion of insurance coverage leading to a sharp increase in the use of medication commonly prescribed for ADHD, but find little evidence of positive effects on educational outcomes and even point to negative academic outcomes such as grade repetition and lower math scores. Kruse et al. (2022) find that abolishing co-payment for psychotherapy reduced suicide attempts for youth. None of these studies focus on children and youth of low SES parents. Other studies have focused on barriers due to variation in GP practice style in relation to e.g. asymmetric information and communication gaps in the GP-patient relationship (Kristiansen and Sheng, 2025, Lagarde and Scott, 2024).

This study asks if reducing barriers to mental health treatment for especially youth of low SES parents can improve social mobility. In particular, we examine if increased access to treatment of mental health problems in youth can improve educational attainment and reduce the intergenerational SES gradient in health and education. Using longitudinal Danish administrative data for individuals aged 18-24 that we follow over the period 2015-2019, we investigate if increased use of psychological therapy provided by a psychologist (henceforth psychotherapy) can improve completion of education.

We estimate the causal effects of psychotherapy using two alternative identification strategies. Our *first* empirical strategy exploits exogenous variation in the use of psychotherapy visits due to a reform in 2018 that removed co-payment for psychotherapy for individuals aged 18 to 21 suffering from depression and anxiety.[3] By exploiting the fact that only certain birth cohorts gained access to free treatment, we estimate the effect of

[1] See (Cosma et al., 2023, Institute for Health Metrics and Evaluation, 2022, Blanchflower et al., 2024). However, despite the discussion of a "youth mental health crisis", mental health problems among children and youth are not new (Currie, 2025)

[2] See also Biasi et al. (2021), Currie and Madrian (1999)

[3] (Kruse et al., 2022) shows that a reduction in the co-payment for psychotherapy due to the 2018-reform increased the use of these services.

the reform on the completion of secondary school.

Our *second* identification strategy exploits the observation that patients whose general practitioner (GP) is relatively more prone to writing a referral to psychotherapy than the average GP are more likely to receive psychotherapy. This strategy lends inspiration from recent literature on the role of the physician in shaping patient outcomes (Bhalotra et al., 2025, Costa-Ramon et al., 2023, Currie and MacLeod, 2020, Cutler et al., 2019, Ginja et al., 2025, Kruse et al., 2022, Simeonova et al., 2024).

Our analysis points to several important findings. *First*, we document that reducing barriers to accessing psychotherapy improved completion of secondary education among youth. The abolition of co-payment for psychotherapy implied that completion rates rose by around one percent for 18-21 year-old women, whereas the effect was insignificant for young men. The results using variation in GP referral-rates point in the same direction; the findings using this identification strategy are significant for both women and men. Thus patients who have a GP with a relatively high tendency to refer patients to psychotherapy are more likely to complete secondary education; their probability to complete secondary education is about 0.6 percent higher compared to the baseline for both men and women.

For both identification strategies, our results suggest that the positive effects on educational attainment run through higher use of psychotherapy, both on the extensive and intensive margin, unconditional on participation. Our results show that abolishing co-payment increased the use of psychotherapy (37% on the intensive margin and 19% on the extensive margin).

Second, we demonstrate that there is variation in the effects of access to psychotherapy across socioeconomic groups. Thus, the effects of increased access to psychotherapy are larger for vulnerable youth from low socioeconomic background or from families with a mental health history. This suggests that higher access to psychotherapy reduces the SES gradient in educational attainment, especially for women. This result is supported by both our identification strategies.

Third, our rich data allows us to investigate potential mechanisms that may explain in what ways GP practice style impact educational outcomes. We find that GPs who more often refer patients to psychotherapy also seem to be more attentive towards mental health problems among their patients; they are e.g. more likely to perform psychometric tests, provide talk therapy, and prescribe mental health medication.

Finally, our findings suggest that low-cost interventions such as lowering co-payment for psychotherapy or promoting GP's knowledge and skills related to mental health problems can potentially effectively promote secondary educational attainment for youth.

Our research contributes to the literature along several dimensions. We contribute to a small but growing literature on the causal relationship between mental health care and education (Cuellar and Dave, 2016, Currie et al., 2014, Sorrenti et al., 2024, Chen et al., 2024). While the causal effect of having a mental health condition in childhood or youth on educational outcomes is by now well established (Currie and Stabile, 2006, Ding et al., 2009, Fletcher, 2009, Johnston et al., 2014), fewer studies have focused on the effects of interventions to promote mental health and behaviors more broadly.

Our study relates to the literature on the effects of reduced payment for specialized mental health care. Currie et al. (2014) studies a policy change in Canada, which expanded insurance coverage leading to a sharp increase in the use of medication commonly prescribed for ADHD, but with little evidence of positive effects on educational outcomes and even negative academic outcomes such as grade repetition and lower math scores. Our

study, on the other hand, suggests that "lighter" interventions such as psychotherapy may benefit secondary educational outcomes, especially for girls. To our knowledge, our study is the first to analyze the effects of co-payment for psychotherapy for young adults. The study closest to ours is a study by Serena (2024) examining a Danish 2008-reform, which introduced 60 percent coverage of the cost of psychotherapy for depression and anxiety patients below age 38. This study finds that increased access to psychotherapy reduced the use of other mental health services, somatic health care, and suicide attempts, but found no effect on labor market outcomes. Moreover, recent insights from behavioral economics suggest that substantial subsidies are needed to stimulate demand for psychotherapy, even if more information about medicine effectiveness is provided (Roth et al., 2024).

In addition, we contribute to the literature on physician practice style (see e.g. Currie et al. (2016), Currie and Zhang (2025), Currie and MacLeod (2020), Cutler et al. (2019), Costa-Ramon et al. (2023), Ginja et al. (2025), Kruse et al. (2022)). In line with the literature, we find substantial variation in practice style among GPs, and we also find that the variation affects the utilization of health care services. Like Finkelstein et al. (2016), we find that both supply and demand factors are important drivers of the variation.

Finally, our results contribute to the literature on the SES gradient in access to mental health care, pointing to stronger effects of easier access and lower prices for low-SES adolescents. This finding is in line with previous research. Currie et al. (2024) document a socio-economic gradient in the type of mental health drugs prescribed to children—low-income children are more likely to receive antipsychotics and benzodiazepines than higher-income children who see the same doctors.

Our paper is organized as follows. Section 2 gives an overview of the reform and institutional setup of health care and secondary education in Denmark. Section 3 describes the data used in the paper. Section 4 lays out the empirical strategy. In Section 5, we present the results of our analysis. Section 6 concludes.

2 Institutional Setting

2.1 Mental health care for Danish youth

Denmark has a tax-funded universal public health insurance system for all citizens. National, regional, or local government schemes covered around 85% of all health spending in 2022 (OECD/European Commission, 2024). The national government is responsible for general health policies, whereas the country's five regions and 98 municipalities cooperate to organize and provide primary and secondary healthcare (Christensen et al., 2016). As part of primary health care, privately owned general practitioner clinics (GPs) offer primary care to patients listed with their clinic free of charge.[4] Patients need a referral from their GP to receive non-acute secondary health care services. GP clinics thus effectively serve as gatekeepers for subsidized secondary health care services offered by specialists in hospitals and private clinics, such as consultations with psychologists and psychiatrists for mental health care. Patients in hospitals receive medicine free of charge while hospitalized. When discharged from the hospital, patients need to collect their medicine at a pharmacy. GPs or specialist physicians can prescribe pharmaceutical drugs sold in pharmacies. Prices of pharmaceuticals sold in pharmacies are subsidized following a non-linear structure in which the patient co-payment declines as their prescription drug spending

[4]In order to be able to provide publicly subsidized services to their patients, GPs must acquire a clinic authorization number to receive reimbursement from the national health insurance system.

accumulates over the calendar year. While there is an out-of-pocket cost associated with purchasing medicine, the average public subsidy for prescription drugs sold in pharmacies was 40% in 2022 (OECD/European Commission, 2024).

The GP is typically a family doctor serving the entire family. Most 18-year-olds will therefore usually be affiliated with the family doctor chosen by their parents as long as they still live at home with their parents. This is helpful for our identification design – explained in Section 4 – as we are therefore less concerned about patient selection into GP clinics based on GP referral rates. Differences in referral rates may partly, but not entirely, be driven by supply effects (as there are capacity constraints in mental health care services in some parts of the country).

GPs are recommended to refer mild mental health cases to private practice psychiatrists, while more severe cases may be sent on to hospitals with psychiatric departments (either as inpatient or outpatient care). GPs can also refer their patients to psychotherapy provided by a psychologist if the patient fulfills certain criteria;[5] such visits may be subject to co-payment or be fully publicly subsidized.[6]

2.2 Barriers to receiving psychotherapy

As described above, GPs act as gatekeepers and patients need a referral from their GP in order to receive subsidized psychotherapy under the national health insurance plan. Although official guidelines specify when GPs can or should refer patients to psychotherapy, the interpretation of these guidelines may vary across practitioners. As a result, GPs differ in their propensity to refer patients to psychotherapy. Obtaining a referral from a GP, therefore, constitutes a barrier to accessing psychotherapy.

Another important barrier is the price of psychotherapy. When a patient has a referral from their GP, the national health insurance plan covers part or all of the fee, but patients are, in most cases, required to pay a co-payment corresponding to 40 percent of the fee. To increase mental well-being for children and youth, the government decided to launch several initiatives in 2018. One of the initiatives was to offer psychotherapy for depression and anxiety without co-payment, thus removing the price barrier, for 18-20 year-olds. In September 2019, the age range was extended to also include 21 year-olds. This initiative lasted from July 1 to December 31, 2021 (Jacobsen et al., 2024).

The initiative has been evaluated; the evaluation documents an increase in the use of psychotherapy in general, and for men an increase in use of anti-depression medication and medication against anxiety.[7] Kruse et al. (2022) show that abolishing psychotherapy co-payment also reduced suicide attempts.

2.3 Secondary education Denmark

The Danish school system has ten years of compulsory (primary) schooling. At the end of primary school, students complete an exam across a number of subjects. After their exam, students can leave school to work or enter into secondary education – either enrolling in

[5]See https://www.sundhed.dk/sundhedsfaglig/information-til-praksis/syddanmark/almen-praksis/patientbehandling/diagnostiske-tilbud/psykologhjaelp.

[6]The organization of mental health care is somewhat different for children and adolescents below 18, who can receive psychotherapy from privately practicing psychologists, school counselors, or municipality-based centers. For children and adolescents, prescription drugs for mental health conditions must be prescribed by a specialist in psychiatry.

[7]See https://www.ism.dk/Media/E/E/Evaluering

high school (ordinary/academic, business, or technical) to prepare for further education or technical/vocational school to prepare for completing a vocational education.[8] The majority of Danish youth complete secondary education between the ages of 18 to 21. Primary, secondary, and tertiary education is offered free of charge. All students aged 18 and above enrolled in secondary or tertiary education are eligible for a universal student aid scheme.

3 Data

The analyses presented in the following sections are based on a sample consisting of annual data from Danish administrative data linking personal characteristics, including parental characteristics, health care utilization, medicine prescriptions and educational outcomes.

3.1 Sample selection

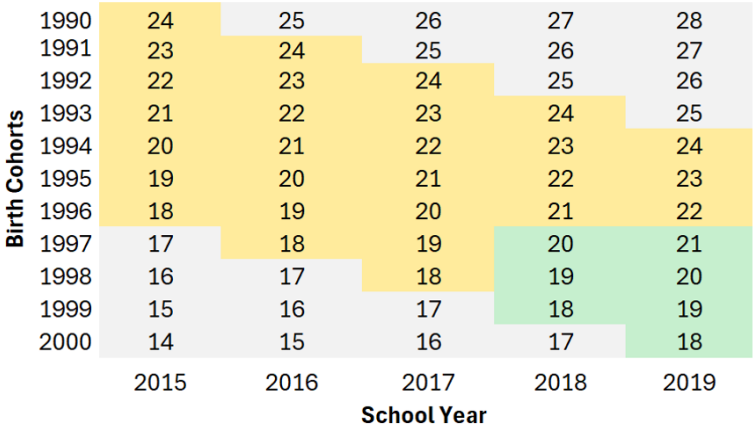
We select individuals aged 18-24 who lived in Denmark at the age of 15 or 16. Our main analyses focus on the school years (defined from July 1st to June 30th) 2015 to 2019.[9] We exclude the subsequent years due to the impact of COVID19. We further restrict the sample to individuals who have had at least one visit at their General Practitioners (GP) within the past three years. This reduces the sample by 54,711 (about 2.3 percent of the sample). We do this to be able to link the individuals to a GP.[10] Individuals whose GP clinic did not exist in the previous three years are therefore also excluded (229,503 observations and about 9.68 percent of the sample). The final sample contains 2,140,814 observations from 734,251 individuals.

[8]Secondary education corresponds to ISCED groups 20 and above in the international ISCED education classification https://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf

[9]We focus on school years because our main variable is completion of education and the abolishment of co-payment was implemented at July 1, 2018.

[10]GPs are identified by their clinic number (in Danish *ydernummer*) under the Danish public health insurance system

Figure 1: Sample selection



Notes: The figure shows our sample. The numbers indicate the age of the individuals. Coloured cells are in-sample individuals, green cells indicate the treatment group (no co-payment) and yellow is control group (40 % co-payment) from our co-payment reform identification strategy. Birth cohorts are based on school years, such that the 1990 cohort consists of individuals born between July 1st 1990 and June 30th 1991.

3.2 Main outcomes

We define a treatment variable as a dummy variable for individuals who would be eligible for free psychotherapy sessions with a psychologist (with the diagnoses of either anxiety or depression). For our sample, it means those who are between 18 and 20 by July 1st in the school year 2018 or those who are between 18 and 21 in the school year 2019, see Figure 1, green cells. The yellow cells in Figure 1 define our control group. We start by investigating if the abolishment of the co-payment impacted the use of psychotherapy. To measure the utilization, we consider outcomes related to use of psychotherapy services. We identify psychotherapy visits from the public health insurance register (Sygesikringsregisteret), where we count the number of visits with the psychologist and identify whether the referral was on the basis of an anxiety, depression diagnosis or any other type of referral.

Our main outcome variable is an indicator of completion of secondary education. Completion of secondary education is defined on the basis of DISCED code of 20 or higher for highest completed education in the Danish educational register.[11] An individual is registered as having finished secondary education if she has completed secondary education in the current or any previous school year. In Figure A.3, we show the fraction who have completed secondary education for different cohorts. The graph shows that the majority of youth complete secondary education between the ages of 18 to 21.

As intermediate outcomes we consider the use of drugs related to psychiatric disorders including psychotropics, anti-psychotics, anti-depressants, anti-anxiety and psychostimulants as well as visits with private practice psychiatrists. We define use of medicine identified as purchase of prescription drugs with particular ATC-codes related to psychiatric illnesses (see Appendix A.8). This therefore includes all prescription medication sold at a pharmacy or other drugstore, but does not include over-the-counter medication or medicine received at a hospital.

[11] See https://www.dst.dk/da/Statistik/dokumentation/nomenklaturer/disced15-audd for documentation of DISCED codes.

3.3 Descriptive Evidence

Table 1 presents descriptive evidence for the outcome variables measured at age 19, separately by gender and treatment status, in the empirical analysis of the co-payment reform. The table shows that 3.7 percent of the women in the treatment group have had a psychotherapy visits at age 19 compared to 3.4 percent in the control group. For men the number is lower, with 1.4 percent in the treatment group and 1.3 percent in the control group having a psychotherapy visit at age 19. This difference is more pronounced at the extensive margin when looking at the number of psychotherapy visits, which increases from 0.193 to 0.245 for women and 0.068 to 0.089 for men. These results are also visualized in figures, see Appendix A.2. We also find that most of the psychotherapy visits relate to diagnoses of either anxiety or depressions, especially for the treatment group. Additionally, a higher percentage of the treatment group has completed secondary education at the age of 19. Looking at the intermediate mental health outcomes, the treatment group is more likely to see a psychiatrist, receive psycho-stimulants as well as receive a psychometric test from their GP. For a comparison of control variables (individual characteristics including parental background see Appendix Table A.1. For descriptive evidence for our sample divided in treatment and control group in our GP referral style empirical strategy see Appendix Table A.2.

Table 1: Comparison between treatment and control sample - Outcome variables

	Women			Men		
	Treatment (No co-payment)	Control (40% co-payment)	T-test	Treatment (No co-payment)	Control (40% co-payment)	T-test
Panel A: First stage outcomes						
Indicator for psychotherapy visit	0.037	0.034	-2.79***	0.014	0.013	-1.97**
N psychotherapy visits	0.245	0.193	-7.74***	0.089	0.068	-5.41***
Indicator for psychotherapy visit, anxiety	0.012	0.008	-7.82***	0.004	0.004	-2.34**
N psychotherapy visits, anxiety	0.063	0.045	-5.85***	0.022	0.018	-1.85*
Indicator for psychotherapy visit, depression	0.023	0.013	-15.53***	0.009	0.005	-11.70***
N psychotherapy visits, depression	0.148	0.066	-16.60***	0.058	0.022	-11.83***
Panel B: Second stage outcomes						
Finished secondary education	0.740	0.691	-25.34***	0.579	0.547	-15.07***
Panel C: Intermediate mental health care outcomes						
N psychometric tests from GP	0.086	0.082	-2.61***	0.044	0.038	-5.04***
N talk therapy services from GP	0.081	0.084	1.32	0.034	0.034	-0.39
N psychiatrist services	0.136	0.109	-5.05***	0.100	0.081	-4.34***
Any mental drug (N05+N06)	0.085	0.082	-2.33**	0.062	0.058	-4.25***
Anti-psychotic (N05A)	0.022	0.017	-7.64***	0.017	0.016	-0.99
Anti-anxiety (N05B)	0.008	0.007	-0.52	0.005	0.004	-0.56
Anti-depressive (N06A)	0.047	0.055	8.88***	0.021	0.024	4.40***
Psycho-stimulants (N06B)	0.021	0.015	-10.12***	0.025	0.021	-6.24***
Number of Observations	64,359	261,830		66,688	272,919	

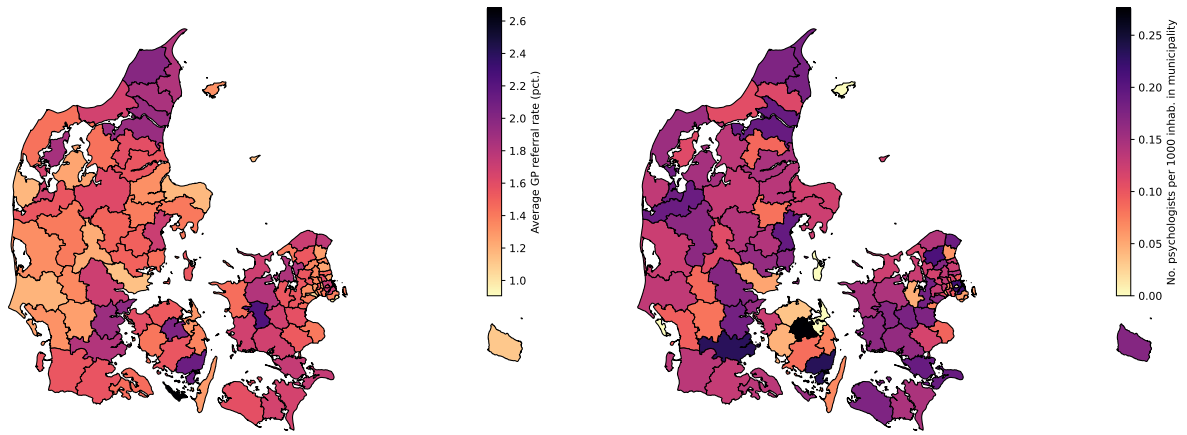
Notes: The table reports means and t-test statistics for differences in means of outcome variables by treatment status at age 19, separately for women and men. To ensure comparability across cohorts, all outcomes are measured at age 19. For cohorts 1990-1994, this means the outcomes are observed prior to the main analysis period. Psychotherapy visits refer to psychotherapy provided by a psychologist.

3.4 GP's Referral Rate to Psychotherapy

In our data, we observe all psychotherapy visits with a psychologist which were fully or partly covered by the national health insurance plan and these visits can be linked to

individual patients. We are also able to link the patients to their GP, from whom they receive the referral to psychotherapy. One caveat of the data is that we only observe the referral from the GP if the patient actually contacts a psychologist.[12] We can then calculate the GP's referral rate as the fraction of patients in a GP clinic that has been referred to psychotherapy in a given year. Notice, that a GP with a low referral rate can be either because the GP makes few referrals or because the patients do not use the referrals the GP makes. To measure the potential effect of having a GP with a high tendency to refer their patients to psychotherapy, we start by examining the variation in referral rate across GPs. There are several plausible reasons why GPs have different referral rates such as composition of patients and heterogeneity in GP's knowledge and preferences for psychotherapy treatment. Another explanation for the variation in GP referral rates is the local supply of psychologist. Figure 2 shows the regional variation in GP's referral rate to psychotherapy in panel a) and the supply of psychologist in panel b), illustrating how the two are correlated. A similar approach of using geographic variation in GP's practice style to study the utilization of mental health care services has also been employed by Fugleholm et al. (2025).

Figure 2: Regional variation in Referral rate and supply of psychologists



(a) Referral rate to psychotherapy

(b) Supply of psychologists

Notes: The referral rate is calculated as the share of the GP's patients who saw a psychologist for the school years 2012-2018. For each municipality the average referral rate is calculated. The supply of psychologists is measured as the average number of psychologists practicing in the municipality per 1000 inhabitants in the year 2012-2018.

To further document the different sources of variation in referral rates we run a regression of the GP's referral rate on number of patients in the clinic, average patient characteristics (age, gender and income) and the local supply of psychologists measured as number of psychologists per inhabitants in the municipality. Table 2 columns 1-4 shows that GP's referral rate is positively correlated with the number of psychologists in the municipality. The referral rate is higher for GP's with a high fraction of female patients and younger patients. Finally in column (4), we include the average waiting time in the region between referral from a GP to psychiatric examination. If psychotherapy provided

[12]Notice, that a GP can make a referral and if the patient does not use it (never contacts a psychologist) we do not observe this referral in our data

by a psychologist is used as a substitution for psychiatric examination or treatment, we would expect to see more referrals to psychotherapy in area with long wait time. We find the opposite, with more referrals in areas with short waiting time. This indicates that GPs do not see psychotherapy as a substitute for psychiatrists.

To construct a measure of the GP's tendency to refer patients to psychotherapy that does not reflect the patient composition, we apply the following procedure. First, we calculate the actual referral rate as the share of the GP's patients who had a psychotherapy visit for the school years 2012-2018. We then regress these actual referral rates on patient characteristics, including the fraction of females, average age, income, as well as municipality and school year fixed effects. The results from this regression are shown in Table 2 column (5). This regression provides a predicted referral rate for each GP. The deviation from the predicted referral rate is obtained by subtracting the predicted referral rate from the actual referral rate. To smooth fluctuations, we take a three-year moving average of this deviation. A GP is then classified as having a high referral rate if their average deviation from the predicted referral rate over the prior three years is above 0. In our results, we refer to this indicator as GP high referral rate.

Table 2: GP's Referral rate to psychotherapy at psychologist clinic

	Sources of variation in GP referral rate				GP Referral rate prediction
	(1)	(2)	(3)	(4)	(5)
No. psychologists per 1000 inhab. in municipality	0.0249***	0.0203***	0.0211***	0.0207***	
	(0.0018)	(0.0017)	(0.0018)	(0.0018)	
Fraction of patients female		0.0250***	0.0235***	0.0236***	0.0239***
		(0.0018)	(0.0022)	(0.0021)	(0.0008)
Patients' average age		-0.0002***	-0.0001***	-0.0001***	-0.0003***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)
Average patient income (DKK in 100,000s)		-0.0001	-0.0004*	-0.0002	0.0023***
		(0.0002)	(0.0002)	(0.0002)	(0.0002)
Waiting time for psychiatric care (in 100 days)				-0.0004**	
				(0.0001)	
School year FE	YES	YES	YES	YES	YES
Municipalty FE					YES
Average referral rate	0.014	0.014	0.015	0.015	0.014
Number of Observations	13,962	13,962	7,338	7,338	13,962

Notes: The dependent variable is GP's referral rate to psychotherapy provided by a psychologist. The referral rate is calculated as the share of the GP's patients who visited a psychologist for the school years 2012-2018. The fraction of female patients, the average age and average income are calculated for each GP over the years 2012-2018. The waiting time measures the average waiting time from a referral to a psychiatrist to a psychiatric examination. Waiting time is only observed from 2015 and onward. Column (4) and (5) is only estimated on the subperiod 2015-2018. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses. Standard errors are clustered at GP level

4 Empirical Strategy

To inform us about the effects of lowering barriers to psychotherapy, we use two alternative identification strategies exploiting i) the exogenous increase in access to fully subsidized

psychotherapy due to the co-payment reform, and ii) variation in referral rates to psychotherapy across GPs. Following our first approach, we estimate the effect of abolishing the co-payment by exploiting that different birth cohorts were differentially affected by the co-payment reform using a Difference-in-Differences approach. The treatment cohorts are children born July 1 1997 to June 31 2000. The control group consists of older cohorts (born July 1 1990 to June 31 1997) and thus above age 20 when the reform was implemented. We apply the following regression model:

$$Y_{it} = \beta_0 + \beta_1 T_{it} + X_{it}\Gamma + \gamma_t + \epsilon_{it} \tag{1}$$

where Y_{it} is the outcome variable of interest (Y can be the use of psychotherapy or completion of education) of individual i and t refers to school year. T_{it} is a dummy indicating if the individual with the referral is entitled to psychotherapy without co-payment, see Figure 1. In the regression, we include X_{it} containing control variables, such as age dummies, controls for SES status, municipality, health controls measured at age 12-16 and characteristics of parents, and γ_t represents school year fixed effects . ϵ_{it} is an idiosyncratic error term. We estimate the model separately for men and women.

In the second approach, we estimate the effect of having a GP with an above-average tendency to refer patients to psychotherapy. The regression equation is given by model.

$$Y_{it} = \beta_0 + \beta_2 R_{it} + X_{it}\Gamma + \gamma_t + \epsilon_{it} \tag{2}$$

where R_{it} is a dummy for having a GP with a high referral rate, conditional on main characteristics of the GP's patient group, as explained in Section 3.4.

Equations 1 and 2 represent reduced-form models. To quantify the effect of the number of psychotherapy visits on the probability of having completed secondary education, we also perform instrumental variable estimations. Our outcome of interest is measured by a dummy for completed secondary education, Edu. We treat the number of visits, $Visit$, as an endogenous variable and use two alternative instruments, Z: i) the indicator for having been affected by the co-payment reform T, and ii) the dummy for having a GP with a high referral rate, R. The second-stage and first-stage regression equations, respectively, are given by:

$$\begin{aligned} Edu_{it} &= \delta_0 + \delta_1 Visit_{it} + X_{it}\Lambda + \gamma_t + \tau_{it} \\ Visit_{it} &= \alpha_0 + \alpha_1 Z_{it} + X_{it}\Psi + \gamma_t + \nu_{it}. \end{aligned} \tag{3}$$

The main parameter of interest, δ_1, can be interpreted as the effect on the probability of completion of education of one additional psychotherapy visit with a psychologist.

5 Results

In this section, we present the results from estimating equations (1), (2), and (3). We first estimate reduced-form models (1)-(2) using psychotherapy visits and completion of secondary education as outcomes. Next, we estimate the effects of psychotherapy on completion of secondary education using the IV approach in model (3). Finally, we explore possible mechanisms that can explain our results.

5.1 The use of psychotherapy

The effects of abolishing co-payment for psychotherapy, estimated by equation (1), are shown in Table 3, panel A. We examine the effects of the co-payment reform on all

psychotherapy visits in columns (1)-(2), on psychotherapy visits for anxiety conditions in columns (3)-(4), and on psychotherapy visits for depression in columns (5)-(6). For each type of visit, we analyze the effects of abolishing co-payment on the *extensive margin*—i.e an indicator for having a psychotherapy visit —and the *intensive* margin—i.e. the number of psychotherapy visits (N visits), respectively. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), socioeconomic status (SES) of the family, controls related to primary school, and controls for pre-treatment use of health care of the child and its parents.[13]

The results show that the reform implied an increase in the use of psychotherapy in general (columns (1)-(2)), and for depression and anxiety separately (columns (3)-(6)). When focusing on psychotherapy for all diagnoses, the effect is stronger when looking at the variation at the intensive margin, with an increase in number of visits of 0.05 visits—corresponding to almost 37 percent of the baseline average number of visits—whereas the increase on the extensive margin amounts to an increase in the probability of having a psychotherapy visit of 0.476 percentage points—corresponding to 19 percent of the baseline probability of those with 40% co-payment (see also Figures A.1 and A.2). These effects imply that the probability of receiving psychotherapy rose from 2.5 to 3% as a consequence of the co-payment reform, whereas the average number of psychotherapy visits, conditional on at least one visit, rose from 5.5 visits per patient to around 6.3 visits per patient.

Moving next to panel B of Table 3, where we report estimates from equation (2), we observe that patients whose GP has a high referral rate are more likely to receive psychotherapy. Thus, having a high- versus low-referral GP is associated with a 22 percent higher probability of receiving psychotherapy. The increase is almost the same on the intensive and extensive margins, implying that having a high-referral GP leads to both more patients receiving psychotherapy and more visits per patient. In the following, we focus on the total number of psychotherapy visits, i.e., the intensive margin.

[13]Socioeconomic status includes controls for ethnicity, parental income, parental employment status and whether parents split up in childhood. Pre-treatment use of health care includes controls for psychologist or psychiatrist visits, medicine use, use of GP services and parents visits to psychotherapy or psychiatrists. See Table A.1.

Table 3: Use of psychotherapy

	Psychologist, all		Psychologist, anxiety		Psychologist, depression	
	(1)	(2)	(3)	(4)	(5)	(6)
	Indicator for Visit	N Visits	Indicator for Visit	N Visits	Indicator for Visit	N Visits
Panel A: Panel A: Co-payment Reform						
No co-payment	0.00476***	0.0507***	0.00270***	0.0206***	0.00384***	0.0348***
	(0.000472)	(0.00346)	(0.000267)	(0.00164)	(0.000327)	(0.00230)
Baseline (40% co-payment)	0.025	0.137	0.008	0.042	0.010	0.056
No co-payment/Baseline	0.193	0.370	0.341	0.496	0.368	0.624
Panel B: Panel B: Variation From GP's Referral Rates						
GP High RR	0.00436***	0.0259***	0.00121***	0.00541***	0.00193***	0.0111***
	(0.000247)	(0.00178)	(0.000143)	(0.000898)	(0.000165)	(0.00112)
Baseline (GP Low RR)	0.022	0.125	0.007	0.037	0.010	0.058
GP High RR/baseline	0.199	0.207	0.173	0.147	0.189	0.194
Number of Observations	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814

Notes: Panel A refers to the estimates of equation (1) and Panel B refers to estimates from equation (2). The dependent variable in columns (1)-(2) is an indicator for visit and the number of visits to psychotherapy with any type of referral, in columns (3)-(4) with a referral for anxiety and in columns (5)-(6) with a referral for depression. No co-payment is a dummy indicating if the individual with the referral is entitled to psychotherapy visits without co-payment. GP high RR is a dummy for having a GP with a high referral rate. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

We next examine whether the effects on psychotherapy utilization (measured by the number of visits) differ by gender and socioeconomic status (SES). We divide our sample in low and high SES. We define individuals as low SES if their parents have an average income under the median, measured when the children are 12-16. We calculate separate medians for each birth cohort to account for general economic growth. Table 4 reports the results of these heterogeneity analyses. In terms of absolute estimates, both the effects of the reform (Panel A) and of having a high-referral GP (Panel B) are stronger for female patients. However, when considering relative effects compared to baseline levels, the reform effect is similar across genders, whereas the effect of having a high-referral GP is relatively stronger for male patients. Among women, as expected, the reform has a larger impact on those with low SES compared to those with high SES, while the opposite holds for men. In contrast, the effect of having a GP with a high referral rate is nearly identical for individuals across SES groups, although the effect is slightly higher for low SES indiduals.

Table 4: Heterogeneity for use of psychotherapy provided by psychologists

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Low SES	High SES	All	Low SES	High SES
Panel A: Panel A: Co-payment Reform						
No co-payment	0.0730***	0.0785***	0.0662***	0.0292***	0.0261***	0.0321***
	(0.00603)	(0.00839)	(0.00867)	(0.00347)	(0.00478)	(0.00504)
Baseline (40% co-payment)	0.201	0.189	0.213	0.074	0.068	0.081
No co-payment/baseline	0.363	0.416	0.310	0.392	0.384	0.397
Panel B: Panel B: Variation From GP's Referral Rates						
GP High RR	0.0369***	0.0384***	0.0344***	0.0149***	0.0152***	0.0140***
	(0.00312)	(0.00424)	(0.00458)	(0.00179)	(0.00240)	(0.00265)
Baseline (GP Low RR)	0.186	0.176	0.196	0.068	0.062	0.074
GP High RR/baseline	0.198	0.218	0.175	0.220	0.245	0.190
Number of Observations	1,056,477	522,829	533,648	1,084,337	538,493	545,844

Notes: The dependent variable is the number of psychotherapy visits provided by psychologists. Panel A refers to the estimates of equation (1) and Panel B refers to estimates from equation (2). Columns (2) and (5) are estimations on only low SES individuals and (3) and (6) only on high SES individuals. No co-payment is a dummy indicating if the individual with the referral is entitled to psychotherapy visits without co-payment. GP high RR is a dummy for having a GP with a high referral rate. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

5.2 Completion of education

We now examine if reducing barriers to psychotherapy may have positive implications for educational outcomes. In particular, we estimate the effects on the completion of secondary education of easier access psychotherapy through (1) the co-payment reform, and (2) having a high-referral GP.

Panel A of Table 5 reports the estimates for equation (1). For the full population (column 1), we find a significant positive effect of the co-payment reform on women's probability of completing secondary education—about one percentage point, corresponding to a relative increase of 1.2% of the baseline mean. For men, the reform shows no impact. Thus, while both genders increased psychotherapy utilization following the removal of co-payment, only women experienced an improvement in educational outcomes.

Panel B of Table 5 reports the results of estimating equation (2), i.e. the effect of having a high-referral GP versus a low-referral GP. For women, the effect is approximately 0.5 percentage points (about 0.6% of the baseline mean). For men, the effect is slightly smaller but similar in relative terms. Both the co-payment reform and having a high-referral GP exhibit larger effects for low-SES women and men, although for men the

effect is only marginally significant (see columns 2–5 of Table 5). Several factors may explain these patterns: First, there may be ceiling effects as completion rates for high-SES individuals are already high (86.2% for women and 79.2% for men), leaving limited scope for improvement. Secondly, there may be differences in compliers across SES groups, such that high-SES compliers may have fewer dropout risk factors initially. Thirdly, there may be substitution of treatment types: High-SES individuals were more likely to receive psychotherapy before the reform (including privately paid consultations not recorded in our data), and the reform may have induced substitution from privately funded to publicly subsidized treatment, without any real net effect on total use of psychotherapy. If subsidized visits fully crowd out private visits, this could explain the absence of an education effect for high-SES individuals. Assuming that the need for psychotherapy is greater among low-SES youth, but utilization is similar across SES groups (see Table 4), we would expect larger effects for *marginal* youth from low-income families.

Our results show that easier access to psychotherapy impacts the completion of education, but they also suggest that different groups may encounter different barriers. Specifically, we find no effect on educational outcomes for men when the co-payment is removed, whereas having a GP with a high referral rate does have an effect. One possible explanation is that the groups who comply with each barriers differ. Men who increase their psychotherapy use because the co-payment is abolished may be systematically different from those who do so because their GP frequently refers patients.

Another potential explanation is heterogeneity in the mechanisms linking increased psychotherapy use to the completion of secondary education. Men who are referred to psychotherapy by high-referral GPs may also be more likely to receive other forms of mental health care, whereas those who increase their psychotherapy uptake due to the reform may not. We will later consider if the difference in accompanying treatments could help explain the contrasting effects.

Our analysis of the effects of the co-payment reform on secondary education differs somewhat from a recent report analyzing the effects of the co-payment reform (Jacobsen et al., 2024) on tertiary education. Thus, while we find some positive and significant effects of the reform on secondary education, the report by Jacobsen et al. (2024) shows no significant effects on tertiary education but positive and significant effects on employment. The report points to several explanations for the lack of significant effects on tertiary education: First, the 2018 co-payment reform affected cohorts that had already been affected by student aid (SU) reforms around 2014-16. Moreover, the report focused on tertiary education effects, which implied that outcomes had to be measured during and after Covid-19 lockdowns.

Table 5: Effect on education

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Low SES	High SES	All	Low SES	High SES
Panel A: Panel A: Co-payment Reform						
No co-payment	0.00911***	0.0107***	0.00691**	0.000755	0.000910	0.000207
	(0.00187)	(0.00298)	(0.00223)	(0.00198)	(0.00306)	(0.00248)
Baseline (40% co-payment)	0.770	0.676	0.862	0.678	0.563	0.792
No co-payment/baseline	0.012	0.016	0.008	0.001	0.002	0.000
Panel B: Panel B: Variation From GP's Referral Rates						
GP High RR	0.00455***	0.00563***	0.00310*	0.00358***	0.00391*	0.00243
	(0.00102)	(0.00162)	(0.00121)	(0.00108)	(0.00167)	(0.00136)
Baseline (GP Low RR)	0.745	0.652	0.842	0.646	0.532	0.763
GP High RR/baseline	0.006	0.009	0.004	0.006	0.007	0.003
Number of Observations	1,056,477	522,829	533,648	1,084,337	538,493	545,844

Notes: Panel A refers to the estimates of equation (1) and Panel B refers to estimates from equation (2). The dependent variable is an indicator variable for having completed secondary education. Columns (2) and (5) are estimations on only low SES individuals and (3) and (6) only on high SES individuals. No co-payment is a dummy indicating if the individual with the referral is entitled to psychotherapy visits without co-payment. GP high RR is a dummy for having a GP with a high referral rate. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

IV estimation

We next turn to quantifying the effect of psychotherapy visits on educational attainment, using an IV estimation with our two instruments capturing barriers to psychotherapy: the co-payment reform and the effect of having a GP with a high referral rate. As we are imposing a number of additional assumptions, these results should be interpreted with caution. First, the effect estimated by the IV approach is the average effect of an extra visit for the compliers. Second, we assume a linear relation between the number of visits and the probability of completion of secondary education.[14] Third, these calculations rely on the monotonicity assumption. In the co-payment reform case, the monotonicity assumption implies that individuals who, in absence of the reform, receive psychotherapy would also receive psychotherapy after the reform. A potential threat here could be capacity constraints in mental health care. If individuals referred on the basis of depression or anxiety take up capacity and crowd out patients with other types of referrals, then this

[14]Løken et al. (2012) shows that if the true model is a non-linear model and a linear model is estimated, the IV and the OLS estimates will use different weights, resulting in different estimates even in the absence of an endogenous variable. With only one binary instrument (in each analysis: the abolishment of the co-payment or having a high referral GP), we cannot identify non-linear effects in an IV estimation.

could lead to a reduced number of visits for individuals with other diagnoses. Table 1 indicates that the number of visits for diagnoses other than depression and anxiety falls from 0.082 to 0.035 for women.[15]

In the case of the referral rate estimation, a potential threat is that high-referral GPs may in general be more aware of mental health issues and therefore also provide better treatment of such patients in their own clinic. Hence, the effect measured may not only reflect that their patients gained better access to psychotherapy, but may also reflect that the GPs themselves offered better mental health care in their GP practice.

The results of the IV estimation using the reform as an instrument are shown in Table 6, Panel A. First stage results are similar to the results shown in Table 4, Panel A, and the F-test for the First Stage indicates that we have a strong first stage. The IV results show a large and positive effect for women and small and insignificant effects for men. When increasing the number of psychotherapy visits by one, the probability of completion of secondary education increases by 12.5 percentage points for women. When considering the effects for high- and low-SES parents, it is clear that the effect is larger for the low-SES women, where an additional psychotherapy visits increases the probability of completing secondary education by 13.6 percentage points while for the high SES women it is 10.4 percentage points.

We now turn to the effect of an additional psychotherapy visit estimated using the GP high-referral rate instrument, see Table 6 Panel B. Again, the F-test indicates a strong First Stage. For women, we find similar results as for the reform, while the pattern is different for men. These results show, in contrast to the results from the reform, that men also benefit from an additional psychotherapy visit, especially men with a low SES background.

[15]Before the reform, female patients' average number of visits due to other diagnoses was 0.193-0.045-0.066=0.082, while the corresponding number was 0.246-0.063-0.148=0.035 after the reform. For men, the number of visits due to other reasons than depression and anxiety were 0.033 visits before the reform versus 0.008 after the reform, see Table 1. Whether these differences reflect a true move from treating other diagnoses towards treating anxiety and depression, or whether they reflect that some re-labeling of diagnoses happened to accommodate new co-payment rules remains unknown. However, Serena (2024) shows that, following a similar reform in 2008, GPs relabeled referral diagnoses depending on the patient's eligibility for subsidized psychotherapy, suggesting that referrals based on other diagnoses may change depending on whether the patient is eligible for subsidized psychotherapy for anxiety or depression.

Table 6: IV estimates of the effect of psychotherapy visits on the probability of completion of secondary education

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Low SES	High SES	All	Low SES	High SES
Panel A: Using reform as instrument						
N psychotherapy visits	0.125***	0.136***	0.104***	0.0259	0.0349	0.00644
	(0.0216)	(0.0314)	(0.0290)	(0.0520)	(0.0889)	(0.0604)
First Stage F-statistic	182.424	107.793	73.465	86.051	37.140	48.658
Baseline (40% co-payment)	0.770	0.676	0.862	0.678	0.563	0.792
N psychologist servies/Baseline	0.162	0.202	0.121	0.038	0.062	0.008
Panel B: Using High Referral Rate GP as instrument						
N psychotherapy visits	0.123***	0.147***	0.0902**	0.240***	0.257**	0.173*
	(0.0220)	(0.0332)	(0.0284)	(0.0580)	(0.0856)	(0.0768)
First Stage F-statistic	184.023	105.404	75.642	89.283	51.328	36.280
Baseline (GP Low RR)	0.745	0.652	0.842	0.646	0.532	0.763
N psychologist servies/baseline	0.166	0.225	0.107	0.372	0.483	0.227
Number of Observations	1,056,477	522,829	533,648	1,084,337	538,493	545,844

Notes: The table shows the IV regression estimates of the number of psychotherapy visits on the completion of secondary education from equation (3). The dependent variable is completion of secondary education and the endogenous variable is the number of visits at a psychologist. The instrument is the dummy for the abolishment of the co-payment in Panel A and a dummy for a GP with high referral rate in Panel B. Columns (2) and (5) are estimations on only low SES individuals and in columns (3) and (6) only on high SES individuals. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

5.3 Robustness

In this section, we perform two sets of robustness checks. First, we examine if our results are sensitive to the inclusion of control variables, and second we perform a placebo test where we implement a hypothetical reform.

Control variables

To assess the sensitivity of our results to the inclusion of control variables, we estimate equation (1) and (2) and progressively add controls in a stepwise manner. Table A.3 reports the estimation results for the number of psychotherapy visits, and Table A.4 presents the results for educational outcomes. The findings indicate that the impact of the reform on psychotherapy visits remains virtually unchanged when additional controls are included. For GP referral style, the estimated effect varies slightly across specifications

but remains consistently significant. Regarding educational outcomes, the effects decrease somewhat as more controls are added, especially when controlling for primary school outcomes and pre-treatment health, yet they remain statistically significant in all cases. Taken together, these results confirm that the estimated effects are relatively robust: they are always positive and significant, although the magnitude varies modestly across specifications.

Placebo Test

To further investigate the ambiguous results for men, we conduct a placebo test in which we explore the potential effects of a hypothetical reform that could alternatively have been implemented in 2015–16. We assume hypothetically that this reform, similar to the actual reform, abolished the co-payment for individuals aged 19–21. We thus hypothesize that cohorts born 1994-97 were the treatment cohorts, while cohorts born 1987-1993 belonged to the control group. The placebo estimation results, which are presented in Table 7, indicate that the placebo reform had no impact on women, neither on psychotherapy visits nor on educational completion. We also find zero placebo "effects" for the use of psychotherapy for men. However, for men we observe significant "effects" of the placebo reform on educational completion. We believe that the placebo test findings for men are an indication of a possible shift in general educational patterns over the same time period that affected young boys and men disproportionately. A detailed examination of the educational trends for boys and men reveals that the proportion of boys completing 9th grade increased over the years prior to the placebo reform (see Appendix A.4). These changing educational trends among men (see Figure A.4) suggest that we need to interpret the results from abolishing co-payment on secondary education for men with caution.[16] Instead, we put more weight on our second identification strategy using GP's referral rates.

[16] We have also introduced a similar placebo reform in 2016-2017 (not shown), finding the same pattern.

Table 7: Placebo analysis

	Women			Men		
	Psychotherapy			Psychotherapy		
	(1)	(2)	(3)	(4)	(5)	(6)
	Indicator for Visit	N Visits	Finished Secondary Education	Indicator for Visit	N Visits	Finished Secondary Education
Placebo treatment in 2015 and 2016						
Placebo treated	0.000682	0.00559	-0.000398	0.000651	0.00240	0.00805***
	(0.000754)	(0.00529)	(0.00184)	(0.000459)	(0.00303)	(0.00192)
Baseline (40% co-payment)	0.038	0.213	0.753	0.014	0.077	0.666
No co-payment/baseline	0.018	0.026	-0.001	0.045	0.031	0.012
Number of Observations	1,172,661	1,172,661	1,172,661	1,237,123	1,237,123	1,237,123

Notes: The table shows estimates for first stage estimates in columns (1)-(2) and reduced form placebo estimation of equation (1).We introduce a placebo treatment in 2015 and 2016. Placebo treated in this panel is an indicator for being 18-20 in 2015 and 18-21 in 2016. The dependent variable in columns (1) and (4) is an indicator variable for having at least one visit to psychotherapy provided by a psychologist, in columns (2) and (5) the number of visits to psychotherapy provided by a psychologist and in columns (3) and (6) an indicator variable for having completed secondary education. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

5.4 Heterogeneity and mental health

In this subsection, we investigate whether reducing barriers to psychotherapy had a differential impact depending on the mental health history of the young people and their parents. We split the sample into four groups for young women and men, respectively. The first group contains individuals who had been diagnosed with a mental disorder before the age of 17 (denoted MHD), the second group contains individuals whose parents have been diagnosed with a mental disorder in the past (denoted Parents MHD), and the remaining sample is split in two groups depending on their predicted probability of receiving psychotherapy (denoted High prob. and Low prob.), see appendix A.5 for more details. Table 8 presents first stage results for the number of psychotherapy visits and reduced form results on secondary education for men and women separately.

For women with previous mental health diagnoses, the abolishment of co-payment increases the use of psychotherapy by 0.15 visits, twice as much as the average effect. However, for this group with serious prior mental health issues, there is no effect from the reform on the completion of education. A plausible explanation is that this group has a rather low probability of completing secondary education and also often receive treatment from psychiatrists. The group that seems to benefit most from the reform is the group of individuals with parents with mental health issues and with a high predicted probability of receiving psychotherapy. These two groups increase psychotherapy visits by 0.074 and 0.077 visits resulting in a 1.5 and 1 percentage points higher likelihood of finishing secondary education, respectively. The results from our second identification strategy, finding the effect of switching from a low referral GP to a high referral GP, show roughly the same pattern; except here, there is not much difference in the effects on education

depending on having a high or low predicted probability of receiving psychotherapy. For both identification strategies we find the largest effect on finishing secondary education on the young women whose parents have been diagnosed with a mental disorder in the past.

Table 8: Heterogeneous effects with respect to previous mental health history

	Women							
	N Psychotherapy Visits				Finished Secondary Education			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	MHD	Parents MHD	High prob.	Low prob.	MHD	Parents MHD	High prob.	Low prob.
Panel A: Copayment Reform								
No co-payment	0.151***	0.0741***	0.0768***	0.0327***	-0.00138	0.0155***	0.0105**	0.00129
	(0.0252)	(0.0106)	(0.0127)	(0.00882)	(0.00718)	(0.00327)	(0.00364)	(0.00314)
Baseline (40% co-payment)	0.310	0.217	0.225	0.128	0.485	0.757	0.826	0.829
No co-payment/baseline	0.488	0.342	0.342	0.256	-0.003	0.021	0.013	0.002
Panel B: Panel B: Variation From GP's Referral Rates								
GP High RR	0.0536***	0.0451***	0.0382***	0.0173***	0.00432	0.00517**	0.00467*	0.00485**
	(0.0131)	(0.00533)	(0.00654)	(0.00446)	(0.00396)	(0.00177)	(0.00186)	(0.00171)
Baseline (GP Low RR)	0.309	0.195	0.207	0.118	0.459	0.733	0.796	0.808
GP High RR/baseline	0.173	0.231	0.184	0.146	0.009	0.007	0.006	0.006
	Men							
	N Psychotherapy Visits				Finished Secondary Education			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	MHD	Parents MHD	High prob.	Low prob.	MHD	Parents MHD	High prob.	Low prob.
Panel C: co-payment Reform								
No co-payment	0.0329*	0.0447***	0.0188*	0.0116*	-0.00278	0.00453	-0.00293	-0.000368
	(0.0149)	(0.00627)	(0.00791)	(0.00492)	(0.00726)	(0.00341)	(0.00401)	(0.00352)
Baseline (40% co-payment)	0.115	0.083	0.083	0.046	0.327	0.662	0.761	0.733
No co-payment/baseline	0.287	0.538	0.227	0.250	-0.008	0.007	-0.004	-0.001
Panel B: Panel B: Variation From GP's Referral Rates								
GP High RR	0.0164*	0.0155***	0.0198***	0.00848***	0.00877*	0.00580**	0.00311	-0.0000484
	(0.00760)	(0.00314)	(0.00379)	(0.00250)	(0.00391)	(0.00185)	(0.00201)	(0.00191)
Baseline (GP Low RR)	0.114	0.077	0.071	0.041	0.299	0.631	0.712	0.711
GP High RR/baseline	0.144	0.200	0.279	0.208	0.029	0.009	0.004	-0.000
Observations Women	103,233	378,512	267,645	307,087	103,233	378,512	267,645	307,087
Observations Men	95,730	396,470	267,356	324,781	95,730	396,470	267,356	324,781

Notes: The table show regression estimates divided in four mutually exclusive groups depending on their mental health background. Panel A and C refers to the estimates of equation (1) and Panel B and D refers to estimates from equation (2). The dependent variable is the number of visits to psychotherapy provided by a psychologist in columns (1)-(4) and indicator variable for having completed secondary education in columns (5)-(8). No co-payment is a dummy indicating if the individual with the referral is entitled to psychotherapy visits without co-payment. GP high RR is a dummy for having a GP with a high referral rate. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Turning to the men in panels C and D in Table 8, abolishing co-payment increases psychotherapy visits across all groups, with the largest effects among those whose parents had any previous mental health conditions. This group receives, on average 0.04 more visits which, with a very low baseline, corresponds to a 54% increase. However, in line with our main results in Table 5, we see no effect of abolishing co-payment on men's probability of completing secondary education in any group.

By contrast, the results from our second identification strategy on the effect of switching from a low referral GP to a high referral GP suggest that additional psychotherapy visits improve educational outcomes for men with prior mental health conditions and for individuals with parents who have mental health problems. Specifically, men diagnosed with a mental health disorder before turning 17 are 0.88 percentage point more likely to complete secondary education when switching from a low-referral to a high-referral GP. Likewise, men whose parents have mental health disorders are 0.58 percentage points more likely to finish secondary education.

5.5 Mechanisms: intermediate mental health care outcomes

We next turn to intermediate mental health care outcomes to explore possible explanations for our results on completed education, including potential substitution between psychotherapy and other types of mental health care (see also Kruse et al. (2022)).

Table A.6 presents regression results from estimating model (1) and (2) on number of psychometric tests, GP talk therapy visits and psychiatrist visits for men and women, respectively.[17] We find that the co-payment reform implied a reduction in talk therapy provided by the GP for women (the reduction is around 6-7% of the baseline) with only minor differences between high or low SES, suggesting substitution between therapy provided by the GP and the psychologist. Furthermore, we find that being a patient of a GP with a high referral rate is associated with a higher probability of the GP having conducted a psychometric test or providing talk therapy for both men and women. These positive effects are non-surprising—GPs who are conscious about mental health issues are also likely to be more active in providing tests to diagnose possible mental health problems and/or to engage in talk therapy to tackle patients' mental health issues. We find no effect on psychiatrist visits for either of our specifications, suggesting that psychotherapy visits are not used as a substitute for seeing a psychiatrist.

To further investigate whether psychotherapy substitutes for medical treatment, we examine the impact on prescription drugs for mental illness. Table A.7 shows the effects of psychologist treatment for individual use of drugs for mental health. Column (1) shows the use of any mental health drugs while columns (2)-(5) explore in greater detail which types of mental health drugs are affected by the increase in number of psychotherapy visits. We find limited evidence of substitution between psychotherapy visits and medication. We find that neither of our treatments have an effect on the use of mental health medication for women, apart from a slight decrease in the probability of being prescribed psycho stimulants for low ses women with a GP with a high referral rate. For men, we observe an increased probability of being prescribed antianxiety following the reform by 16%, for low SES while for high SES men we observe an increase in prescription of antidepressive of around 12% while we find no effect on other types of mental health medication. Further, we find that being a patient of a GP with a high referral rate is associated with a 6%

[17] Psychometric tests are used by GPs to diagnose anxiety and depression. GP talk therapy is a type of psychotherapy that can be provided by the general practitioner themselves

higher probability of being prescribed any mental drug for low SES (mainly driven by antipsychotics). This finding suggests in line with Currie et al. (2024) that psychotherapy visits may complement prescription of mental health drugs for men especially with low SES background.

Finally, we examine whether there are potential interaction effects between the reform and GP referral style—for example, whether abolishing the co-payment reduced differences across patients who had GPs with high and low referral rates, respectively. This analysis is presented in the Appendix A.9 (see Panel C in Table A.9), where we show that including the interaction term only marginally changes the main effects of the reform and referral style. Moreover, the interaction effect itself is small and statistically insignificant. This suggests that the abolishment of the co-payment neither equalized nor amplified differences between GPs. Taken together, these findings provide indicative evidence that variation in referral style is more likely driven by differences in GPs' perceptions and attitudes towards mental health issues rather than by patients' willingness or ability to use referrals.

6 Conclusion

Our analysis demonstrates that lowering barriers to accessing psychotherapy during the critical age window of 18–21 significantly improves the likelihood of completing secondary education among Danish youth. We use two complementary identification strategies—a reform abolishing co-payment and variation in GP referral practices. The co-payment reform primarily benefits youth with mild to moderate mental health challenges, who are most likely to be enrolled in secondary education, rather than those requiring more intensive psychiatric care. For women, the abolishment of the co-payment increased completion rates by around one percent, while the effect for men was insignificant. Having a GP with a high tendency to refer patients to psychotherapy improves completion probability by about 0.6 percent for both men and women. These effects are particularly pronounced among individuals from low socioeconomic backgrounds and those with parents who have mental health issues, suggesting that the intervention reduces educational inequality and promotes social mobility. While some of the observed effects may reflect earlier completion rather than higher ultimate completion rates, the timing of treatment during this formative period remains crucial.

We have also investigated potential mechanisms through which GP referral and practice styles influence educational outcomes. Our findings suggest that GPs who more frequently refer patients to psychotherapy also tend to use psychometric tests and provide talk therapy, indicating a broader awareness of mental health issues among these practitioners. Furthermore, men with GPs who refer more often are more likely to receive prescriptions for mental health medication, pointing to a link between referral practices and pharmacological treatment. These patterns imply that the observed effects may partly reflect differences in GP engagement with mental health care, which could amplify the benefits of psychotherapy for vulnerable groups.

Even in Denmark's publicly funded universal health care system, mental health problems among Danish youth are associated with lower educational attainment. Thus only 57 percent of 25 year-olds with mental health problems have completed high school or equivalent, compared to 80 percent of those without such disorders (Dalsgaard et al., 2020). Our findings underscore that lowering the barriers for access to psychotherapy either by abolishing co-payment or increasing GP's awareness about mental health challenges are

relatively low-cost policies with substantial educational returns, especially for vulnerable groups. Making co-payment conditional on parental income could further enhance targeting. By improving access to mental health care, such policies not only support educational attainment but also contribute to improve long-term mobility.

7 Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the authors used ChatGPT and Copilot in order to correct and improve text, search for institutional details and find academic references. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article. Further the AI-tool Research Rabbit has been used to find relevant literature.

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A Appendix

A.1 Descriptive evidence

Table A.1 shows how our treatment and control group are balanced on the control variables included in our analyses. To keep the table comparable to Table 1 we divide the sample in treatment and control group based on their treatment status at age 19. Table A.2 show descriptive evidence for the outcome variables, respectively, for the treatment and control groups in our empirical strategy using GP referral style.

Table A.1: Comparison between treatment and control sample - Control variables

	Women			Men		
	Treatment (No co-payment)	Control (40% co-payment)	T-test	Treatment (No co-payment)	Control (40% co-payment)	T-test
Birth month dummies						
January	0.084	0.080	-3.76***	0.083	0.082	-1.02
February	0.076	0.078	1.67*	0.076	0.077	0.78
March	0.085	0.087	1.83*	0.085	0.087	1.32
April	0.087	0.086	-1.33	0.085	0.086	1.54
May	0.085	0.087	1.55	0.086	0.087	0.90
June	0.085	0.086	1.09	0.085	0.086	0.89
July	0.090	0.089	-1.18	0.090	0.090	-0.12
August	0.089	0.087	-1.74*	0.089	0.087	-1.69*
September	0.086	0.085	-0.83	0.087	0.084	-2.25**
October	0.081	0.081	0.30	0.082	0.081	-0.32
November	0.076	0.076	0.09	0.076	0.075	-0.22
December	0.075	0.078	2.58***	0.077	0.077	0.25
SES controls						
Danish	0.884	0.902	13.53***	0.881	0.900	14.21***
Descendent	0.039	0.043	4.91***	0.040	0.045	6.45***
Immigrant	0.078	0.056	-19.98***	0.079	0.055	-22.02***
Dad's income (100,000s)	3.242	2.724	-26.55***	3.245	2.722	-22.37***
Mom's income (100,000s)	2.707	2.400	-24.22***	2.693	2.393	-39.12***
Dad's income missing	0.047	0.048	1.31	0.045	0.047	2.06**
Mom's income missing	0.012	0.013	0.91	0.016	0.014	-3.65***
Mom on cash assistance or early retirement	0.177	0.162	-9.43***	0.177	0.162	-9.99***
Dad on cash assistance or early retirement	0.121	0.112	-6.88***	0.121	0.113	-6.54***
Mom unemployed at least half a year	0.064	0.076	11.73***	0.063	0.076	12.48***
Dad unemployed at least half a year	0.055	0.065	10.35***	0.052	0.065	13.57***
Mom and dad seperate	0.069	0.074	4.19***	0.065	0.070	5.29***
Health controls						
Seen psychologist or psychiatrist as teenager	0.030	0.029	-0.71	0.016	0.015	-3.12***
Medicin use, total DDD	547.505	541.064	-1.69*	273.564	197.153	-21.51***
Received any mental drug	0.071	0.060	-9.77***	0.080	0.056	-22.22***
No. of vistis to GP	20.704	19.201	-19.39***	11.267	9.778	-32.53***
Mom seen psychologist or psychiatrist	0.066	0.051	-14.75***	0.064	0.051	-12.79***
Dad seen psychologist or psychiatrist	0.027	0.023	-6.56***	0.027	0.023	-6.18***
School grades: Math	-0.032	-0.019	3.23***	0.023	0.010	-3.34***
School controls						
School grades: Danish	0.227	0.205	-5.83***	-0.221	-0.201	5.39***
Age when finishing 9th grade	15.618	15.569	-20.74***	15.756	15.678	-33.20***
Not finished 9th grade at age 18	0.028	0.040	15.85***	0.036	0.052	21.45***
Finished 10th grade	0.479	0.500	9.98***	0.477	0.477	0.11
Number of Observations	66.727	388.966		69.932	411.700	

Notes: Control variables are measured at age 12-16, apart from psychologist visits, psychiatrist visits and doctor visits which are measured at ages 15-16. Dummies for school years, age and municipalities, are not shown. Z-scores for school grades are calculated for entire population and not only on analysis sample.

Table A.2: Comparison between treatment and control sample - Outcome variables

	Women			Men		
	Treatment (GP High RR)	Control (GP Low RR)	T-test	Treatment (GP High RR)	Control (GP Low RR)	T-test
Panel A: First stage outcomes						
Indicator for psychotherapy visit	0.039	0.032	-19.88***	0.015	0.013	-12.85***
N psychotherapy visits	0.228	0.186	-15.76***	0.085	0.068	-10.84***
Indicator for psychotherapy visit, anxiety	0.012	0.010	-10.21***	0.005	0.004	-6.23***
N psychotherapy visits, anxiety	0.064	0.053	-7.72***	0.025	0.022	-3.80***
Indicator for psychotherapy visit, depression	0.018	0.015	-11.71***	0.007	0.006	-8.89***
N psychotherapy visits, depression	0.101	0.085	-9.14***	0.040	0.032	-7.47***
Panel B: Second stage outcomes						
Finished secondary education	0.769	0.745	-28.72***	0.668	0.646	-23.93***
Panel C: Intermediate mental health care outcomes						
N psychometric tests from GP	0.096	0.082	-15.63***	0.052	0.044	-14.22***
N talk therapy services from GP	0.101	0.091	-9.35***	0.046	0.041	-6.98***
N psychiatrist services	0.129	0.128	-0.48	0.093	0.089	-1.87*
Any mental drug (N05+N06)	0.092	0.087	-8.91***	0.068	0.064	-7.44***
Anti-psychotic (N05A)	0.023	0.022	-3.09***	0.020	0.019	-3.79***
Anti-anxiety (N05B)	0.009	0.009	-3.01***	0.005	0.005	0.25
Anti-depressive (N06A)	0.056	0.053	-8.42***	0.029	0.027	-6.51***
Psycho-stimulants (N06B)	0.018	0.017	-1.43	0.022	0.022	-2.41**
Number of Observations	551,430	505,047		540,503	543,834	

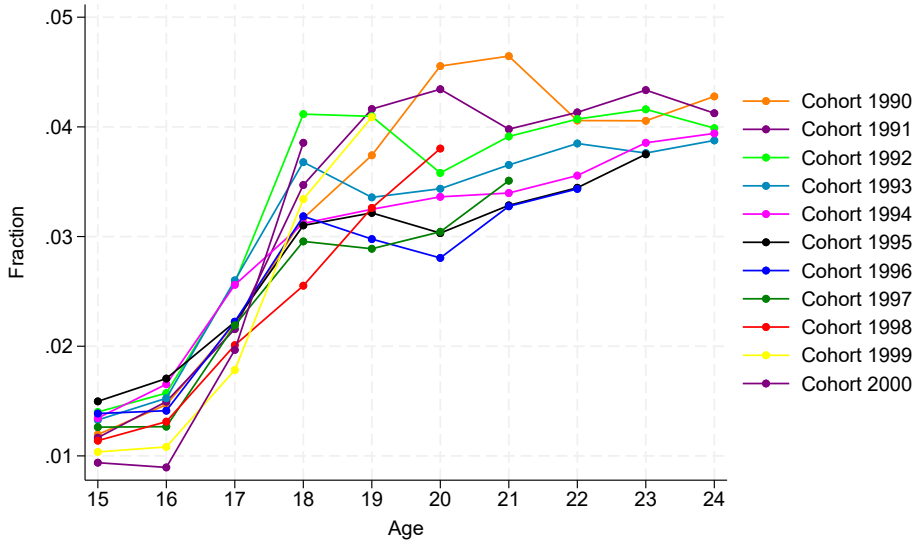
Notes: The table reports means and t-test statistics for differences in means of outcome variables by treatment status in our GP referral style empirical strategy, separately for women and men. Psychotherapy visits refer to psychotherapy provided by a psychologist.

A.2 Figures of use of psychologist and completion of secondary education

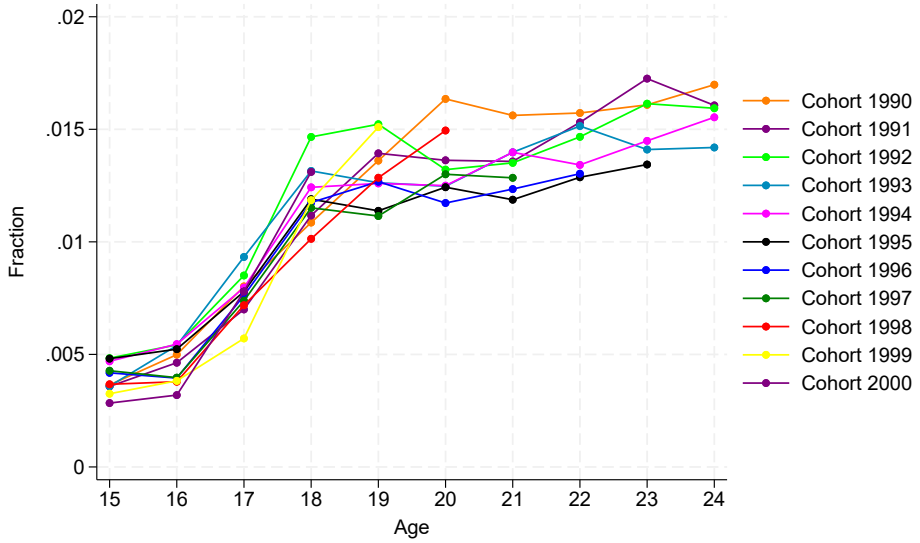
We show the use of psychotherapy provided by psychologists both in the extensive margin in Figure A.1 and on the intensive margin, conditional on having a psychotherapy visit in Figure A.2. In Figure A.3 we show completion of secondary education for each cohort born between 1990-2000 (notice that birth cohorts are defined based on school years).

Figure A.1: Fraction of cohort having at least one psychotherapy visit

(a) Girls



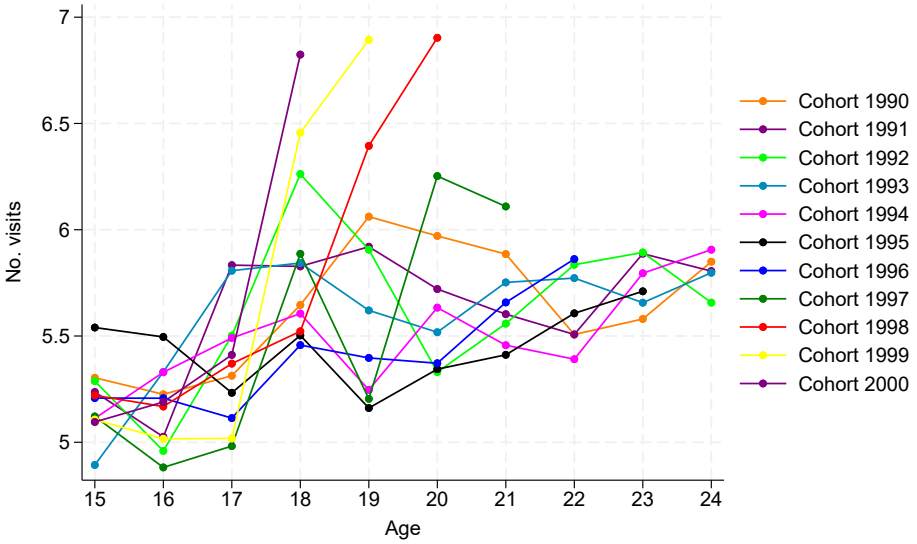
(b) Boys



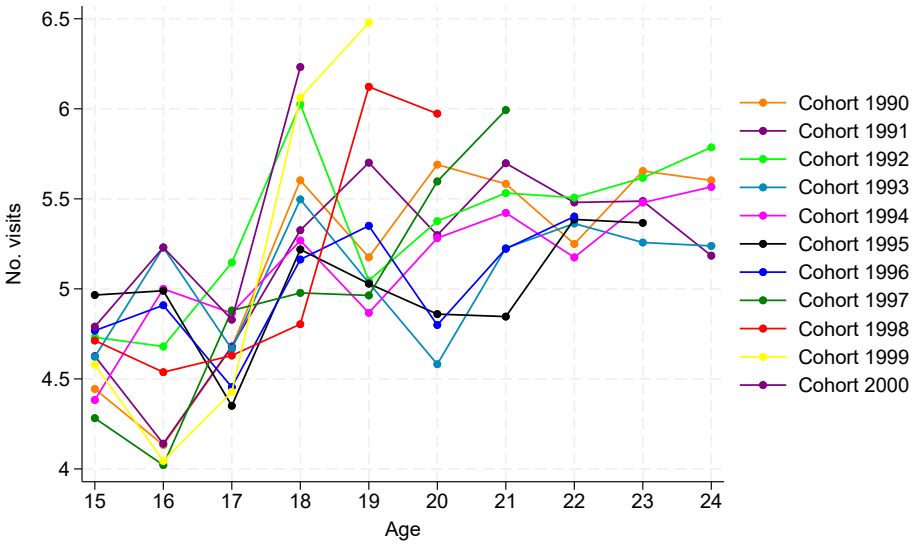
Notes: Birth cohorts are based on school years, such that the 1990 cohort consists of individuals born between July 1st 1990 and June 30th 1991.

Figure A.2: Number of psychotherapy visits conditional on visit

(a) Girls



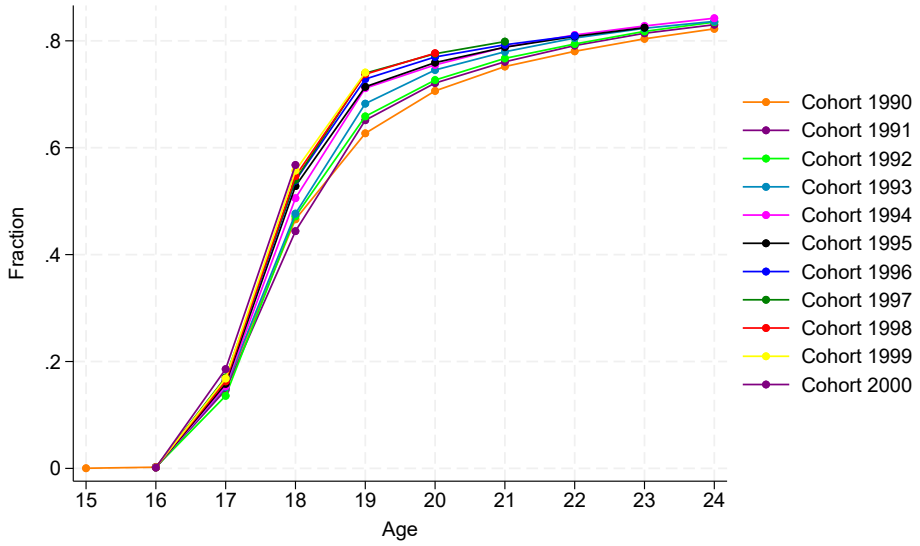
(b) Boys



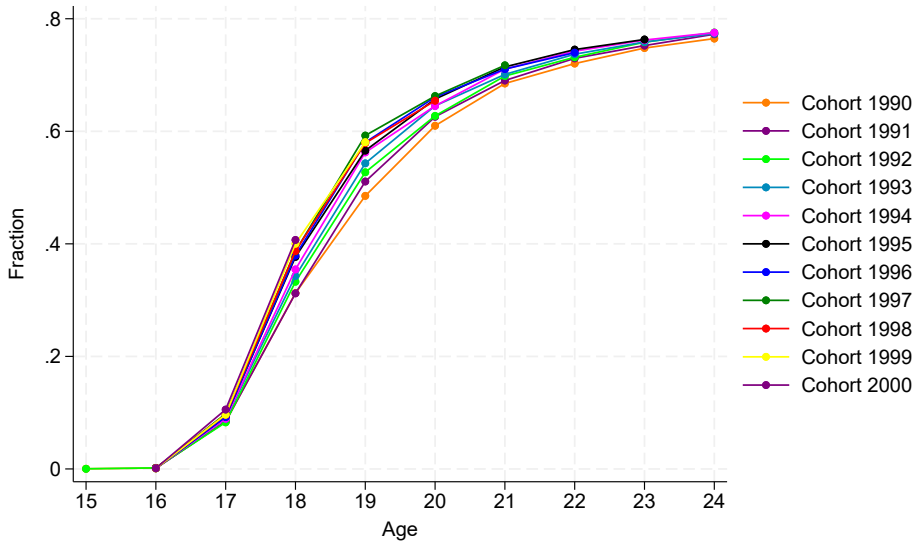
Notes: Birth cohorts are based on school years, such that the 1990 cohort consists of individuals born between July 1st 1990 and June 30th 1991.

Figure A.3: Finishing secondary education

(a) Girls



(b) Boys



Notes: Birth cohorts are based on school years, such that the 1990 cohort consists of individuals born between July 1st 1990 and June 30th 1991.

A.3 Education trends for boys and girls

Figure A.4 illustrates educational trends for women and men across birth cohorts. The figure presents the share of each cohort that does not complete 9th grade by age 18, indicating that the gender gap has gradually closed.

Figure A.4: Completion of 9th grade

Notes: The figure shows changes in educational trends across different birth cohorts in our sample. Vertical lines indicate the cohorts included in the analyses: green lines correspond to the main estimation sample and purple lines to the sample used for our placebo analysis in Table 7. See figures 1 and A.5 for further visualization of our estimation samples. Cohorts between dashed lines constitute control-group cohorts, while cohorts between solid lines constitute treatment cohorts. Birth cohorts are defined based on school years, such that the 1990 cohort consists of individuals born between July 1, 1990, and June 30, 1991. Completion of 9th grade is measured at age 17.

Figure A.5: Control and treatment group in placebo analysis

Birth Cohort	2012	2013	2014	2015	2016
1987	24	25	26	27	28
1988	23	24	25	26	27
1989	22	23	24	25	26
1990	21	22	23	24	25
1991	20	21	22	23	24
1992	19	20	21	22	23
1993	18	19	20	21	22
1994	17	18	19	20	21
1995	16	17	18	19	20
1996	15	16	17	18	19
1997	14	15	16	17	18

Notes: The figure shows our sample for our placebo analyses. The numbers indicate the age of the individuals. Coloured cells are in-sample individuals. Purple cells indicate the placebo treatment groups, while yellow cells indicate the placebo control groups used for the placebo estimates reported in Table 7. Birth cohorts are defined by school years, such that the 1990 cohort consists of individuals born between July 1, 1990, and June 30, 1991

A.4 Robustness check

We further conducted a set of robustness analyses to investigate if our estimation results depend on the chosen set of control variables and fixed effects. The robustness analyses, shown in Table A.3 and A.4, document that our estimation results are quite robust for the inclusion of control variables.

Table A.3: Robustness for psychotherapy visits

	Psychotherapy					
	(1)	(2)	(3)	(4)	(5)	(6)
	Indicator for Visit	Indicator for Visit	Indicator for Visit	N Visits	N Visits	N Visits
Panel A: Robustness for treatment effects						
No co-payment	0.00477***	0.00479***	0.00476***	0.0503***	0.0507***	0.0507***
	(0.000475)	(0.000475)	(0.000472)	(0.00348)	(0.00348)	(0.00346)
Panel B: Robustness for GP referral style						
GP High RR	0.00530***	0.00553***	0.00436***	0.0317***	0.0332***	0.0259***
	(0.000247)	(0.000250)	(0.000247)	(0.00178)	(0.00180)	(0.00178)
School Year FE	YES	YES	YES	YES	YES	YES
Age FE	YES	YES	YES	YES	YES	YES
Municipality FE	NO	YES	YES	NO	YES	YES
SES Controls	NO	NO	YES	NO	NO	YES
Health Controls	NO	NO	YES	NO	NO	YES
Parent Controls	NO	NO	YES	NO	NO	YES
School Controls	NO	NO	YES	NO	NO	YES
Number of Observations	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814

Notes: The table shows the regression estimates of psychotherapy. Panel A refers to the estimates of equation (1), Panel B refers to estimates from equation (2). The dependent variable is an indicator variable for having at least one contact with a psychologist in Column (1), (2) and (3), while the dependent variable is the number of contacts with a psychologist in Column (4), (5) and (6). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Table A.4: Robustness for effect on education

	Finished Secondary Education						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Robustness for co-payment reform							
No co-payment	0.00714***	0.00822***	0.00822***	0.00703***	0.00776***	0.00647***	0.00482***
	(0.00160)	(0.00157)	(0.00150)	(0.00153)	(0.00156)	(0.00142)	(0.00137)
Panel B: Robustness for GP referral style							
GP High RR	0.0171***	0.0126***	0.00865***	0.0136***	0.0132***	0.00290***	0.00352***
	(0.000867)	(0.000858)	(0.000822)	(0.000839)	(0.000857)	(0.000772)	(0.000745)
School Year FE	YES	YES	YES	YES	YES	YES	YES
Age FE	YES	YES	YES	YES	YES	YES	YES
Municipality FE	NO	YES	YES	YES	YES	YES	YES
SES Controls	NO	NO	YES	NO	NO	NO	YES
Health Controls	NO	NO	NO	YES	NO	NO	YES
Parent Controls	NO	NO	NO	NO	YES	NO	YES
School Controls	NO	NO	NO	NO	NO	YES	YES
Number of Observations	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814

Notes: The table shows the regression estimates of completion of education. Panel A refers to the estimates of equation (1), Panel B refers to estimates from equation (2). The dependent variable is an indicator variable for having completed secondary education. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

A.5 Heterogeneity

We split the sample according to the likelihood of mental health issues of the individuals or its parents. Separately for men and women, the population is split into four mutually exclusive categories: 1) Children with a mental health disorder. Defined as those who have had contact with a psychiatrist at ages 15–16, been in contact with a psychiatric hospital, or received any mental drugs, between ages 12–16, referred to as MHD. 2) Children who are not in group 1 but have a parent diagnosed with a mental disorder when the child is between 12-16. Defined as at least one parent having been in contact with a psychiatrist when the child was aged 15-16, or been in contact with a psychiatric hospital or received any mental drug when the child was aged 12-16, referred to as Parents MHD. Next, we split the remaining sample evenly in two groups by predicted probability of seeing a psychologist at ages 18-20 based on control variables, resulting in the following categories: 3) youth without a diagnose and where the parents do not have a diagnose (Not in group 1 or 2) who have a high predicted probability of seeing a psychologist, referred to as the high probability group and the remaining youth not in the previous categories, referred to as the low probability group.

Table A.5: Heterogeneity by mental health status and regression coefficients from linear probability model

	Women				Men				LPM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	MHD	Parents MHD	High prob.	Low prob.	MHD	Parents MHD	High prob.	Low prob.	Coef.	SE
Outcome Variables										
Indicator for psychotherapy visit	0.055	0.035	0.038	0.020	0.024	0.014	0.014	0.007		
N psychotherapy visits	0.359	0.201	0.218	0.116	0.136	0.080	0.081	0.036		
Any mental drug (N05+N06)	0.393	0.059	0.047	0.023	0.356	0.038	0.026	0.016		
Linear Probability Model (LPM)										
Predicted probability of psychotherapy	0.104	0.070	0.084	0.051	0.053	0.027	0.038	0.014		
Control Variables/Variables included in LPM										
Female	1	1	1	1	0	0	0	0	0.0310***	(0.0007)
Danish	0.945	0.844	0.995	0.842	0.936	0.849	0.996	0.843	0.0322***	(0.0013)
Descendent	0.022	0.042	0.002	0.061	0.022	0.041	0.001	0.064	0.0002	(0.0020)
Immigrant	0.033	0.114	0.003	0.097	0.043	0.110	0.003	0.094	0.0000	(.)
Dad's income (100,000s)	2.730	2.850	3.282	3.379	2.620	2.841	3.394	3.331	-0.0002**	(0.0001)
Mom's income (100,000s)	2.458	2.482	2.776	2.752	2.428	2.473	2.827	2.703	-0.0003	(0.0002)
Dad's income missing	0.056	0.037	0.043	0.056	0.060	0.034	0.043	0.054	0.0047**	(0.0015)
Mom's income missing	0.012	0.005	0.013	0.018	0.015	0.006	0.015	0.022	0.0057*	(0.0027)
Mom on cash assistance or early retirement	0.260	0.296	0.058	0.087	0.277	0.295	0.049	0.091	-0.0023*	(0.0009)
Dad on cash assistance or early retirement	0.163	0.212	0.032	0.062	0.181	0.208	0.028	0.067	-0.0030**	(0.0010)
Mom unemployed at least half a year	0.069	0.079	0.045	0.064	0.075	0.079	0.039	0.065	-0.0013	(0.0012)
Dad unemployed at least half a year	0.071	0.077	0.039	0.055	0.077	0.079	0.035	0.057	-0.0009	(0.0013)
Mom and dad seperate	0.083	0.093	0.070	0.040	0.071	0.094	0.067	0.037	0.0048***	(0.0012)
Mom seen psychologist or psychiatrist	0.129	0.117	0.045	0.001	0.123	0.120	0.047	0.001	0.0232***	(0.0013)
Dad seen psychologist or psychiatrist	0.050	0.058	0.013	0.001	0.049	0.057	0.013	0.000	0.0208***	(0.0019)
Seen psychologist or psychiatrist as teenager	0.165	0.023	0.029	0.000	0.124	0.009	0.009	0.000	0.0719***	(0.0020)
Medicin use, total DDD	1596	465	588	248	1529	137	173	85	-0.0000	(0.0000)
Received any mental drug	0.658	0.000	0.000	0.000	0.810	0.000	0.000	0.000	0.0088***	(0.0014)
No. of vistis to GP	36.284	20.943	28.435	9.278	19.335	11.399	15.561	5.595	0.0011***	(0.0000)
School grades: Math	-0.307	-0.177	-0.040	0.184	-0.296	-0.063	0.091	0.204	-0.0057***	(0.0004)
School grades: Danish	0.038	0.135	0.401	0.246	-0.403	-0.276	0.054	-0.298	0.0074***	(0.0004)
Not finished 9th grade at age 18	0.065	0.021	0.011	0.036	0.100	0.028	0.012	0.040	0.0054	(0.0086)
Age when finishing 9th grade	15.673	15.632	15.571	15.613	15.876	15.766	15.721	15.722	0.0007	(0.0005)
Finished 10th grade	0.541	0.496	0.546	0.436	0.556	0.481	0.548	0.431	0.0040***	(0.0006)
Observations	15970	51783	36140	46708	15035	55255	37530	49013	560364	

Notes: Three first variables are outcome variables measured at age 19. Predicted probability of psychotherapy is the predicted probability from an LPM estimation of receiving psychotherapy at age 18-20 based on background characteristics. The control variables are measured at ages 12-16.

A.6 Intermediate mental health outcomes

Table A.6: Effect on use of psychometric test, GP talk therapy and psychiatrist

	Women					
	Low SES			High SES		
	(1) N Psychometric tests	(2) N GP Talk Therapy Visits	(3) N Psychiatrist Visits	(4) N Psychometric tests	(5) N GP Talk Therapy Visits	(6) N Psychiatrist Visits
Panel A: Co-payment Reform						
No co-payment	-0.00230	-0.00654*	-0.00522	0.0000507	-0.00614*	0.00549
	(0.00286)	(0.00329)	(0.00817)	(0.00244)	(0.00295)	(0.00780)
Baseline (40% co-payment)	0.100	0.110	0.134	0.079	0.090	0.114
No co-payment/baseline	-0.023	-0.060	-0.039	0.001	-0.068	0.048
Panel B: Panel B: Variation From GP's Referral Rates						
GP High RR	0.0118***	0.00578***	-0.000904	0.00650***	0.00733***	0.00144
	(0.00142)	(0.00173)	(0.00420)	(0.00126)	(0.00154)	(0.00415)
Baseline (GP Low RR)	0.092	0.102	0.137	0.073	0.080	0.118
GP High RR/baseline	0.129	0.057	-0.007	0.090	0.091	0.012
	Men					
	Low SES			High SES		
	(1) N Psychometric tests	(2) N GP Talk Therapy Visits	(3) N Psychiatrist Visits	(4) N Psychometric tests	(5) N GP Talk Therapy Visits	(6) N Psychiatrist Visits
Panel C: Co-payment Reform						
No co-payment	-0.00211	-0.00207	-0.00404	-0.0000336	-0.000933	0.00665
	(0.00203)	(0.00215)	(0.00643)	(0.00179)	(0.00191)	(0.00617)
Baseline (40% co-payment)	0.054	0.050	0.096	0.043	0.041	0.081
No co-payment/baseline	-0.039	-0.042	-0.042	-0.001	-0.023	0.082
Panel B: Panel B: Variation From GP's Referral Rates						
GP High RR	0.00892***	0.00469***	0.00282	0.00534***	0.00335***	0.000978
	(0.000998)	(0.00110)	(0.00331)	(0.000857)	(0.000998)	(0.00319)
Baseline (GP Low RR)	0.049	0.046	0.094	0.038	0.037	0.085
GP High RR/baseline	0.183	0.103	0.030	0.139	0.091	0.012
Observations Women	522,906	522,906	522,906	533,571	533,571	533,571
Observations Men	538,610	538,610	538,610	545,727	545,727	545,727

Notes: The table shows the regression estimates for receiving a psychometric tests, talk therapy at a GP and psychiatrist treatment. Panel A and C refers to the estimates of equation (1) and Panel B adn D refers to estimates from equation (2). The dependent variable is in column (1) the number of psychometric tests at the GP, in column (2) the number of times received talk therapy with the GP, column (3) the number of contacts with a psychiatrist. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

A.7 Prescription of mental health drugs

Tables A.7 reports the effects of psychologist treatment on use of mental health medications for women and men. Column (1) presents the effect of abolishing co-payment and having a high-referral GP on the probability of receiving any medication for mental illness. Columns (2)–(5) examine the effects on medication use across different categories of mental health drugs.

Table A.7: Effect on use of medication for mental illness

	Women									
	Low SES					High SES				
	(1) Any mental drugs	(2) Anti-psychotic	(3) Anti-anxiety	(4) Anti-depressive	(5) Psycho-stimulants	(6) Any mental drugs	(7) Anti-psychotic	(8) Anti-anxiety	(9) Anti-depressive	(10) Psycho-stimulants
Panel A: Co-payment Reform										
No co-payment	0.00109	0.00198	0.000563	0.000575	0.000572	0.00165	0.000437	0.000655	0.00125	-0.000508
	(0.00193)	(0.00111)	(0.000600)	(0.00158)	(0.000993)	(0.00169)	(0.000827)	(0.000535)	(0.00144)	(0.000811)
Baseline (40% co-payment)	0.104	0.029	0.010	0.062	0.020	0.077	0.016	0.008	0.050	0.013
No co-payment/baseline	0.011	0.069	0.055	0.009	0.028	0.021	0.028	0.080	0.025	-0.039
Panel B: Variation From GP's Referral Rates										
GP High RR	0.00148	0.000827	0.0000435	0.00115	-0.00121*	0.00106	0.000524	0.000118	-0.0000183	0.000383
	(0.00103)	(0.000594)	(0.000319)	(0.000847)	(0.000530)	(0.000920)	(0.000449)	(0.000290)	(0.000786)	(0.000436)
Baseline (GP Low RR)	0.100	0.028	0.010	0.058	0.021	0.073	0.015	0.007	0.047	0.013
GP High RR/baseline	0.015	0.029	0.004	0.020	-0.057	0.014	0.035	0.016	-0.000	0.029
	Men									
	Low SES					High SES				
	(1) Any mental drugs	(2) Anti-psychotic	(3) Anti-anxiety	(4) Anti-depressive	(5) Psycho-stimulants	(6) Any mental drugs	(7) Anti-psychotic	(8) Anti-anxiety	(9) Anti-depressive	(10) Psycho-stimulants
Panel C: Co-payment Reform										
No co-payment	0.000512	-0.000882	0.00109*	0.00126	-0.000205	0.00234	-0.0000831	0.000121	0.00287**	0.000143
	(0.00168)	(0.00106)	(0.000500)	(0.00115)	(0.00104)	(0.00141)	(0.000744)	(0.000397)	(0.00102)	(0.000869)
Baseline (40% co-payment)	0.080	0.027	0.007	0.033	0.026	0.053	0.013	0.004	0.025	0.017
No co-payment/baseline	0.006	-0.033	0.165	0.039	-0.008	0.044	-0.006	0.027	0.116	0.009
Panel D: Variation From GP's Referral Rates										
GP High RR	0.00447***	0.00203***	-0.000205	0.00158*	0.00151**	0.00180*	0.000392	-0.0000906	0.000823	0.0000723
	(0.000908)	(0.000560)	(0.000260)	(0.000619)	(0.000576)	(0.000754)	(0.000396)	(0.000209)	(0.000549)	(0.000469)
Baseline (GP Low RR)	0.076	0.025	0.006	0.030	0.026	0.052	0.013	0.004	0.023	0.018
GP High RR/baseline	0.059	0.081	-0.032	0.053	0.059	0.035	0.031	-0.021	0.035	0.004
Observations Women	522,829	522,829	522,829	522,829	522,829	533,648	533,648	533,648	533,648	533,648
Observations Men	538,493	538,493	538,493	538,493	538,493	545,844	545,844	545,844	545,844	545,844

Notes: Panel A and C refers to the estimates of equation (1) and Panel B and D refers to estimates from equation (2). The dependent variables are indicator variable for receiving the type of mental drug, see Table A.8. Treated is a dummy indicating if the individual with the referral is entitled to psychologist visits without co-payment. GP high RR is a dummy for having a GP with a high referral rate. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

A.8 Health Outcomes - Sources and Definitions

Table A.8 shows definitions of medicine outcomes. The medicine groups are defined based on ATC codes defined by the World Health organization. Descriptions of the specific ATC codes can be found on medstat.dk.

Table A.8: Health outcomes definitions

Code	**Description**
ATC codes for medicine classification	
N05 & N06	Any mental drug
N05A	Anti-psychotic
N05B	Anti-anxiety
N06A	Anti-depressive
N06B	Psychostimulants

A.9 Interaction effect between GP referral style and abolishing co-payment

Finally to investigate if abolishing co-payment is having a differential effect depending on the referral style of the GP. We do this by introducing a model with an interaction effect between the treatment dummy and the dummy for having a GP with high tendency for referral:

$$Y_{it} = \beta_0 + \beta_1 T_{it} + \beta_2 R_{it} + \beta_3 T_{it} \cdot R_{it} + X_{it}\Gamma + \gamma_t + \epsilon_{it} \tag{A.1}$$

In this model, the parameter β_3 measures the differential impact.

Table A.9: Heterogeneity for use of psychologist treatment

	Psychologist, all		Psychologist, anxiety		Psychologist, depression	
	(1)	(2)	(3)	(4)	(5)	(6)
	Indicator for Visit	N Visits	Indicator for Visit	N Visits	Indicator for Visit	N Visits
Panel A: Panel A: Co-payment Reform						
No co-payment	0.00476***	0.0507***	0.00270***	0.0206***	0.00384***	0.0348***
	(0.000472)	(0.00346)	(0.000267)	(0.00164)	(0.000327)	(0.00230)
Baseline (40% co-payment)	0.025	0.137	0.008	0.042	0.010	0.056
No co-payment/Baseline	0.193	0.370	0.341	0.496	0.368	0.624
Panel B: Panel B: Variation From GP's Referral Rates						
GP High RR	0.00436***	0.0259***	0.00121***	0.00541***	0.00193***	0.0111***
	(0.000247)	(0.00178)	(0.000143)	(0.000898)	(0.000165)	(0.00112)
Baseline (GP Low RR)	0.022	0.125	0.007	0.037	0.010	0.058
GP High RR/baseline	0.199	0.207	0.173	0.147	0.189	0.194
Number of Observations	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814
Panel C: Treatment + Referral Rate Interaction Effect						
No co-payment	0.00519***	0.0512***	0.00280***	0.0213***	0.00365***	0.0321***
	(0.000536)	(0.00402)	(0.000305)	(0.00189)	(0.000381)	(0.00272)
GP High RR	0.00455***	0.0260***	0.00124***	0.00560***	0.00185***	0.00992***
	(0.000276)	(0.00194)	(0.000160)	(0.00101)	(0.000177)	(0.00115)
Treated X GP High RR	-0.00113	-0.00270	-0.000278	-0.00170	0.000272	0.00474
	(0.000585)	(0.00460)	(0.000337)	(0.00206)	(0.000438)	(0.00333)
Number of Observations	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814	2,140,814

Notes: The table shows the regression estimates of psychologist treatment. Panel A refers to the estimates of equation (1), Panel B refers to estimates from equation (2) and Panel C refers to the estimates from equation (A.1). The dependent variable is the number of contacts with a psychologist. We control for school year fixed effects, age dummies, municipality dummies (municipality fixed effects), SES controls, health controls (pre-treatment), and parent controls. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.