(Not) talking through our mental problems

The impact of talk therapy on healthcare utilization and labour market outcomes

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Abstract

Mental health disorders account for one in six years lived in disability worldwide, translating into a substantial economic burden to the world economy. Cognitive behavioral (talk) therapy is often the first line of treatment for these mental health disorders. Using administrative data and exploiting a policy reform in the Netherlands that introduced an easily accessible form of talk therapy in general practitioners' offices, I examine the causal impact of this form of therapy on healthcare utilization and labour market outcomes. Although the reform significantly increased treatment uptake, there are no improvements in a wide range of patient labour market outcomes.

Keywords: Mental health treatment, Talk therapy, Labour supply, Disability Insurance

JEL: J08, I1, J22

*Affiliation: Lancaster University. Contact: r.prudon@lancaster.ac.uk. I am grateful for useful comments of participants at ... . I gratefully acknowledge the financial support from NWO for this research project. The results in this paper are based on non-public microdata from Statistics Netherlands (CBS) and Nivel. In principle, these microdata are accessible for statistical and scientific research. For further information: microdata@cbs.nl. This study has been approved according to the governance code of Nivel Primary Care Database, under number NZR-00324.04. The use of electronic health records for research purposes is allowed under certain conditions. When these conditions are fulfilled, neither obtaining informed consent from patients nor approval by a medical ethics committee is obligatory for this type of observational studies containing no directly identifiable data (art. 24 GDPR Implementation Act jo art. 9.2 sub j GDPR).

1 Introduction

The burden of mental health diseases on society has been rising over the last decades. Recent estimates show that approximately one in eight people worldwide live with a mental disorder (WHO, 2022). Given the significant impact mental health disorders can have on individuals' labour market outcomes, this substantial health burden also translates into substantial economic losses due to mental health diseases. In 2010, the economic burden of mental health on the world economy was estimated at 2.5 trillion, approximately 5% of the world GDP. This economic burden is predicted to grow to 6 trillion by 2030 (Lancet, 2020).

Given this large impact of mental health disorders, adequate treatment of these disorders could potentially lead to significant gains for society. The medical literature has largely established the effectiveness of treatments in reducing the health burden of mental disorders (Hofmann et al., 2012). However, a large share of individuals suffering from mental health disorders remain untreated, and at the same time, little is known about the impact of mental health treatment on labour market outcomes of patients (NIMH, 2024).

Two important exceptions are studies by Biasi et al. (2021) and Shapiro (2022), showing the causal impact of the availability of lithium as a treatment for bipolar disease and antidepressants. Both of these studies find sizeable impacts of the availability of treatment on employment, earnings and sickness days. While informative on the economic gains of mental health treatment, both studies concern the pharmaceutical treatment of mental health disorders. However, for most mental health disorders, pharmaceuticals are only used as a second line of treatment, while cognitive behavioural therapy (more commonly referred to as talk therapy) is used as the first line of treatment. Little is known about the economic impacts of this first line of treatment due to the fact that, unlike pharmaceuticals, exogenous variation in the availability of talk therapy is scarce.

In ongoing work, I examine the impact of waiting times for specialized mental healthcare in the Netherlands on the labour market outcomes of patients (Prudon, 2023). Specialized mental healthcare often incorporates talk therapy in combination with pharma-

ceuticals and the treated patients tend to suffer from relatively severe mental health problems. Disentangling the impact of talk therapy from the impact of pharmaceutical utilization is therefore not possible in the setting of specialized mental healthcare in the Netherlands.

This paper aims to fill this gap by examining a reform in the Netherlands that introduced an easily accessible form of talk therapy at general practitioner (GP) offices. Using administrative data on healthcare utilization and employment outcomes, I first examine how the introduction affected the actual take-up of this newly introduced form of treatment and of already existing treatment options. As a second step, I estimate the causal impact of talk therapy on a wide range of labour market outcomes.

Both treatment uptake and the type of treatment people receive are likely to be endogenous. Standard estimation approaches, such as Ordinary Least Squares, would then give biased estimates. To circumvent the endogeneity of treatment (type) receipt, I exploit the expansion of funding availability of this specific type of treatment to estimate its causal impact.

As individuals can only receive this type of treatment if their GP offers it, I compare individuals who contact their GP right after their GP expands the availability of this type of treatment to those who contact their GP right after. While the introduction and expansion of this type of talk therapy at the practice level might be endogenous, I argue and provide evidence to show that the difference in timing between the expansion of the talk therapy and the moment individuals registered at the practice seek care, is random.

Using a (difference-in-)Regression Discontinuity (RD) strategy, I find that patients contacting their GP for mental health-related issues are 8.5 percentage points more likely to receive talk therapy at the GP office after the expansion of the service. There is no significant impact on the receipt of alternative (already-existing) mental healthcare treatment options. Talk therapy at GP offices thus acts as a complement to the already existing treatment options, as patients receiving talk therapy would not have received an alternative type of treatment in the absence of the talk therapy option.

Additionally, heterogeneity in the uptake based on background characteristics such as

migration background and gender is limited. Groups with relatively high and relatively low utilization of already existing mental healthcare treatment options are equally likely to take-up talk therapy at GP offices. While not sufficient to close the absolute gap in treatment uptake, the availability of talk therapy at GP offices does reduce the relative gap in the uptake of treatment for mental health problems.

Despite this substantial uptake of talk therapy at GP offices, I find no significant impacts on a wide range of labour market outcomes of patients. After the expansion of the talk therapy option, patients seeking care are not more likely to be employed, do not have higher labour earnings and are not less likely to receive various types of social benefits. This holds both in the short and long run, as labour market outcomes are unaffected up to 8 years after treatment has commenced.

One potential explanation for the lack of labour market improvements is that the mental health problems of patients being treated at GP offices are arguably less severe than those being treated at the already existing mental healthcare facilities. It is however unlikely that this fully explains null results for labour market outcomes as the patients receiving talk therapy at GP offices do experience a deterioration of their employment status around the moment they seek treatment. Specifically, patients who will receive talk therapy at the GP office experience a drop in the probability of employment of five percentage points around the moment they contact their GP. This is similar to the drop in employment for patients who will be treated at basic mental healthcare facilities, and half of the drop experienced by patients who will be treated at specialized mental healthcare facilities. While these drops should not be interpreted as the causal impact of mental health problems, they are indicative of the severity of the problems and do point to the potential of labour market gains through treatment.

A second potential reason for the lack of labour market impacts could be the intensity of treatment. While the expansion of the talk therapy option does increase its take-up by approximately 8.5 percentage points, individuals only receive approximately five sessions of 30 minutes on average in the first year of treatment. As a point of comparison, individuals receiving specialized mental healthcare treatment receive approximately eight

times as many sessions. Talk therapy at a higher intensity might thus be necessary in order to achieve improvements in labour market outcomes.

The findings of this study are most closely related to the literature on the causal impact of mental health treatment on employment outcomes. In contrast to this paper, the three main papers in this literature have however found significant improvements in labour market outcomes. Biasi et al. (2021) finds that lithium reduces the negative earnings penalty of bipolar disease by one-third, or approximately 10 percentage points. Similarly, Prudon (2023) finds that if individuals have to wait one additional month before treatment commences, their employment rate drops by two percentage points. Lastly, Shapiro (2022) finds that a 10% increase in advertising for antidepressants leads to a 0.3% increase in prescriptions. Assuming all labour supply impacts run through prescriptions, using antidepressants would reduce the number of missed days at work by almost 4 days per month. The measure most closely related to missed days at work available in Dutch administrative data is take-up of (short-term) sickness benefits. In line with the null results on employment and earnings, talk therapy does not significantly impact the take-up of sickness benefits either. The results in this paper highlight that given the broadness of mental health disorders and the variability in treatment options available, the effectiveness of treatment (in terms of labour market improvements) is not a guarantee.

The results contribute more broadly to research on the impact of mental health problems on employment. This literature highlights that mental health issues significantly reduce employment outcomes. Early studies, using cross-sectional data with instruments related to early-life events such as parental psychological problems, religiosity, social support, and past mental health, estimated a 10 to 30 percentage point decline in employment (Ettner et al., 1997; Chatterji et al., 2011; Hamilton et al., 1997; Ojeda et al., 2010; Chatterji et al., 2007; Alexandre & French, 2001; Marcotte et al., 2000). However, these instruments risk bias as early-life events may also affect traits like motivation. Addressing this, Frijters et al. (2014) used panel data with the death of a friend as an instrument, showing that a one standard deviation decline in mental health reduces em-

ployment probability by 30 percentage points, despite the instrument's modest impact on mental health (0.04 standard deviation).

Lastly, this paper contributes to a strand of literature examining differences in mental health treatment uptake. Studies in the U.S. have identified significant disparities in treatment uptake, with minority groups being up to 80% less likely to seek mental healthcare. Language barriers, such as limited English proficiency, are a primary factor driving this reduced access (Sentell et al., 2007; Cook et al., 2017). This study shows that similar disparities exist in the Netherlands. Simultaneously, the take-up of talk therapy at GP offices is comparable across different subgroups of the population and therefore potentially reduces some of the existing gaps in treatment uptake.

In the remainder of this paper, the Dutch institutional setup of mental healthcare broadly and the setup of the talk therapy reform specifically are discussed in Section 2. Section 3 presents the data used and descriptive statistics for the sample of interest. The main empirical results are presented in Section 4 and finally Section 5 concludes.

2 Mental healthcare in the Netherlands

2.1 Prior to the reform

In the Netherlands, the General Practitioner (GP) is the gatekeeper to the healthcare system. In almost all cases, individuals must first see a GP to be referred to specialized care. Unless there is an urgent situation, individuals can only go to the GP office at which they are registered, and this GP office must be located close to where they live.

All costs related to care provided by GP offices is covered by mandatory basic health insurance without any co-payments or deductibles. If GPs refer patients to specialized care, co-payments might be required. Additionally, there is an annual deductible of €385 for all specialized care.[1] Given the extensive coverage of basic health insurance and its mandatory nature, private provision of care in the Netherlands is limited.

If an individual faces health issues, they must contact their GP in order to receive

[1]The annual deductible has increased over time, and individuals can opt for a higher deductible of up to €885 in exchange for a reduction in their health insurance premium.

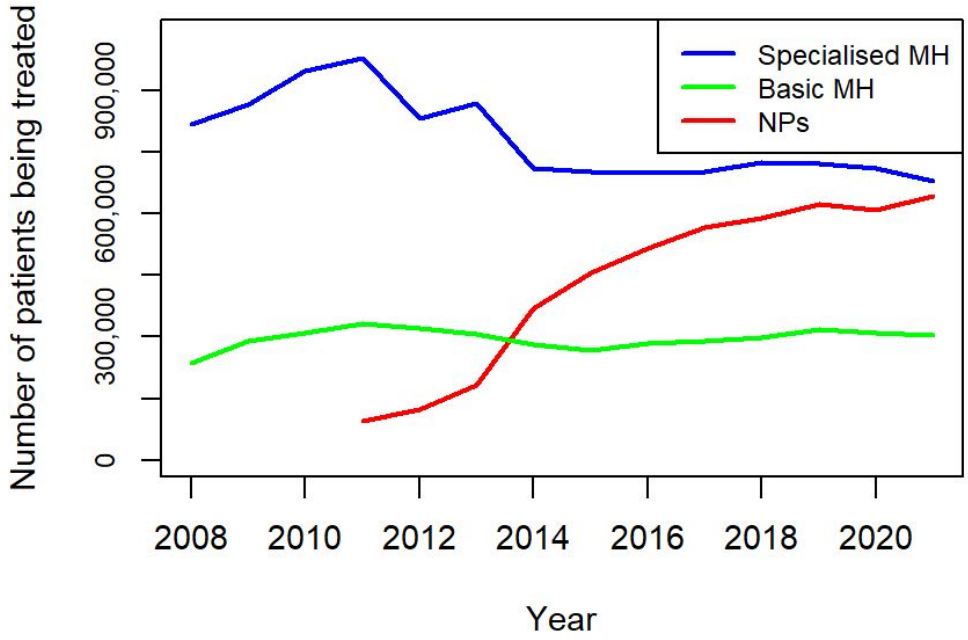
a referral for further care. In the case of mental health problems, GPs make a first assessment of the severity of the mental health problems after which they have various treatment options to refer to. If a GP deems the mental health problems very limited, they can decide not to refer to any treatment and potentially ask their patients to return after a certain period of time to check on the mental health problems. If the mental health problems are more severe, GPs can refer patients to either basic mental healthcare or specialized mental healthcare. Basic mental healthcare is focused on "singular" mental health disorders, while specialized mental healthcare is aimed at more complex cases. Alongside these various referral options, GPs can decide to prescribe pharmaceuticals. Their medical guidelines do however state that they should do so "with caution".

2.2 After the reform

In order to alleviate pressure from the basic and specialized mental healthcare systems and to increase the uptake of treatment for mental health in general, the Dutch government decided to expand the treatment options available to patients from 2011 onwards. Since 2011, GP offices can decide to hire nurse practioners (NPs) specialized in mental healthcare. These NPs are most often not medical doctors but they are required to have a 4-year nursing degree (or equivalent) and at least 2 years of mental health-related work experience. If individuals meet these requirements, they can follow a one-year program, which includes an internship at a GP office for at least 1 day per week, to receive their mental healthcare NP accreditation. Given that these NPs are not medical doctors, they are not allowed to prescribe pharmaceuticals. They do however provide various forms of cognitive behavioral therapy/talk therapy. In consultation with the NP, GPs can decide to prescribe pharmaceuticals to patients being treated by the NP.

This form of talk therapy at GP offices was first covered by basic health insurance in the Netherlands in 2011. At that moment, GP offices could receive funding for 9 hours per week for every 2350 patients registered at the office. Since the initial introduction in 2012, funding available has steadily increased over the years to 16 hours per week for every 2350 patients in 2024. As the amount of funding available has increased, the

Figure 1: Number of patients being treated per year for each type of mental healthcare treatment



number of GP offices that offer this type of treatment has also increased.

To illustrate the gradual expansion of NP treatment, Figure 1 shows the number of patients being treated each year in basic mental healthcare, specialised mental health and by NPs at GP offices. As can be seen from the figure, the number of patients in both basic and specialised mental healthcare has been fairly stable at 300,000 and 700,000 respectively. At the same time, the number of patients being seen by NPS has grown substantially from 95,000 in 2011 to over 600,000 in 2021.

Over the period 2008 till 2021, the total amount of patients being treated for mental health problems has substantially increased from approximately one million to over 1.6 million. This stark increase is almost fully driven by treatment provided by NPs which could indicate that treatment by NPs acts as a complement and not a substitute to these already existing treatment options. This would partly contradict the initial aim of the NP treatment option as a way of reducing pressure on the basic and specialised mental healthcare system. Section 4.1 will examine this question of complementarity or substitutionality to already existing care options in more detail.

3 Data

To assess the impact of talk therapy provided at GP offices, several administrative data sources from various providers are merged to obtain individual level information on healthcare utilization, labour market outcomes and background characteristics. Linkage of all datasets was done using anonymized citizen service numbers. The next subsections first discuss the various datasets, after which descriptive statistics are shown in Subsection 3.4

3.1 Data on healthcare provided at GP offices

Detailed data on healthcare provided at GP offices is unfortunately not available in the standard administrative datasets of the Netherlands. I therefore use data provided by Nivel, which is an association of GP offices in the Netherlands. There are currently approximately 500 GP offices affiliated with Nivel, covering 10% of the entire Dutch population. While not a random sample, the population served by Nivel affiliated GP offices is representative of the Dutch population in terms of a wide range of background characteristics.

Nivel has provided data on all mental-health related GP consultations between 2011 and 2021. For these consultations, I observe patient and GP office identifiers, the exact date and the reason for the consultation. Additionally, Nivel has provided the same data for all consultations done by NPs. This makes it possible to construct time series for treatment by NPs both at the individual level and the practice level.

It is important to note that GP offices can (and in some cases do) start their affiliation with Nivel after the start of the observation window (2011) or terminate their affiliation with Nivel. Additionally, patients can move GPs when they relocate to a different municipality. In both of these cases, once a patient is registered at a GP office data on healthcare provided at the GP office is missing. All remaining administrative data discussed below is however still available and linkable for these patients.

3.2 Data on (mental) healthcare

The data on healthcare provided at GP offices is complemented with a datset provided by Statistics Netherlands showing annual healthcare expenditures covered by basic health insurance from 2009 to 2020. These expenditures are categorized into subcategories, enabling a distinction between expenditures at GP offices (combines both GP and NP care), expenditures for basic mental healthcare, specialised mental healthcare, pharmaceuticals and non-mental healthcare spending.[2] This data source is used to create annual time series on the utilization of the various types of healthcare.

While covering all types of healthcare, the main downside with the data on expenditures is its annual nature and limited level of detail. For specialised mental healthcare, I therefore use an additional dataset obtained through the health insurance system which contains information on a more granular level. More specifically, this data source contains information on all treatment-related events in specialized mental healthcare that took place between 2011 and 2021. Mental healthcare treatment is defined as any in-person or virtual interaction with a mental healthcare provider. For each event, the dataset includes details such as the exact event date, event type (e.g., initial contact, intake, treatment, administrative), the duration of patient contact in minutes, the mental health diagnosis, the category of treatment provider (psychologist, psychiatrist, psychotherapist, or other), and anonymized identifiers for both the patient and the provider.

Lastly, the healthcare data is supplemented with detailed information on the use of pharmaceuticals for mental health-related diagnoses. This dataset includes all individual prescriptions covered by basic health insurance for a selection of ATC-4 code medications, along with the dates the prescriptions were filled. The data covers seven drug categories: (1) antidepressants, (2) antipsychotics, (3) anxiolytics, (4) hypnotics, (5) psychostimulants, (6) medications for addictive disorders, and (7) opioids.[3] Prescriptions are included in the dataset if issued by a general practitioner (GP) or a mental healthcare provider. Combining these four different datasets yields individual-level monthly time series on all available treatment options for mental healthcare in the Netherlands for a sample of

[2]Refer to Online Appendix Section **??** for the classification of healthcare spending categories.
[3]The corresponding ATC-4 codes are N02A, N05A, N05B, N05C, N06A, N06B, and N07B.

individuals who contact their GP for a mental health-related reason.[4]

In order to not only have measures of healthcare utilization, but also of healthcare needs, a large survey is merged to the administrative datasets. This survey, the Health Monitor (Gezondheidsmonitor), is administered by Statistics Netherlands every four years starting in 2012 and covers a representative sample of approximately 400.000 respondents (2% of the full Dutch population). The survey contains a wide range of health and healthcare questions. Most important for this paper, it contains questions about self-reported mental well-being and measures that summarize the risk of the most frequent mental health disorders such as anxiety and depression.[5] Combining information on healthcare utilization and the survey measures on healthcare needs yields a proxy for the gap in treatment uptake for various groups of the population. This will be used in heterogeneity analysis to determine whether the reform has partly closed, or widened the treatment gap between different groups.

3.3 Data on labour market outcomes and other characteristics

The healthcare data is finally merged with the data on labour market outcomes. The labour market outcomes in the sample include monthly metrics for employment, labour earnings, working hours, and the receipt of unemployment benefits, sickness/disability benefits, and social assistance. The labour market panel covers the period from 2006 to 2023, with data on monthly labour earnings and working hours available starting in 2009. For most analyses, time series are aligned relative to the initial contact with a GP. Individuals are tracked from eight years before the initial contact with a GP to ten years after, resulting in an unbalanced panel.

The panel data on health and labor market outcomes is supplemented with administrative records from Statistics Netherlands, which include information on date of birth, gender, migration background, educational attainment, and municipality of residence.

[4]The only exception to this is the use of basic mental healthcare, for which only annual time series are available.

[5]The survey contains both the underlying questions to compute these risk measures, and the risk measures themselves.

3.4 Descriptive statistics

The Nivel sample is comprised of 925,654 individuals who first contacted their GP for a mental health-related reason between 2012 and 2021. 153,286 of these individuals received treatment by an NP at the GP office within the first after contacting their GP. Note that individuals first contacting their GP in 2011 are excluded, as for these individuals, it cannot be determined whether they already contacted their GP/received care from their GP for a mental health-related reason in the year prior. Descriptive statistics for the sample contacting their GP and the subsample receiving care from an NP are shown in columns (2) and (3) of Table 1. As a point of comparison, column (1) shows descriptive statistics for the full Dutch population.

The descriptive statistics show several interesting differences and similarities between the three samples. First of all, individuals seeking care for mental health-related reasons tend to be younger on average, which is in line with the fact that the onset of many mental health problems is at a relatively young age. Additionally, females are significantly more likely to seek from their GP, and receive treatment from an NP. For educational education, a slightly different pattern emerges as high education individuals are less likely to contact their GP, but more likely to receive treatment from an NP. Contrary to what is often found in other countries, migration background does not seem to correlate with health-seeking behavior.

In terms of healthcare utilization in the year prior to contacting a GP, the sample first contacting their GP has higher utilization rates across all measures compared to the general population (whose healthcare utilization is measured in 2012). The subsample being treated by an NP tends to have slightly lower utilization, which could indicate that treatment by NPs is more common among individuals with less severe health issues.

The survey measures on self-reported health largely align with healthcare utilization rates as the sample contacting their GP is at a higher risk of having psychological disorders, anxiety and depression or loneliness. It should be noted that the survey outcomes were all measured in 2012. For the majority of the sample contacting their GP, this implies that the survey outcomes are measured years before the moment they seek care.

Table 1: Descriptive statistics of the general Dutch population, the sample contacting their GP for the first time, and the sample receiving treatment from an NP

	General population[a]	Sample first contacting GP[b]	Sample treated by NP[c]
Demographics[d]:			
Age	45.4	42.8	39.7
Male	49.9%	44.3%	38.4%
Dutch native	76.4%	77.7%	77.7%
Education unknown[e]	49.3%	35.2%	25.5%
Education[f]:			
Low	29.6%	34.0%	21.6%
Middle	38.0%	37.4%	44.7%
High	32.4%	28.6%	33.6%
Annual healthcare (expenditures)[g]**:**			
GP cost	€136.25	€175.57	€172.96
Share using basic MH	1.6%	2.2%	1.7%
Basic MH expenditures	€3.93	€13.96	€11.37
Share using specialised MH	3.8%	6.6%	3.8%
Specialised MH expenditures	€173.14	€416.09	€173.00
Pharmaceuticals	€36.80	€54.39	€34.83
Physical healthcare	€984.52	€1707.82	€1382.87
Number of individuals	20,633,684	925,654	153,286
Survey measures on health[h]**:**			
Self-reported health[i]	2.2	2.3	2.2
High risk of psychological disorder	4.7%	7.7%	9.1%
High risk for anxiety and depression	38.8%	49.0%	53.8%
High risk for loneliness	7.7%	10.6%	11.9%
Number of individuals	365,281	20,957	3,006

(a) Full Dutch population in January 2012; (b) Sample first contacting their NIVEL GP for a mental health-related reason between January 2012 and December 2021; (c) Sample being referred to an NP within the first year of contacting their GP; (d) Demographics on January 2012 for the general population or in the year of first contacting their GP for remaining two samples; (e) The large percentage of unknown education level in the general population is because the Dutch education registry started in the 1980s. The education level is unknown for most individuals in cohorts who graduated earlier. The difference in unknown education level between the general population and the other two samples is driven by the age difference; (f) Education level if known; (g) Yearly healthcare expenditures in 2012 for the general population or in the year before first contacting their GP for the remaining two samples; (h) Survey measures in the 2012 survey wave of the health monitor are available for approximately 2% of the sample. The survey only includes individuals aged 18 or above; (i) Self-reported health is measured on a 5-point Likert scale, with 1 being excellent health.

3.5 Gaps in treatment uptake

The introduction of talk therapy at GP offices can be seen as an expansion of the treatment options for mental health problems. Previous research has shown that the uptake of treatment for mental health problems can differ significantly based on individual characteristics such as migration background and education. Sentell et al. (2007); Cook et al. (2017) for example find that non-white individuals in the US are up to 80% less likely to use mental healthcare, compared to their white counterparts. The expansion of treatment options could either narrow or widen these disparities in treatment uptake, depending on the degree to which different groups utilize the new treatment option.

For the Netherlands, differences in uptake of mental health treatment are less well documented. The descriptive statistics in Table 1 potential hint at moderate differences based on gender and education level. However, to accurately measure disparities in treatment uptake, both utilization of care, and the need for care should be included. To illustrate, the minor differences in utilization based on migration background as reported in Table 1 do not necessarily indicate the abscance of a treatment uptake gap. It could be the case that individuals with a migration background have a higher (or lower) need for care, and should thus have a higher (or lower) utilization of care.

To determine whether disparities in mental healthcare uptake exist in the Netherlands, I analyze the annual expenditure healthcare data and survey measures on health for the full population in 2012 (column (1) of Table 1) and estimate the following equation:

$$H_i = \alpha + \beta X_i + \delta Z_i + \varepsilon \tag{1}$$

with H_i an indicator for using either basic or specialized mental healthcare[6] X_i indicators for age, gender, migration background and education level and Z_i survey measures of health. To determine the influence of differences in health, Equation 1 is estimate while including and excluding the survey health measures Z_i, and while conditioning on the subsamples with a high risk of either psychological disorder, anxiety and depression or loneliness.

[6]Results using only basic mental healthcare or only specialized mental healthcare are similar.

Table 2: Differences in mental healthcare utilization rates in 2012 conditional and unconditional on self-reported mental health

	Unconditional regression	Conditional on self-reported mental health	High risk psychological disorder	High risk anxiety and depression	High risk loneliness
Aged $< 45^a$	1.84%**	1.73%**	7.35%**	3.73%**	6.17%**
	(0.10)	(0.09)	(0.86)	(0.21)	(0.55)
Aged $> 65^a$	-2.09%**	-2.33%**	-11.14%**	-5.61%**	-8.02%**
	(0.09)	(0.09)	(0.87)	(0.19)	(0.50)
Male^b	-1.36%**	-0.58%**	-0.45%	-0.98%**	-1.35%**
	(0.07)	(0.07)	(0.67)	(0.15)	(0.39)
Dutch native^c	-0.61%**	0.92%**	7.89%**	1.32%**	4.20%**
	(0.10)	(0.10)	(0.74)	(0.20)	(0.47)
Low^d	0.59%**	-1.37%**	-8.56%**	-1.53%**	-2.20%**
	(0.15)	(0.15)	(1.27)	(0.31)	(0.81)
Middle^d	0.51%**	-0.44%**	-3.68%**	0.03%	-1.16%
	(0.12)	(0.12)	(1.18)	(0.26)	(0.74)
Average utilization rate	4.4%	4.4%	23.6%	8.5%	12.0%
Number of individuals	365,281	350,791	17,048	139,495	26,853

Standard errors shown in parentheses; *significant at a 10% significance level; **significant at a 5% significance level; (a) Omitted age category is individuals aged between 45 and 65. Note that individuals 18 or younger are not include survey data; (b) Omitted gender is female; (c) Omitted migration background is first or second generation migrant; (d) Omitted educational level is high educated.

Table 2 shows the estimated differences in utilization of mental healthcare. Column (1) shows that when not controlling for differences in underlying (self-reported) health, individuals that are older, males, Dutch natives and higher educated individuals are less likely to use mental healthcare. The estimated differences are sizeable, ranging from 0.51 to 2.09 percentage points, or 12 to 50 percent of the baseline utilization rate.

Columns (2) to (5) show that for some background characteristics, differences in self-reported health partly explain the differences in healthcare utilization, while other differences in self-reported health, mask the gap in utilization. More specifically, the substantial difference in utilization between age groups is largely unaffected by differences in self-reported health. For all regressions, individuals aged 18-45 are approximately 30% more likely to use care than those aged 45-65, while those older than 65 are almost 50% less likely to use mental healthcare compared to those aged 45-65. Lower utilization rates at younger ages are in line with literature showing that the onset of many mental health tends to be during early adulthood (OECD, 2014; Jones, 2013). However, the gaps in treatment among the subsamples with a high risk of mental health problems could indicate

undertreatment among older cohorts. Alternatively, these individuals might have been treated at younger ages already.

When looking at gender, differences in self-reported health explain approximately half of the difference in utilization. When accounting for self-reported health, males are approximately 2 to 10 percent less likely to use mental healthcare compared to females. These differences are largely in line with literature showing lower treatment uptake rates for men (Hauenstein et al., 2006).

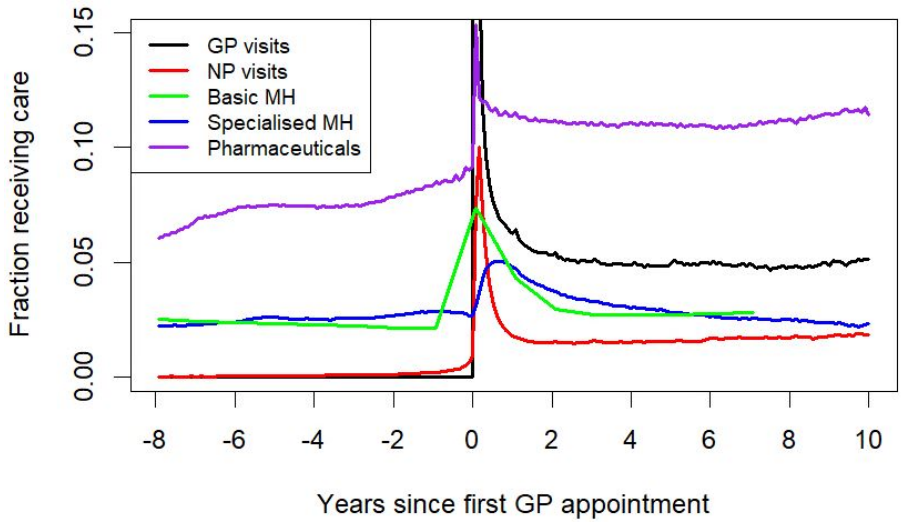
When examining differences in mental healthcare utilization based on migration background and educational attainment, differences in self-reported health have a large impact and flip the direction of the disparity. Without controlling for self-reported health, Dutch natives and higher educated individuals are approximately 10% less likely to use mental healthcare than their counterparts. However, when controlling for self-reported health, these groups tend to use relatively more healthcare. More specifically, Dutch natives are 10 to 30 percent more likely to use mental healthcare than non-natives whereas higher educated individuals are 10 to 15 percent more likely to use care.

The analysis above has shown that when examining differences in healthcare utilization, controlling for self-reported health measures can have large implications. While treatment disparities are less substantial than those reported for the US, differences in treatment uptake for mental health problems are still significant. Older individuals, males, individuals with a migration background and those with lower educational attainment are between 10 and 30 percent less likely to use care.[7] Given these large disparities, it is important to determine whether an expansion of treatment options closes part of the treatment gap or only further widens the gap. To do so, a heterogeneity analysis of the impact of the reform will be performed.

[7]For age, the difference can be up to 130% when comparing those below the age of 45 to those above the age of 65. However, this age difference might be explained by the fact that older individuals already received treatment when they were younger.

3.6 Treatment uptake and employment trajectories

Figure 2: Utilization of treatment types relative to the initial GP appointment



To illustrate the treatment trajectories of individuals, Figure 2 shows the utilization of the various treatment options relative to the moment individuals contact their GP. By construction, individuals have not seen their GP for a mental health-related reason in the years leading up to the first GP appointment and the share seeing their GP jumps to 1 at time zero. GP visits for mental health-related reasons gradually decrease during the first year and stabilize at approximately 5% per month.

NP visits follow a similar but less pronounced pattern, with a peak utilization rate of approximately 10% in the first month after the GP visit. Most NP visits take place within the first year after the GP appointment, after which they stabilize at approximately 2%. It is important to note that Figure 2 includes individuals contacting their GP both before and after their GP office has hired an NP. In GP offices where talk therapy by NPs is available, utilization is thus larger.

Utilization of both basic and specialized mental healthcare is lower than utilization of NP visits in the first months after the GP appointment but stabilizes at a higher rate in subsequent years. This likely reflects that treatment in both basic and specialized mental healthcare facilities tends to be of longer duration, than treatment by an NP.

Lastly, a significant share of the sample uses pharmaceuticals for mental-health related reasons in the years leading up to the first GP appointment already. There is a clear spike

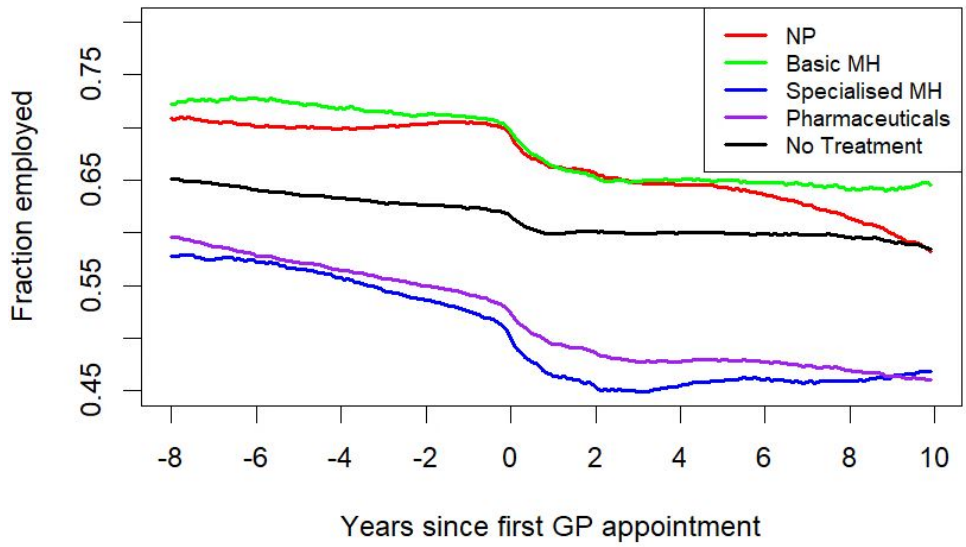
in the exact month of the GP appointment. Given the long waiting times for basic and specialized mental healthcare, it is most likely that this spike in pharmaceutical utilization is driven by prescriptions being done by the GP. Pharmaceutical utilization stabilizes in subsequent years at a significant higher level than prior to the GP appointment, at approximately 10%.

As already briefly mentioned, the type of treatment individuals receive is likely to depend on a wide range of observable and unobservable characteristics of the patient, such as, for example, the severity of their mental health problems. To illustrate these differences, Figure 3 shows the fraction of individuals employed over time for different groups, based on the type of treatment they receive in the first year after their GP appointment. Note that individuals can receive multiple types of treatment and can hence also be in multiple groups of Figure 3.

In the years leading up the the first GP appointment, there are already substantial differences in the employment rates between the various treatment types. Individuals who will be treated by either an NP or in basic mental healthcare are substantially more likely to be employed than individuals who will either receive no treatment, or those who will receive specialised mental healthcare treatment and/or pharmaceuticals. Additionally, the drop in employment rate around the first GP appointment among those who will receive treatment by an NP or basic mental healthcare is also smaller. These employment differences could partly reflect the fact that those receiving treatment by an NP or basic mental healthcare suffer from less severe mental health problems.

The drop in employment around the first GP appointment should not be interpreted as a causal impact of mental health problems given the potential for reverse causality and (un)observed confounders. However, it could be seen as a proxy of such a causal impact. While the drop in employment among the NP group is smaller than the drop among individuals who will receive specialised mental healthcare, it is still economically meaningful. almost 10 percent of these individuals lose their job around the first GP appointment. This implies that there is scope for mental health treatment to potentially increase the employment outcomes of this sample.

Figure 3: Employment trajectories for individuals split by the type of mental health treatment they receive in the first year after their initial GP appointment



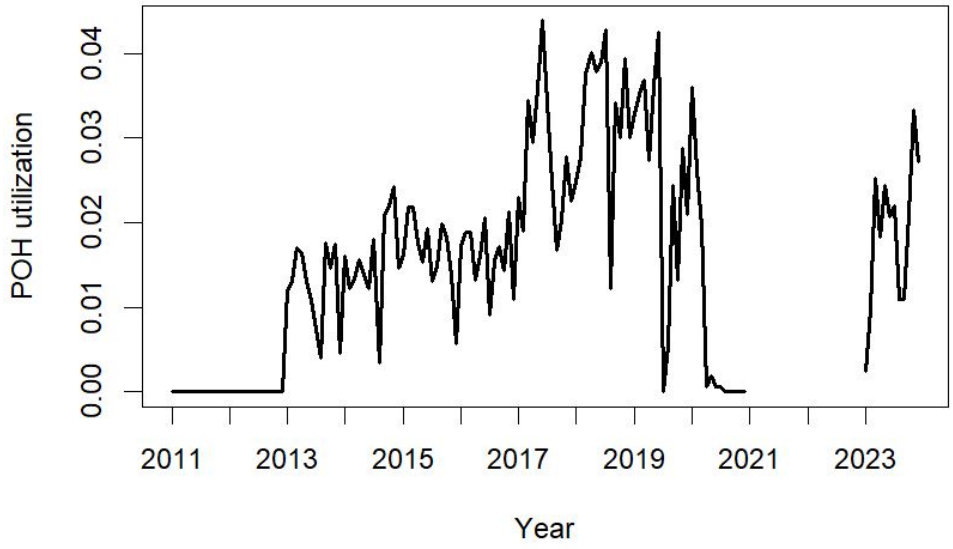
4 Causal impact of talk theraphy

As illustrated in the previous subsection, the type of treatment individuals receive correlates with their employment status in the years leading up to the moment they contact their GP. This correlation could partly be caused by differences in the severity of mental health problems faced by these individuals. A direct comparison of individuals who do and do not receive treatment from an NP is therefore likely to yield biased estimates.

In order to estimate the causal impact of talk therapy provided by NPs, I therefore exploit the gradual expansion of the funding available for this type of treatment. As mentioned before, funding for this type of treatment first became available in 2011. At that moment, GP offices could receive funding for 9 hours per week for every 2350 patients registered at the office. Since the initial introduction in 2012, funding available has steadily increased over the years to 16 hours per week for every 2350 patients in 2024. With this increase in the availability of funding, GP offices have gradually been more likely to hire an NP, and more likely to increase the contractual hours of their NP.

To illustrate this, Figure 4 shows the share of patients of a given GP office that have a consultation with an NP in each month, between 2011 and 2024. For this specific GP office, NP utilization was zero in 2011 and 2012 and first spiked in January 2013 as

Figure 4: Utilization of treatment by NPs at a GP office between 2011 and 2024



they hired their first NP. Utilization remains fairly constant until January 2017 when it increases further. Between 2020 and 2023, the GP office was not affiliated with Nivel, and hence no data is available. For this specific GP office, I can thus determine jumps in utilization rates in January 2013 and January 2017.

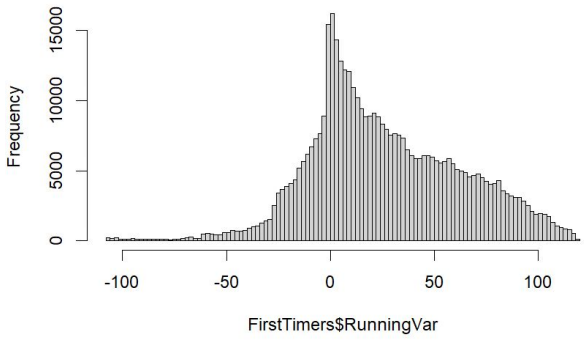
To systematically analyse the utilization rates for all 600 GP offices, I determine the first moment they hire an NP as the first month in which I observe positive utilisation, conditional on the office being affiliated and providing data in the previous month. Additionally, I determine the largest expansion at an office as the month in which the increase in utilization between that month, and the maximum utilization over the previous month is the largest. This increase must also be larger than 1 percentage point to ensure sufficient variation and it should be at least 1 year after the month in which an NP was first hired.

In the example in Figure 4, the opening month is thus determined as January 2013, and the expansion month is determined as January 2017 with a jump of approximately 1.5 percentage points. If GP offices are already utilizing an NP at the start of their Nivel affiliation or before January 2012, no month of first hire is calculated. 2011 is again omitted as it cannot be determined whether the office already hired an NP in the previous year.

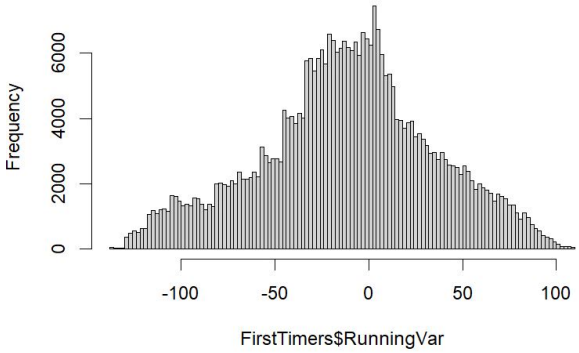
Given the months of the first hire and the months of the largest expansion, I can

Figure 5: Distribution of patients contacting their GP relative to the month an NP is first hired (left) or the month of the largest expansion (right).

(a) NP first hired



(b) Largest expansion



estimate the impact of talk therapy provided by NPs by comparing individuals who contact their GP right before, or right after. The intuition behind this is that individuals contacting their GP right after, have a higher probability of receiving treatment from an NP while being similar in all other observable and unobservable characteristics. While the moment a GP office decides to hire an NP or expand the NP services might be endogenous, this comparison relies on random variation in the moment individuals seek care at the GP office.

One potential issue could however be that hiring an NP or expanding the NPs contract, could have a direct impact on the inflow of patients. Patients could, for example, contact their GP after hearing about this treatment option, or GPs could proactively contact individuals they deem suitable for treatment by GPs. To determine whether this is the case, Figure 5 shows the distribution of individuals contacting their GP, relative to either the month an NP is first hired (left) or the month of the largest expansion (right).

As can be seen in Figure 5, there is a substantial increase in the number of patients contacting their GP in the months after an NP was first hired. For the month after the largest expansion, such a discontinuity is not present. McCrary tests confirm that the distribution for first NP hires has a significant discontinuity at zero, while the distribution for the largest expansion does not have such a discontinuity. The difference between these two distributions might be due to the fact that for new hires, a new treatment option becomes available and GPs or patients respond to this while for the largest expansion, the

treatment by NPs is already available prior to the expansion. Given the discontinuity for new hires, I focus solely on variation in talk therapy provided by NPs due to expansions.[8]

As an initial estimation approach, a direct comparison between the cohort contacting their GP in the year prior the expansion to the cohort contacting their GP in the year after the expansion could be implemented. Such a difference-in-difference analysis, however, does not take into account the calendar time difference between these two cohorts. This results in significant time-varying differences between the cohorts prior to the initial GP appointment, violating the parallel trends assumptions. These results are available upon request.

Instead, I exploit the discontinuity in treatment availability through a (difference-in-)Regression-Discontinuity design approach to estimate the causal impact of talk therapy. In this approach, the month at which an individuals contacts their GP, relative to the month at which the largest expansion takes place, is the running variable. This method thus compares individuals contacting their GP right before the expansion to those contacting their GP right after the expansion while flexibly controlling for any time effects. The baseline specification looks as follows:

$$H_{it} = \alpha + f(t) + I(t > 0)g(t) + \delta I(t \geq 0) + \varepsilon_{it} \tag{2}$$

with H_{it} the outcome of interest for individual i who contacts their GP t months after the expansion takes place. $f(t)$ and $g(t)$ flexibly controls for the impact of time relative to the month of expansion, and $I(t > 0$ indicates whether an individuals has contacted their GP after the expansion has taken place. δ is thus the parameter of interest, capturing a jump in the outcome of interest at the month in which the expansion takes place. In the baseline specifications, $f(t)$ and $g(t)$ are quadratic functions, and a triangular kernel is used around the threshold. The Imbens Kalyanaraman optimal bandwidth is used in all regeressions.

H_{it} is measured at a specific point in time, and the panel structure of the data thus allows this to be measured both before and after individuals contact their GP. By varying

[8]Results using first hires of NPs are actually similar and available upon request.

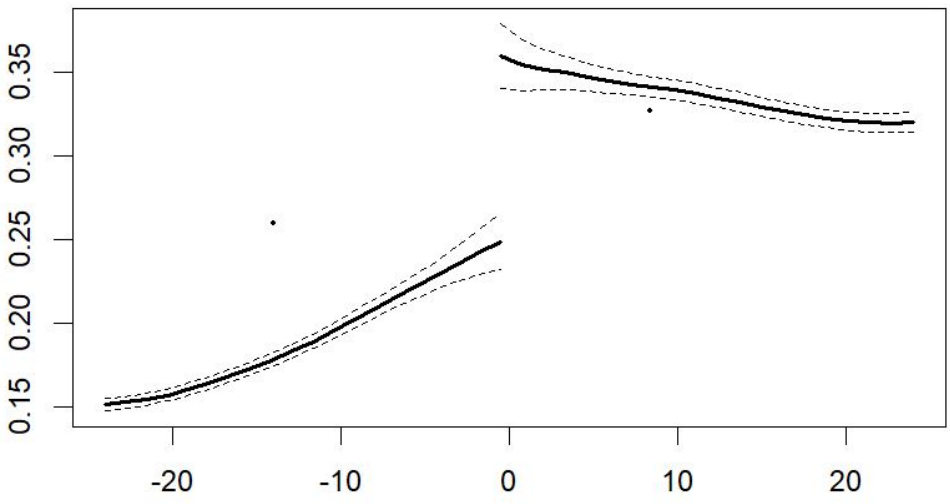
the moment of measurement from 8 years before the GP appointment to 10 years after the GP appointment, a difference-in-RD approach can be estimated. In this approach, all RD estimates looking at the outcome in the 8 years prior to the GP appointment are placebo estimates as treatment should not have an effect yet. Estimates 10 years after the GP appointment show how the impact of talk therapy provided by an NP potentially changes over time.

Many of the expansions take place in January, as increases in funding availability also always come into effect in January. Using the difference-in-RD approach controls for any calendar time impacts, i.e. individuals seeking care in January being different from those seeking care in December.

4.1 Impact on mental healthcare treatment uptake

Figure 6 shows the RD estimate for the share of patients receiving talk therapy from an NP in the first 6 months after the initial GP appointment.[9] For individuals contacting their GP in the months before the expansion, approximately one-in four are referred to an NP. After the expansion of NP services, this increases to almost one-in-three. The expansion of services thus does significantly increase the uptake of treatment by NPs.

Figure 6: Regression discontinuity estimate on the probability of visiting a GP in the first 6 months after the GP appointment



[9]Similar figures are available for all other healthcare measures.

To examine the impact on all other treatment options, Table 3 shows the RD estimates when using GP visits, NP visits, basic mental healthcare, specialised mental healthcare or pharmaceuticals as outcomes of interest. The various columns use different windows relative to the GP appointment. Column (1) of the table should be seen as a placebo test, as it examines differences in treatment uptake in the 6 months prior to the GP appointment. By construction, the individuals in the sample have no GP or NP visits in this period, but reassuringly, the RD analyses also show no significant differences in the uptake of any of the other treatment options.

Columns (2) to (5) show differences in treatment uptake in the first 3, 6, 12 and 24 months after the initial GP appointment. For all time windows, there is a significant increase in the probability of receiving treatment by an NP. The magnitude of this in-

Table 3: Differences in treatment uptake in 6 months prior to GP appointment and in the first 3, 6, 12 and 24 months after the GP appointment

	6 pre-months	3 months	6 months	12 months	24 months
P(GP visit>1)		-0.34%	0.02%	-0.10%	-1.20%
		(1.11)	(1.14)	(1.15)	(1.13)
# GP visits		-0.03	-0.02	-0.01	-0.14
		(0.03)	(0.04)	(0.06)	(0.09)
P(NP visit)		8.53%**	8.61%**	6.95%**	5.82%**
		(0.86)	(0.89)	(0.94)	(0.98)
# NP visits		0.36**	0.43**	0.38**	0.25**
		(0.03)	(0.05)	(0.06)	(0.08)
P(Basic MH)	0.07%			0.04%	-0.08%
	(0.35)			(0.64)	(0.64)
Basic MH spending	11.37			-3.39	-16.65
	(7.23)			(7.46)	(10.44)
P(Specialized MH)	0.57%	-0.01%	0.00%	0.02%	0.03%
	(0.48)	(0.51)	(0.59)	(0.66)	(0.71)
# specialized	-3.52	1.07	-1.27	3.25	10.61
MH minutes	(6.24)	(2.80)	(5.85)	(10.47)	(17.30)
P(Any MH treatment)	0.96%	8.12%**	7.97%**	6.14%**	4.60%**
	(0.59)	(1.09)	(1.12)	(1.15)	(1.11)
P(Pharmaceuticals)	0.50%	0.54%	1.02%	1.03%	1.87%*
	(0.84)	(0.94)	(0.99)	(1.05)	(1.10)
# Pharmaceutical	0.06	0.03	0.00	-0.02	0.15
prescriptions	(0.14)	(0.09)	(0.17)	(0.33)	(0.64)

Standard errors shown in parentheses; *significant at a 10% significance level; **significant at a 5% significance level

crease decreases as the observation window becomes larger. This implies that individuals contacting their GP prior to the expansion, are more likely to eventually receive treatment from an NP. This is due to the fact that they might see their GP again a couple of months later (after the expansion has taken place) to be referred to the NP.

Table 3 furthermore shows that there are no significant differences in the uptake of the other, already existing mental healthcare treatment options. Individuals contacting their GP after the expansion are equally likely to see their GP in later months, are equally likely to receive treatment in either basic or specialised mental healthcare and are equally likely to receive pharmaceuticals. This implies that talk therapy provided by NPs acts as a complement to the already existing treatment options. In line with this, the probability of receiving any type of mental healthcare increases with a similar magnitude as the estimates for seeing an NP.

ADD SUBSECTION ON HETEROGENEITY BY BACKGROUND CHARACTERISTICS

4.2 Impact on labour market outcomes

The analyses in the previous subsection have shown that once GP offices expand the contract of their NPs, individuals contacting the GP offices are substantially more likely to receive talk therapy from their NP. There are no spillovers on other types of mental healthcare treatment. At the same time, individuals contacting their GP for mental health-related reasons experience a significant drop in their employment rate, as shown in the descriptive statistics section, and this drop in employment poses a substantial economic burden to society. This section, therefore, examines whether the increased treatment uptake also provides protection against negative labour market consequences of mental health problems.

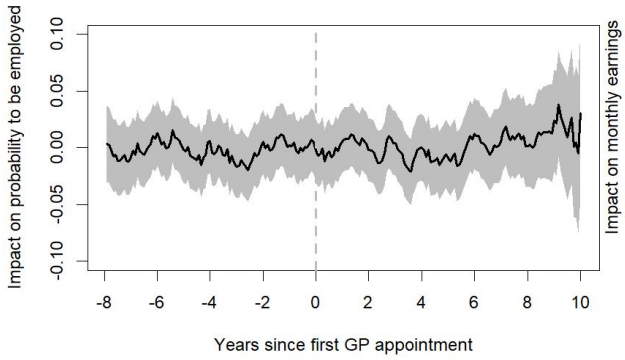
To estimate the causal impact of talk therapy on labour market outcomes, I follow a similar (difference-in-)Regression-Discontinuity approach, which uses various economic measures as outcome variables. As a baseline specification, I use a sharp regression discontinuity which thus estimates the impact of the expansion of NP services on labour

market outcomes. Assuming the only impact of the expansion is the increased likelihood of being treated by an NP, I can then use the estimates of the previous subsection to calculate the impact of talk therapy on labour market outcomes. This two-stage approach is used instead of a fuzzy-RD design, given that the impact of the expansion on the probability of receiving talk therapy changes depending on the time window used.

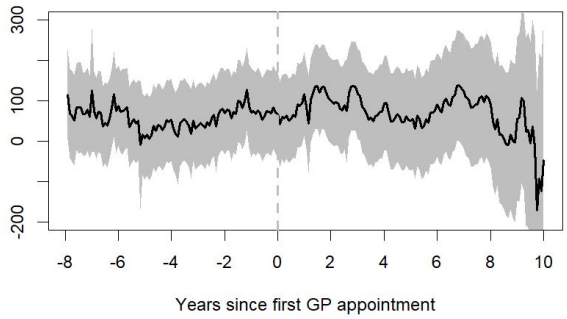
Figure 7 shows the RD estimates using employment, monthly earnings and the receipt of sick or disability benefits as outcomes. The figures are obtained through repeated RD estimation, in which the outcome is measured at a fixed point in time relative to the initial GP appointment.[10] For the first 8 years prior to the initial GP appointment, the RD estimates thus serve as placebo check. As individuals have not contacted their GP yet, there should be no significant differences. Figure 7 confirms that this is the case.

Figure 7: Estimated RD estimates and 95% confidence intervals of the impact of NP expansion on labour market outcomes measured starting 8 years before the initial GP appointment until 10 years after the appointment

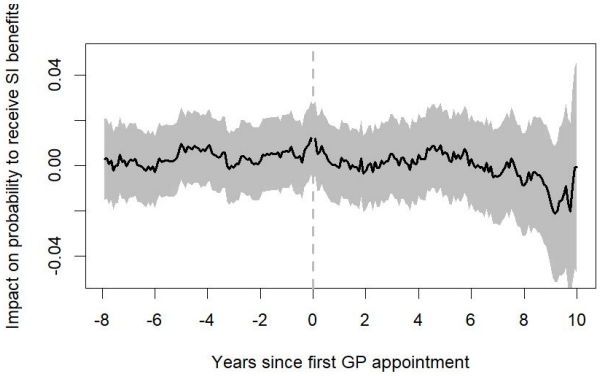
(a) Employment



(b) Earnings



(c) Sick or Disability insurance



[10]Similar figures are available for all healthcare outcomes. These show a similar pattern as the estimates reported in Table 3.

The estimates from time zero until 8 years after the initial GP appointment show how the impact of the expansion evolves as time since the GP appointment progresses. For all three labour market outcomes, there is no significant impact of the expansion of NP services. A similar conclusion can be drawn when examining monthly working hours and the receipt of various other social benefits such as unemployment benefits and social assistance.

One could argue that these estimates are noisy, especially when taking into account that the expansion of NP services increases the probability of receiving talk therapy from an NP by 8.5 percentage points. However, even when examining the impact of the expansion on total earnings over the entire 10-year period after the initial GP appointment, there is no significant impact. Similarly, when zooming into subpopulations (based on the mental health problems reported by the GP) experiencing the largest increases in the probability of receiving treatment by an NP, there are no significant increases in labour market outcomes.

Both the healthcare and employment estimates are robust against a wide range of alternative specifications. This includes the use of larger or smaller bandwidth, the use of a donut around the threshold month and more and less flexible control functions for the running variable.

ADD SUBSECTION ON HETEROGENEITY BY BACKGROUND CHARACTERISTICS

5 Conclusion

According to the OECD, half of all individuals will suffer from mental health problems at some point in their lifetime and the majority of these individuals do not receive adequate treatment (OECD, 2014; NIMH, 2024). These mental health problems can have large negative impacts on labour market outcomes as their economic burden is estimated to be approximately 5% of world GDP (Lancet, 2020).

Treatment of these mental health issues has been shown to effectively reduce their

health burden in the medical literature (Hofmann et al., 2012). While this could indicate that adequate treatment also has substantial labour market benefits, causal estimates of the impact of treatment on labour market outcomes are scarce.

In this paper, I fill this gap in the literature by examining a reform in the Netherlands that introduced an easily accessible form of cognitive behavioural therapy (commonly referred to as talk therapy) at General Practitioner (GP) offices in the Netherlands provided by Nurse Practitioners (NPs) specialized in mental healthcare. By exploiting the gradual expansion of funding availability through a (difference-in-)Regression-Discontinuity, I first show that there is a significant increase in the uptake of talk therapy among patients seeking care. The uptake of already existing forms of mental healthcare is not affected, implying that the talk therapy provided at GP offices acts as a complement and not a substitute to these other forms of treatment. Consequently, the probability that patients seeking care, receive any form of mental healthcare significantly increases by 8.5 percentage points.

This increased uptake of treatment is comparable across different subpopulations and potentially partly closes existing gaps in treatment uptake. More specifically, I first show that individuals who are older or less educated, as well as males and those with a migration background, are substantially less likely to use mental healthcare in the Netherlands relative to their healthcare needs. These groups are however equally likely to benefit from the introduction of talk therapy at GP offices. While not being sufficient to close the absolute gap in treatment uptake, the availability of talk therapy at GP offices does therefore partly close the relative gaps in treatment uptake.

Despite the significant increase in the use of talk therapy at GP offices, I find no improvement in a wide range of labour market outcomes of patients. Employment, earnings and the receipt of various social benefits are unaffected both in the short and long-run (up to 10 years after treatment).

These null results on labour market outcomes are in contrast with prior research on the causal impact of mental health treatment. Biasi et al. (2021); Shapiro (2022) and Prudon (2023) all find significant impacts on labour market outcomes due to treatment

against bipolar disorder, the use of antidepressants, and waiting times for mental health treatment. One potential explanation for this discrepancy is that all three papers examine treatment which incorporates (or is strictly limited to) the use of pharmaceuticals while treatment in this paper largely excludes pharmaceuticals. Additionally, Biasi et al. (2021) and Prudon (2023) focus on relatively severe mental health problems, while talk therapy at GP offices is intended for less severe mental health problems.

It is important to note that these patients with potentially less severe mental health problems still experience a persistent five percentage point drop in their probability of employment. A more intensive form of treatment than the talk therapy provided at GP offices might be necessary to protect against this deterioration of labour market status. The results in this paper highlight that the effectiveness of treatment for mental health problems, at least in terms of labour market improvement, is not a guarantee.

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A Appendix

B Online Appendix