Health, education and crime of children in out-of-home care

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Abstract

Children at risk of out-of-home care are among the most vulnerable in our societies, yet little is known about how out-of-home care affects child outcomes. This paper investigates the short-term impact of placing children in out-of-home care on child health, juvenile crime and schooling. We apply two different strategies. First, we adopt an event study approach using detailed full-population data to investigate the dynamic trajectory of child outcomes from 12 quarters before to 8 quarters after their first placement in out-of-home care. We show that there is a clear deterioration of outcomes related to mental health and juvenile crime in the last eight quarters before placement. When the child enters out-of-home care, we find a temporary increase in health care utilization, a decrease in hospitalizations and an improvement in schooling outcomes. Second, we explore the effect of placement for a small sub-sample of children using additional information we have collected from their caseworkers at the time these children were considered for out-of-home placement. We use the caseworkers' risk assessments of the children to match children placed in care to a control group of non-treated children with similar risk assessments. Using this data, we estimate the causal impact of the placement and find that, for the child at the margin, the effects of out-of-home placement are small but imprecisely measured. The paper contributes to the literature on the effects of out-of-home care for children's health, schooling and crime outcomes by documenting the contemporaneous changes in child outcomes around the time of placement.

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1 Introduction

Child neglect and maltreatment can have devastating consequences for later-life health and well-being (Doyle, 2007; Doyle, 2008, 2013; Currie and Widom, 2010; Paxson and Waldfogel, 2002; Currie and Tekin, 2012). Most Western countries have child protection programs to improve equity in conditions and secure basic rights and safety for at-risk children. These often include preventive measures and support to children and families. Removing children from their parents to place them in care outside their home is often seen as the last resort, and it is one of the most drastic and intrusive interventions into family life. In the US and in other Western countries such as Denmark, an average of around 1 percent of a cohort of children is placed in care, and 5-6 percent of children will experience some type of out-of-home placement before they turn 18 years old (Ejrnæs and Gørtz, 2017a; Turney and Wildeman, 2016). In addition to being a drastic measure, out-of-home placement is a very costly intervention (Cavalca, Ejrnæs, and Gørtz, 2021).

Children who receive child protective services are more likely to experience homelessness, delinquency, unemployment and chronic health conditions than other children later in life, and they have poorer educational outcomes (see for example Doyle and Aizer, 2018 and Lindquist and Santavirta, 2014). Yet the evidence on the causal effects of out-of-home care is sparse and results are somewhat mixed. The lack of causal evidence is related to the challenge of defining a relevant control group for children placed in out-of-home care. The ideal experiment for estimating the causal effect of out-of-home care would be to randomize children into care. Given the obvious ethical concerns related to such an experiment, a number of different approaches using observational data have been adopted.

The first study to credibly estimate the causal effect of out-of-home care adopts a two-stage instrumental variable approach using random assignment of cases to child protection investigators and judges with differential propensity to place children in care (Doyle, 2007). The author finds an increase in juvenile delinquency for the marginal child placed in foster care. Follow-up papers using the same identification strategy show an increase in adult delinquency (Doyle, 2008) and no effect on health outcomes (Doyle, 2013). Other studies using a similar identification strategy provide mixed evidence of the effect of the marginal out-of-home placement. Warburton et al. (2014) finds no effects on criminal behaviour, a reduction in the graduation rate, and an increase in welfare receipts for 16-18 year old Canadian boys having been placed in foster care. Baron and Gross (2020) exploit the quasi-random assignment of child welfare investigators in Michigan, and find positive effects of foster care on child outcomes, in particular schooling outcomes, such as

increased attendance and improvement in test scores, as well as a decrease in grade retention. Bald et al. (2019) show, with data from Rhode Island, that girls being removed before the age of 6 had higher test scores and reduced grade repetition, while there was no detectable impacts for boys. Roberts (2019) finds, using data from South Carolina, that for children on the margin, a foster care placement leads to positive and substantial educational effects, which are stronger for children who are younger at the time of investigation.

Studies looking at the average treatment effect of placement rather than the local average treatment effect generally point to zero results. Berger et al. (2015) use a combination of OLS, DiD, fixed effects models, and matching to show that, when adjusting for selection bias, placement has little effect on children's cognitive skills or behavior problems. Lindquist and Santavirta (2014) find no statistically significant association between placement in foster care and criminality. In this paper, we attempt to reconcile the mixed findings in the previous literature by adopting two new empirical approaches to study the effects of out-of-home care on child outcomes. In our first approach, we use an event study to trace out the dynamic trajectory of child outcomes around the time of their first out-of-home care placement. This allows us to investigate how child outcomes change in the time leading up to placement as well as the short-term impact of placement. Causal identification in an event study of the effect of placement relies on the assumption that for children who are placed in care, the exact timing of the first out-of-home placement is independent of child outcomes. As we will show in the empirical analyses, there are indications that this assumption is not fulfilled; therefore, we also apply an alternative approach. In our second approach, we use survey information collected on a sub-sample of children at risk. The sample contains children for whom an out-of-home placement is considered, and the survey collected caseworker's risk assessments for each individual child. We use these risk assessments to form a control group and estimate the causal effect of out-of-home care for the marginal child.

We exploit extraordinarily rich population-wide longitudinal data with quarterly observations from the Danish administrative registers. We study all children in Denmark placed in out-of-home care for the first time in the years between 2013 and 2016 and who were between 4 and 18 years old at the time of placement. The detailed administrative data allows us to identify around 7,000 children in care, their placement history and their outcomes on a quarterly basis. We observe quarterly number of visits to the general practitioner, share of children for whom prescription drugs are purchased and the share of children who are hospitalized in any given quarter, either to a somatic or psychiatric hospital. We look at the share of children enrolled in elementary school, and for the children enrolled in elementary school we

look at the rate of absenteeism. For the older children we observe juvenile delinquency, measured as criminal charges. Our rich data allows us to follow the children closely in a period preceding (two to three years before) and following (two years after) their first out-of-home care placement.

The estimates from our event study show a deterioration in health, schooling outcomes and juvenile crime leading up to the first out-of-home placement. At the time of the placement, we see a sharp increase in hospitalization due to mental illness and an increase in criminal charges, indicating that the timing of placement could be endogenous and triggered by, for example, mental health problems. After the placement, there is a temporary increase in primary care utilization in the year following placement, followed by a stabilization. Hospitalizations decrease and school absenteeism improves for the average child in care, while there is no significant change in juvenile crime following placement.

To overcome the endogeneity problems in the event study, we adopt an alternative approach using additional data from the survey we collected on caseworker risk assessments of children. For every child case investigation in the municipality of Copenhagen over the period 2015 to 2016, caseworkers provided their assessment of individual child risks. This information, which is usually unobserved, is essential to form a valid control group. The survey data is linked with administrative registers, which allows us to evaluate the same set of outcomes as for the full-population analysis. We provide evidence that having access to a measure of caseworker risk assessment of the individual child enables us to match children placed in out-of-home care to a control group of children with very similar characteristics, but who were not placed in care following the survey, and to estimate the causal effects of out-of-home care. Despite the limited size of the survey and that the results are imprecisely estimated, the analysis provides further evidence on the causal effects of out-of-home care. Interestingly, for some of the child outcomes, we find very different results compared to the event study. In particular, we find no indication of causal effects of the placement on either hospitalization or absenteeism. We find some evidence for a small causal increase in visits to the GP.

We contribute to the literature on the causal effects of out-of-home placements on several dimensions. First, our paper is the first to use an event study approach to study child outcomes both before and after out-of-home care. Using high-quality quarterly longitudinal data on child outcomes, we are able to measure contemporaneous and short-run impacts on a broad spectrum of outcomes measuring health, schooling, and crime. Our rich register data, which provides information on the family backgrounds of the children allows us to show that, even using a control group matched on a rich set

of observable characteristics, for example, on parental background and prior outcomes, the group of children being placed in care experienced a different development path in the years leading up to placement compared with children who are not placed in care. Second, we exploit a unique, but small, survey data set to show that having access to details about children considered for out-of-home care and a measure of caseworkers' risk assessments of each individual child allows us to match children placed in out-of-home care to a control group of children with very similar characteristics. This allows us to estimate the causal effects of out-of-home care placement using propensity score matching on caseworker risk assessment.

2 Institutional setting

The overall goal of Danish child protection laws is to support at-risk children in attaining "the same opportunity for personal development, health and an independent adult life as their peers".[1] The child protection responsibility lies with the municipalities, which can draw on a range of interventions from various preventive measures to placement in out-of-home care as the most drastic intervention. In principle, out-of-home care is intended to be a temporary arrangement, implying that reunification with the child's parents should be sought when possible. In practice, less than one third of children in out-of-home care return to their biological parents before age 18, and the rest "age out" of care at age 18 or over. Out-of-home placements are primarily for the 0-17 year-olds, but in some cases, the municipality extends the placement up to the age of 22. Around two thirds of children are placed in a foster family, while a third live in institutional care.[2] Note that in this paper we use the term foster children to refer to children in all types of out-of-home care. Many children transition from one type of care into another; on average, children experience 1.4 placements.

A report from daycare workers, school teachers, nurses, doctors, or a neighbor will instigate a municipal investigation into potential child neglect or abuse. Such an investigation takes a general view on the child's situation, investigating the child's behavior, development, health, school and family situation. The investigation draws on the assessment by relevant experts and professionals, and the parents and children aged 15 and above are also heard during the process. An investigation should be concluded within four months of being opened. As a result of the investigation, municipalities can either conclude that there is no reason for intervention, or it can initiate preventive

[1] Law on Social Services, Ch. 11, Paragraph 46

[2] Own calculations on register data, see Data section for details.

care measures or a placement. Survey evidence from Copenhagen (Ejrnæs and Gørtz, 2017a) suggests that the most common reasons for placing a child in out-of-home care are parental neglect (50 percent) and child externalizing behavior and social adjustment issues (33 percent). Less frequent reasons are violence or threats of violence (10 percent) or sexual abuse (2 percent). The municipal council (which consists of elected local politicians) is responsible for the decision to place a child in out-of-home care and parents can appeal such decisions to the National Social Appeals Board (Svendsen, 2017). In grave child abuse cases where a decision is made to acutely place a child into care (without parental consent), a child welfare investigation must be completed within two months of the placement.

An out-of-home placement can also be initiated following various preventive measures. On average, around 55 percent of all children in our register data sample are placed in out-of-home care without any previous preventive measures. Conditional on having received preventive measures before a placement in out-of-home care, the average duration from the first quarter of a preventive measure to the first placement is 9 quarters (or around two years).

3 Data

The analyses presented in the following sections are based on a main sample consisting of quarterly Danish administrative data for the full population of children in Denmark and a subsample of children in the municipality of Copenhagen for whom we collected additional survey information. We link information from several registers using anonymized personal identification numbers to obtain information on children's personal characteristics, child protective services, health care utilization, educational outcomes and criminal charges.

3.1 Main outcomes

We look at 7 main outcomes related to the child's health, education and criminal behavior.

We measure the *number of visits to general practitioner* as the sum of reported health services a child received in the given quarter. The number of visits is reported on a weekly basis and we cap the number of weekly services to +/- 5 visits (following Sundhedsdatastyrelsen, 2019). We measure the *share of children with a prescription drug purchase* by identifying children for whom at least one prescription drug was purchased in a given quarter.

This includes all prescription medication sold at a pharmacy or other drug store, but does not include over-the-counter medication or medication given to the patient at the hospital. We do not measure the quantity of drugs purchased since this can be hard to compare across drug types. We measure *hospitalizations* as the child having at least one inpatient or outpatient admission to a hospital. We count the hospitalization in the quarter that the hospitalization was initiated, independent of the duration of the stay. The ICD-10 diagnosis codes distinguish between psychiatric and somatic hospitalizations.

We measure *enrollment* for children between and including ages 7 and 15, using information for all public and private elementary schools in Denmark. *Absenteeism* is measured conditional on enrollment as the percentage of total time the student has been absent from school as reported by the school, regardless of the reason for the absence.

Criminal charges are measured for children 15 years or older who are charged with a crime. A charge is counted in the quarter that the crime was committed as recorded in the criminal register.

3.2 Sample selection

Our main sample consists of all people in Denmark aged 0-24 years old in the period 2010-2018 who experienced their first placement in out-of-home care between ages 4 and 18 in the years 2013-2016. We observe children 12 quarters before their first out-of-home care placement and 8 quarters after, and the balanced sample consists of around 7,000 foster children. Note that we use the term foster children and children in out-of-home care interchangeably. For enrollment in elementary school, we restrict the sample to school-aged children (ages 7-15 throughout the period), and for absenteeism, the sample is restricted to the group of children who were enrolled in school throughout the period. For criminal charges, we restrict the sample to children above the age of criminal responsibility (ages 15 and above). See table 1 for descriptive statistics on the samples.

For comparison, we construct a matched control group consisting of children who were never placed in out-of-home care and is selected to match the foster care sample on age and gender, mother's characteristics and past outcomes measured in all quarters from 8 to 12 quarters prior to the event. The matching is done using propensity score matching (Leuven and Sianesi, 2003) on prior observable characteristics presented in table 2. The estimated propensity score is used to match non-foster children to foster children using the one-to-one nearest neighbor algorithm without replacement. The control group is assigned a random placebo event quarter. We match on the outcome

Table 1: Foster children at time of first placement, balanced samples

	Health sample		Enrollment sample		Absenteeism sample		Crime sample	
	mean	(sd)	mean	(sd)	mean	(sd)	mean	(sd)
Age	12.62	(4.0)	11.45	(1.4)	11.16	(1.4)	16.99	(0.1)
Girl	0.48	(0.5)	0.45	(0.5)	0.49	(0.5)	0.48	(0.5)
Placed in out-of-home care with no prior preventive care	0.56	(0.5)	0.54	(0.5)	0.52	(0.5)	0.51	(0.5)
Quarters from first preventive care to first out-of-home care placement	8.28	(5.7)	7.92	(5.8)	8.99	(6.2)	7.46	(5.2)
Placement ongoing	0.29	(0.5)	0.45	(0.5)	0.55	(0.5)	0.00	(0.0)
Legal action								
Placement with consent	0.84	(0.4)	0.83	(0.4)	0.79	(0.4)	0.89	(0.3)
Placement without consent	0.10	(0.3)	0.12	(0.3)	0.15	(0.4)	0.04	(0.2)
Urgent placement	0.03	(0.2)	0.04	(0.2)	0.04	(0.2)	0.01	(0.1)
Other	0.02	(0.2)	0.01	(0.1)	0.02	(0.1)	0.06	(0.2)
Placement Type								
Foster family care	0.29	(0.5)	0.39	(0.5)	0.51	(0.5)	0.07	(0.3)
Kinship care	0.07	(0.3)	0.08	(0.3)	0.11	(0.3)	0.02	(0.1)
Group home	0.20	(0.4)	0.15	(0.4)	0.08	(0.3)	0.20	(0.4)
Institutional care	0.30	(0.5)	0.33	(0.5)	0.30	(0.5)	0.30	(0.5)
Independent living	0.14	(0.3)	0.04	(0.2)	0.01	(0.1)	0.41	(0.5)
Length of placement								
Duration, years	1.34	(1.1)	2.05	(1.8)	2.11	(1.8)	0.61	(0.3)
Spell duration, years	1.71	(1.2)	2.98	(1.9)	3.02	(1.9)	0.67	(0.3)
Reason for placement								
Child risk/externalizing behavior	0.80	(0.4)	0.78	(0.4)	0.71	(0.5)	0.85	(0.4)
Child health concerns	0.35	(0.5)	0.38	(0.5)	0.37	(0.5)	0.35	(0.5)
Abuse/neglect of child	0.60	(0.5)	0.68	(0.5)	0.72	(0.5)	0.44	(0.5)
Adult risk/externalizing behavior	0.50	(0.5)	0.58	(0.5)	0.61	(0.5)	0.45	(0.5)
Other	0.28	(0.4)	0.24	(0.4)	0.27	(0.4)	0.33	(0.5)
Share of reasons due to child	0.51	(0.3)	0.47	(0.3)	0.42	(0.3)	0.60	(0.3)
Share of reason due to parents	0.49	(0.3)	0.53	(0.3)	0.58	(0.3)	0.40	(0.3)
At end of first placement								
Exit before age 18	0.36	(0.5)	0.55	(0.5)	0.50	(0.5)	0.12	(0.3)
New placement	0.17	(0.4)	0.26	(0.4)	0.31	(0.5)	0.04	(0.2)
Continued care after age 18	0.00	(0.1)	0.00	(0.1)	0.00	(0.0)	0.00	(0.0)
Age out	0.46	(0.5)	0.18	(0.4)	0.20	(0.4)	0.83	(0.4)
N	7,000		2,470		762		1,314	

trajectory in 8-12 quarters prior to the event since we observe a divergence in outcomes between children who are eventually placed in care and children never placed in care from 8 quarters prior to the placement (see appendix section A). Before 8 quarters the outcome levels between the two groups are different, but their trends are largely parallel. The matched control group is similar to the foster children on observable characteristics 8 quarters prior to the event. Since we still see differential pre-trends in the 8 quarters leading up to the event, we only use the matched control group for reference in the descriptive evidence, but they are not used to estimate the impact of placement in the main specification of the event study.

3.3 Descriptive evidence

Figure 1 shows descriptive evidence on the four health outcomes; the quarterly number of visits to a general practitioner, share of children with prescription drug purchase and share of children with a somatic or psychiatric hospital admission. The figure shows the average outcome for foster children and the matched group of non-foster children separately.

Figure 1a shows that foster children have an average of a little more

Table 2: Treatment vs matched control children, quarter before first placement

	Treatment mean	Control mean	Difference b	t
Age	12.65	11.95	0.70***	(10.7)
Girl	0.49	0.48	0.00	(0.2)
Preventive care	0.31	0.00	0.31***	(55.4)
Average outcome, measured 8 quarters prior to event (t-8)				
Number of GP visits	1.10	1.08	0.02	(0.5)
Somatic hospital contact	0.12	0.12	0.00	(0.2)
Psychiatric hospital contact	0.03	0.03	0.00	(1.7)
Prescription drug purchase	0.31	0.32	-0.01	(-0.9)
Enrolled in elementary school	0.96	0.99	-0.03***	(-8.3)
Absenteeism	0.12	0.10	0.01***	(4.4)
Criminal charge	0.12	0.07	0.05***	(4.1)
Mother's characteristics, measured at year of birth of the child				
Age	27.44	27.15	0.29**	(2.8)
Married/Registered partnership	0.33	0.30	0.02**	(2.9)
Highest completed elementary school	0.01	0.01	0.00	(0.1)
Highest completed secondary education	0.81	0.81	-0.00	(-0.4)
Highest completed tertiary education	0.08	0.07	0.01*	(2.4)
Unemployed	0.05	0.05	-0.00	(-0.5)
On early retirement benefits	0.03	0.03	0.00	(0.5)
On cash benefits	0.35	0.17	0.18***	(23.9)
Criminal charge	0.24	0.25	-0.00	(-0.4)
Psychiatric hospital contact	0.11	0.12	-0.00	(-0.5)
N	6,781	6,781	13,562	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

than 1 visit per quarter to their general practitioner 12 quarters prior to their first out-of-home care placement. From 8 quarters prior to placement we see a clear divergence between foster and non-foster children in the time leading up to the event.[3] The figure also shows a sharp increase in the average number of GP visits at the time of entry into out-of-home care, with a subsequent drop in the number of visits, but the average remains much higher than before the placement in out-of-home care. When we look at prescription drug purchases, figure 1b shows a similar pattern. Prescription drugs are purchased for around 30 percent of children in each quarter in both groups 8 quarters prior to the event. In the last 6 quarters prior to the event there is a clear divergence in the groups, and a sharp increase in prescription drug purchases for the foster children at the time of their first placement, followed by a stabilization at around 45 percent. The lower two panels show the quarterly share of children who experience somatic or psychiatric hospitalization. Figure 1c shows a divergence between the two groups in the 8 quarters leading up the first placement and a small additional increase in somatic hospitalizations at the time of entry into out-of-home care.

[3]The decline in the outcome variable for the control group is likely to be caused by convergence to the mean.

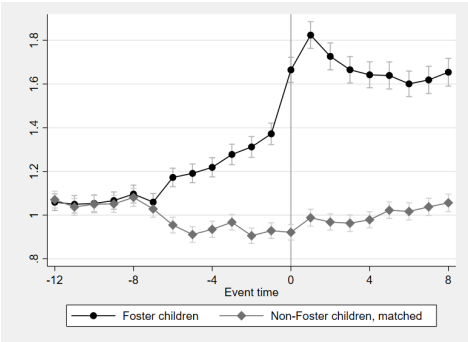
We see the same pattern, but much more pronounced, in the share with a psychiatric hospital contact shown in figure 1d. More than 8 percent of foster children have a psychiatric hospital visit in the quarter they are placed in out-of-home care, and the percentage stabilizes at around 6 percent following placement. This should be viewed relative to the less than 1 percent in the matched control group.

Figure 2 shows a significant decrease in the share of foster children who are enrolled in school from more than 95 percent two quarters before placement in out-of-home care to 90 percent two quarters after. The enrollment rate in the matched control group remains high at around 99 percent throughout the event period. There is a higher rate of absenteeism among foster children at around 10 percent absence on average in the years leading up to placement in care. This is followed by a clear drop in absence at the time of placement to an average of around 5 percent for those enrolled throughout the period.

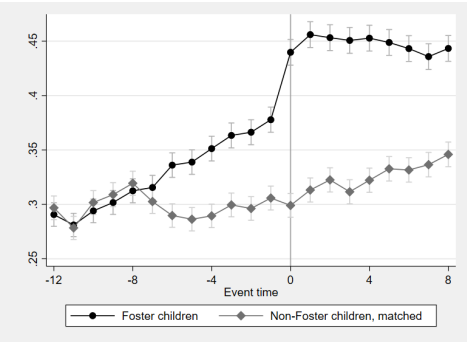
Figure 3 shows an increasing share of children with a criminal charge among foster children in the time before the event. After placement there is a small drop, and the share remains relatively stable at around 10 percent.

The descriptive evidence clearly documents why a traditional matching approach is insufficient to account for differences between foster children and non-foster children even when very detailed administrative data is available. It also highlights the importance of timing when matching on observable characteristics, since large changes in most outcomes occur shortly before out-of-home care placement, which could mistakenly be attributed to the placement itself if only less granular data were available. In the following, we drop the control group and only use foster children to estimate the impact of an out-of-home care placement relative to the quarter prior to placement. Given the substantial pre-trends in several outcomes, we are very careful when interpreting the results of the event study.

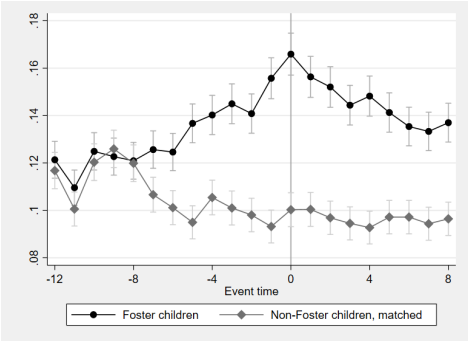
Figure 1: Health, quarterly average



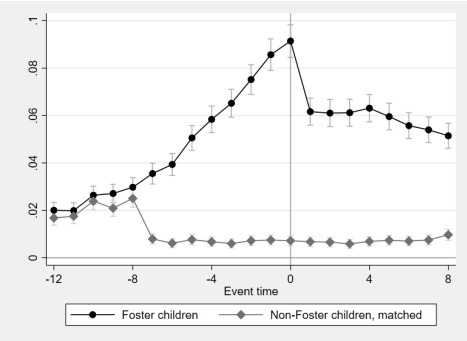
(a) Number of visits to general practitioner



(b) Share with prescription drug purchase



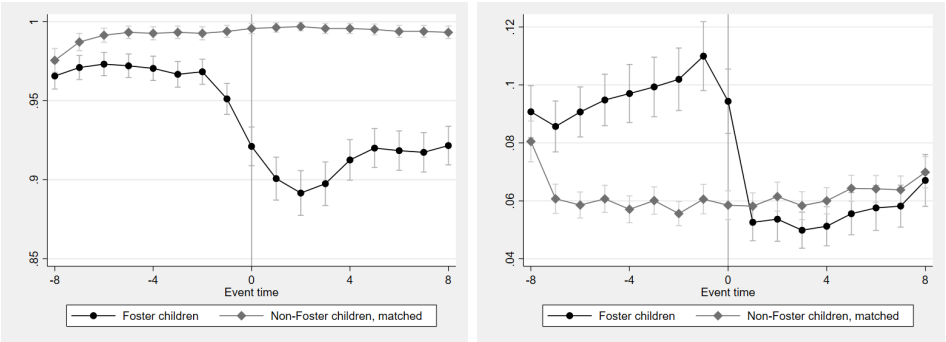
(c) Share with somatic hospitalization



(d) Share with psychiatric hospitalization

Note: The figure shows the average outcomes separately for foster children and the group of matched non-foster children in the balanced health sample (see table 2). The two groups are matched on observable characteristics measured prior to the event, i.e., in quarters t-12 to t-8.

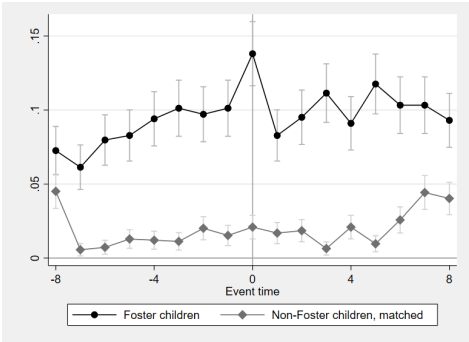
Figure 2: Schooling, quarterly average



(a) Enrollment (b) Absenteeism

Note: The figure shows the average outcomes separately for foster children and the group of matched non-foster children in the balanced schooling sample, consisting of school-age children (ages 7-15). The two groups are matched on observable characteristics measured prior to the event, i.e., in quarters t-12 to t-8.

Figure 3: Juvenile crime, quarterly average



(a) Criminal charges

Note: The figure shows the average outcome separately for foster children and matched non-foster children in the balanced crime sample, consisting of children above the age of criminal responsibility (age 15 and above). The two groups are matched on observable characteristics measured prior to the event, i.e., in quarters t-12 to t-8.

3.4 Survey among caseworkers

From January 2015 to June 2016, we conducted a survey of caseworkers in the municipality of Copenhagen. The survey was intended to provide insights into the "marginal child" by asking questions regarding the caseworkers' risk assessments for each individual child for each child protection decision.[4]

A municipal caseworker concerned about a child will open an investigation to determine whether there are grounds for intervention. Based on the investigation, the caseworker will present the case for the team of child protection caseworkers. At the meeting, the leader and the caseworkers discuss the case and decide whether to recommend an out-of-home placement. One exception for this procedure is if an acute out-of-home placement is needed. In this case, action is taken immediately.

The survey was designed to collect caseworker assessments of every case that was taken up at a meeting, irrespective of whether the child was placed in out-of-home care following the meeting or not. This means that by construction, the survey consists of children at the margin of a placement as all of the children in the survey sample were considered for placement.

For every case in which placement in out-of-home care was considered for a child in the 18-month period in 2015 to 2016, caseworkers were asked to respond to ten short questions. The caseworkers responded to the questionnaire online. The response rate was 89 percent on the distributed survey. Specifically, the questionnaire asked caseworkers to assess the strength of causes for placement for each case, and whether there had been unanimity or disagreement among caseworkers about that assessment. They were asked to assess how concerned (on a scale from 1 to 10) they were for the child, what signs of threats to the child's well-being they saw, how they made their overall evaluation of the concerns and risk factors that were threatening the child, their assessment of resources surrounding the child, and if applicable, which type of placement (foster family versus institutional care) they found most suitable for the child in question. This is information that is not available in the registers or in municipal administrative data, but which may determine whether the child is placed or not.

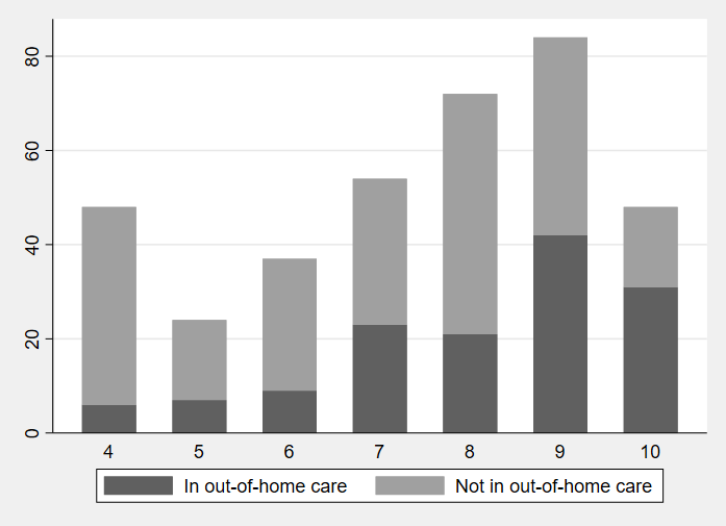
We will primarily use the caseworker's risk assessments, in particular their answer to the question: How do you assess the total burden of risk factors for the child on a scale from 1 to 10, where 1=high risk and 10=no risk.[5] We have reversed the scale to facilitate interpretation of the results. Figure

[4]See Ejrnæs and Gørtz, 2017b for a description of the main results of the survey.

[5]DK: Hvordan vurderer du den samlede belastning af bekymringer/risikofaktorer for barnet påen skala fra 1 til 10 hvor 1=høj belastning fra risikofaktorer og 10=ingen belastning fra risikofaktorer?

4 shows how the cases were distributed on the risk factor scale divided by those children who were subsequently placed in out-of-home care and those who were not. We have also experimented with using information from other questions, but as most of the questions are highly correlated it does not make a difference.

Figure 4: Distribution of risk assessment



Note: Due to the small number of observations at each risk assessment level, risk assessments of ≤ 4 *are grouped at risk level 4.*

.

The final survey dataset contains information on 350 children of which a placement of 139 children was initiated after the case meeting. The survey responses were subsequently anonymized and linked at the individual level to the same type of register information on socio-economic characteristics that was used in the first set of analyses on the full-population register data. We refer to the children who are placed in care after the meeting as the treatment group and those who were not placed in care as the control group. Table 3, columns 1-2, shows descriptive statistics based on register data for all survey children. As shown in columns 3-4 in the table, there are still substantial differences between the two groups of children even when we only look at children who were considered for out-of-home placement. Importantly, children who were subsequently placed in care following the case meeting had a more severe risk assessment by the caseworkers on average than those who were not placed in care.

To improve the balance between the treatment and control group, we use propensity score matching to match the treatment and control groups on age,

sex and the caseworkers' assessments. The matched survey sample consists of 262 children, of which 131 (50 percent) were placed in out-of-home care after the survey.

Table 3, columns 5-8, shows that once we match on age, gender and caseworker risk assessment, the matched survey children that were not placed in care were very similar to the survey children who were placed in out-of-home care.[6] Outcomes at the time of the survey are not significantly different and we see only small differences in mother's characteristics. It is striking how similar these children are when comparing observable characteristics. Taking into account the caseworker risk assessment allows us to identify what looks like a valid control group compared to just matching on a large number of characteristics observed in the registers for the full-population sample. This suggests that the caseworker assessment likely holds important additional information that is not readily observable even in comprehensive and detailed administrative data.

Table 3: Survey treatment vs control children, survey quarter

	Unmatched				Matched			
	Treatment mean	Control mean	Difference b	t	Treatment mean	Control mean	Difference b	t
Matching variables								
Age at time of survey	13.56	10.43	3.14***	(5.2)	13.37	13.05	0.31	(0.5)
Girl	0.55	0.48	0.07	(1.2)	0.52	0.51	0.01	(0.1)
Caseworker risk assessment	8.11	6.77	1.34***	(6.2)	7.99	7.60	0.39	(1.9)
Outcome variables								
Number of GP visits	1.24	1.38	-0.15	(-0.7)	1.21	1.31	-0.09	(-0.4)
Somatic hospital contact	0.17	0.17	0.01	(0.2)	0.17	0.18	-0.01	(-0.2)
Psychiatric hospital contact	0.10	0.02	0.08**	(3.1)	0.09	0.04	0.05	(1.8)
Prescription drug purchase	0.34	0.29	0.04	(0.9)	0.32	0.32	0.00	(0.0)
Enrolled in elementary school	0.81	0.80	0.01	(0.2)	0.81	0.76	0.04	(0.6)
Absenteeism	0.20	0.15	0.06	(1.1)	0.20	0.17	0.03	(0.6)
Criminal charge	0.11	0.11	-0.00	(-0.0)	0.11	0.13	-0.01	(-0.2)
Mother's characteristics								
Age	28.86	28.19	0.66	(1.1)	28.93	28.13	0.80	(1.2)
Married/Registered partnership	0.33	0.37	-0.04	(-0.7)	0.33	0.45	-0.12*	(-2.0)
Highest completed elementary school	0.03	0.07	-0.04	(-1.6)	0.03	0.10	-0.07*	(-2.3)
Highest completed secondary education	0.69	0.64	0.06	(1.1)	0.69	0.63	0.06	(1.0)
Highest completed tertiary education	0.08	0.16	-0.08*	(-2.3)	0.08	0.14	-0.06	(-1.6)
Unemployed	0.04	0.06	-0.01	(-0.6)	0.04	0.05	-0.02	(-0.6)
On early retirement benefits	0.02	0.02	0.00	(0.2)	0.02	0.01	0.02	(1.0)
On cash benefits	0.39	0.38	0.00	(0.1)	0.40	0.42	-0.02	(-0.4)
Criminal charge	0.29	0.29	-0.00	(-0.0)	0.29	0.24	0.05	(0.8)
Psychiatric hospital contact	0.16	0.24	-0.08	(-1.8)	0.16	0.15	0.01	(0.2)
N	139	211	350		131	131	262	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[6]The number of observations is lower, since not all observations could be matched satisfactorily in the propensity score matching procedure.

4 Empirical strategy

To structure our discussion of the impact of a placement, we use the framework of Freyaldenhoven, Hansen, and Shapiro (2019). Let z_{is} be an indicator for the placement of child i in out-of-home care in period s. We assume that the decision about placement of a child is initiated if the risk of the child's safety and health exceeds a threshold. Let η_{is} be a measure of the child's general risk and η^* the threshold. The indicator for placement is given by $z_{is} = 1(\exists s^* \geq s : \eta_{is} \geq \eta^*)$, such that the child i is in out-of-home care in period s if $z_{is} = 1$. We now consider the outcome Y_{is}, e.g., the health or school outcome for the child, and assume that it is affected not only by the placement decision but also by the underlying risk to the child:

$$Y_{is} = \beta z_{is} + \gamma \eta_{is} + \alpha_i + \epsilon_{is}. \tag{1}$$

We assume strict exogeneity of the placement with respect to ϵ_{is}. α_i is an individual fixed effect, which we can account for given the panel structure of our data. In this model z_{is} is endogenous if $\gamma \neq 0$ and η is unobserved. If η_{is} is observed, we can solve the endogeneity problem by controlling for η_{is}.

4.1 Event study

In the event study framework, we introduce an additional time variable: the event time t, which is defined such that $t = 0$ in the first period that the child is placed in out-of-home care ($\min s : z_{is} = 1$). We index all periods relative to that period. In the baseline specification, we consider a balanced panel of children placed in care from 12 quarters prior to their first out-of-home placement to 8 quarters after. We study the evolution of a set of child health and schooling outcomes across event time, focusing on high-frequency outcomes that are available on a quarterly basis.

If η_{is} is unobserved, we would expect to see a trend in the outcome variable prior to the first placement (see Freyaldenhoven, Hansen, and Shapiro, 2019). A large spike or dip in the outcome variable around the time of the first placement may also suggest that the outcome in itself can trigger a placement, e.g., charges of crime or hospitalization. Therefore, it is also important to consider the dynamics of the outcome leading up to the placement. More information about this process may also allow us to determine which outcomes could potentially impact the decision about a placement.

We estimate the level change in the average outcome for foster children relative to the quarter before placement, controlling for age and quarter fixed effects. We model the outcome of interest, Y_{iqt}, for individual i, in quarter q, at event time t for child i in a non-parametric event study as follows:

$$Y_{iqt} = \sum_{s \neq -1} \beta_s \cdot \mathbf{I}[s = t] + \delta_{iq} + \gamma_q + \alpha_i + \eta_{iqt} + \epsilon_{iqt}. \quad (2)$$

The first term on the right hand side is the full set of event time dummies, where $t = -1$ is left out so the remaining event time coefficients represent the difference in outcomes with respect to the quarter prior to placement. The model includes age dummies (δ) and quarter dummies (γ) to control for underlying age and time effects. Without controlling for age and time, the model would simply yield the level change in the mean outcome for the group relative to $t - 1$. The three sets of dummies are all identified in the model due to variation in the age and the calendar time at which a child experiences the first placement. In some of the specifications we allow for an individual fixed effect (α).

For a causal interpretation of the estimates from the non-parametric event study, the timing of first placement in out-of-home care should be uncorrelated with the outcome conditional on being placed in care, and on time and age effects. In addition to the non-parametric event-study, we estimate a parametric version of the model following Dobkin et al. (2018), where we allow for a linear pre-trend in event time t such that

$$Y_{iqt} = \sum_{s > -1} \beta'_s \cdot \mathbf{I}[s = t] + \delta t \cdot + \delta_{iq} + \gamma'_q + \alpha'_i + \eta_{iqt} + \epsilon'_{iqt}. \quad (3)$$

The event time coefficients (first term on the right hand side) now identify the post-event effect relative to the linear pre-trend. We assume that the pre-trend would have continued in the post-period in the absence of the event. In other words, if the children had not been placed in care, we assume outcomes would have evolved as predicted by the linear pre-trend. Although this is a strong simplification, it may be a relatively good short-run approximation and yield a conservative estimate of the effects of foster care on child outcomes. For a causal interpretation of the parametric event study coefficients, we need the timing of first placement to be uncorrelated with deviations from the linear trend conditional on being placed in care, and on time and age effects. We also have to assume that no third factor that is correlated with the outcome variable occurs at the same time as the event.

In the main graphs we will present the non-parametric event time coefficients as estimated in model 2 with the linear trend estimated from the parametric event model 3. This allows us to visually evaluate the fit of the linear pre-trend to the non-parametric changes in outcomes in the periods prior to the event and to evaluate the magnitude and statistical significance of the post-event coefficient estimates.

To test the robustness of the main results from the event study, we estimate the impact of foster care on child outcomes using three alternative approaches presented in detail in appendix B. First, we estimate model (2) with a control group and individual fixed effects, where we use children that are placed in out-of-home care 8 quarters later as a control group for the treatment group following Fadlon and Nielsen (2019) (see appendix B.1). Second, we estimate model (2) with individual fixed effects, restricting two pre-periods to zero to identify all parameters (see appendix B.2). Third, we estimate model (2) with the matched control group and unit fixed effects (the matched control group is the one described in section 3, see also appendix B.3).

4.2 Survey matching

In the second empirical approach, we use children who were considered for out-of-home care and who had a similar caseworker risk assessment as a control group for the children placed in out-of-home care. The control group contains children who were considered for out-of-home care but where caseworkers decided not to place the child in care. This implies that we limit our attention to children with a high η, who are all on the margin to be placed. In addition, we have collected a new measure of child risk (η_{is}), which is usually unobserved. We use this variable to form a control group using propensity score matching. The idea behind our approach is to compare children who are placed in out-of-home care with children who are not but who have the same caseworker assessed propensity for a placement.

The survey data provides information on the caseworker risk assessment for children on the margin of placement. This allows us to identify the causal impact of an out-of-home care placement. With a slight modification of the notation, we consider the event time to be t time since caseworkers were considering a placement and the event time measures the quarters since the case meeting. The causal effect of placement measured 8 quarters after the caseworker meeting is identified by

$$E(Y^1_{iq8} - Y^0_{iq8} | p(\eta_{iq0}, x_{iq0})). \tag{4}$$

We construct the control group by propensity score matching with respect to sex, age (denoted by x) and case worker risk assessment (η), where p denotes the propensity score function. We use the estimated propensity score in a one-to-one nearest neighbor matching algorithm to match children considered for, but not placed in care to children placed in out-of-home care after the case assessment meeting. The effect we identify is mainly deter-

mined from the children who are at the margin of being placed in out-of-home care, since both the treatment and the control children were considered for placement.

To account for the fixed individual effect, we also use an alternative estimation method where we measure the changes in outcomes between period t=0 and t=8: $\Delta Y^z_{iq8} = Y^z_{iq8} - Y^z_{iq0}$ for $z_{iq0} = z$

$$E(\Delta Y^1_{iq8} - \Delta Y^0_{iq8} | p(\eta_{iq0}, x_{iq0})). \tag{5}$$

5 Results

We will present two sets of results corresponding to the two empirical approaches. In the first set of results, we examine the evolution of child outcomes in the years around their first out-of-home care placement in an event study. The event study coefficients measure the level change in outcomes for children relative to the period before placement, when controlling for time and age fixed effects. This set of results sheds light on the average impact of placement in out-of-home care on child outcomes. In the second set of results, we apply the caseworkers' assessment to form a control group of children who are not placed in care. By comparing the children who are placed with a control group, we obtain an estimate of the impact of the placement.

5.1 Event Study

Figure 5 shows the estimated change in health outcomes relative to the quarter before placement for children. The point estimates are from the non-parametric model 2 and the linear pre-trend estimated from the parametric model 3. This allows us to graphically inspect the change in outcomes across event time relative to the linear pre-trend.

The estimated impact in 5a shows a large and statistically significant upwards jump in number of visits to the general practitioner at the time of entry into out-of-home care. The increase seems to be only temporary. A year after the placement began, the number of visits to a general practitioner, conditional on age and calendar time effects, has decreased again to the pre-event level. We would expect to see a temporary increase if children are, e.g., taken for a routine health visit at the time of placement. A similar change is, however, also reflected in Figure 5b, which shows a significant increase in prescription drug purchases for children at the time of placement, followed by a drop in the years following placement in care. Changes in these health

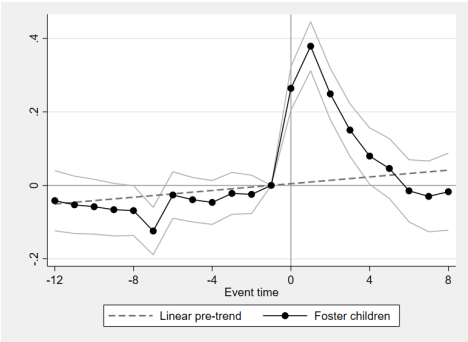
outcomes may reflect either changes in health care utilization behaviour or changes in the true underlying health of the child.

The rich register data on health care use allows us to dig deeper into specific types of drugs and diagnoses that are prevalent for this group of children. Details can be found in the Appendix section C. Prescription drug purchases by drug type are shown in figure C.5. On the one hand, the significant increase in the purchase of asthma medication indicates that the increase in drug purchases following placement in care is likely to, at least partly, be driven by utilization effects. On the other hand, the share of children using ADHD medication, benzodiazepines and related drugs gradually decreases in the years following out-of-home care placement. This development possibly reflects changes in underlying health.

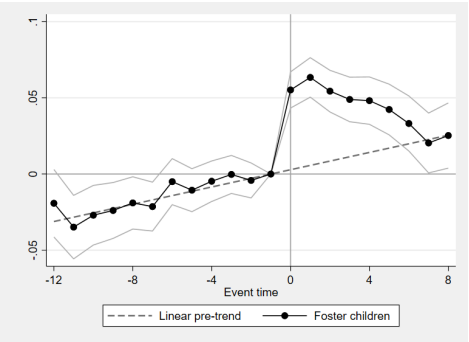
Figure 5c shows a gradual decrease in somatic hospitalizations following placement in out-of-home care. When we turn to psychiatric hospitalizations, we see a strong increase in the two years leading up to placement in out-of-home care, followed by a large and continued decrease in psychiatric hospitalizations after placement in care, see Figure 5d. The strong pre-trend indicates that psychiatric hospitalization may in itself be a decisive factor in initiating an out-of-home placement, and we are cautious with any causal interpretation of the subsequent drop in hospitalizations.

A closer look at hospitalizations by diagnosis groups suggests that the decrease is at least partly driven by a decrease in injury related hospitalizations (see Figure C.1). We interpret this as evidence that the decrease in somatic hospitalizations, at least to some degree, does reflect improvements in the underlying health of the children, perhaps mediated by a safer environment or potentially less risk-seeking behavior, although it is impossible to rule out that utilization effects may play a role.

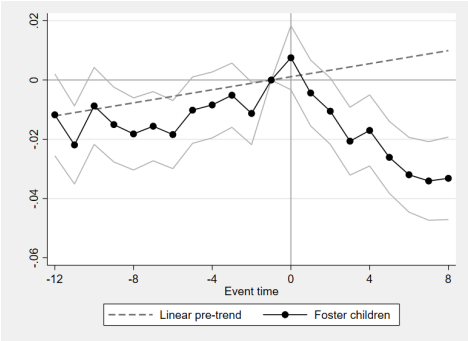
Figure 5: Health



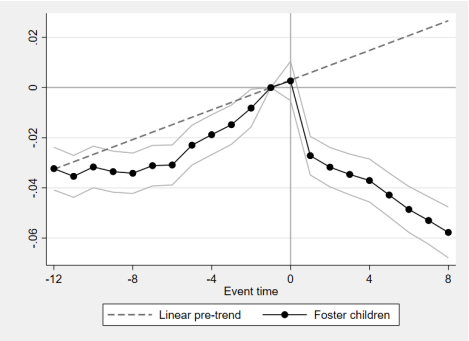
(a) Number of visits to general practitioner



(b) Share with prescription drug purchase



(c) Share with somatic hospitalization

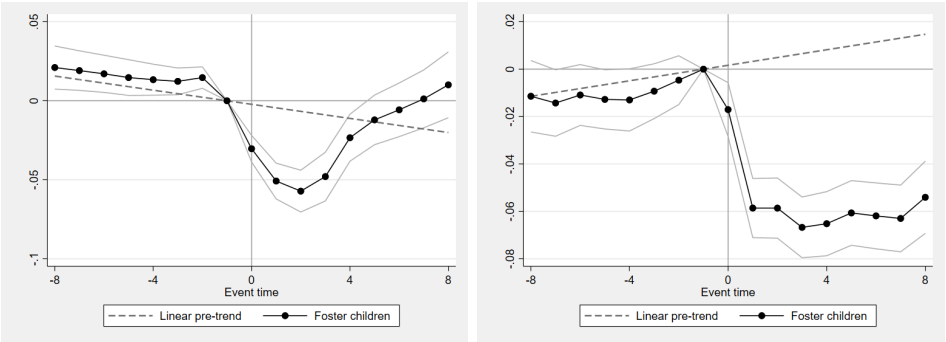


(d) Share with psychiatric hospitalization

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced health sample of children in care.

Figure 6 shows that the share of children who are enrolled in elementary school decreases around the time of placement, but recovers within a year from the time of first placement. Absenteeism conditional on enrollment, on the other hand, decreases significantly at the time of placement and remains low throughout the observation period. We interpret the changes in schooling outcomes as reflecting a generally positive impact of the placement in out-of-home care. There is no statistically significant change in criminal charges across event time as shown in Figure 7.

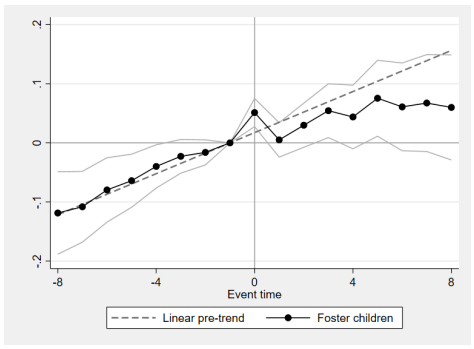
Figure 6: Schooling



(a) Enrollment (b) Absenteeism

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced school sample of children in care. Absenteeism is conditional on enrollment throughout the event period.

Figure 7: Juvenile crime



(a) Criminal charges

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced crime sample of children in care.

Robustness of results

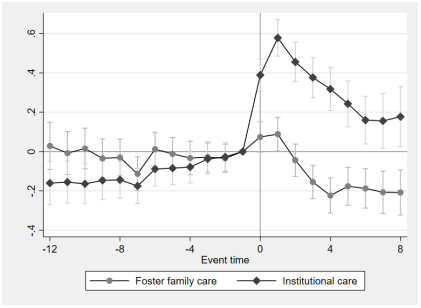
We perform three additional estimations to test the robustness of the event study results, see appendix B. The first robustness check uses later-placed children as the control group, following the design used in Fadlon and Nielsen (2019). The second robustness check uses an event study design,

but with individual fixed effects instead of modelling a trend. And the third robustness check uses an event study design combined with propensity score matching. All three alternative estimation approaches yield results that are very similar to the main results. One exception is the estimates for schooling outcomes in the specification with unit fixed effects presented in B.2. The results from this specification show no temporary drop in enrollment in the year following placement in out-of-home care, but instead shows a gradual and sustained increase in enrollment following the event. The decrease in absenteeism following placement in out-of-home care is estimated to be larger at the time of placement compared with the main estimates, and to continue to decrease in the years following the event. In this sense, the main results may represent conservative estimates of the positive impact of out-of-home care on schooling outcomes.

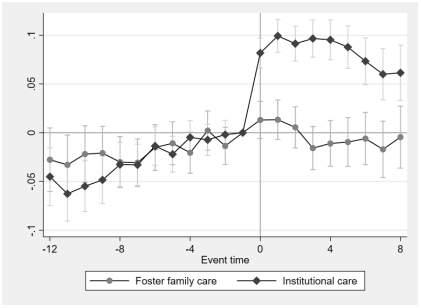
Heterogeneous effects

To check for heterogeneous effects, we split the sample according to type of care, gender and age. When splitting the sample into children who are placed in foster families and children in institutional care we see remarkable differences, as shown in figure 8. For children in foster families, we do not see the same deterioration in health and school outcomes prior to placement. For most of the outcomes there are no pre-trends, with the exception of juvenile crime. Moreover, we see clear improvements in health and schooling outcomes after the placement, since both the rate of hospitalization, the number of GP visits and absenteeism fall. On the other hand, children in institutional care follow the same development as shown in the main graphs, but with even larger changes. Although it is tempting to try to draw causal inference on the effect of foster families versus institutional care from the comparison of the outcomes of the two types of care, however, it is important to remember that children placed in institutional care are different to children placed in family foster care. They are older and often have more complex needs.

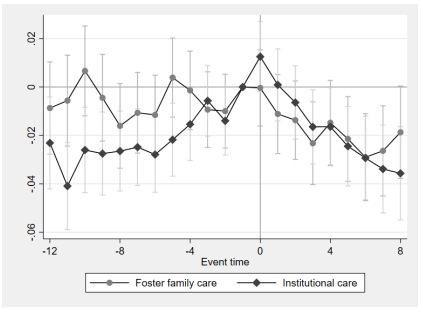
Figure 8: Heterogeneity by type of care



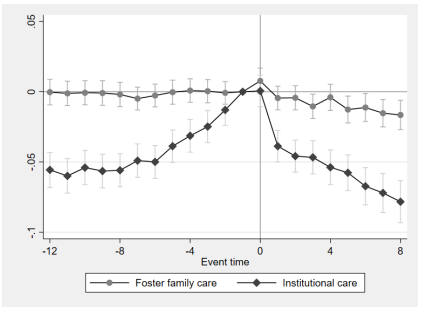
(a) GP visits



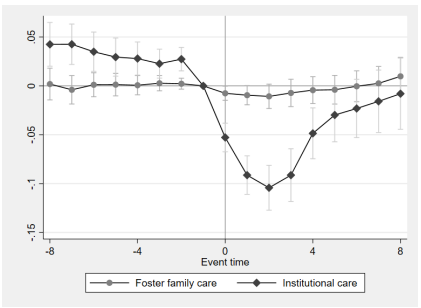
(b) Prescription drug purchase



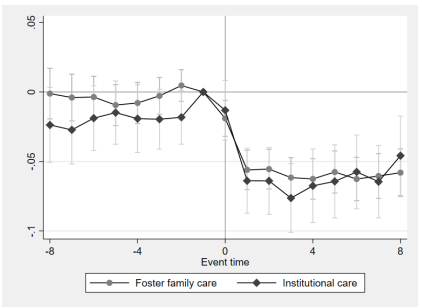
(c) Somatic hospitalization



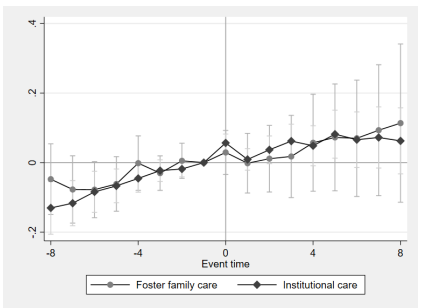
(d) Psychiatric hospitalization



(e) Enrollment



(f) Absenteeism



(g) Criminal charges

Note: The graphs show the level change in outcomes relative to period t=-1 separately for children placed in institutional care and family foster care.

Results by age and sex are shown in Appendix section D. When splitting the sample according to age in Figure D.2, we see that the effects on health are mainly driven by the oldest children (aged 13-16). For school outcomes, there are only minor differences across age.

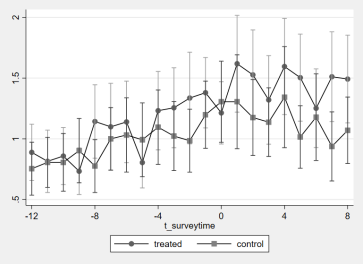
When comparing the effects across sex, see Figure D.1, we find that the health effects are stronger for girls, while the effects on juvenile crime are stronger for boys.

5.2 Survey matching

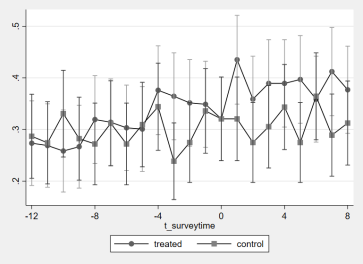
In this section, we present results for the local average treatment effect of placement using our matching strategy on the survey data collected for this project. We compare the outcomes of children who were placed in care with a matched control group of children who were not placed, but had similar risk levels as assessed by the caseworker.

Figure 9 shows event graphs on health and school outcomes for the two groups. The event time $t = 0$ refers to the quarter in which the decision about placement was taken. All the event graphs show that the two groups are not significantly different neither before nor after the placement, partly due to small sample size. When taking a closer look at the outcomes, we find a weak tendency fort visits to a GP and drug purchases to increase after the placement relative to the control group and that the enrollment rate is decreasing for the children in care relative to the control group.

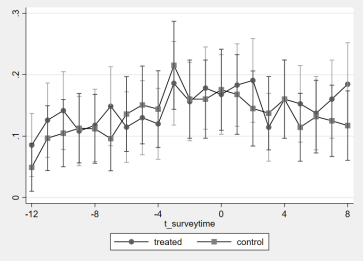
Figure 9: Main outcomes, quarterly averages



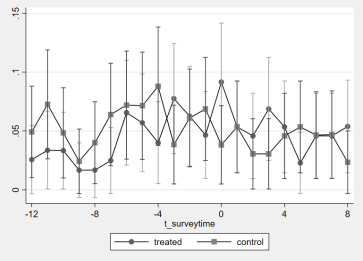
(a) Number of visits to general practitioner



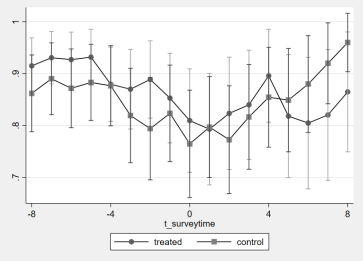
(b) Share with prescription drug purchase



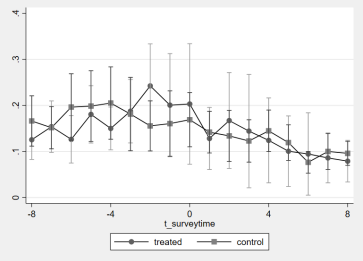
(c) Share with somatic hospitalization



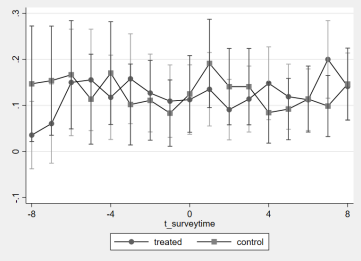
(d) Share with psychiatric hospitalization



(e) Enrollment



(f) Absenteeism



(g) Criminal charges

Note: The figure shows the average outcomes separately for children placed in care after the survey and children who were not placed in care after the survey. The two groups are matched on age, gender and caseworker risk assessment. The sample is unbalanced across event time.

To further investigate the effect of placement, we look at child outcomes 8 quarters after the placement decision was taken. The results are shown in the top part of table 4. We do not see any significant differences between the children placed in out-of-home care and those who are not placed in care. The point estimates indicate an increase in GP visits, hospital contacts and prescription drug purchases and a decrease in enrollment, absenteeism and criminal charges. None of these differences are statistically significant.

In Appendix section F, we show additional regression analyses where we pooled all observations after the care decision is taken. In the regression framework, we control for background characteristics (see Table F.3). We find largely the same effects, and now the increase in GP visits is statistically significant.

Finally, we take individual fixed effects into account by looking at the average change in outcomes between periods t=0 and t=8 and compare the two groups, see table 4. The last column shows the difference in differences between the two groups over time. We see largely similar results, with a few exceptions. The difference between the number of GP visits is now a little larger and marginally statistically significant. The difference in psychiatric hospitalizations has switched sign from positive to negative, but remains insignificant. The difference in school enrollment and absenteeism between the treatment and control groups has increased, but it remains insignificant, and the same is true for the change in criminal charges. When we do the same exercise, but pool all observations from $t = 1, .., 8$, we get the same results, namely, the only significant effect of placement is found in the number of visits to a GP (see Table F.4).

Generally, our results using survey data show no significant short-run effects of the placement on health and school outcomes. The only marginally significant effect is on the number of GP visits, which on average, increase by around half a visit after a placement. Where the results for visits to a GP and partly also for enrollment are in line with the results of the event study, the results on hospitalization and absenteeism are inconsistent with the event study. The decline in hospitalization and absenteeism found in the event study is unlikely to be a causal effect of the out-of-home placement as the control group based on survey data displays a similar decline.

Table 4: Survey treatment vs control children, 8 quarters after survey

	Treatment mean	Control mean	Difference b	t
Average outcome in t=8				
Number of GP visits	1.49	1.07	0.42	(1.8)
Somatic hospital contact	0.18	0.12	0.07	(1.5)
Psychiatric hospital contact	0.05	0.02	0.03	(1.3)
Prescription drug purchase	0.38	0.31	0.06	(1.1)
Enrolled in elementary school	0.86	0.96	-0.10	(-1.6)
Absenteeism	0.08	0.10	-0.02	(-0.7)
Criminal charge	0.14	0.15	-0.01	(-0.1)
Average change in outcome from t=0 to t=8				
Δ Number of GP visits	0.28	-0.25	0.53*	(2.0)
Δ Somatic hospital contact	0.02	-0.06	0.08	(1.2)
Δ Psychiatric hospital contact	-0.04	-0.02	-0.02	(-0.6)
Δ Prescription drug purchase	0.06	-0.02	0.08	(1.2)
Δ Enrolled in elementary school	0.00	0.14	-0.14	(-1.4)
Δ Absenteeism	-0.04	0.02	-0.06	(-1.2)
Δ Criminal charge	-0.01	0.02	-0.03	(-0.4)
N	130	128	258	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: The top rows of the table show average outcomes 8 quarters after the survey for all survey children observed in that quarter. The bottom rows show the average change between the survey quarter and 8 quarters after the survey. For this reason, the bottom rows are conditional on observing an outcome for each child in both quarters and results may differ with respect to the unbalanced sample.

6 Conclusion

This paper examines the development in child outcomes around the time of a placement in out-of-home care.

The first part of our analysis uses a unique data set with administrative register data for all children experiencing a placement in out-of-home care in the period 2013 to 2016 in Denmark. The analysis points to a remarkable development in child outcomes up to two years *before* as well as *after* a placement in out-of-home care. Estimation results indicate a deterioration in health and an increase in juvenile crime in the period leading up to the placement, while the effect is less clear for school outcomes. This suggests that health issues and juvenile crime can trigger a placement.

After a placement, the picture is mixed. Some child outcomes improve following a placement. We find that, on average, the probability of hospitalization decreases after placement, while visits to the GP and prescription drug purchases remain at a high level. These effects may partly be driven by an increase in health utilization (for example an increase in asthma medication) and partly by improvements in underlying health (for example a reduction in hospitalization due to accidents). Turning to school outcomes, we see two opposite effects: a decrease in enrollment and a reduction of absenteeism for those who are enrolled.

In the second part of the empirical analysis, we use a survey data set that we collected on caseworker assessments of risk levels for a small sample of children who were all considered for out-of-home placement in Copenhagen during 2015-16. The purpose of this survey was to collect information about a group of children that shared quite similar circumstances in the sense that they were all investigated for the purpose of deciding whether to place them in out-of-home care or not. Some where subsequently placed in out-of-home care, others were not, but all could be thought of as being a "marginal child" on the verge of a placement. Due to the limited sample size of the survey, the results are generally imprecisely estimated. However, the results point to important insights into the causal effects. The increase in GP visits after placement found in the event study are likely to be a causal effect. Likewise, we find an indication that the fall in school enrollment for children in care could be a causal effect driven by children in institutional care. In contrast, the decline in hospitalization and absenteeism after the placement that was seen in the event study are unlikely to be a causal effect of the placement. The fact that we see a similar decline for children who are not placed indicates that it is not the placement in itself that causes the decline. However, it is important to note first, that the marginal children who are not in out-of-home care will receive other types of support and caseworkers will follow

these children closely. Second, these results are effects on the marginal child and may not hold for all children in out-of-home care.

Our paper makes several important contributions. First, while a number of recent papers (Doyle, 2007; Doyle, 2008, 2013; Doyle and Aizer, 2018; Warburton et al., 2014; Baron and Gross, 2020; Bald et al., 2019) were able to identify the causal effects of placing the "marginal" child in foster care, our results based on an event study are related to placement of the average child. Our unique longitudinal data allows us to document the development in key outcomes of the children quarter by quarter. This description of the process leading up to placement as well as after placement clearly illustrates that the group of children being placed in out-of-home care had experienced a deterioration in their situation over several years before the decision to place them in care was taken. This underlines the difficulty in defining a relevant control group for this group of children and illustrates why ordinary propensity score matching on socioeconomic characteristics as well as previous child outcomes is generally not successful in identifying causal effects for placements in care.

Second, we contribute by exploiting a survey that we conducted to better understand the assessments and decisions that caseworkers have to make. Two features of this survey are important. First, the survey is designed to only consider "marginal" children, for whom a placement is considered. Second, when including caseworker risk assessments, which are usually unobserved, as an additional variable in our propensity score matching, the treatment and control groups become much more similar in terms of socioeconomic characteristics. Hence, including measures such as caseworker risk assessment improves the potential success of matching methods to identify causal effects by providing information that allows us to compare children who are similar on parameters that are essential in the placement decision.

Our analysis thus suggests that having better data on child characteristics, such as an assessment of, e.g., risk factors, would substantially improve policy makers options for evaluating public programs such as out-of-home care. Our paper provides a suggestion for a simple yet effective questionnaire that collects the essential information. This would furthermore contribute to improving the design of treatments for a very vulnerable group in society. Moreover, collecting such data systematically would assist caseworkers in finding the appropriate balance between out-of-home placement versus preventive measures for the individual child.

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Appendix

A Children in care compared to all children not in care

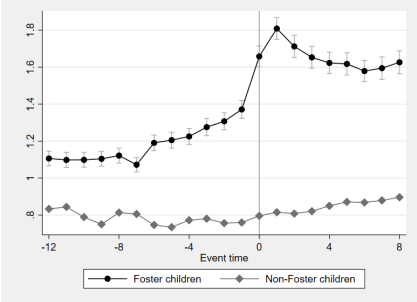
Here we present graphs showing descriptive difference between our sample of children in care as compared to all children who are not in care in our sample, matched only on gender and age. Graphs show the quarterly average of the two groups across event time. Non in care children are assigned a placebo event time.

Table A.1: Foster children vs non-foster children, quarter before first placement

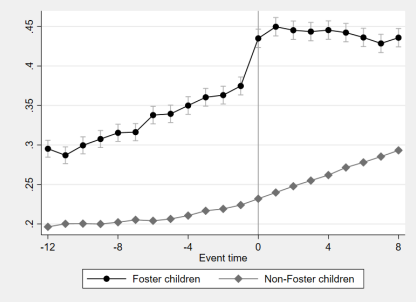
	Foster children	Non-foster children	Difference	
	mean	mean	b	t
Age	12.37	11.88	0.49***	(10.4)
Girl	0.48	0.49	-0.01	(-0.9)
Preventive care	0.31	0.00	0.31***	(302.4)
Number of GP visits	1.37	0.76	0.61***	(36.7)
Somatic hospital contact	0.15	0.07	0.08***	(24.7)
Psychiatric hospital contact	0.08	0.00	0.08***	(88.5)
Prescription drug purchase	0.37	0.22	0.15***	(29.6)
Criminal charge	0.14	0.01	0.14***	(67.1)
Enrolled in elementary school	0.92	0.99	-0.08***	(-55.6)
Absenteeism	0.17	0.05	0.12***	(75.5)
Mother's characteristics, measured at year of birth of the child				
Age	27.40	29.39	-1.99***	(-33.3)
Married/Registered partnership	0.32	0.50	-0.17***	(-28.6)
Highest completed elementary school	0.01	0.01	0.01***	(4.3)
Highest completed secondary education	0.81	0.60	0.21***	(35.6)
Highest completed tertiary education	0.08	0.34	-0.26***	(-45.5)
Employed	0.29	0.65	-0.36***	(-61.5)
Self-employed	0.01	0.02	-0.01***	(-6.0)
Unemployment benefits	0.05	0.02	0.03***	(16.8)
Education or health benefits	0.16	0.17	-0.01	(-1.5)
Early retirement benefits	0.03	0.00	0.03***	(33.7)
Retirement benefits	0.00	0.00	0.00**	(2.9)
On cash benefits	0.35	0.07	0.28***	(84.9)
Other	0.03	0.02	0.01***	(4.4)
On cash benefits	0.35	0.07	0.28***	(84.9)
Criminal charge	0.25	0.12	0.13***	(31.9)
Psychiatric hospital contact	0.12	0.03	0.09***	(42.2)
N	7,000	204,212	211,212	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

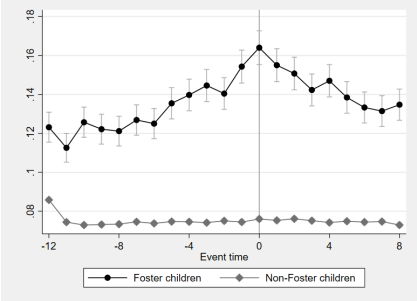
Figure A.1: Health, quarterly average



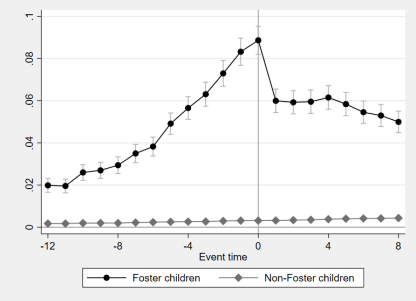
(a) Number of visits to general practitioner



(b) Share with prescription drug purchase



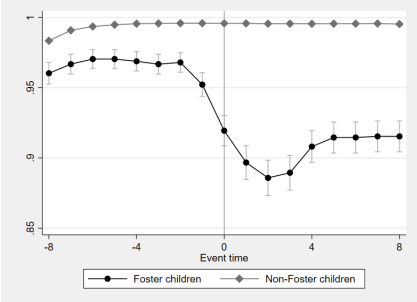
(c) Share with somatic hospitalization



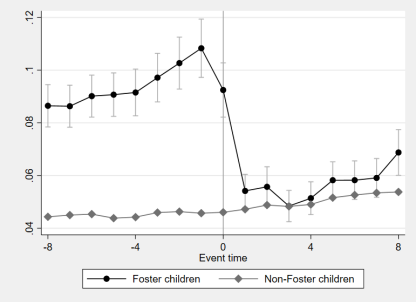
(d) Share with psychiatric hospitalization

Note: The figure shows the average outcomes separately for foster children and non-foster children matched only on age and gender.

Figure A.2: Schooling, quarterly average



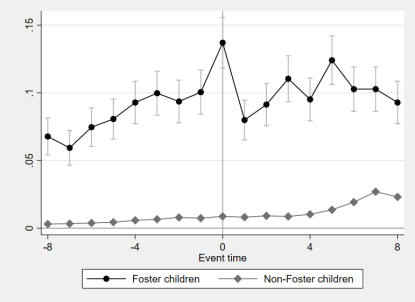
(a) Enrollment



(b) Absenteeism

Note: The figure shows the average outcomes separately for foster children and non-foster children matched only on age and gender, for school-age children (age 7-15).

Figure A.3: Juvenile crime, quarterly average



(a) Criminal charges

Note: The figure shows the average outcome separately for foster children and non-foster children matched only on age and gender, for children above the age of criminal responsibility (age 15 and above).

B Alternative estimation methods

Here we present 3 alternative event study estimation methods. The first alternative method is an estimation of the non-parametric event model using children placed in care at a later time as a control group. Adding the control group allows us to include unit fixed effects. The second alternative method is an estimation of the non-parametric event model on an unbalanced sample of children in care with unit fixed effects. In order to identify unit fixed effects without a control group, we must omit an additional pre-period dummy. The third alternative approach is an estimation of the non-parametric event model using the matched control group. Adding a control group to the estimation allows us to include unit fixed effects.

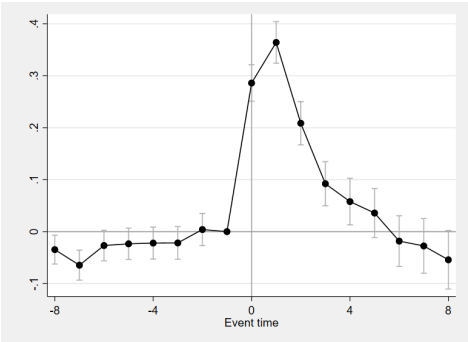
B.1 Event study with children placed in care 8 quarters later as control group

Table B.1: Foster children vs children placed in care 8 quarters later as control group, quarter before event

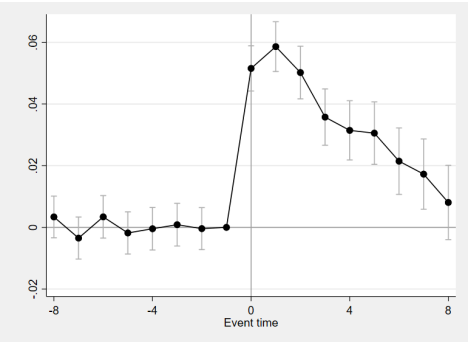
	Foster children	Non-foster children	Difference	
	mean	mean	b	t
Age	11.40	9.45	1.95***	(33.5)
Girl	0.47	0.48	-0.01	(-1.7)
Preventive care	0.28	0.13	0.15***	(29.7)
Number of GP visits	1.42	1.09	0.33***	(13.1)
Somatic hospital contact	0.17	0.12	0.05***	(11.2)
Psychiatric hospital contact	0.07	0.02	0.05***	(18.4)
Prescription drug purchase	0.36	0.28	0.07***	(12.4)
Criminal charge	0.14	1.00	-0.86***	(-18.1)
Enrolled in elementary school	0.91	0.96	-0.06***	(-15.3)
Absenteeism	0.16	0.10	0.07***	(19.2)
Mother's characteristics, measured at year of birth of the child				
Age	27.17	27.59	-0.42***	(-5.4)
Married/Registered partnership	0.30	0.33	-0.03***	(-5.5)
Highest completed elementary school	0.01	0.02	-0.00	(-1.7)
Highest completed secondary education	0.78	0.79	-0.02**	(-2.9)
Highest completed tertiary education	0.07	0.09	-0.02***	(-5.0)
Employed	0.25	0.30	-0.05***	(-8.9)
Self-employed	0.01	0.01	-0.00	(-0.7)
Unemployment benefits	0.05	0.05	0.01***	(3.3)
Education or health benefits	0.15	0.15	-0.01	(-1.3)
Early retirement benefits	0.03	0.03	0.00	(1.7)
Retirement benefits	0.00	0.00	-0.00	(-0.5)
On cash benefits	0.36	0.35	0.01	(1.5)
Other	0.04	0.03	0.00	(0.4)
On cash benefits	0.36	0.35	0.01	(1.5)
Criminal charge	0.27	0.26	0.01	(1.4)
Psychiatric hospital contact	0.14	0.14	0.01	(1.3)
N	18,590	9,888	28,478	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

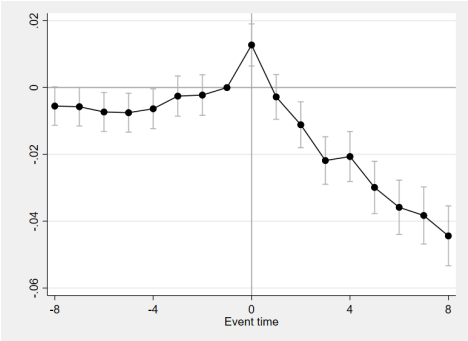
Figure B.1: Health



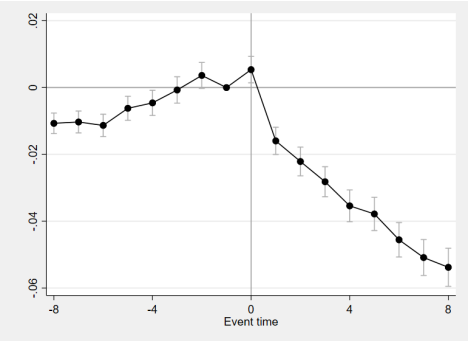
(a) Number of visits to general practitioner



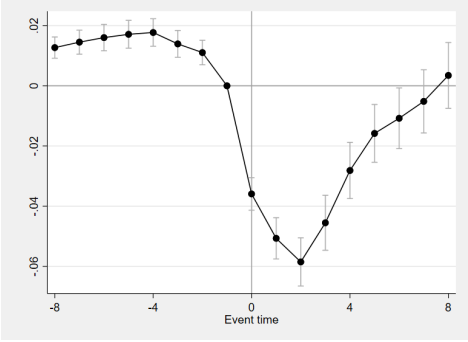
(b) Share with prescription drug purchase



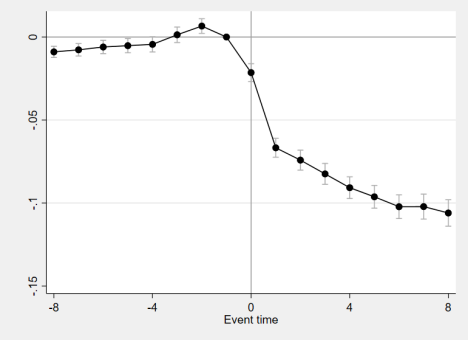
(c) Share with somatic hospitalization



(d) Share with psychiatric hospitalization



(e) Enrollment

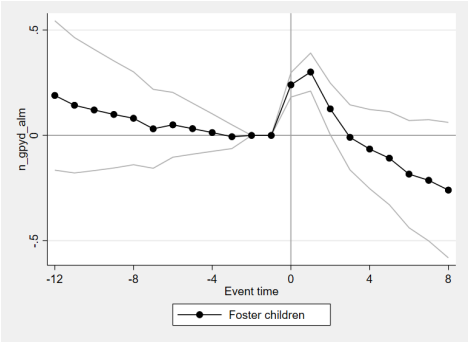


(f) Absenteeism

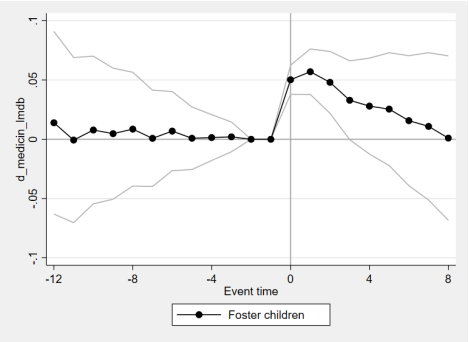
Note: The figure shows estimated event coefficients from model 2 with the group of children placed in care at a later (calendar) time as control group and unit fixed effects. The sample is unbalanced.

B.2 Event study with unit fixed effects

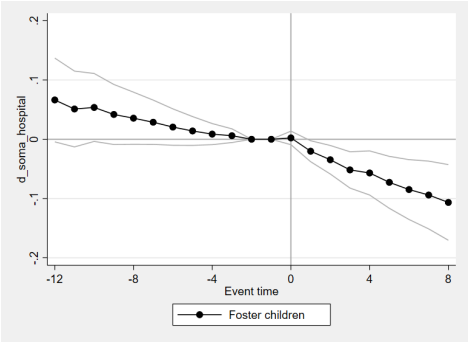
Figure B.2: Event coefficients, with unit fixed effects (no control group)



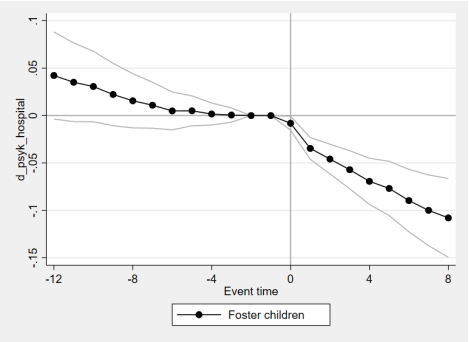
(a) Number of visits to general practitioner



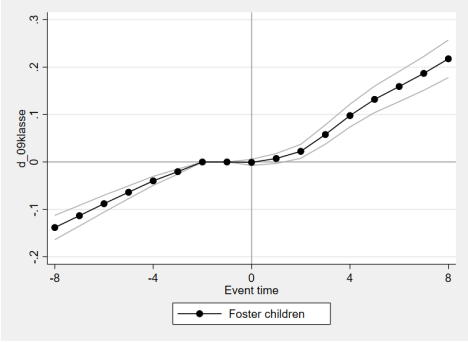
(b) Share with prescription drug purchase



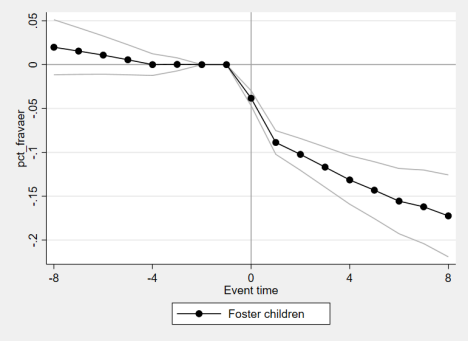
(c) Share with somatic hospitalization



(d) Share with psychiatric hospitalization



(e) Enrollment

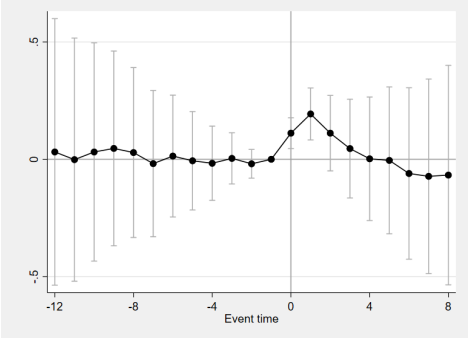


(f) Absenteeism

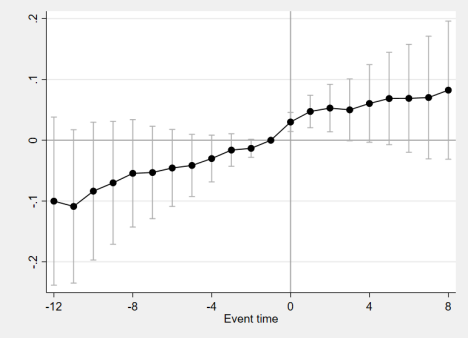
Note: The figure shows estimated event coefficients from model 2 with unit fixed effects and where pre-periods -1 and -2 are restricted to zero. The sample is unbalanced.

B.3 Event study with matched control group

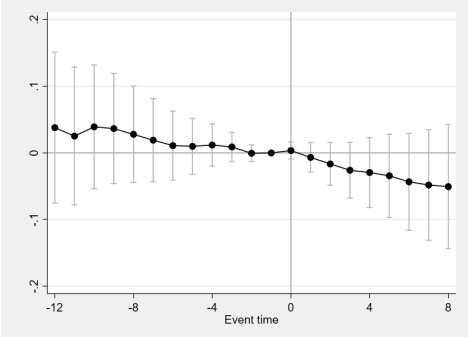
Figure B.3: Event coefficients, matched control group with unit fixed effects



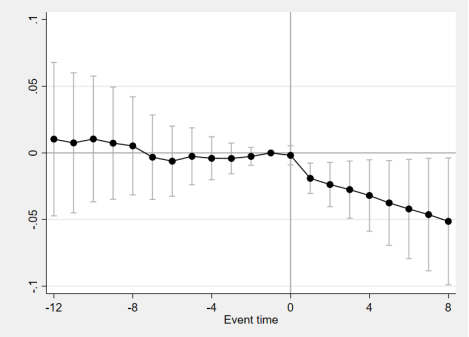
(a) Number of visits to general practitioner



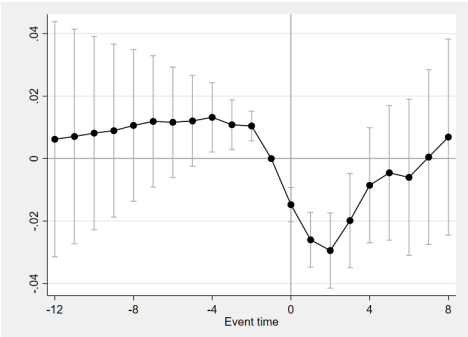
(b) Share with prescription drug purchase



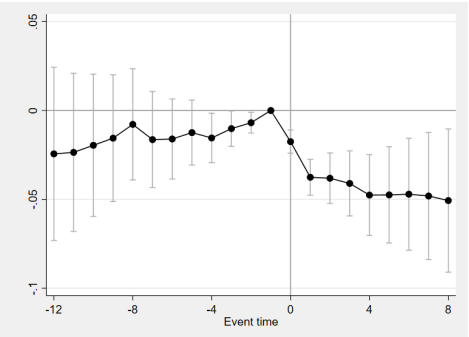
(c) Share with somatic hospitalization



(d) Share with psychiatric hospitalization



(e) Enrollment



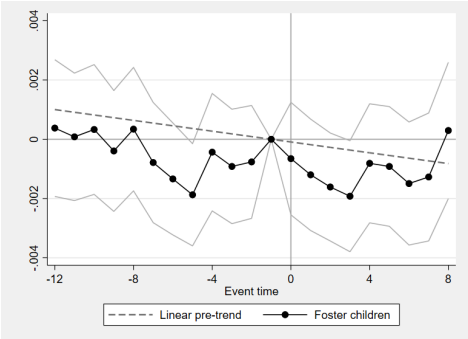
(f) Absenteeism

Note: The figure shows estimated event coefficients from model 2 with the matched children not in care as control group and unit fixed effects. The sample is unbalanced.

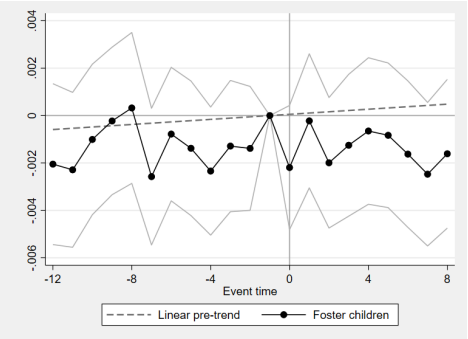
C Supplementary health evidence

Here we present supplementary evidence on health outcomes. For somatic hospitalizations we show results by 4 of the major diagnosis groups. The diagnosis groups are defined on the basis of the ICD10 diagnosis code and the specific ICD10 codes belonging to each group can be found in the notes to the figure. For psychiatric hospitalizations we show 3 of the largest diagnosis groups. For prescription drug purchases we show results for 4 of the largest drug groups.

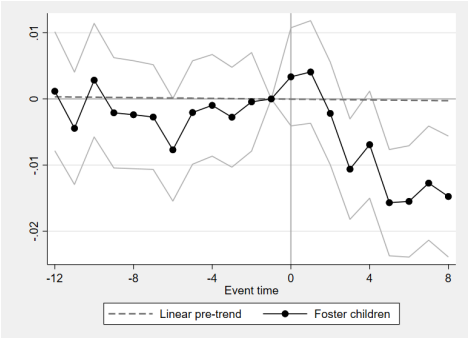
Figure C.1: Somatic hospitalizations by diagnosis group



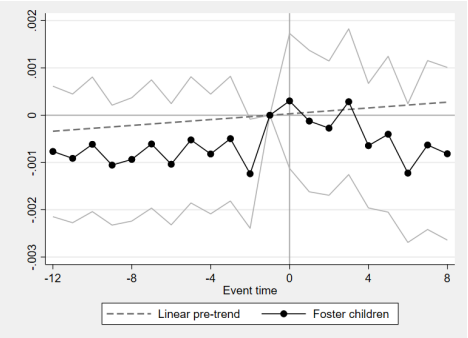
(a) Infections



(b) Respiratory diseases



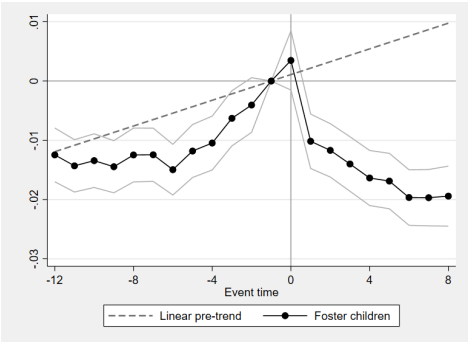
(c) Injury



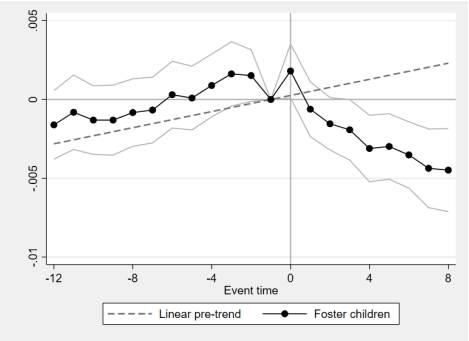
(d) Poisonings

Notes: ICD10 diagnosis codes in each of the diagnosis groups. Infections and parasites: A00-B99 , Respiratory diseases: J00-J99, Injuries: S00-T14, Poisonings: T15-T98.

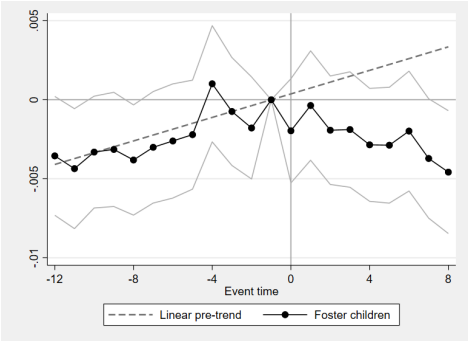
Figure C.2: Psychiatric hospitalizations by diagnosis group



(a) Reaction to severe stress, and adjustment disorders



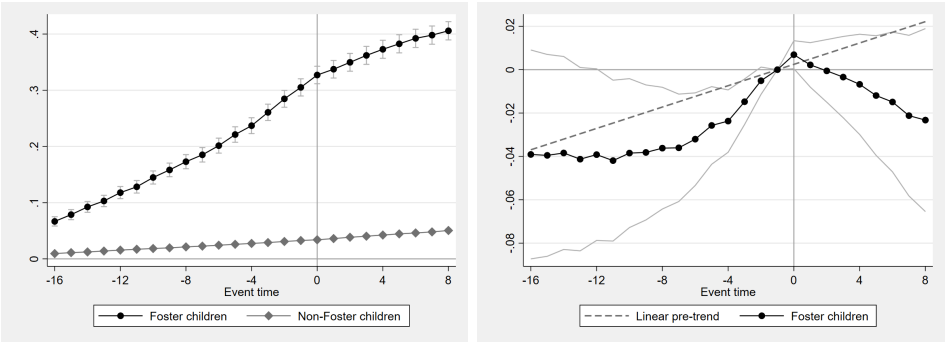
(b) Eating disorders



(c) Hyperkinetic disorders

Note: The diagnoses are categorized according to the ICD10 classification for mental and behavioral disorders. Here we show group F43 (Reaction to severe stress, and adjustment disorders), group F50 (Eating disorders) and group 90 (Hyperkinetic disorders).

Figure C.3: Cumulative psychiatric diagnoses



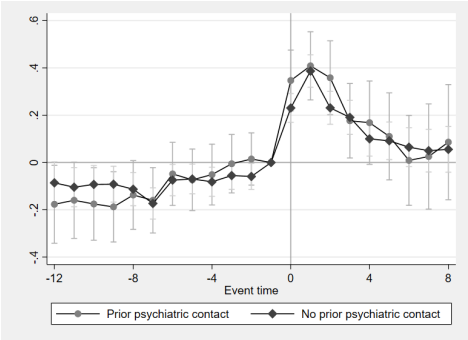
(a) Averages (b) Event coefficients

Table C.1: Survey treatment vs control children, no psychiatric hospitalization in t=0

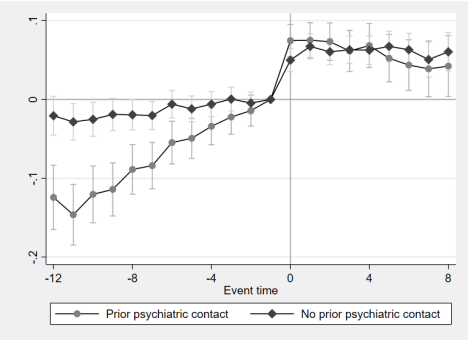
	Treatment mean	Control mean	Difference b	t
Average outcome in t=8				
Number of GP visits	1.33	1.01	0.32	(1.5)
Somatic hospital contact	0.17	0.12	0.05	(1.0)
Psychiatric hospital contact	0.04	0.02	0.02	(0.8)
Prescription drug purchase	0.35	0.30	0.05	(0.8)
Enrolled in elementary school	0.89	0.96	-0.07	(-1.2)
Absenteeism	0.08	0.10	-0.02	(-0.7)
Criminal charge	0.12	0.16	-0.03	(-0.6)
Average change in outcome from t=0 to t=8				
Δ Number of GP visits	0.23	-0.34	0.57*	(2.2)
Δ Somatic hospital contact	0.01	-0.06	0.07	(1.0)
Δ Psychiatric hospital contact	0.04	0.02	0.02	(0.8)
Δ Prescription drug purchase	0.07	-0.02	0.09	(1.4)
Δ Enrolled in elementary school	0.03	0.14	-0.11	(-1.2)
Δ Absenteeism	-0.04	0.02	-0.06	(-1.2)
Δ Criminal charge	-0.05	0.02	-0.07	(-0.9)
N	118	123	241	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

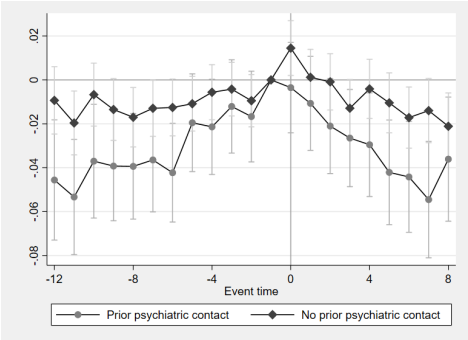
Figure C.4: Changes in outcomes for children with/without previous psychiatric diagnoses



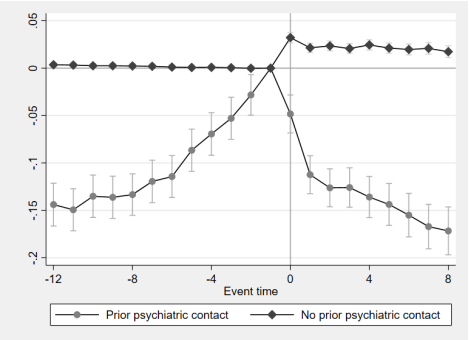
(a) Number of GP visits



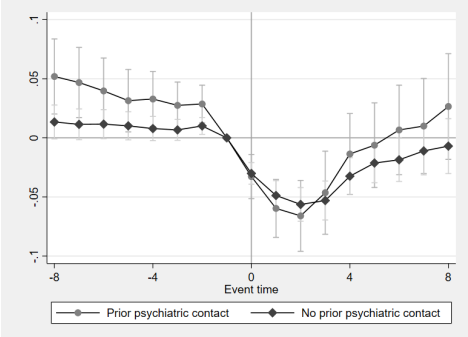
(b) Prescription drug purchases



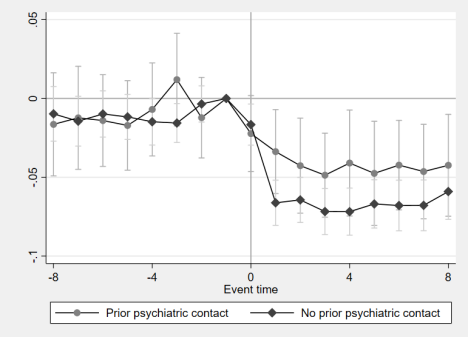
(c) Somatic hospitalizations



(d) Psychiatric hospitalizations

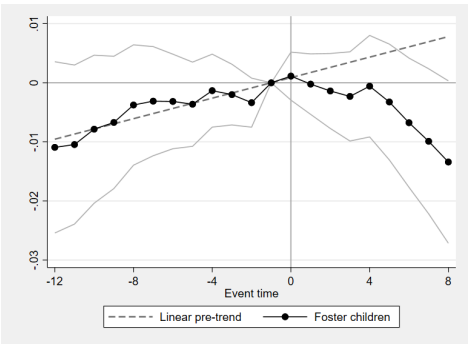


(e) Enrollment

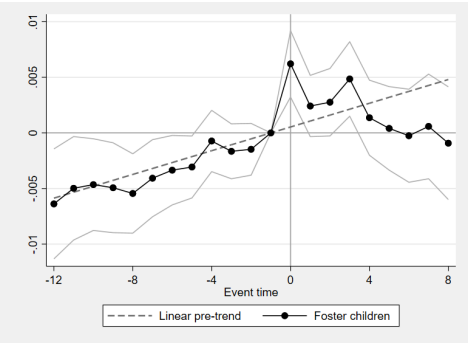


(f) Absenteeism

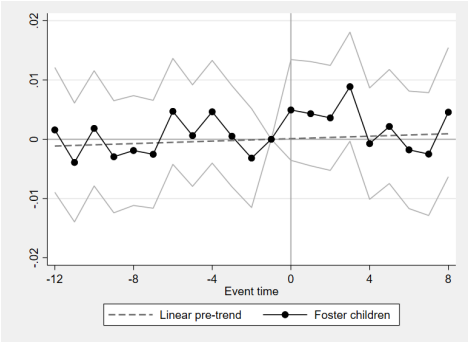
Figure C.5: Prescription drug purchases by drug group



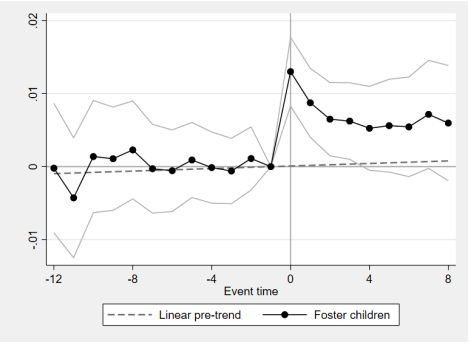
(a) ADHD treatment



(b) Benzodiazepines and related drugs



(c) Antibiotics

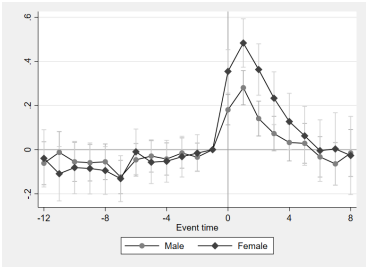


(d) Astma

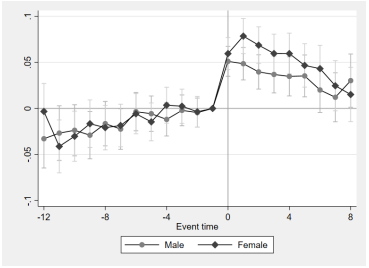
Notes: The drugs are categorized according to groups defined by the Danish Health Data Authorities (Sundhedsdatastyrelsen). The groups are defined based on the WHO ATC codes. The specific ATC codes can be found on medstat.dk. Asthma medication includes ATC codes R03. Antibiotics include ATC codes J01. ADHD medication includes ATC codes CO2AC01, N06BA01, N06BA04, N06BA09, N06BA12. Benzodiazepines and related drugs include ATC codes N05BA, N05CD, N03AE, N05CF.

D Heterogeneity by sex and age

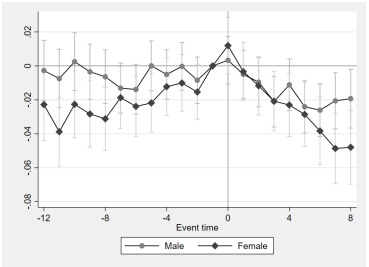
Figure D.1: Heterogeneity by sex



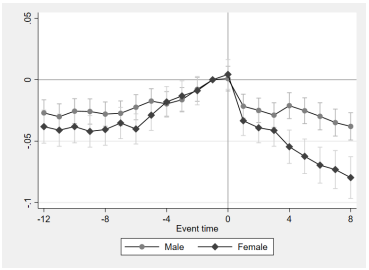
(a) GP visits



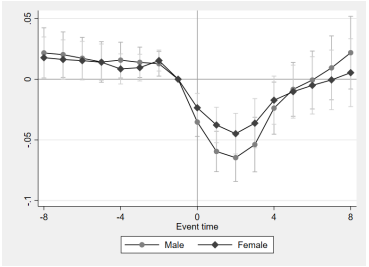
(b) Prescription drug purchase



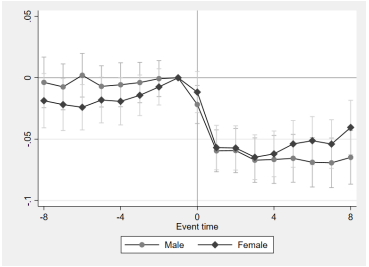
(c) Somatic hospitalization



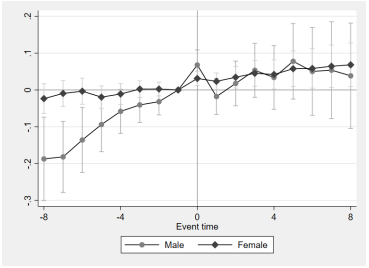
(d) Psychiatric hospitalization



(e) Enrollment



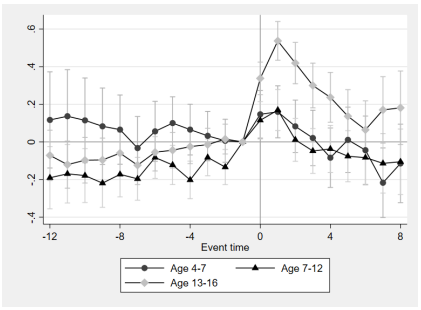
(f) Absenteeism



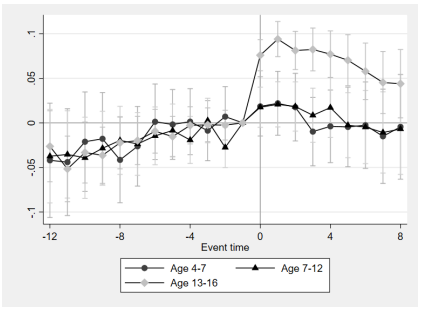
(g) Criminal charges

Note: The figures show the level changes in outcomes relative to period t=-1 separately for boys and girls.

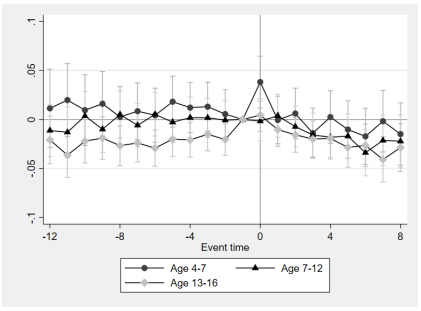
Figure D.2: Heterogeneity by age



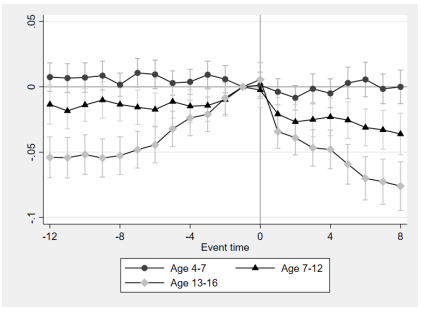
(a) GP visits



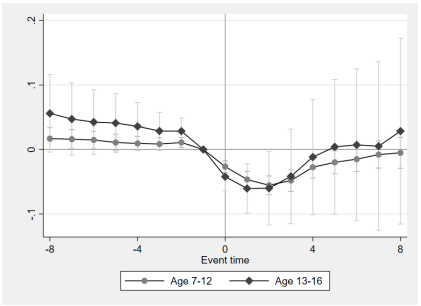
(b) Prescription drug purchase



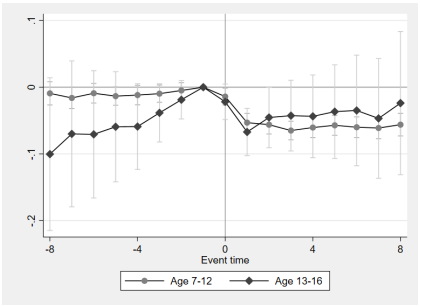
(c) Somatic hospitalization



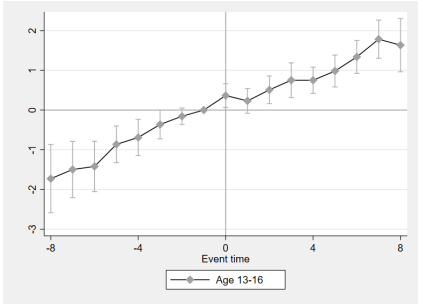
(d) Psychiatric hospitalization



(e) Enrollment



(f) Absenteeism



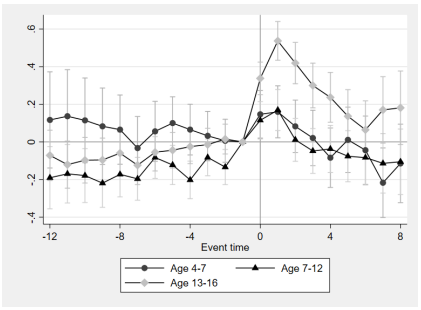
(g) Criminal charges

Note: The figures show the level changes in outcomes relative to period t=-1 separately by age group at the time of placement in out-of-home care.

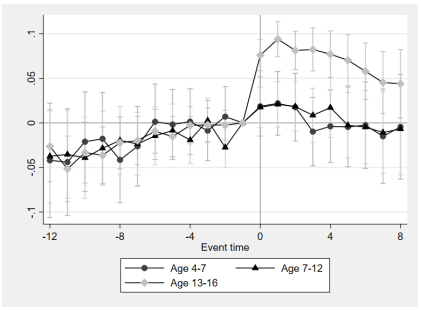
E Event graphs on monthly basis

To further investigate what happens around the time of the placement, we repeat our event graphs but now using a monthly frequency. We focus on a period of 12 month before and 12 month after the placement.

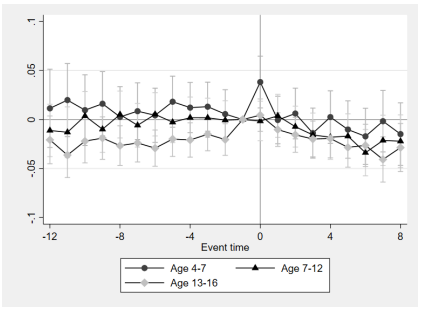
Figure E.1: Event graphs on monthly basis



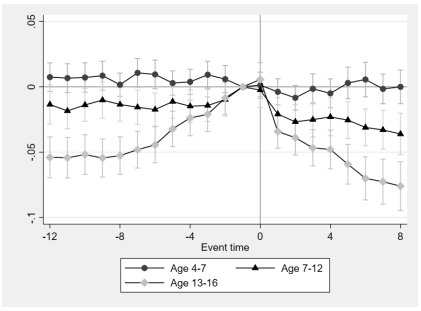
(a) GP visits



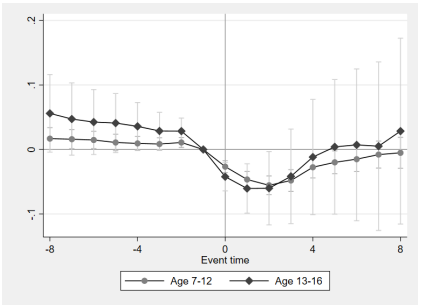
(b) Prescription drug purchase



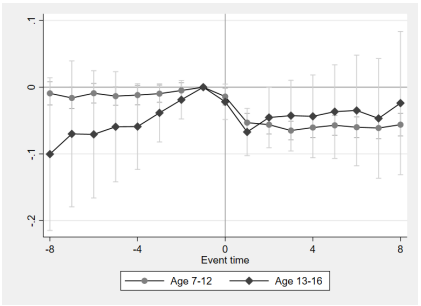
(c) Somatic hospitalization



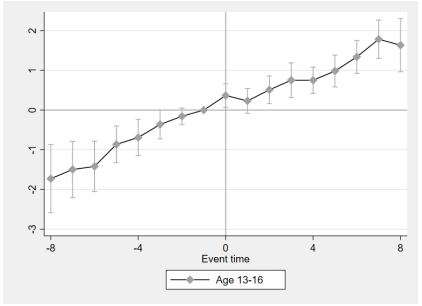
(d) Psychiatric hospitalization



(e) Enrollment



(f) Absenteeism

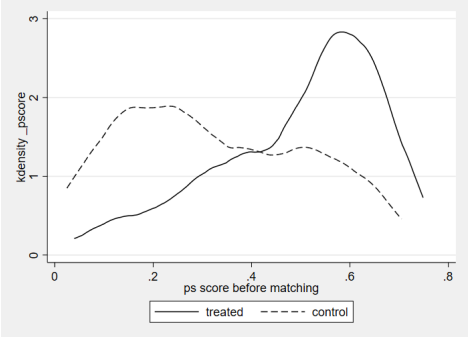


(g) Criminal charges

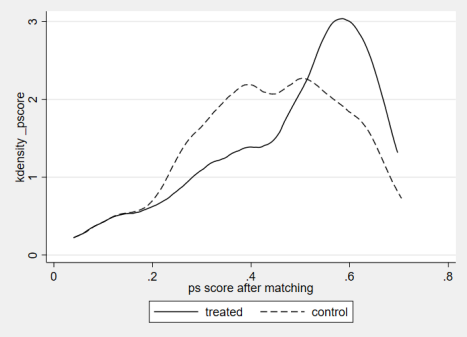
Note: The figures show the level changes in outcomes relative to period t=-1 12 months before and 12 month after the time of placement in out-of-home care.

F Supplementary survey evidence

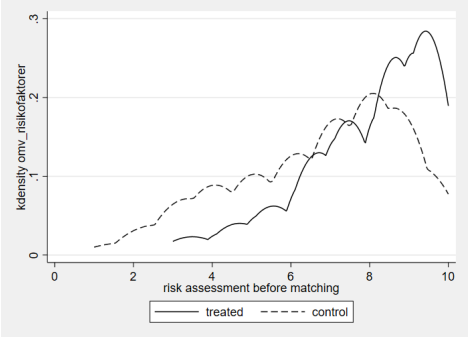
Figure F.1: Common Support



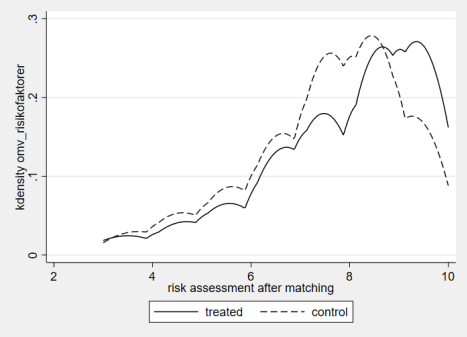
(a) Propensity score distribution, before matching



(b) Propensity score distribution, after matching



(c) Risk assessment distribution, before matching



(d) Risk assessment distribution, after matching

Note: The figure shows kernel density plots of the sample distributions before and after matching. The upper two panels show the estimated propensity score and the lower two panels the caseworker risk assessment. The matching procedure imposes a common support restriction on the propensity score and any observations not on common support are dropped from the matched sample.

Table F.1: Survey regression estimates, post-periods pooled, unmatched sample

	(1) Number of GP visits	(2) Somatic hospital contact	(3) Psychiatric hospital contact	(4) Prescription drug purchase	(5) Enrolled in elementary school	(6) Absenteeism	(7) Criminal charge
Placed in out-of-home care	0.270	0.0101	0.00460	0.0690	-0.0338	-0.00743	-0.00845
	(1.94)	(0.47)	(0.28)	(1.90)	(-0.59)	(-0.31)	(-0.26)
Age at time of survey	0.0251*	0.000901	0.00464***	0.0159***	-0.0165*	0.0111***	-0.000510
	(2.06)	(0.42)	(3.58)	(5.00)	(-2.13)	(3.65)	(-0.05)
Girl	0.415***	-0.0126	0.00941	0.0925**	0.0725	-0.0248	-0.110***
	(3.53)	(-0.68)	(0.70)	(3.04)	(1.84)	(-1.38)	(-3.57)
Caseworker risk assessment	0.0236	0.00971	0.00462	0.0135	-0.00841	0.00408	0.0223**
	(0.81)	(1.82)	(1.35)	(1.88)	(-0.70)	(1.04)	(3.05)
Mother's characteristics measured at year of birth of the child							
Age	-0.0276*	-0.00247	-0.000959	-0.00655*	0.00392	-0.00152	-0.000640
	(-2.41)	(-1.34)	(-0.81)	(-2.33)	(0.88)	(-0.92)	(-0.21)
Married/Registered partnership	-0.205	-0.0284	-0.0185	-0.0824*	0.0735	0.0175	0.00434
	(-1.55)	(-1.44)	(-1.23)	(-2.39)	(1.72)	(0.86)	(0.14)
Highest completed elementary school	0.201	0.0102	0.00867	0.0990	-0.125	-0.00660	-0.0475
	(0.90)	(0.21)	(0.42)	(1.27)	(-1.39)	(-0.18)	(-0.55)
Highest completed secondary education	0.478**	0.0237	0.0201	0.171***	0.0322	-0.0262	-0.0362
	(2.84)	(0.85)	(1.47)	(3.70)	(0.48)	(-1.05)	(-0.90)
Highest completed tertiary education	0.956***	0.0244	0.0763**	0.248***	-0.0683	-0.0345	-0.0889
	(4.12)	(0.69)	(2.85)	(4.40)	(-0.66)	(-0.93)	(-1.77)
Unemployed	-0.0238	-0.0217	0.0415	-0.0427	0.104*	0.0737*	-0.0168
	(-0.08)	(-0.57)	(0.85)	(-0.56)	(2.22)	(2.12)	(-0.51)
On early retirement	1.133*	0.0458	0.00783	0.249*	0	0	-0.0874*
	(2.49)	(1.06)	(0.42)	(2.36)	(.)	(.)	(-2.29)
On cash benefits	-0.268*	-0.00174	0.00353	-0.0742*	0.0331	-0.00578	0.0511
	(-2.06)	(-0.08)	(0.28)	(-2.23)	(0.74)	(-0.34)	(1.47)
Criminal charge	0.0342	-0.00566	0.0181	0.00955	0.0180	0.0370*	0.0221
	(0.23)	(-0.26)	(1.11)	(0.26)	(0.38)	(2.29)	(0.48)
Psychiatric hospital contact	0.0363	-0.0215	-0.0111	-0.0175	-0.114	-0.00157	-0.0377
	(0.23)	(-0.85)	(-1.11)	(-0.42)	(-1.74)	(-0.09)	(-0.49)
Constant	0.975**	0.135	-0.0502	0.0512	0.936***	0.0241	0.0637
	(2.64)	(1.88)	(-1.09)	(0.50)	(5.30)	(0.41)	(0.33)
Observations	2786	2786	2786	2786	1051	613	1402

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table F.2: Survey regression estimates, change with respect to t=0, unmatched sample

	(1) Δ Number of GP visits	(2) Δ Somatic hospital contact	(3) Δ Psychiatric hospital contact	(4) Δ Prescription drug purchase	(5) Δ Enrolled in elementary school	(6) Δ Absenteeism	(7) Δ Criminal charge
Placed in out-of-home care	0.488*	0.0199	-0.0561*	0.0881	-0.103	-0.0106	-0.00222
	(2.50)	(0.46)	(-2.11)	(1.95)	(-1.62)	(-0.18)	(-0.04)
Constant	-0.240	-0.0316	0.00836	-0.0304	0.0713*	0.00811	0.00539
	(-1.75)	(-1.24)	(0.61)	(-1.10)	(2.15)	(0.60)	(0.14)
Observations	2786	2786	2786	2786	948	459	1188

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table F.3: Survey regression estimates, post-periods pooled, matched sample

	(1) Number of GP visits	(2) Somatic hospital contact	(3) Psychiatric hospital contact	(4) Prescription drug purchase	(5) Enrolled in elementary school	(6) Absenteeism	(7) Criminal charge
Placed in out-of-home care	0.333*	0.0158	0.00503	0.0727	-0.0239	-0.00562	-0.00707
	(2.29)	(0.71)	(0.30)	(1.91)	(-0.44)	(-0.23)	(-0.21)
Age at time of survey	0.0550***	0.00449	0.00443**	0.0208***	-0.0181*	0.0164***	-0.00104
	(3.45)	(1.43)	(2.92)	(5.04)	(-2.07)	(3.67)	(-0.09)
Girl	0.612***	-0.00481	0.0167	0.135***	0.0741	-0.0488	-0.112***
	(4.31)	(-0.22)	(1.05)	(3.63)	(1.53)	(-1.91)	(-3.41)
Caseworker risk assessment	0.0450	0.0163**	0.00932**	0.0150	0.00832	0.00558	0.0231*
	(1.17)	(2.63)	(2.73)	(1.47)	(0.43)	(0.72)	(2.40)
Mother's characteristics measured at year of birth of the child							
Age	-0.0330**	-0.00345	-0.000677	-0.00875**	0.00257	-0.000489	-0.000609
	(-2.63)	(-1.66)	(-0.49)	(-2.85)	(0.49)	(-0.22)	(-0.18)
Married/Registered partnership	-0.340*	-0.0326	-0.0282	-0.0925*	0.0768	0.0339	0.00176
	(-2.21)	(-1.40)	(-1.64)	(-2.21)	(1.49)	(1.15)	(0.05)
Highest completed elementary school	0.413	0.0487	0.00679	0.130	-0.110	0.0106	-0.0354
	(1.73)	(0.97)	(0.32)	(1.54)	(-1.09)	(0.26)	(-0.40)
Highest completed secondary education	0.590**	0.0467	0.0173	0.218***	0.0503	-0.0112	-0.0227
	(3.07)	(1.56)	(1.10)	(4.19)	(0.61)	(-0.35)	(-0.52)
Highest completed tertiary education	1.273***	0.0476	0.0937*	0.334***	-0.151	0.0464	-0.0757
	(4.34)	(1.15)	(2.42)	(4.75)	(-1.20)	(0.71)	(-1.38)
Unemployed	-0.122	-0.0120	0.0195	-0.0154	0.120*	0.0864	-0.0599*
	(-0.34)	(-0.23)	(0.45)	(-0.16)	(2.08)	(1.86)	(-2.16)
On early retirement	0.460	0.103*	0.0129	0.263*	0	0	-0.0861*
	(1.25)	(2.33)	(0.54)	(2.22)	(.)	(.)	(-2.06)
On cash benefits	-0.316*	-0.0148	0.0129	-0.0951*	0.0561	0.00813	0.0534
	(-2.08)	(-0.60)	(0.85)	(-2.44)	(1.19)	(0.37)	(1.41)
Criminal charge	0.0326	-0.00630	0.00403	-0.00896	0.0177	0.0378	0.00942
	(0.18)	(-0.24)	(0.23)	(-0.19)	(0.31)	(1.67)	(0.20)
Psychiatric hospital contact	-0.0282	-0.00488	-0.0138	-0.0191	-0.102	0.0151	-0.0132
	(-0.15)	(-0.15)	(-1.00)	(-0.36)	(-1.26)	(0.71)	(-0.15)
Constant	0.398	0.0367	-0.0941	-0.00812	0.815**	-0.0922	0.0584
	(0.83)	(0.41)	(-1.64)	(-0.06)	(2.99)	(-0.81)	(0.27)
Observations	2087	2087	2087	2087	821	426	1265

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table F.4: Survey regression estimates, change with respect to t=0, post-periods pooled, matched sample

	(1) Δ Number of GP visits	(2) Δ Somatic hospital contact	(3) Δ Psychiatric hospital contact	(4) Δ Prescription drug purchase	(5) Δ Enrolled in elementary school	(6) Δ Absenteeism	(7) Δ Criminal charge
Placed in out-of-home care	0.428*	0.0318	-0.0459	0.0822	-0.0994	-0.0130	0.00529
	(2.02)	(0.65)	(-1.45)	(1.71)	(-1.45)	(-0.22)	(0.09)
Constant	-0.163	-0.0394	0.00288	-0.0125	0.0675	0.0105	-3.69e-17
	(-1.03)	(-1.19)	(0.14)	(-0.39)	(1.63)	(0.56)	(-0.00)
Observations	2087	2087	2087	2087	759	332	1076

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

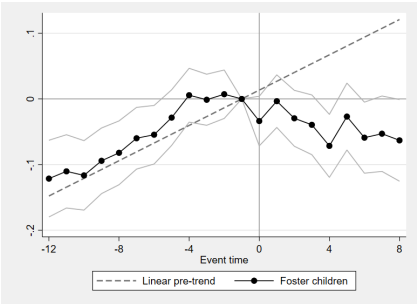
G First preventive care measure

Here we present results in the same way as the main results in the paper, but where we have defined the event to be the first preventive care measure, rather than the first out-of-home care placement. For some children, this event coincides with their first out-of-home care placement, but other children are never placed in out-of-home care and only ever receive preventive care measures.

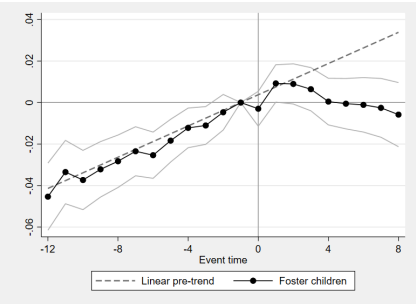
Table G.1: Foster children at time of first preventive care measure, balanced samples

	Health sample		Enrolment sample		Absenteeism sample		Crime sample	
	mean	(sd)	mean	(sd)	mean	(sd)	mean	(sd)
Age	13.46	(4.1)	11.35	(1.4)	11.11	(1.4)	17.83	(1.1)
Girl	0.45	(0.5)	0.39	(0.5)	0.39	(0.5)	0.49	(0.5)
Placed in FC with no prior preventive care	0.08	(0.3)	0.03	(0.2)	0.03	(0.2)	0.17	(0.4)
Quarters from first preventive care to first out-of-home care placement	6.59	(5.0)	8.41	(5.9)	9.34	(6.2)	1.65	(0.7)
Placement ongoing	0.10	(0.3)	0.26	(0.4)	0.29	(0.5)	0.01	(0.1)
Legal action								
Placement with consent	0.86	(0.4)	0.80	(0.4)	0.86	(0.4)	0.93	(0.3)
Placement without consent	0.07	(0.3)	0.09	(0.3)	0.07	(0.3)	0.01	(0.1)
Urgent placement	0.02	(0.2)	0.11	(0.3)	0.07	(0.3)	0.00	(0.0)
Other	0.05	(0.2)	0.00	(0.0)	0.00	(0.0)	0.06	(0.2)
Placement Type								
Foster family care	0.21	(0.4)	0.40	(0.5)	0.56	(0.5)	0.05	(0.2)
Kinship care	0.06	(0.2)	0.13	(0.3)	0.25	(0.4)	0.00	(0.0)
Group home	0.14	(0.4)	0.15	(0.4)	0.00	(0.0)	0.08	(0.3)
Institutional care	0.27	(0.4)	0.27	(0.4)	0.19	(0.4)	0.16	(0.4)
Independent living	0.32	(0.5)	0.04	(0.2)	0.00	(0.0)	0.72	(0.5)
Length of placement								
Duration, years	1.02	(1.1)	2.13	(2.1)	3.19	(2.3)	0.55	(0.4)
Spell duration, years	2.37	(3.1)	3.94	(3.9)	4.83	(4.5)	1.98	(2.9)
Reason for placement								
Child risk/externalizing behavior	0.89	(0.3)	0.82	(0.4)	0.79	(0.4)	0.91	(0.3)
Child health concerns	0.20	(0.4)	0.23	(0.4)	0.14	(0.4)	0.19	(0.4)
Abuse/neglect of child	0.52	(0.5)	0.64	(0.5)	0.79	(0.4)	0.47	(0.5)
Adult risk/externalizing behavior	0.48	(0.5)	0.50	(0.5)	0.71	(0.5)	0.59	(0.5)
Other	0.27	(0.4)	0.27	(0.4)	0.21	(0.4)	0.16	(0.4)
Share of reasons due to child	0.51	(0.3)	0.43	(0.3)	0.34	(0.3)	0.49	(0.2)
Share of reason due to parents	0.49	(0.3)	0.57	(0.3)	0.66	(0.3)	0.51	(0.2)
At end of first placement								
Exit before age 18	0.34	(0.5)	0.44	(0.5)	0.40	(0.5)	0.09	(0.3)
New placement	0.13	(0.3)	0.28	(0.5)	0.10	(0.3)	0.05	(0.2)
Continued care after age 18	0.01	(0.1)	0.00	(0.0)	0.00	(0.0)	0.00	(0.0)
Age out	0.52	(0.5)	0.28	(0.5)	0.50	(0.5)	0.86	(0.4)
N	12,995		4,790		1,887		4,434	

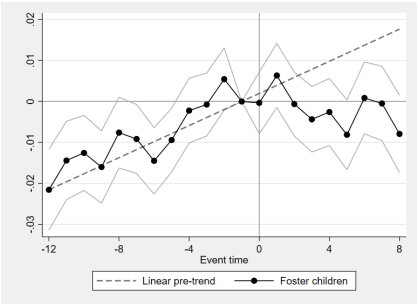
Figure G.1: Health



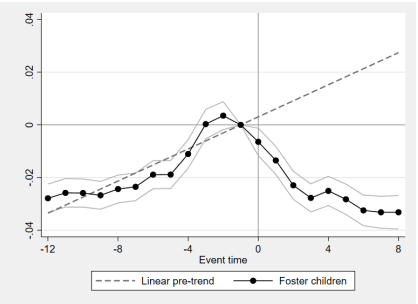
(a) Number of visits to general practitioner



(b) Share with prescription drug purchase



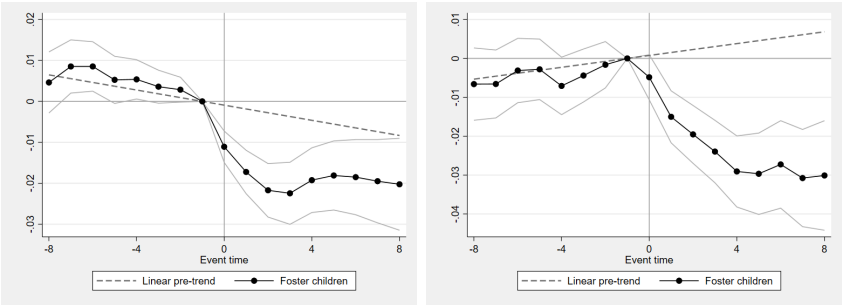
(c) Share with somatic hospitalization



(d) Share with psychiatric hospitalization

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced health sample of children in preventive care.

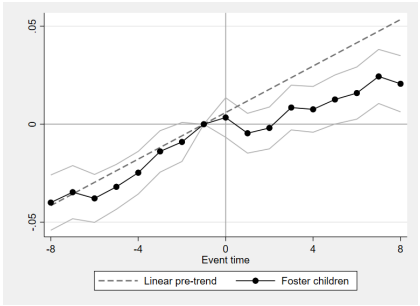
Figure G.2: Schooling



(a) Enrollment (b) Absenteeism

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced school sample of children in preventive care. Absenteeism is conditional on enrollment.

Figure G.3: Juvenile crime



(a) Juvenile crime

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced crime sample of children in preventive care.

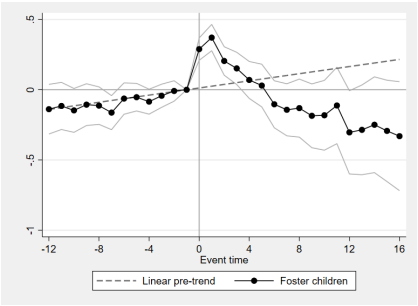
H Longer term effects - 16 quarters

Here we show results similar to the main results in the paper, but where we have extended the post-event period from 8 quarters to 16 quarters to look at the changes over the longer run at the cost of a reduced sample size.

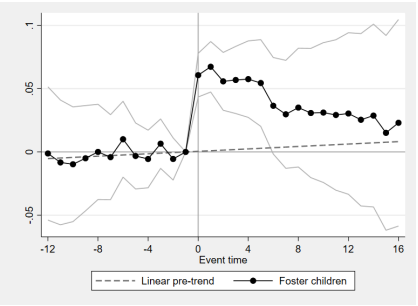
Table H.1: Foster children at time of first placement, balanced samples

	Health sample		Enrolment sample		Absenteeism sample		Crime sample	
	mean	(sd)	mean	(sd)	mean	(sd)	mean	(sd)
Age	12.64	(4.0)	10.14	(0.8)	10.06	(0.8)	16.99	(0.1)
Girl	0.48	(0.5)	0.40	(0.5)	0.46	(0.5)	0.48	(0.5)
Placed in FC with no prior preventive care	0.56	(0.5)	0.54	(0.5)	0.50	(0.5)	0.53	(0.5)
Quarters from first preventive care to first out-of-home care placement	6.67	(4.4)	6.54	(4.2)	6.75	(4.2)	5.84	(3.8)
Placement ongoing	0.21	(0.4)	0.51	(0.5)	0.57	(0.5)	0.00	(0.0)
Legal action								
Placement with consent	0.85	(0.4)	0.78	(0.4)	0.73	(0.4)	0.90	(0.3)
Placement without consent	0.10	(0.3)	0.17	(0.4)	0.19	(0.4)	0.03	(0.2)
Urgent placement	0.03	(0.2)	0.05	(0.2)	0.07	(0.2)	0.01	(0.1)
Other	0.03	(0.2)	0.01	(0.1)	0.01	(0.1)	0.07	(0.3)
Placement Type								
Foster family care	0.28	(0.4)	0.46	(0.5)	0.53	(0.5)	0.06	(0.2)
Kinship care	0.07	(0.2)	0.07	(0.3)	0.09	(0.3)	0.02	(0.1)
Group home	0.20	(0.4)	0.12	(0.3)	0.06	(0.2)	0.19	(0.4)
Institutional care	0.31	(0.5)	0.34	(0.5)	0.32	(0.5)	0.29	(0.5)
Independent living	0.15	(0.4)	0.01	(0.1)	0.00	(0.0)	0.44	(0.5)
Length of placement								
Duration, years	1.56	(1.3)	2.30	(1.9)	1.79	(1.8)	0.61	(0.3)
Spell duration, years	1.96	(1.4)	2.94	(2.0)	2.54	(2.1)	0.67	(0.3)
Reason for placement								
Child risk/externalizing behavior	0.81	(0.4)	0.78	(0.4)	0.71	(0.5)	0.85	(0.4)
Child health concerns	0.37	(0.5)	0.43	(0.5)	0.38	(0.5)	0.37	(0.5)
Abuse/neglect of child	0.60	(0.5)	0.69	(0.5)	0.73	(0.4)	0.42	(0.5)
Adult risk/externalizing behavior	0.53	(0.5)	0.62	(0.5)	0.62	(0.5)	0.48	(0.5)
Other	0.27	(0.4)	0.25	(0.4)	0.28	(0.5)	0.32	(0.5)
Share of reasons due to child	0.51	(0.3)	0.46	(0.3)	0.42	(0.3)	0.60	(0.3)
Share of reason due to parents	0.49	(0.3)	0.54	(0.3)	0.58	(0.3)	0.40	(0.3)
At end of first placement								
Exit before age 18	0.36	(0.5)	0.66	(0.5)	0.58	(0.5)	0.13	(0.3)
New placement	0.15	(0.4)	0.30	(0.5)	0.40	(0.5)	0.03	(0.2)
Continued care after age 18	0.00	(0.1)	0.00	(0.0)	0.00	(0.0)	0.00	(0.0)
Age out	0.48	(0.5)	0.05	(0.2)	0.01	(0.1)	0.84	(0.4)
N	3,553		730		195		803	

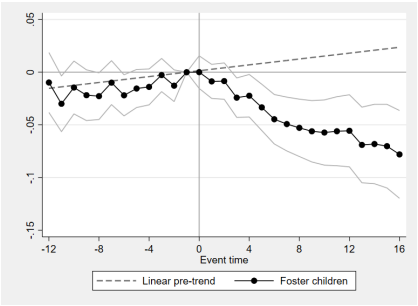
Figure H.1: Health



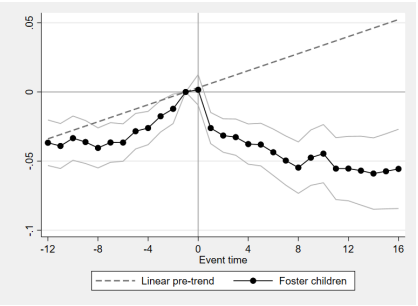
(a) Number of visits to general practitioner



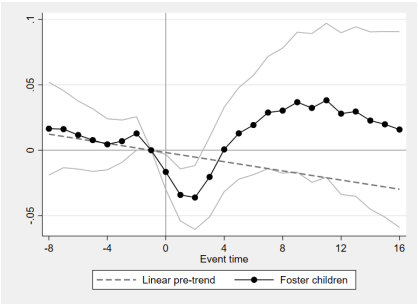
(b) Share with prescription drug purchase



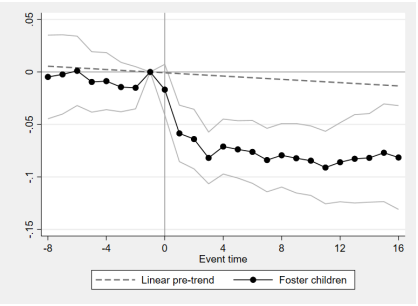
(c) Share with somatic hospitalization



(d) Share with psychiatric hospitalization



(e) Enrollment



(f) Absenteeism

Note: The figure shows the estimated event coefficients from model 2 and the pre-trend from model 3, estimated for the balanced sample of foster children who are observed in a post-period of 16 quarters following their first out-of-home care placement.