

# The effect of foster care placement on development throughout childhood and beyond – Evidence from Norway\*

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## Abstract

We follow the same children before and after they receive their first child welfare service (CWS) record, and compare the trajectories of those assigned to foster care with those that received home-based CWS in an event-study framework. To account for the fact that children who start receiving CWS at different ages may have different trajectories, we look at children of different ages at first intervention separately (ages 0-5, 6-11 and 12-17). Administrative data covering more than two decades allow us to follow children through childhood and into adulthood, studying school and health outcomes, subsequent crime, welfare and earnings. We show that children placed in foster care are substantially more likely to receive health treatment, both psychiatric and somatic, in the years following the intervention. On other outcomes, there are mostly small differences, with the exception that children placed in foster care at age 12-17 more often receive welfare benefits as adults. We proceed to exploit geographical variation in the likelihood of being assigned to foster care, and find evidence that foster care placement increases health-care treatment, mirroring the event-study results. One interpretation of the results is that the foster care system mitigates the consequences of a negative shock to the child's circumstances.

Keywords: child development, child protective services, child welfare services, families, health, foster care

JEL: I14, I18, I38, J12, J13

## I. Introduction

Across countries and institutional settings, receiving Child Welfare Services (CWS) is a powerful predictor for unfavorable adult outcomes such as school dropout, crime, poverty, poor health, unemployment and welfare benefit claims (Backe-Hansen et al. 2014, Drange et al. 2021, Lindquist and Santavirta 2014, Warburton et al. 2014). The negative relationship is even stronger when the child receives out of home care (Vinnerljung and Franzén 2006, Sariaslan et al. 2021). In a meta-analysis of foster children, Goemans et al (2016) conclude that post-placement outcomes of foster children do not

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differ from those of children at risk who remained at home with respect to cognitive functioning, adaptive functioning, and behaviour problems.

Despite the urgent need for a better understanding of how foster care affects subsequent child outcomes, the amount of causal evidence on the impact of individual foster care experience is limited. The targeted nature of foster care services makes it particularly complicated to construct counterfactual outcomes, as it is hard to know what children affected by such care would have accomplished in absence of intervention. In two methodologically innovative papers, Doyle (2007, 2008) estimate causal effects of being placed in foster care by exploiting variation between child welfare investigators with differing tendencies to remove a child from its family. These papers, studying children in contact with the child welfare services in Illinois in the US in the 1990's and early 2000's, uncover negative effects of foster care placement on outcomes of children at the margin of such placement. The key comparison is between children placed outside the home and children remaining at home with the parents likely receiving various services. This is a highly policy relevant margin, as it concerns children around the threshold for placement, who are most likely to be affected by a change in placement practice.

Recent studies that use similar identification strategies find positive impacts of being removed from the family. Gross and Baron (2021) show that foster care for school age children reduce later maltreatment and crime and increase school attendance and math test scores in Michigan, while Bald et al. (2022) find positive impacts on test scores and grade progression for girls investigated before age 6 in Rhode Island. While these studies have high internal validity, the diverging results underline the difficulties of extrapolating findings to other settings and call for more evidence. Results will likely vary with the quality of the average foster family, the ability of the system to support such families and the families of children that remain in the home, and importantly, the troubles of the marginal child.

We contribute to the existing evidence by exploiting detailed administrative data covering more than two decades to study how foster care affects children through childhood and into adulthood across a number of outcomes. Almost 50 000 Norwegian children and adolescents under 18 receive child welfare services (CWS) every year, within or outside their family environment. This amounts to about 3% of the population below age 18. About 14% of children receive at least one CWS before turning 18 and close to 4% of children receive the perhaps most far-reaching intervention some time during childhood: CWS outside the home (Drange et al. 2021).

We start with a descriptive event study approach where we follow children before and after their first contact with the CWS and map out school and health outcomes, subsequent crime, welfare and earnings in the years around this first contact. Importantly, we exclude children that receive institutional care as their first CWS, and focus the comparison on children with a foster care CWS and children receiving support in the home. To account for the fact that children who start receiving CWS at different ages may have different trajectories (e.g. Lindquist and Santavirta 2014, Bald et al. 2022), we look at young

children (0-5), older children (6-11) and teenagers (12-17) separately. Unsurprisingly, we find that children who receive foster care differ from children receiving services in the home along several dimensions. Our extensive set of control variables accounts for some of this difference, but there are likely unobservable factors related to the children or their home environment that we fail to account for. Hence, we go on to exploit geographical variation in the likelihood of being placed in foster care. Relying on variation across as well as within geographical CWS units, we instrument for the service received using the likelihood of placement in foster care of the CWS unit.

Our results show that children placed in foster care are substantially more likely to receive health treatment, both psychiatric and somatic, in the years following the intervention. This pattern is consistent across children with their first intervention at different ages. On other outcomes, there are mostly small differences between the trajectories of children placed in foster care versus receiving support in the home. One exception is that children placed in foster care at age 12-17 more often receive welfare as adult. These results are robust to the inclusion of child and parent characteristics, as well as for the reasons for the first intervention.

When exploiting geographical variation in the likelihood of being assigned to foster care, we find evidence that foster care placement increases psychiatric and somatic treatment, mirroring the event-study results, but no significant effects on other outcomes. However, we cannot reject economically important effects on school outcomes and youth crime.

Our event study approach resembles that of Cavalca et al. (2022) who follow children for two years before and after placement in out-of-home care in Denmark, and find an increase in GP visits among children placed in out-of-home care, as well as a decrease in school enrolment. Our main contribution is that we can follow the children into adulthood. This allow us to address the crucial question about long-run consequences of CWS.

## II. Empirical strategy

Our point of departure is the universe of children that received service(s) from the Norwegian CWS from 1994 to 2018. Our event study analysis follows children before and after their first encounter with CWS and look at groups of children who remained in the home and were placed in foster care respectively. Many children in the CWS system have complicated trajectories and may receive different services throughout childhood. Hence, we find it easier to interpret the difference between groups that start in foster care vs in the home around their *first entry* to the CWS system. We operationalize this by comparing children with their first six months of receiving service being entirely home-based care to those removed from the home and placed in foster care within six months from their first contact with the CWS. The counterfactual to foster care is then staying at home with CWS provided to the family and/or the child. It is worth noting that the families of removed children may receive home-based

services while the child is in foster care, and that many children eventually return to their biological parents.

We study groups of children based on the age when CWS intervene for the first time: age 0-5 captures children below school age, age 6-11 concerns the first six years of primary school, and age 12-17 covers those who experience their first intervention during adolescence. We think this distinction is meaningful for two main reasons. First, the reasons for intervening in the life of young children will typically differ greatly compared to for older children. Second, placement in foster care during early years is likely a quite different experience compared to when the child is older. Young children may stay in foster care throughout childhood, while older children will (mechanically) only be in foster care or institution for a comparatively short period, as they more quickly exit the CWS, typically at age 18.

### Outcomes by type of care

First, we describe the conditional outcome differentials by care type in an event study framework. This approach is descriptive, as it is clearly not random whether a child receives foster care. However, our detailed data allow us to control for a comprehensive battery of covariates that capture parental and child background, and we proceed to look at differences in outcomes adjusted for these covariates to assess the degree of selection into foster care. For many outcomes, we follow children both before and after their first CWS service. This allows us to assess whether children in foster care have different outcomes even before they received CWS the first time.

### IV estimates of foster care from practice style variation across CWS units

A careful analysis of the different trajectories of children placed and not placed in foster care will give us valuable information on how children fare across the two groups. However, we worry that differences are driven by selection into the different interventions along dimensions that we do not observe. Hence, we turn to a strategy where we take advantage of the information we have on the CWS unit level.

Child welfare services in Norway are divided into local units that handle cases at the municipality level. Smaller municipalities cooperate in bigger units. In the capital, Oslo, the responsibility is delegated to the city district level. The case of the individual child belongs to one of the 189 local CWS units. In each of these units, foster care placements are typically initiated by a team of caseworkers. Cases belong to a unit based on geographic location over which population characteristics may differ substantially. We know the outcome of all cases in a unit on a yearly basis and use this to construct a measure of CWS unit leniency. The idea is that the marginal child on the verge of being placed in foster care may be treated differently across CWS units due to differences in the stock of caseworkers or other institutional features that vary across units.

A common way to construct such a measure of practice style is to calculate the leave-out mean of the fraction treated per unit (see i.e. Doyle 2007 or Aizer and Doyle 2015). These studies typically operate in a setting where assignment to a specific unit (e.g. judge, investigator or caseworker) is random. Hence,

there is no correlation in expected outcomes between cases within or between units. In our case, the process of entering the sample can in principle depend on several non-random factors, potentially correlated to the foster care assignment leniency. One such factor could be a general propensity to even notify the CWS of children in need among other services in the local unit (schools, child care, health care), as well as the CWS' general practice style to provide CWS treatment of any kind. For these reasons, unobserved determinants of individual child outcomes may differ within and between units.

The identification problems arising from this non-experimental setting cannot be solved without making strong assumptions. Our strategy is to carefully construct a measure of practice style and selection controls, as described below, and include these step-wise in a transparent manner, as well as exploiting the richness of the data to draw on different margins for identification, such as between units (cross sectional) and within units (unit fixed effects and practice variation within units).

To account for the differences in mean expected outcomes across units, we construct the practice style measure as a covariate adjusted leave-out mean, following Markussen and Røed (2014). First, we estimate a probability model predicting foster care with a rich set of individual covariates. Then we construct the instrumental variable as the leave-out-mean of per unit/person of the residual from this regression. As in an examiner leniency/strictness design, this variable is used to instrument for the actual treatment.

### III. Data construction

#### Sample

We include the universe of children with a Norwegian CWS record during 1994 to 2018. Each record contains information about the type of service the child is receiving, from low-intensive home based services like guidance, free childcare and economic support and parental supervision, to out-of-home care in an institution or with foster parents. A detailed list of all services is provided in Table A1 in the appendix. For each record, there is information on the reason(s) for CWS intervention, see Table A.2 in the appendix for a complete list. Records without registered reason for intervention are excluded from the sample.

We divide children into three groups: Children who receive their first intervention when they are below school age, i.e. 0-5, school aged children 6-11 and children with first intervention during adolescence, i.e. 12-17. Since our CWS data start in 1994, we restrict our sample to children having their first

intervention between 1999 and 2016. We use data from 1994-1998 to exclude children with prior interventions.<sup>1</sup>

As we are interested in children at the margin of placement outside the home, we further restrict our sample to children who received CWS assistance in all 6 months from the date of their first CWS record. This is to rule out less serious cases. Starting with a foster care intervention is defined as being registered with a foster care placement in the first of these first 6 months.<sup>2</sup>

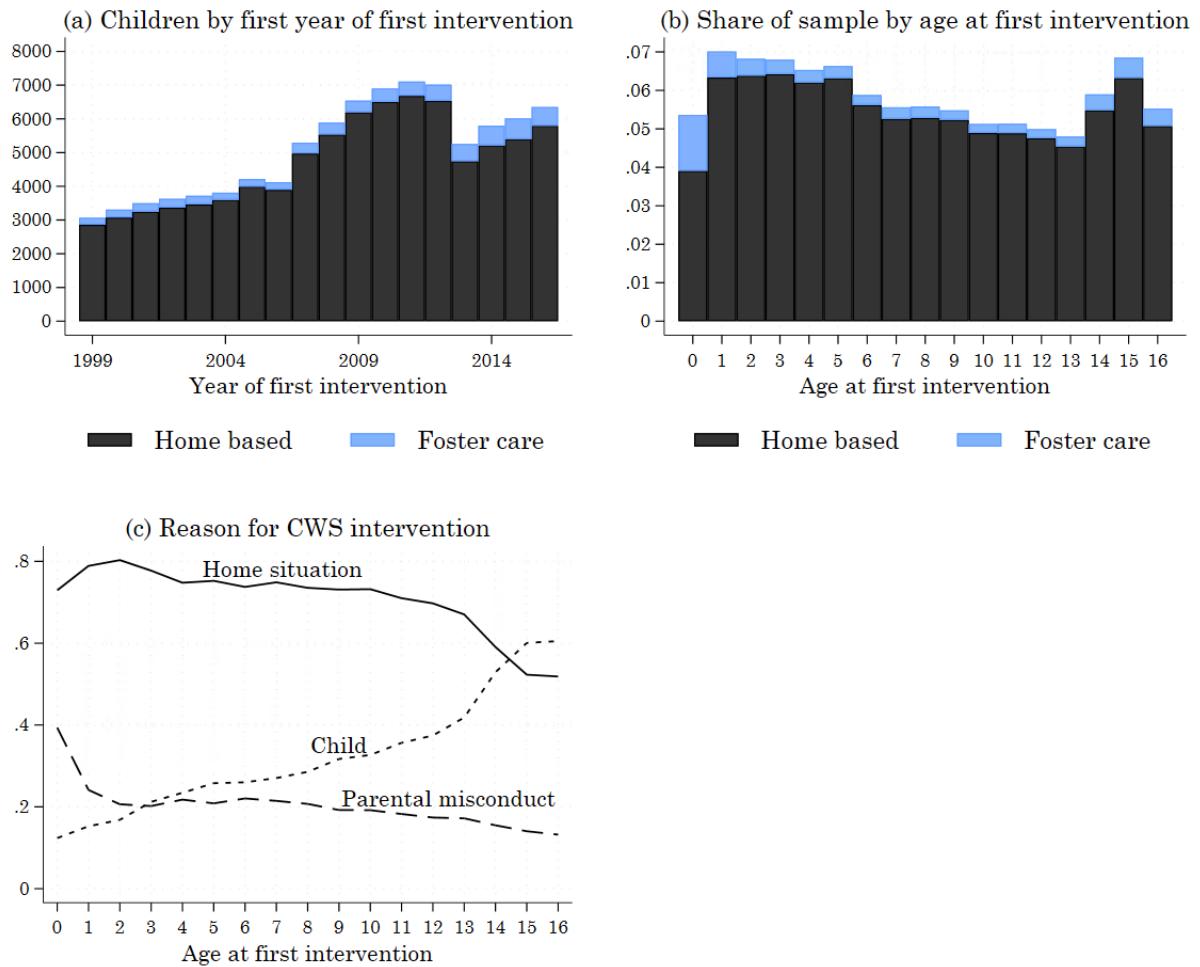
In Figure 1, we first display the number of children entering the CWS by entry year and type of service (panel a). In the left panel we note that about 90 percent of first interventions are home based. This seems consistent across years, although there appear to be a slightly higher share with foster care as first intervention during the most recent years. The large drop in 2013 is due to changes in reporting from the local CWS units to Statistics Norway, which implied that cases with ongoing investigation at the end of the year had missing reasons for assistance. Consequently, more children are excluded due to missing information after 2012. In panel (b), we show how the type of interventions vary by entry age. The youngest and oldest children are more likely to experience a first intervention out of the home.

Finally, panel (c) displays reasons for intervening. For purpose of illustration, we have here categorized the 13 different reasons into three categories: Home situation, Parental misconduct and Child related health or behavioral problems, see Table A.2 in the appendix for details. Note that each child may have more than one reason reported. Most children across all ages are likely to have home situation listed as a reason for intervention. The two other main categories vary substantially with age. For the youngest children, parental misconduct is much more common than child related reasons. Among teenage entrants, however, the majority of the interventions are for child related reasons.

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<sup>1</sup> Note that this implies that the older children in 2000 and some years after may have been in contact with CWS prior to 1994 when we first observe them. For these cohorts, we require that they have not been registered with CWS assistance in the six years 1994-1999.

<sup>2</sup> As a robustness test aiming to make the two groups more comparable, we have estimated the propensity to be placed in foster care on the registered reasons for assistance. The predicted propensities are displayed in Figure A1 in the appendix. There is some support across the whole distribution, but there are few who have a high probability of out-of-home placement and end up receiving only home-based services. The results are robust to including only cases with a predicted probability up to 0.45, i.e. excluding cases with a very high probability of out-of-home placement.

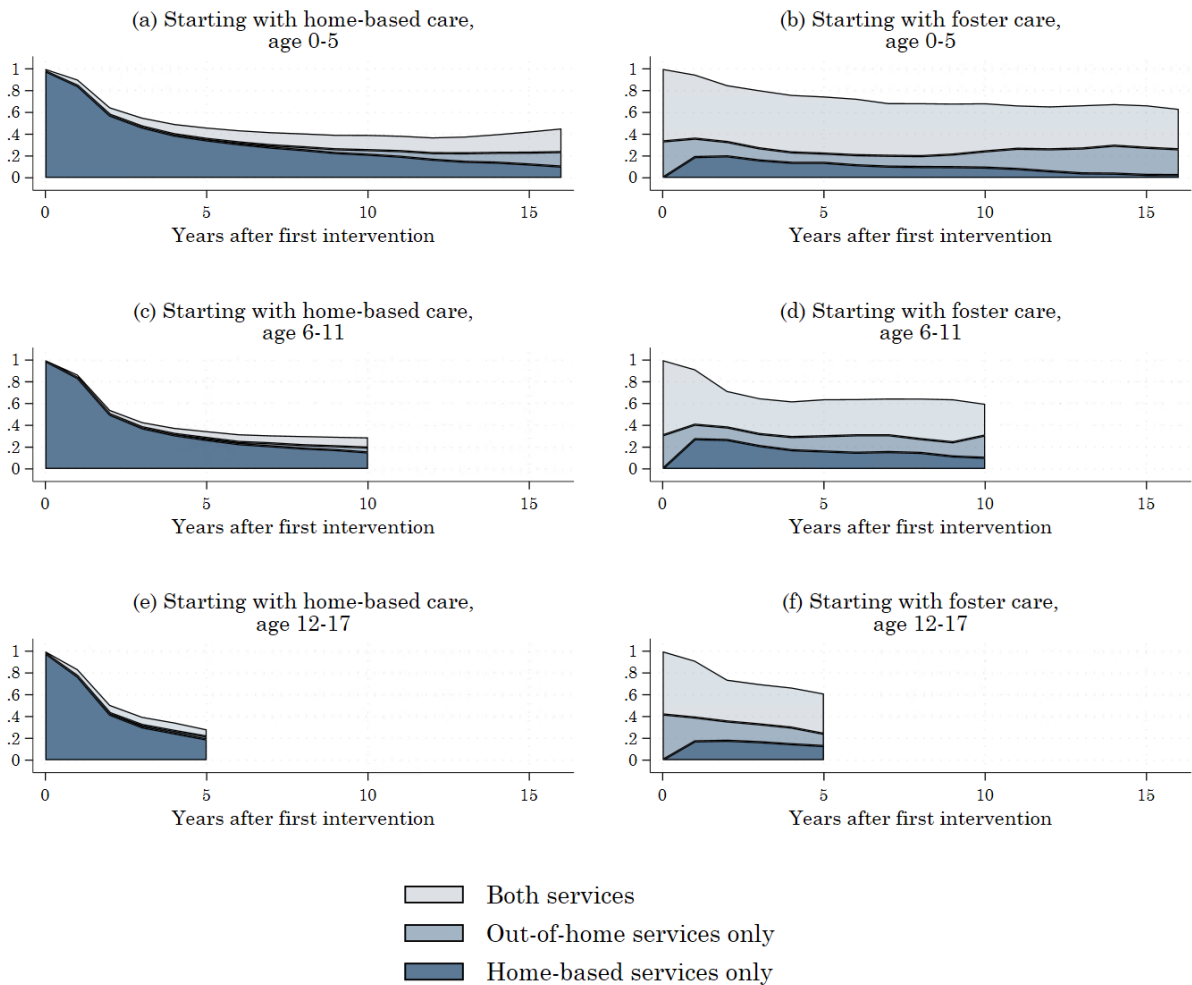


**Figure 1. Type of intervention by entry year, age and reason for assistance**

### CWS assistance

Figure 2 shows the frequency of child welfare services receipt by calendar year relative to the year of first intervention (entry year equal to zero), type of service and age at first CWS intervention. In panel (a), we see that for children who start out with a home-based intervention at age 0-5, the share with CWS service declines quite quickly and stabilizes at around 40-50%. As they grow older, an increasing share of these young entrants receive out-of-home-services, typically in addition to home-based services. In Figure 2, “Both services” indicates that the child is registered with both a home-based service and an out-of-home placement in the same calendar year. Children with their first intervention at age 12-16 follow a similar pattern, see panels (e) and (f).

Children placed in foster care have more persistent receipt of services, see panels (b), (d) and (f). Most of these children continue in out-of-home care, many in combination with receiving home-based assistance (in the same year). Children starting with a foster care intervention tend to receive assistance for a long period, often in combination with home-based services.



**Figure 2. Receipt of CWS services after first intervention, by type of first intervention and age**

### Outcomes and child background characteristics

We measure child outcomes along four important dimensions: Physical and psychological health, cognitive development, crime and labor market outcomes. Health outcomes are available from 2006, and are collected from administrative health registries (KUHR). These data include detailed information on all contacts between patients and the primary health care system, including contacts with general practitioners (GPs), the emergency room (ER) and other outpatient care services that are generally subject to co-payments. We construct a dummy variable that captures whether the child has any psychiatric/psychological treatment during a year. Most children visit the GP during a year, so we focus on frequent visits defined as more than five yearly visits for somatic health problems. For adults, we also define a dummy variable indicating whether an individual has received disability benefits at some point during the year.

To construct child cognitive development outcomes, we rely on data from the administrative education registries. We observe three to four records for each child, at ages 10, 13 and 16, and for 14 year-olds



during the latter years. The first two outcomes are test scores from fifth and eighth grade that measures student proficiency on national standardized tests in Norwegian, English and Mathematics on a continuous scale. We construct a variable that captures the average of the three subjects. Missing observations are set to 0. Subsequently we standardize this measure in a sample consisting of all other children taking the same tests in the same year. Ninth graders take similar tests in Norwegian and Mathematics, and we construct a similar measure as for the other grades. While fifth and eighth grade (age 10 and 13) results are available from 2007, the tests were introduced in ninth grade (age 14) in 2010.

At age 16, students graduate from compulsory schooling with marks in 12 subjects. They typically also have one written and one oral exam in two randomly drawn theoretical subjects. Grades in individual subjects are awarded on a scale from one to six, where six indicates excellence and one indicates very little competence. We construct a measure of grade point average (GPA), which is the average mark of the 12 subjects in which the 10<sup>th</sup> graders get a final assessment.<sup>3</sup> Similar to the other educational measures, we standardize GPA in a sample consisting of all other children graduating in the same year. In addition to these school outcomes, we construct a variable indicating whether an individual has completed high school.

We measure crime by a dummy variable indicating whether the individual has been charged with a crime committed during the year. This variable is measured for individuals aged 14 or above.

In order to investigate labor market behavior, we define a dummy variable indicating receipt of welfare and a dummy variable indicating whether an individual has earned any income during the year. Finally, we construct a dummy variable picking up NEET status, i.e. if a person is not in employment, education or training, measured from the age of 16.

We include a comprehensive battery of covariates in our analysis, measured in the year prior to the child's first intervention. For the child, we include a gender dummy and 12 dummies for different types of immigrant background. In Table 1, the immigrant dummy takes the value 1 if both parents are born abroad and 0 otherwise. For parents, we include an inflation adjusted<sup>4</sup> earnings measure and a dummy capturing if the mother (father) received welfare support or disability benefits. To measure parental education, we construct dummy variables set to 1 if the parent has finished high school and likewise if the parent has completed higher education. We also include a dummy variable set to 1 if the mother is married, and a dummy if she is divorced. Finally, we include a dummy capturing whether the mother (father) has ever been registered with a penal sanction.

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<sup>3</sup> Some records contain missing observations for one or more marks. We replace these with 0.

<sup>4</sup> We adjust income by the basic amount (Grunnbeløpet), which is adjusted for inflation and wage growth by the Norwegian parliament every year and is included in most formulae for public welfare transfers.

Looking at the summary statistics in Table 1 below, we see clear differences across age groups, both for reasons for intervention as well as for parental background. For the young children, the home situation is the most important reason for intervention. Parental misconduct is also a common reason, particularly for the children placed in foster care. In the group of older children, the reason for intervention is much more likely to be child-related compared to for the young. Home situation is less common, and the same is parental misconduct, although the latter is more likely to result in a foster placement. As for child characteristics, we note that girls are slightly less likely to receive CWS interventions in the group of young children, in both the home-based and foster care group. For the older children, girls are overrepresented in the group placed in foster care. Immigrant background is similar across groups, apart from in the group of older children receiving foster care, where more than 40 % have parents who are born abroad.

For parental background, the perhaps clearest pattern is across child age groups. Parents of older children are on average more educated, have higher earnings and are much less likely to receive welfare benefits. Although earnings and education may be positively correlated with the older age of these parents, the welfare benefits and the likelihood of having a criminal record should not be. Despite the fact that having a criminal record is a cumulative measure, this measure is lower among the parents of older children. This background difference may be related to the reasons for intervention, which we have already noted is more likely to be parental misconduct in the younger age group, and less related to the child.

Finally, we note that the difference across parental background in the groups receiving home-based and foster care interventions are smaller for the older children. For the youngest, the group that receive foster care are on average more likely to have parents with a criminal record, with less education and with lower earnings. For the older children, this difference is much less pronounced.

Table 1. Descriptive statistics for the estimation sample at first intervention

Age at first intervention	0-5		6-11		12-17	
	Home-based	Foster care	Home-based	Foster care	Home-based	Foster care
Reason for assistance						
Home situation	78	70	73	74	58	61
Parental misconduct	21	56	19	52	13	39
Child	20	10	31	13	53	38
Child characteristics						
Age (years)	3	2	8	8	14	15
Girl	47	48	42	49	48	62
Immigrant background	36	32	37	54	31	42
Mother						
Teen at birth	7	10	5	7	7	10
Married	33	28	37	45	41	44
Divorced	15	12	27	19	32	26
Finished high school	21	16	26	22	26	23
Log earnings, NOK	6.17	4.86	8.15	6.66	9.06	7.28
Welfare	32	42	23	28	15	16
Disability receipt	22	30	23	25	24	25
Criminal record	17	27	9	14	6	6
Deceased	0	1	1	4	1	8
Father						
Finished high school	27	21	32	29	31	26
Log earnings, NOK	8.97	7.27	9.48	8.18	9.44	7.81
Welfare	23	27	15	20	11	12
Disability receipt	18	22	16	16	17	17
Criminal record	39	42	28	29	21	20
Deceased	1	1	3	2	3	6
N	32 095	3 190	28 090	1 383	26 569	1 930

Note: Percent unless otherwise stated. Immigrant background is defined as having both parents born abroad, married and divorced is defined for the mother, earnings are inflation adjusted, welfare is a dummy defining if the mother/father received any welfare benefits throughout the year, and disability receipt is the share receiving disability insurance benefits. Criminal record is a dummy capturing if the mother/father ever had a penal sanction.

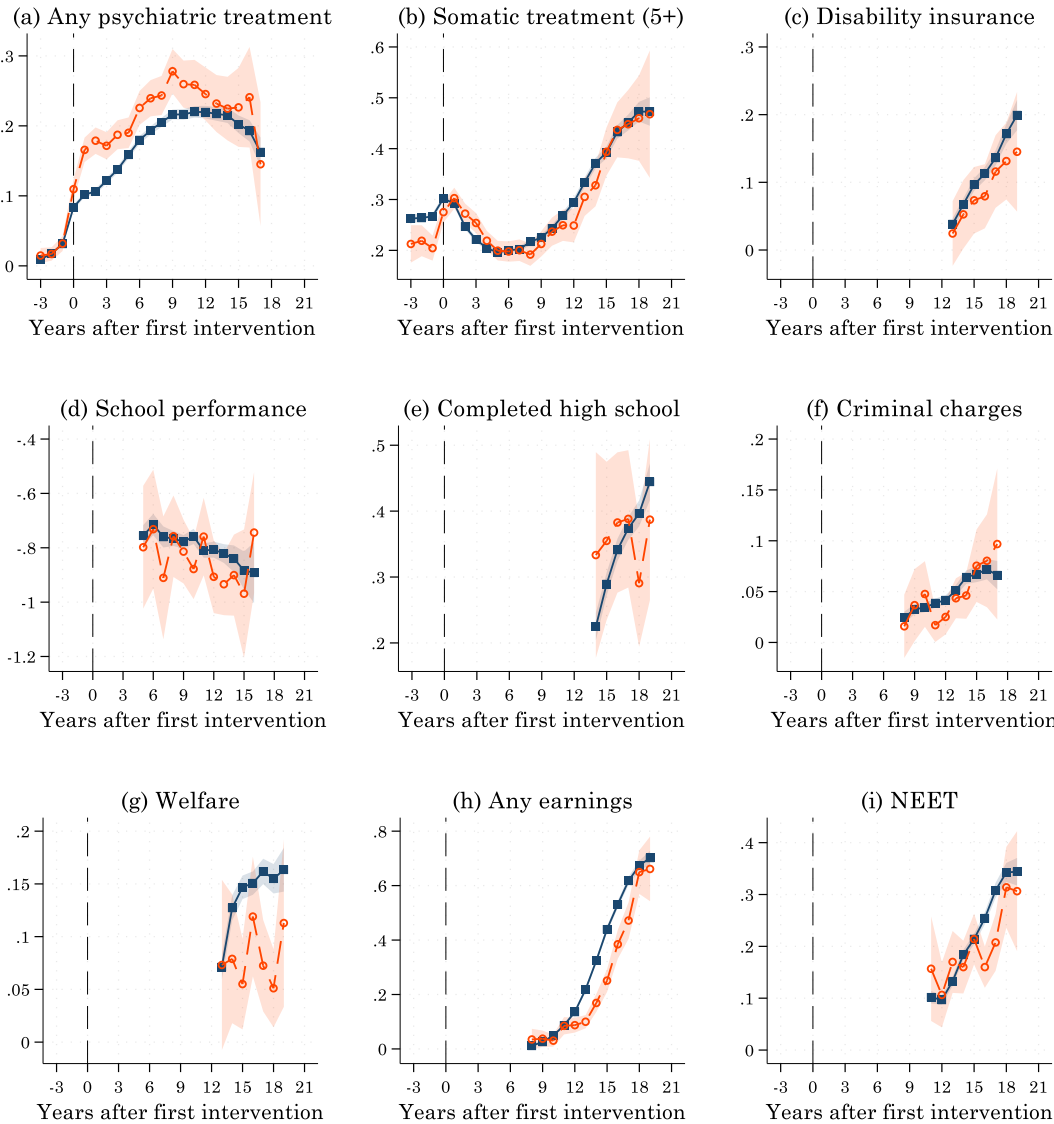
## IV. Results

### Outcomes by type of intervention

Figure 3 displays the unadjusted outcomes for children starting with home-based and foster-based interventions aged 0-5. The shaded areas show the confidence intervals. Panel (a) shows that mental health services are similar prior to the intervention year, but the increased frequency as they grow older is larger for children starting with a foster care intervention. Panel (b) shows that somatic treatment is somewhat lower before the intervention for kids later placed in foster care, but similar later. When it comes to school performance, Panel (c), we that both groups score about 80% of a standard deviation lower than the average child in the population, so many of these children are clearly having trouble in

school. For high school completion and criminal charges, the two groups have quite similar outcomes. Children with an early foster care intervention is more likely to be NEET, on welfare or receive disability benefits 12 to 18 years later, but the precision is low. These very long-term associations are based on quite few cohorts that were placed in foster care as small children early in our observation window.

Even though we have taken some steps to make the two groups more comparable, children placed outside the home may plausibly be thought to have larger, unobserved problems, thus it is somewhat surprising that there seem to be little difference.

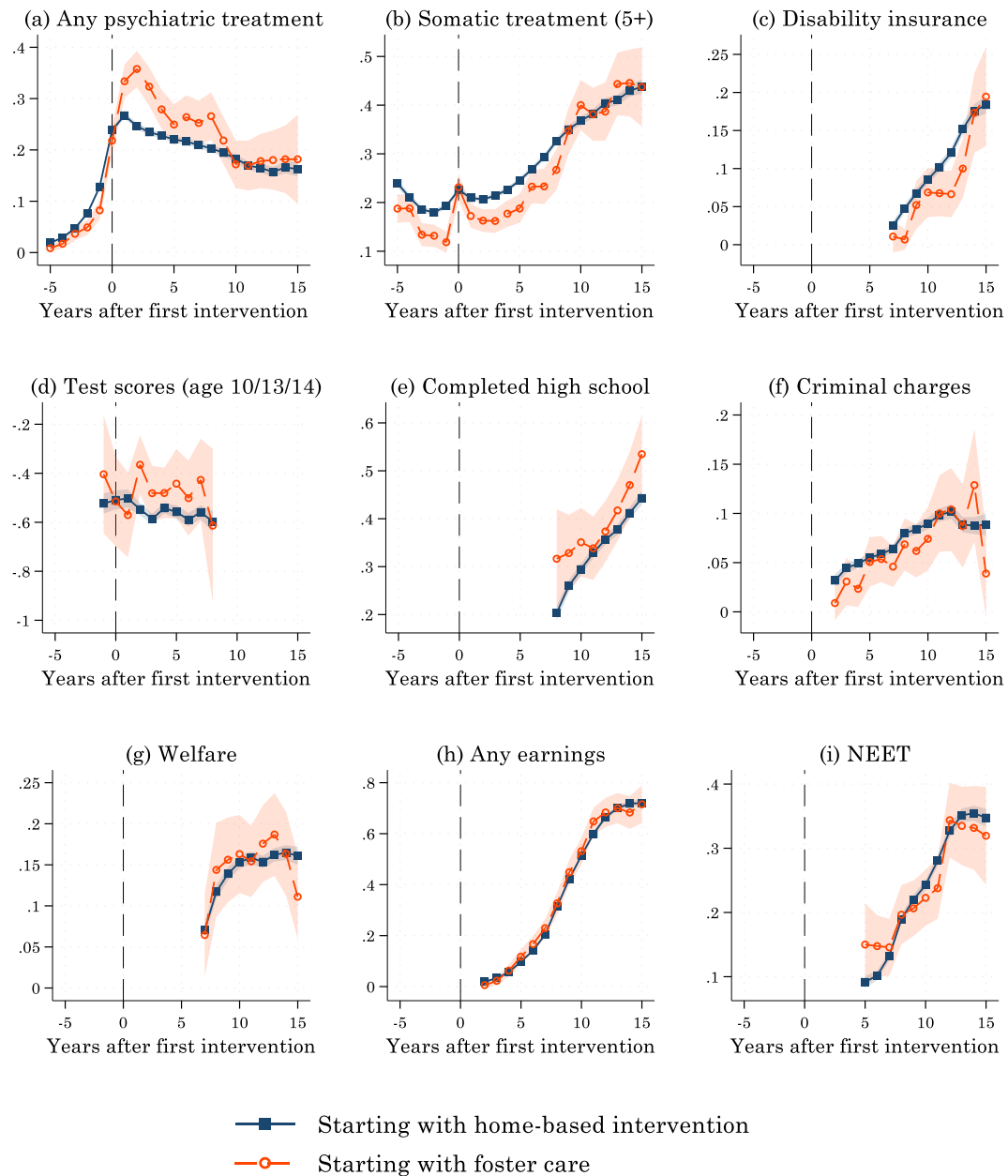


■ Starting with home-based intervention  
○ Starting with foster care

### **Figure 3. Outcomes, before and after first contact with CWS. Entry age 0-5**

Figure 4 shows similar graphs for children who were 6-11 at their first intervention. Due to their age, we observe a longer pre-period. Panel (a) shows a pronounced increase in psychiatric health treatment after the first intervention, which prevails for almost 10 years. Differences for GP visits are in the other direction, see panel (b), while disability receipt is lower for children starting out with foster care.

Children who started with foster care perform somewhat better than those who started with home-based services on test scores and high school completion, see panels (d) and (e). When it comes to criminal charges, welfare receipt, earnings and NEET status, the differences between children with foster and home-based care are small or nonexistent.



**Figure 4. Outcomes, before and after first contact with CWS. Entry age 6-11**

Figure 5 shows similar graphs for children who were 12-17 at their first intervention and we can follow them all the way up to adulthood. Panels (a) and (b) show that children that go on to be placed in foster care have lower rates of psychiatric and somatic treatment before the intervention, at which point this switches, and they have higher rates for the next 10 years. Despite this, the two groups have similar disability insurance rates later, see panel (c).

In school, both groups of children are on similar downward-sloping trends for a long time before the intervention. Youth that have previously entered foster care later have a markedly higher high school completion rate and lower rates of crime charges.

Adolescents who entered CWS with a foster care placement during age 12-17, have similar test scores as those with home-based services, but they complete high school at a higher rate. Foster care adolescents are also less likely to commit crime, but have higher rates of welfare receipt. When it comes to having earnings or being outside of both education and the labor market (NEET), there are no differences.

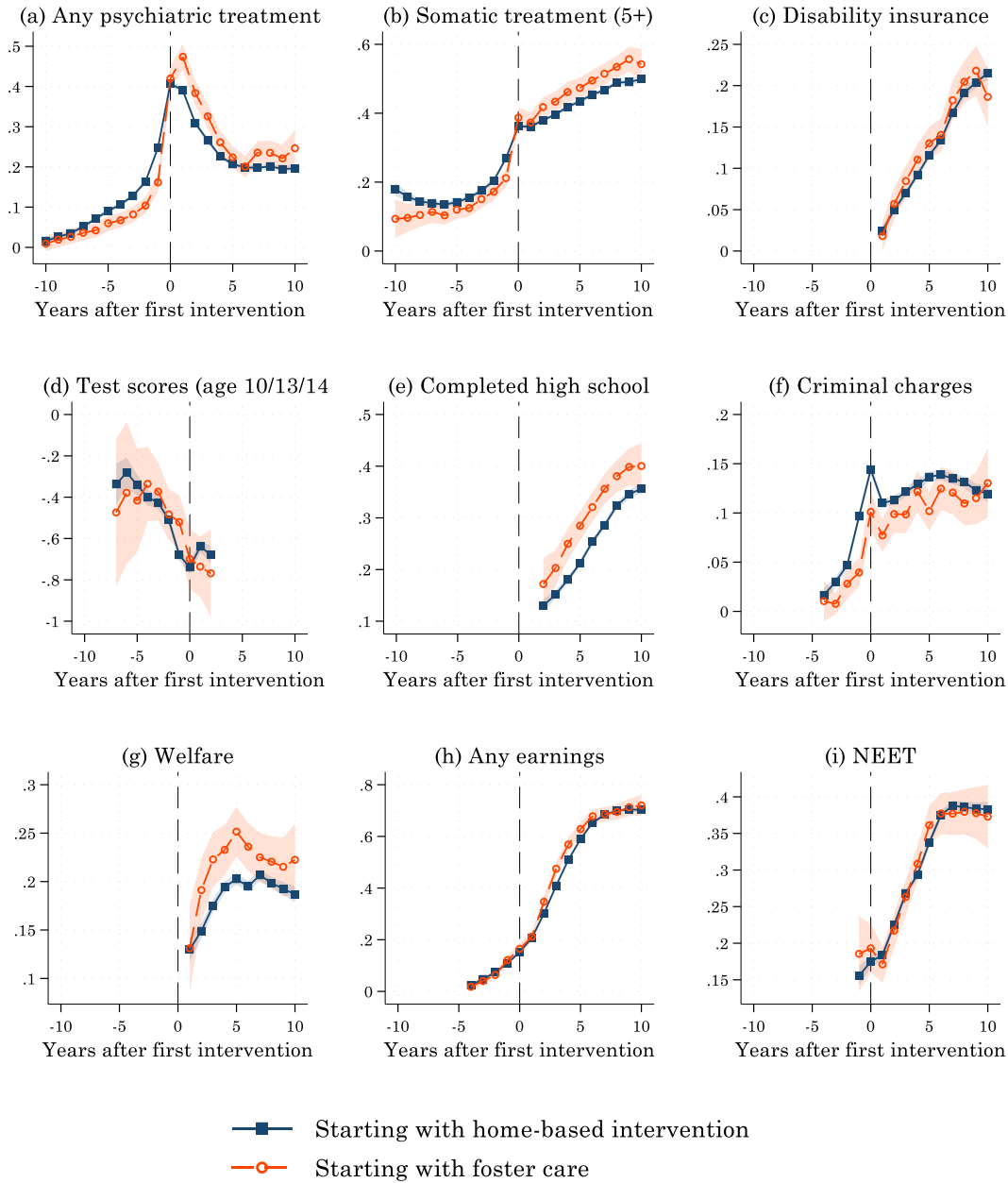


Figure 5. Outcomes, before and after first contact with CWS. Entry age 12-17

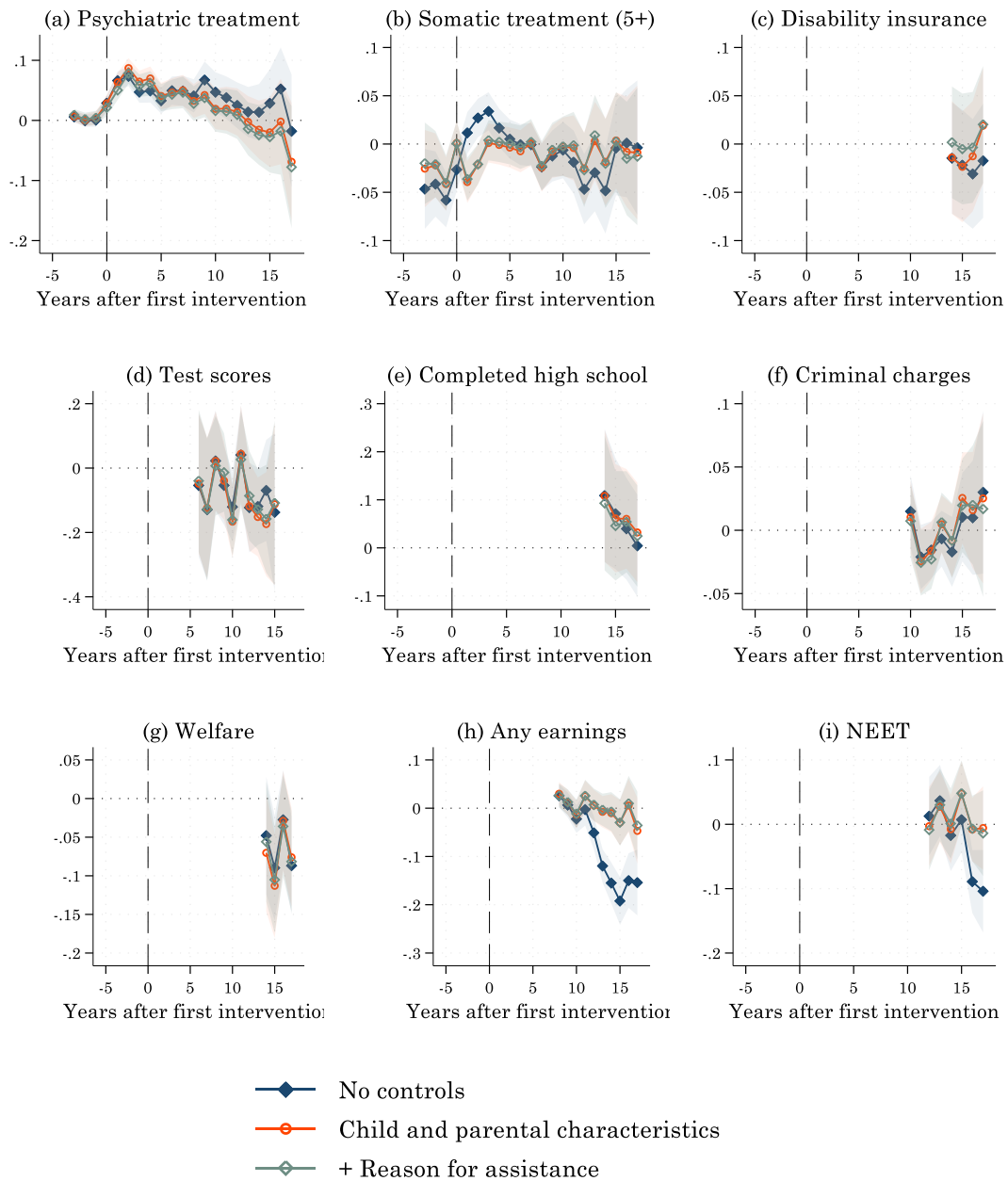
In Appendix figures A.2-A.4 we zoom in on the months around the cut-off. The idea is to check whether the lack of pre-trends we have seen in Figure 2-Figure 4 is caused by the coarse yearly measure. Interestingly, the appendix figures show quite similar trends where children placed in foster care have a lower use of psychiatric and somatic health care prior to the intervention. After placement this changes, in line with what we see for panel a) and b) in the Figures 3-5 above.

### Conditional outcome differentials

We expect selection on both observable and unobservable characteristics across the groups of children who receive an intervention in the home or a foster care placement. In this section, we explore the extent to which the observed differential outcomes can be explained by observed characteristics. We estimate the year-by-year difference in outcomes between children placed in foster care and children receiving a home based intervention in their first year. “Child characteristics” is the raw difference adjusted for age at first intervention, immigrant background (dummy variables for 12 different regions) and sex. “Parental characteristics” includes parental age, education, benefit receipt, criminal record and marital status, and several variables capturing socio-economic dimensions at the municipality level. “Reason for intervention” adds dummy variables indicating one or more of the 13 different reasons indicated in Table A.2. The results are shown in Figures 6-8. The discrepancy between the outcomes of children receiving foster care and an in-home intervention is relatively similar when characteristics are added, suggesting little selection on these observables. Adding parental characteristics and reason for intervention makes very little difference.

Results suggest that children with foster care as their first intervention are more likely to receive mental health treatment in the years following the intervention. This result is consistent across children with their first intervention early and late. For the group of young children, we do not find differences in other outcomes when comparing children receiving intervention in the home with children in foster care. For older children, our results indicate that children placed in foster care are more likely to be charged with a crime, have NEET status and to receive welfare. As discussed above, these results are robust for the inclusion of child and parent characteristics, as well as for the reason for the first intervention.

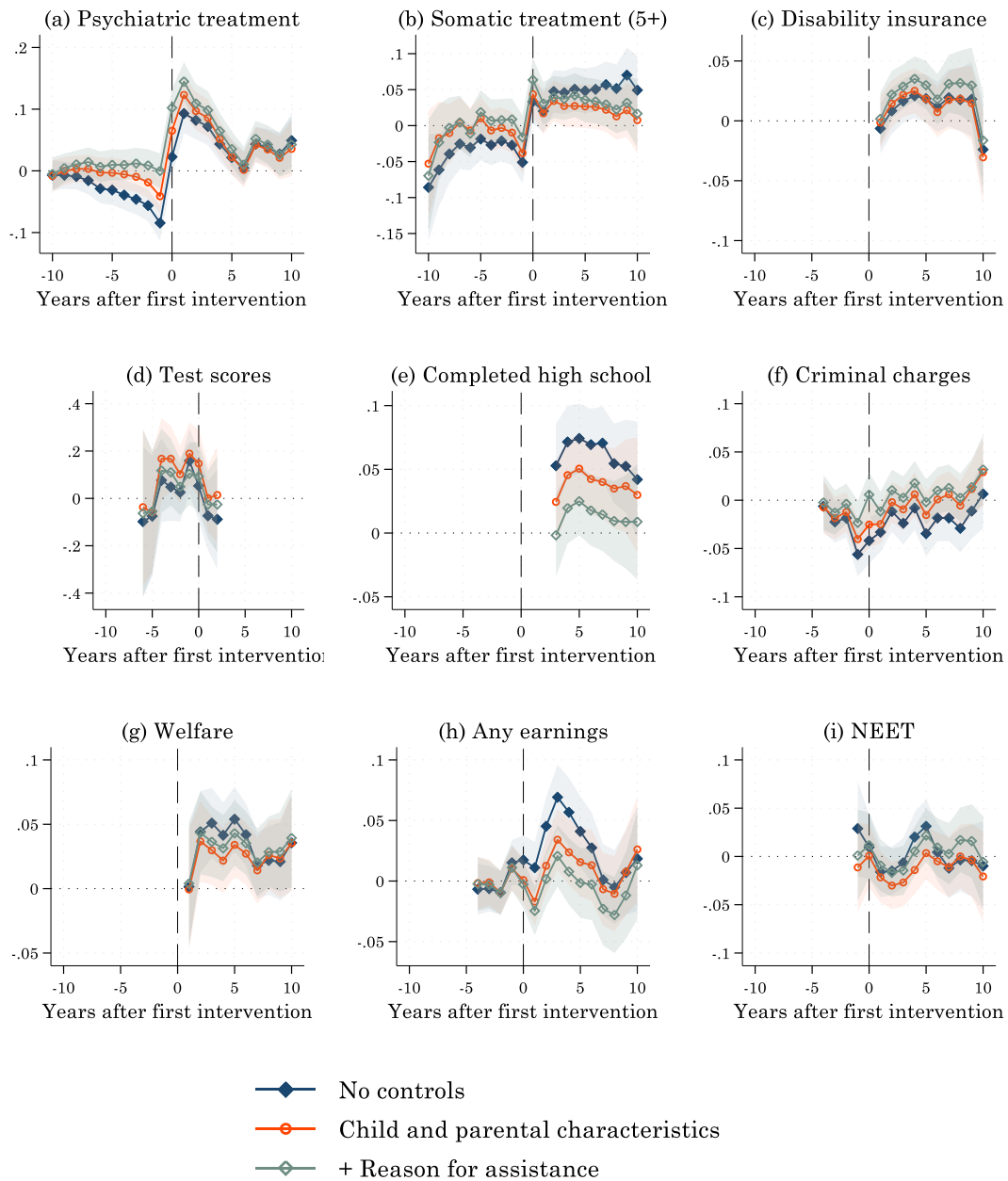




**Figure 6. Conditional outcome differentials, outside the home vs. home-based first intervention. Entry age 0-5.**

Note: Child controls: Age at first intervention\*year of first intervention fixed effects, gender, immigrant background fixed effects (12). Parental controls: age, education, benefit receipt, criminal history and marital status of each parent and the population of parents in the CWS unit's area. Reason for assistance: 13 fixed effects, see Table A.2 for details.





**Figure 8. Conditional outcome differentials, outside the home vs. home-based first intervention. Entry age 12-17.**

Note: Child controls: Age at first intervention\*year of first intervention fixed effects, gender, immigrant background fixed effects (12). Parental controls: age, education, benefit receipt, criminal history and marital status of each parent and the population of parents in the CWS unit's area. Reason for assistance: 13 fixed effects, see Table A.2 for details.

### Instrumental variables estimation using local CWS practice styles

As discussed in section II, unlike recent US studies, a child is not assigned to a single investigator identified in the data. Thus, we base our IV strategy on the idea that local CWS units make different

decisions on foster care placement for similar children under identical family conditions, resulting in more variation in foster care interventions across units, conditional on observable child background characteristics, than what is expected from pure chance. The sample in this analysis consist of a pooled sample of children aged 0-17 that satisfy the sample entry criteria.

The IV analysis consist of several steps. We start by constructing the practice style measure, which we later use as an instrumental variable. First, we regress an indicator for being placed in foster care on the same variables as used in the most extensive specification in the analysis above – child and parental characteristics and reason for intervention – and compute the residual from this regression.

$$(1) \quad I_i = \kappa + X_i\delta + \phi_i + \xi_i$$

Second, for each child, we compute a leave-out mean of this residual within each year/CWS unit<sup>5</sup>.

$$(2) \quad Z_{J-i,t} = \frac{\sum_{j \in J|t} \xi_{jt} - \xi_{it}}{N_{j \in J|t} - 1}$$

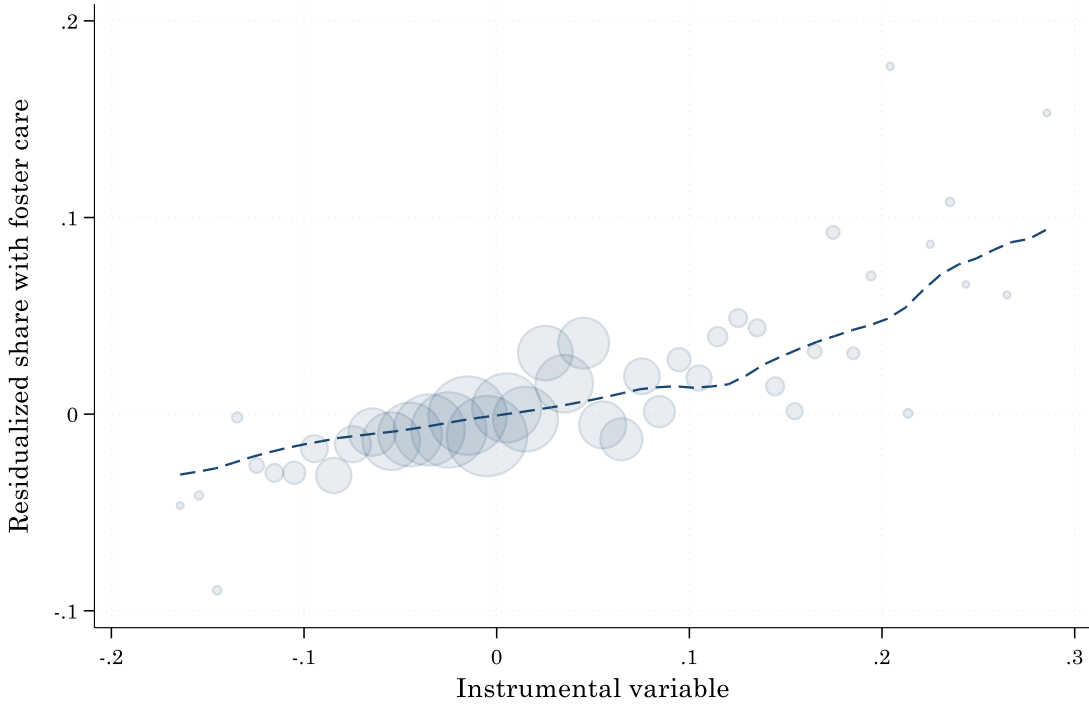
We denote this as  $Z_{J-i,t}$ , or “the instrument”. The interpretation is “the fraction of the other children in the sample being placed in foster care in the same year at the same unit, adjusted for observable characteristics”.<sup>6</sup>

Figure 9 provides a first inspection of the relevance of the practice style. A larger tendency to place other children in foster care in a given CWS unit in a given year, the “Instrumental variable”, is associated with a higher rate of foster care placement at the individual level.

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<sup>5</sup> When constructing a leave-out mean the purpose is to eliminate observation i’s influence in the instrument. When constructing the leave-out mean from the residual, the influence of individual i will, at least in principle, not be eliminated completely, since it also has affected the estimated coefficients in the model from which the residuals are computed.

<sup>6</sup> This is slightly imprecise, since we take the mean of a residual, whose mean is zero, the interpretation is however still the same.



**Figure 9. Effect of CWS unit practice style on (residualized) foster care placement.**

Note: Shown for 0.01-width bins with at least 50 children.

We test the relevance of the practice style  $Z_{J-i,t}$  by estimating its impact on actual foster care placement  $Y_i$ . This is the first stage equation, where  $Y_i$  is a dummy variable taking the value 1 when a child is placed outside the home, and  $X_i$  denotes the vector of control variables used in the estimation of the practice style.

$$(3) \quad Y_i = \alpha + X_i\beta + \gamma Z_{J-i,t} + \phi_t + \mu_J + \varepsilon_{it}$$

Finally, we include year fixed effects  $\phi_t$  and CWS unit fixed effects  $\mu_J$ . Hence, we just exploit idiosyncratic within-unit variation in (unobserved) practice style. Standard errors are clustered at the CWS unit level.

We present the results in Table 2 below. In the first three columns, we display the first stage for the three samples of children entering the child welfare system at different ages. The coefficients are around 1/3 and F-statistics around 90 for children with their first intervention at ages 0-5 and 6-11, and around half for the sample entering CWS at ages 12-17. In the final column, we include all the children in our dataset, regardless of entry age (0-17), and estimate a first stage coefficient of 0.285, with a F-statistic

of 143. Based on the results in Table 2, we conclude that the instrument is relevant, providing us with a strong first stage.

**Table 2: First stage equation**

	Entry age 0-5	Entry age 6-11	Entry age 12-17	Entry age 0-17
CWS Practice style (Z)	0.334 (0.035)	0.327 (0.034)	0.163 (0.037)	0.285 (0.024)
R-squared	0.160	0.115	0.115	0.126
N	32401	27196	26304	85901

Note: Child controls: Age at first intervention\*year of first intervention fixed effects, gender, immigrant background fixed effects (12). Parental controls: age, education, benefit receipt, criminal history and marital status of each parent and the population of parents in the CWS unit's area. Reason for assistance: 13 fixed effects, see Table A.2 for details.

To have a valid instrument, we also have to assume that any (conditional) correlation between children's outcomes and the instrumental variable is caused by the practice style variation. This exclusion restriction is not directly testable, but we try to test it by regressing the instrumental variable on pre-treatment outcomes, determined before the CWS intervenes. The model we estimate is then:

$$(4) \quad Y_i^{PRE} = \alpha + X_i\beta + \gamma Z_{J-i,t} + \phi_t + \mu_J + \varepsilon_{it}$$

We show the results in Table 3. The first three panels report results for children with their first intervention at age 0-5, 6-11 and 12-17, respectively, while the third panel shows results for children off all ages (0-17). Reassuringly, coefficients are generally small and insignificant, indicating that the practice style variation do not predict pre-intervention outcomes.

**Table 3. Placebo estimates on pre-intervention outcomes**

<i>Entry age 0-5</i>	Test scores	Psychiatric treatment	Somatic treatment (5+)	Criminal charges
Practice style Panel (zt1)		-0.019 (0.024)	-0.025 (0.043)	
R-squared		0.046	0.066	
No. observations		18485	18485	
<hr/>				
<i>Entry age 6-11</i>				
Practice style Panel (zt1)		0.006 (0.044)	-0.021 (0.046)	
R-squared		0.123	0.087	
No. observations		18965	18965	
<hr/>				
<i>Entry age 12-17</i>				
Practice style Panel (zt1)	0.045 (0.178)	0.011 (0.064)	0.042 (0.059)	0.021 (0.046)
R-squared	0.187	0.129	0.103	0.112
No. observations	11673	17703	17703	12087
<hr/>				
<i>Entry age 0-17</i>				
Practice style Panel (zt1)	0.088 (0.168)	-0.008 (0.028)	-0.008 (0.031)	0.021 (0.046)
R-squared	0.178	0.151	0.092	0.112
No. observations	14128	55153	55153	12087

Note: Based on estimations from Equation 4. Child controls: Age at first intervention\*year of first intervention fixed effects, gender, immigrant background fixed effects (12). Parental controls: age, education, benefit receipt, criminal history and marital status of each parent and the population of parents in the CWS unit's area. Reason for assistance: 13 fixed effects, see Table A.2 for details.

Table 4 shows the reduced form effects, for the sample consisting of children of all ages. The first two columns show that children placed in foster care experience a substantial increase in health care visits, in both the short and the long term, mirroring the results from the event-study analysis. In the long term, there is also an increase in disability benefit receipt, although this result is somewhat imprecise. Higher rates of health-care visits and disability benefit receipt may indicate worsened health, particularly when they are long-term outcomes. On other outcomes, we mostly find insignificant results, however, the uncertainty is large, and we refrain from making strong conclusions.

**Table 4. Estimated reduced form effects of foster care placements. Entry age 0-17.**

	Psychiatric treatment	Somatic treatment	Disability benefits	Test scores	High school completion	Criminal charges	Welfare	NEET
Short term (first five years after intervention)								
Foster care	0.060***	0.049***	-0.014	0.026	0.047	-0.038*	0.041	-0.015
(s.e.)	(0.022)	(0.018)	(0.025)	(0.109)	(0.047)	(0.020)	(0.039)	(0.027)
$R^2$	0.167	0.143	0.093	0.140	0.143	0.186	0.119	0.181
N	79991	79991	20464	31378	16402	36403	20464	28850
Long term (after five years, as long as we observe)								
Foster care	0.042	0.054**	0.045*	-0.060	-0.059	0.001	-0.018	0.011
(s.e.)	(0.026)	(0.021)	(0.023)	(0.118)	(0.041)	(0.016)	(0.026)	(0.026)
$R^2$	0.053	0.117	0.105	0.113	0.112	0.137	0.092	0.156
N	50369	63470	38699	25385	35275	41290	38699	44899

Note: Child controls: Age at first intervention\*year of first intervention fixed effects, gender, immigrant background fixed effects (12). Parental controls: age, education, benefit receipt, criminal history and marital status of each parent and the population of parents in the CWS unit's area. Reason for assistance: 13 fixed effects, see Table A.2 for details.

We show the instrumental variable results in Table 5. These should be interpreted with caution. First, we cannot be sure that we have captured all relevant factors underlying geographical difference in foster care use. Second, even if we have, geographical differences in foster care use may correlate with other geographical practice dimensions, such as other types of CWS services employed or school and social services. In other words, even if the reduced form results are correct, we cannot be sure that the exclusion restriction holds. Finally, the uncertainty is large. With this in mind, we note that the IV results show substantial increases in health visits. Taken literally, the results suggest that the probability of a psychiatric health-related visit increases by over 20 percentage points in both the short and the long term, and the probability of visiting a GP increases by almost 17 percentage points in the first five years after the intervention and by around  $\frac{1}{4}$  in the period after the placement. Results for other outcomes are much less precise.



**Table 5. Estimated instrumental variable effects of foster care placements. Entry age 0-17.**

	Psychiatric treatment	Somatic treatment	Disability benefits	Test scores	High school completion	Criminal charges	Welfare	NEET
Short term (first five years after intervention)								
Foster care	0.203***	0.167***	-0.107	0.087	0.361	-0.189*	0.312	-0.088
(s.e.)	(0.076)	(0.063)	(0.190)	(0.369)	(0.405)	(0.110)	(0.309)	(0.162)
$R^2$	0.082	0.062	0.035	0.107	0.049	0.076	-0.011	0.040
N	79991	79991	20464	31378	16402	36403	20464	28850
Long term (after five years, as long as we observe)								
Foster care	0.228	0.239**	0.288*	-0.216	-0.404	0.008	-0.118	0.062
(s.e.)	(0.141)	(0.097)	(0.161)	(0.429)	(0.304)	(0.104)	(0.172)	(0.148)
$R^2$	0.018	0.029	0.014	0.084	0.044	0.086	0.036	0.037
N	50369	63470	38699	25385	35275	41290	38699	44899

Note: Based on estimations from Equation 3. Child controls: Age at first intervention\*year of first intervention fixed effects, gender, immigrant background fixed effects (12). Parental controls: age, education, benefit receipt, criminal history and marital status of each parent and the population of parents in the CWS unit's area. Reason for assistance: 13 fixed effects, see Table A.2 for details.

## V. Conclusion

Children receiving Child welfare services are at risk for poor life outcomes. The decision to place a child in foster care has substantial consequences for both the child itself and the family involved. Understanding the potential risks and benefits of such placement appear to be crucial for how we design efficient CWS policies that serve the interest of children. The targeted nature of CWS interventions makes it particularly complicated to construct counterfactual outcomes, as it is hard to know what children affected by CWS would have accomplished in absence of intervention.

We follow individual children before and after they receive their first child welfare service record and compare the trajectories of those assigned to foster care with those that received home-based CWS in an event-study framework. To account for the fact that children who start receiving CWS at different ages may have different trajectories, we split by entry age; young children (below 5), middle (6-11) and older children (12-17). Our data span over a period of 25 years, allowing us to follow children from birth and into adulthood. Administrative records provide detailed information on school and health outcomes, subsequent crime, welfare and earnings, as well as detailed records of family background.

The results suggest that children with foster care as their first intervention are more likely to receive treatment, both psychiatric and somatic, in the years following treatment. This result is consistent across entry age groups. On other outcomes, there are mostly small differences between the trajectories of children placed in foster care versus staying at home. These results are robust to the inclusion of child and parent characteristics, as well as for the reasons for the first intervention. In light of the fact that there may be remaining negative selection in which children are placed in foster care, and our interpretation of the lack of long-term differences between the two groups of children is that foster care compensates for the .

We proceed to exploit geographical variation in the likelihood of being assigned to foster care as an instrument for causal identification. Relying on both variation across units but also within the same unit over time, this allows us to use the practice style of the local CWS unit as an instrument for actual foster care. We find evidence that foster care placement increases psychiatric and somatic treatment, mirroring the event-study results, but insignificant and imprecise effects on other outcomes.

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## VII. Appendix

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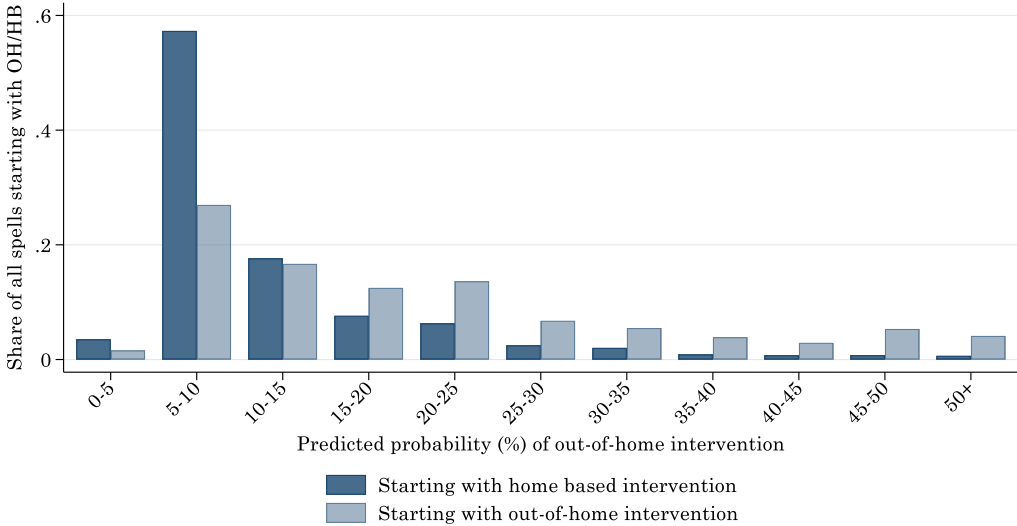
Out-of-home	1	Institutions
	1.01	Child welfare institutions
	1.02	Other institutions
	1.99	Other institutional measures
	2	Foster homes
	2.01	Foster homes of family and close network
	2.02	Foster homes outside family and close network
	2.03	Public family homes
	2.04	Foster homes under § 4-27 Child Welfare Act
	2.05	Emergency shelter homes
	2.99	Other foster home measures
Home based	3	Measures to enhance parenting skills
	3.01	MST (Multisystemic Therapy)
	3.02	PMTO (Parent Management Training Oregon)
	3.03	FFT (Functional Family Therapy)
	3.04	Webster Stratton - The Incredible Years
	3.05	ICDP (International Child Development Programme)
	3.06	Marte Meo
	3.07	Other home-based measures
	3.08	Family support centres
	3.09	Decisions on advice and guidance
	3.10	Home adviser/therapist
	3.99	Other measures to enhance parenting skills
	4	Measures to enhance the child's development
	4.01	Kindergartens
	4.02	Before and after school care
	4.03	Leisure activities
	4.04	Financial assistance
	4.05	Home visits/respice measures
	4.06	Support person
	4.07	Discussion groups/children's groups
	4.08	Education and employment
	4.09	Aggression Replacement Therapy (ART)
	4.99	Other measures to enhance the child's development
	5	Supervision and control
	5.01	Voluntary supervision at home
	5.02	Imposed supervision at home
	5.03	Supervised visits
	5.04	Substance abuse control
	5.99	Other supervision and control measures
	6	Networking/cooperation with other services
	6.01	Family Group Conference
	6.02	Network meetings
	6.03	Individual plan
	6.04	Participation in accountability/support groups
	6.99	Other networking measures/cooperation with other services
	7	Investigation and treatment from other services
	7.01	Medical investigation and treatment (§ 4-10 Child Welfare Act)
	7.02	Treatment of children with special training needs (§ 4-11 Child Welfare Act)
	7.03	Mental health care for children and youths
	7.99	Other investigation and treatment measures from other services
8	Housing	
8.01	Financial assistance with own housing	
8.02	Housing with support (including home share)	
8.03	Life skills training	
8.99	Other housing measures	

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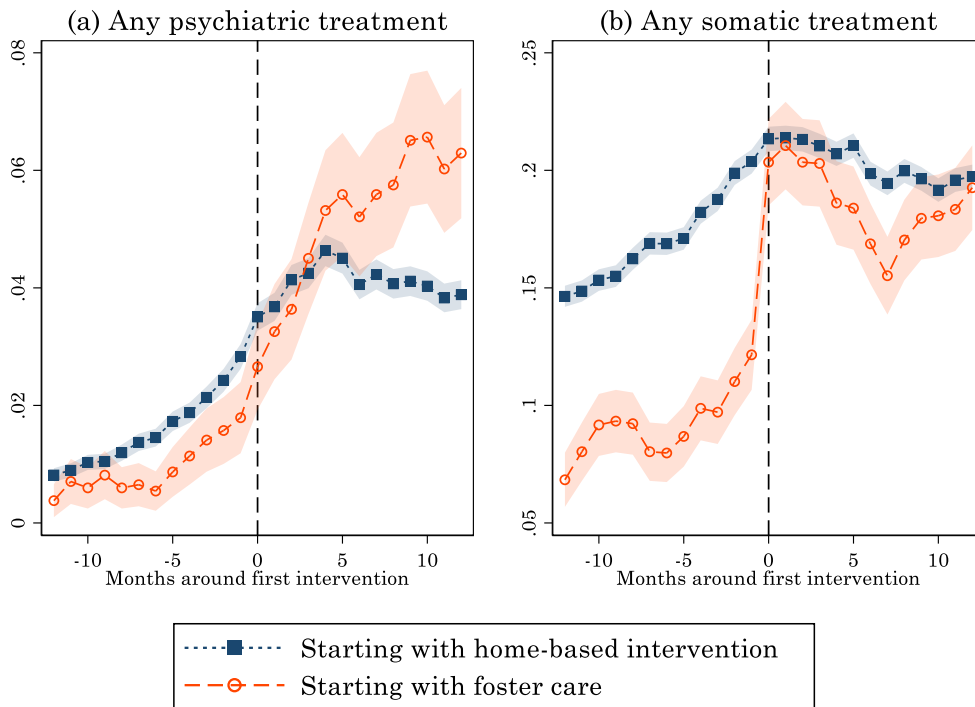
**Table A1. Categorization of CWS assistance measures**

Home environment	Parent's mental health problems Parent's substance abuse Conflict at home / domestic violence / parents' somatic illness or criminality / other aspects of the parents / family
Parents	Parent's lack of parenting skills The child is subjected to neglect The child is subjected to physical abuse The child is subjected to mental abuse The child is the victim of sexual abuse/incest The child has no one to care for him / her
Child	The child has disabilities The child's substance abuse The child's behavior / criminality / mental health problems The child's relationship difficulties or other

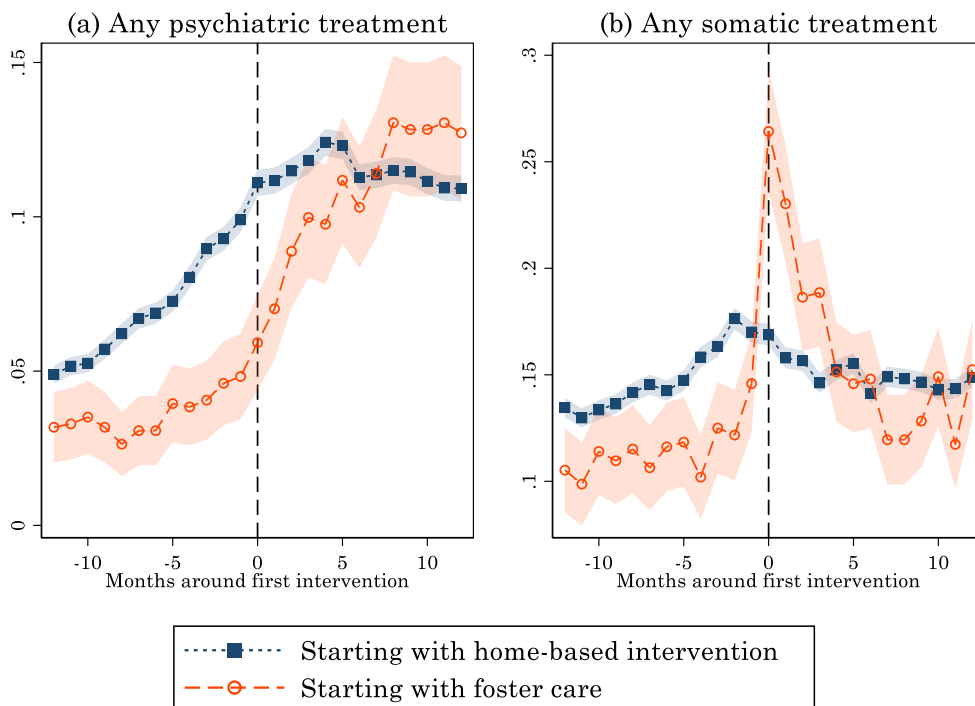
**Table A2. Categorization of reason for assistance**



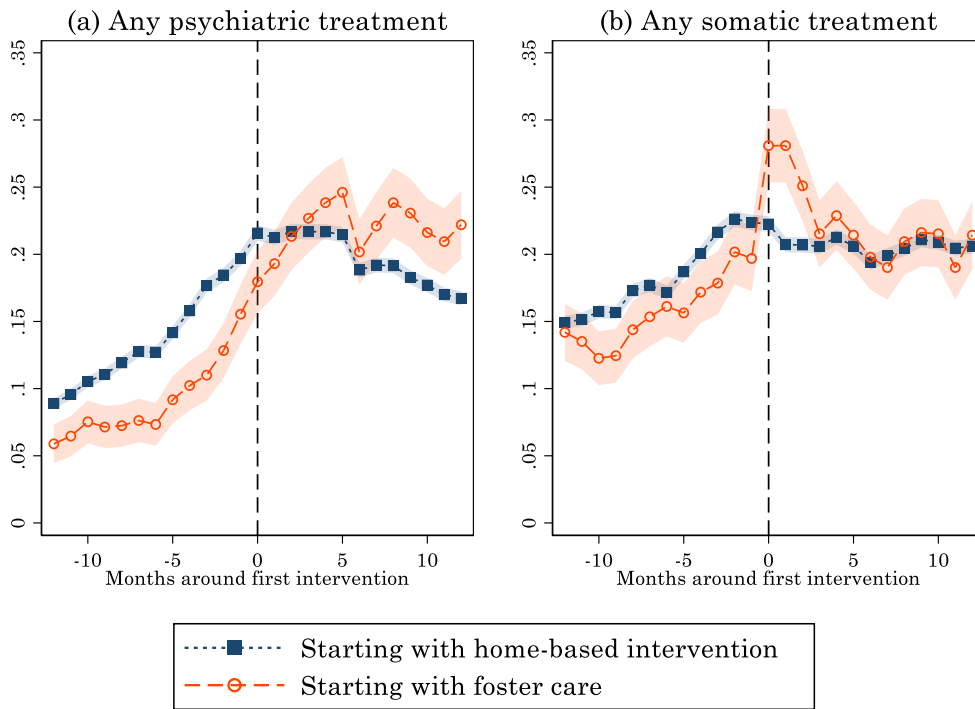
**Figure A1. Probability of out-of-home intervention**



**Figure A.2. Receiving health treatment around the first intervention, by month. Age 0-5**



**Figure A.3. Receiving health treatment around the first intervention, by month. Age 6-11**



**Figure A.4. Receiving health treatment around the first intervention, by month. Age 12-17**