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ORIGINAL PAPER

The Effect of Family Foster Care vs. Residential Group Care on Educational Attainment

Iben Bolvig[1] · Mette Thorsager[1]

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Abstract

This study investigates the effect of foster care relative to residential group care on enrollment in upper secondary education among Danish children in out-of-home care who were placed out of home at the age six to 14 years ($n = 4530$). We address the proposition that children placed in family foster care generally have less severe emotional and/or behavioral problems than children placed in residential group care by utilizing a variation in the municipalities' relative use of foster care among all children placed in out-of-home care. We find evidence that children living in municipalities with a high inclination to use foster care will be more likely to enroll in upper secondary education ($p = 0.004$). When splitting the sample by gender, we see that the effects are significant only among girls. When looking at potential mechanisms, we find that children in foster care are more likely to attend the school-leaving exams after lower secondary school, while we find no effect on the average standardized test score in the school-leaving exams. As with the main results, these findings apply to the girls only.

Keywords Out-of-home care · Foster care · Residential group care · Educational attainment

Highlights

- This study investigates the effect of foster care relative to residential group care on educational attainment among children in out-of-home care.
- We found that children in residential group care have more severe emotional and/or behavioral problems than children in foster care.
- We found evidence that children living in municipalities with a higher inclination to use foster care were more likely to continue into upper secondary education.
- As a mechanism, our findings suggest that foster care have beneficial impacts on the school decision-making process, whereas it has no impact on the child's scholastic ability.

Throughout the world, child protection agencies need to provide care for children who, if they continued to live with their families, would be at risk of being abused and neglected, or harmed due their own risky behavior. Child protection agencies have a duty to provide substitute care for such children that will promote positive development and life outcomes for the children. In most countries, residential group care and family foster care are the two most widespread types of out-of-home substitute care used for these children. A rich research literature on child placement and the associated characteristics of families, children, and care history shows significant differences in these characteristics when comparing residential group care and family foster care (Barth, 2002; McCrae et al., 2010; Leloux-Opmeer et al., 2017; Portwood et al., 2018; Robst et al., 2011). Overall, the literature agrees that children in residential group care tend to have more serious cognitive and behavioral disorder than children in foster care (Berrick et al., 1993; Lausten & Jørgensen, 2017; Lee & Thompson, 2008; McCrae et al., 2010; Portwood et al., 2018). Conversely, the biological parents of children in foster care show poorer parental skills and more severe material problems (poverty/ unemployment)

✉ Iben Bolvig
ibbo@vive.dk

[1] The Danish Center for Social Science Research – VIVE. Søren Frichs Vej 36G / DK, 8230 Aarhus, Denmark

than the biological parents of children in residential group care (Leloux-Opmeer et al., 2017).

Despite the above descriptive knowledge on the different types of children in out-of-home placement, less is known about the effect of out-of-home care types on adolescent outcomes, and the research that aims to identify the best type of out-of-home care for successful adolescent outcomes is less conclusive. Some studies have found positive impacts on outcomes for high-standard residential group care programs (See e.g. James, 2011), and Knorth et al., (2008) conclude that psychosocial functioning outcomes are expected to improve for children in residential group care. Nonetheless, the majority of studies find evidence that indicates that foster care leads to better adolescent outcomes than does residential group care (Barth, 2005; Ejrnæs & Andersen, 2013; Gutterswijk et al., 2020; Lausten & Jørgensen, 2017; Lee et al., 2011; Olsen et al., 2011). Other studies, however, find uncertain evidence of such a difference (McCrae et al., 2010).

As pointed out by Portwood et al. (2018), the literature does not adequately address the selection bias that arises because, when compared with children in foster care, children placed in residential group care experience more serious cognitive and behavioral disorders at the time of the first out-of-home placement. The authors call for additional research in this area and, particularly, for projects that address the methodological problems present in many earlier studies (Lee et al., 2011). In their own study, they attempt to account for selection bias in a pretest-posttest design, by comparing development in the general functioning, mental problems, and behavioral problems of children in foster care with children in residential group care (Portwood et al., 2018).

We contribute to this research area by estimating the effect of foster care placement relative to residential group care on school performance of children placed out of home. Our methodological approach to estimate the effect utilizes the fact that some municipalities are more inclined to place a child in foster care rather than residential group care compared to other municipalities. That is, we investigate a potential causal effect by using municipal variation in the number of out-of-home care children in foster care relative to residential group care. Doyle (2007) employs a similar strategy, utilizing differences in protection investigators' inclination to recommend foster care in order to identify the impact of foster care placement on juvenile delinquency and teen motherhood. Gross and Baron (2022) have recently also applied such a strategy. They find positive causal effects of placing a child in foster care on, for instance, daily school attendance and standardized math test scores. Likewise, Gupta and Frederiksen (2012) estimate the effect of foster care relative to residential group care on juvenile delinquency among youths placed out-of-home in Denmark. They find less juvenile delinquency among children placed in foster care than among children placed in residential group care.

By examining effects on educational outcomes, we also contribute to the strand of literature that describes educational attainment among children in out-of-home care. Several studies have observed lower educational attainment among children in care compared to peers, who have never been in care (Clausen & Kristofersen, 2008; Kääriälä & Hiilamo, 2017; Olsen et al., 2011; Vinnerljung & Hjern, 2011). A recent systematic review by O'Higgins et al., (2017) analyzes a large range of potential factors linked with educational outcomes among children in kinship or foster care. The review identifies correlations in four main groups of factors—child-related factors, birth family factors, care history factors, and school factors—thus showing that multiple sources affect educational outcomes for this group of children.

Previous studies have shown that girls are more prone to negative peer effects, especially to those from older male peers (Belsky et al., 2020; Johansen, 2021). Johansen (2021) finds that girls with older peers show more risky behavior, such as heavy drinking and drug use, and exhibit more cases of teenage pregnancy. A study by Lovett and Xue (2020) shows that the effect of placement in kinship care relative to foster care is stronger for females than for males on a number of educational, labor market, and social outcomes. In particular, for enrollment in formal education both males and females appear to benefit from kinship care, but the effect is statistically significant for females only (Lovett & Xue, 2020).

The analysis in this paper is based on 4567 Danish children aged six to 14 years who were placed in out-of-home care for the first time during the period 2008 to 2017. We benefit from rich registry data, which include detailed information on demographic characteristics, socioeconomic status of the children's parents, and public health care utilization.

We hypothesize that there are two main mechanisms by which the type of out-of-home care can affect educational attainment among children placed out of home. Firstly, the pedagogical approach to school homework might differ between the two types of out-of-home care. Parental involvement and home-school collaboration are advantageous for academic achievement and learning behavior among children (Cox, 2005; Froiland et al., 2013; Jeynes, 2012). If home-school collaboration works better in foster care families, this might result in improved school performance in lower secondary school among foster care children relative to children in residential group care. Foster care more often occurs in small family units where the foster parents are the main caretakers of the child. This enables foster care parents to involve themselves in schoolwork more closely and promotes

a closer home-school collaboration. Residential group care typically involves a staff of group care workers charged with the caretaking of the child/children. These staff members might change during the day (e.g., due to dayshifts and nightshifts), during the week (e.g., due to days off), or during the year (e.g., due to employee turnover). The fluctuating presence of adults may impede the development of a close and stable home-school collaboration. On the other hand, in residential group care staff members are trained caregivers who often have pedagogical qualifications, which might enable a more professional and structured involvement in schoolwork.

Secondly, the peers surrounding a child placed out of home are likely to differ between the two types of out-of-home care. Research on peer effects in primary and secondary schools shows sizeable effects on academic performance from the classroom composition in terms of socioeconomic background (Ammermueller & Pischke, 2009), student ability (Lavy et al., 2012), and gender (Lavy & Schlosser, 2011). We expect the same types of peer effects to be prevalent among children in out-of-home care. For instance, since children in residential group care more frequently suffer from serious cognitive behavioral disorders these children will also be more likely to reside with peers with these types of disorders, which could thus give rise to negative effects on educational attainment. Correspondingly, we expect such negative peer effects to be less pronounced in foster care—both because, on average, the behavioral disorders are less prevalent among foster care children than among the children in residential group care and because the number of same-age peers is smaller in foster care homes. Recent studies (Osei, 2021; Osei & Gorey, 2019) confirm this expectation. However, previous studies have also shown that mothers of residential group care children have higher education as compared to foster care mothers, thus introducing a potential selection bias (Ejrnæs & Andersen, 2013). We are not able to test these hypotheses formally, but we discuss the likelihood of these potential mechanisms by estimating effects on school performance in lower secondary school and by investigating gender differences.

Background

In Denmark, the decision to remove a child from their nuclear family and place them in care outside their home rests with municipal authorities. While national legislation governs the overall policy framework on out-of-home care, municipalities have local authority on social affairs (Danish Social Service Law, 2020). Thus, we see variation among municipalities in how they implement their policy on out-of-home care (The Ministry of Social Affairs, 2020). Most municipalities use a request-execute model (named BUM) in the process preceding a decision to place a child in out-of-home care. In this process, one department in the municipality requests the placement while another department acts upon the request by finding the relevant type of out-of-home care (Mehlbye, 2014). Several other stakeholders, including the child's school or daycare center and the municipality's pedagogical psychological counseling (PPR) service, cooperate to arrange the placement.

Institutional Setting

Placement of children outside their home is one of the most drastic family interventions made by public authorities. Nevertheless, public authorities placed 13,557 Danish children outside their homes in either foster care (8554), residential group care (4000), protected placement in their own apartment (626), or other type of out-of-home care (boarding schools and locked units) (377) in 2019 (Statistics Denmark, 2022).

In the present analysis, we divide the residential types of out-of-home care into two categories: foster care and residential group care. Foster care families provide shelter and care for the foster child, including structure in the child's daily life, which promotes well-being and development for the child. Foster care includes placements in ordinary and municipal foster care as well as in network and kinship foster care. The Reform for the Child in 2011 introduced municipal foster care as an additional type of foster care. Unlike ordinary foster parents, municipal foster parents are trained to take in children with more severe mental and behavioral problems. In network and kinship foster care, the foster parents are either relatives of the child or are close friends of the child's family (The Ministry of Social Affairs, 2020). Andersen and Fallesen (2015) show that ordinary foster care and network and kinship foster care are equally good at maintaining stable placements.

Residential group care includes group homes with pedagogical specialization, 24-hour care centers, and acute residential group care. Size, treatment services, and target groups vary, both within and between each of the types of residential group care. In general, all residential group care homes are to provide care, personal support, and guidance for the children in care. Specialized group homes focus specifically on helping the child develop close and stable relations with adults. Most often, a trained staff provides the daily supervision and treatment services for the children in care. In some cases, treatment settings are tailored to target groups of children with specific treatment needs and sometimes include a school for special education. While the treatment provided at specialized group homes and 24-hour care centers varies between such care facilities, the children placed in these facilities show smaller differences in background characteristics compared to children in foster care (The Ministry of Social Affairs, 2020).

The legal framework regarding out-of-home care has undergone some changes during the years of the analysis. In general, these changes have led to an increasing focus on children's schooling when placing them in out-of-home care. Of special interest for this study, we might mention that the reform specifies that measures must be taken to support the child's scholastic performance and reinforce the child's opportunities to complete an education (The National Board of Social Services, 2011).

For the remainder of this paper, we will use the term foster care to denote ordinary family foster care and kinship care, and the term residential group care to denote group homes with pedagogical specialization, traditional 24-hour care centers, and acute residential group care. Due to highly specialized care, we exclude placements in care centers for children with functional disabilities and locked units in 24-hour care centers. We also leave out protected placement in apartments and placements at boarding schools.

Placement Decisions – who and where

The decision to place a child in care outside their home rests with the municipal authorities in which the child's parents live. Based on an assessment of resources and problems with the child, family, and network, the authorities decide whether to implement out-of-home care or instead implement preventive measures of some sort (e.g., family counseling or a personal mentor for the child) to prevent the out-of-home placement. The responsibility for implementing the out-of-home care and preventive measures lies with the municipality of residence of the child's parents, as do the costs of these measures (The Ministry of Social Affairs, 2020). Studies have shown variations in the assessment of the child and family and in the implementation of out-of-home care and preventive measures. This means that children and families with comparable difficulties are sometimes assessed differently across different caseworkers and municipalities, which results in varying consequences for the child and family (Egelund & Thomsen, 2002). The process from a request for an assessment of the need for out-of-home care to the assessment and decision as to placement type varies across municipalities. Often, a municipality has a committee that decides on out-of-home care cases. If the committee decides to place a child in out-home-care, a social worker and foster care consultant are included in the process of deciding on placement type and setting up contact with care personnel.

Data and Descriptive Analysis

The analysis draws on Danish registry data providing detailed individual-level information, including details on placements in out-of-home care. From the full population of children placed in out-of-home care, we extract the subpopulation of first-time placements with a minimum length of six months initiated during the period 2008–2017. Since our analysis aims to evaluate effects of out-of-home care on children's school performance, we further limit the population to children of school age, i.e., six to 14 years old at the time of placement in out-of-home care. This data set contains 7607 children. To obtain school performance measures in the observation period, we limit the population to children who had completed grade 8 by September 2018. This leaves us with a main population of 4530 children. However, when determining whether the children attends upper secondary education we further limit the population to children aged 18 in 2018, leaving us with a population of 2900 children when considering attending upper secondary education as an outcome. We limit the population by age 18 years to make sure all children have had the chance to finish primary school since pupils have the option of attending grade 10 of primary schooling (which more than 50 percent of a cohort do).

We link the sample of children in out-of-home care with detailed background information, such as demographic characteristics, socioeconomic status of their parents, and public health service visits. The regression analysis includes municipal socioeconomic and labor market indicators as control variables. Among these municipal indicators are financial spending on public schooling and special needs education.

Records from The Danish Student Register form the basis for measures of schooling outcomes. In addition, we include standardized test scores from the grade 9 school-leaving exams. The Danish Student Register covers all enrollments in programs at Danish educational institutions and thus allows us to determine whether the children in out-of-home care complete lower secondary education and/or continue in upper secondary education. Note that graduation relies on an assessment of the school and that students may graduate from lower secondary school without attending any exams.

Descriptive Statistics

Table 1 shows descriptive statistics of the sample measured in the year of their first placement for the children placed in foster care and residential group care, respectively. We see that more boys who were aged 12 or older at the time of placement and who belong to an ethnic minority were placed in residential group care, as compared to foster care. We also find a higher rate of children with chronic diagnoses among the children in residential group care. This is especially true for children with cerebral palsy, autism, and developmental disability, who are two-three times more likely to be in residential group care than in foster care.

Table 1 Descriptive statistics measured during the year of first admission to out-of-home care

		Foster care		Residential group care		Test of difference
		Mean	Std. dev.	Mean	Std. dev.	*P* value
Characteristics concerning the child:						
Child	Aged below 12 years when placed out of home	0.53	0.50	0.33	0.47	0.00***
	Ethnic minority	0.10	0.30	0.14	0.35	0.00***
	Boy	0.51	0.50	0.57	0.50	0.00***
	Diagnoses registered before the year of admission:					
	- Cerebral palsy	0.01	0.09	0.03	0.16	0.00***
	- Developmental disability	0.05	0.22	0.10	0.30	0.00***
	- Autism	0.04	0.20	0.14	0.35	0.00***
	- ADHD	0.16	0.36	0.25	0.43	0.00***
	- Down's syndrome	0.00	0.05	0.00	0.05	0.84
	- Brain damage	0.04	0.19	0.05	0.22	0.02**
	- Epilepsy	0.04	0.20	0.09	0.28	0.00***
	- Muscular dystrophies	0.00	0.03	0.00	0.06	0.12
	Parents' consent to placement	0.87	0.34	0.84	0.37	0.02**
	Parents' consent unknown	0.03	0.17	0.04	0.20	0.05*
	Special needs education during the year of first out-of-home care:					
	- Any special needs education	0.12	0.32	0.17	0.37	0.05**
	- Schooling at residential home	0.05	0.22	0.18	0.38	0.00***
	- Schooling at special school	0.05	0.22	0.11	0.32	0.00***
	Reason for special needs education:					
	- Learning difficulties	0.03	0.17	0.04	0.19	0.17
	- Psychological difficulties	0.01	0.11	0.03	0.17	0.00***
	- Physical difficulties	0.01	0.09	0.01	0.07	0.09*
	Contact with social authorities:					
	- <1 year before placement	0.15	0.36	0.13	0.34	0.12
	- 1–4 years before placement	0.20	0.40	0.18	0.38	0.03**
	- >4 years before placement	0.21	0.41	0.17	0.37	0.00***
	- No contact w. social authorities before placement	0.42	0.49	0.51	0.50	0.00***
Characteristics concerning the mother:						
Mother	Age when child was born	27.1	7.06	27.3	6.70	0.37
	Ethnic minority	0.10	0.30	0.15	0.36	0.00***
	Short education (ISCED 1–3)	0.70	0.46	0.55	0.50	0.00***
	Long education (ISCED 4–8)	0.29	0.44	0.45	0.47	0.00***
	Deceased before placement	0.07	0.25	0.02	0.14	0.00***
	Received social welfare in year of placement	0.71	0.45	0.61	0.49	0.00***
	Previously convicted[a]	0.02	0.13	0.02	0.14	0.74
	Number of consultations with specialist doctor[b]	1.14	2.13	1.67	3.58	0.00***
	Number of visits to psychiatric hospital[b]	0.70	2.64	0.60	2.38	0.18
	Number of consultations with general practioner[b]	17.6	17.0	16.1	13.5	0.00***
	Hospitalized (days)[b]	2.19	2.22	1.96	1.69	0.00***

Table 1 (continued)

		Foster care		Residential group care		Test of difference
		Mean	Std. dev.	Mean	Std. dev.	*P* value
Characteristics concerning the father:						
Father	Age when child was born	29.4	10.4	29.9	10.0	0.41
	Ethnic minority	0.10	0.30	0.13	0.34	0.00***
	Short education (ISCED 1–3)	0.69	0.46	0.58	0.49	0.00***
	Long education (ISCED 4–8)	0.29	0.45	0.34	0.48	0.00***
	Deceased before placement	0.06	0.23	0.04	0.19	0.00***
	Received social welfare in year of placement	0.59	0.49	0.50	0.50	0.00***
	Previously convicted[a]	0.06	0.24	0.06	0.23	0.49
	Number of consultations with specialist doctor[b]	0.11	0.32	0.11	0.31	0.80
	Number of visits to psychiatric hospital[b]	0.67	1.70	0.71	1.94	0.39
	Number of consultations with general practioner[b]	0.26	4.98	0.27	3.59	0.90
	Hospitalized (days)[b]	8.56	10.61	7.92	9.30	0.03**
Number of observations		2018		2512		4530

The table shows descriptive characteristics of children and their biological parents in the year of placement in out-of-home care. The descriptive statistics include mean and standard deviation measured for each subsample of children (and their parents) in foster care and residential group care, respectively. Subsample-differences in the mean values are tested using a t-test

[a]Registered in crime statistics

[b]Average yearly contacts measured three years before the year of out-of-home placement

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Special needs education is also more common among children in residential group care, as is schooling in special schools, which is twice as likely for children in residential group care. Unsurprisingly, we also see that in-home schooling in a residential group care home is three times as high for children placed in residential group care compared to children in foster care, but it is worth noting that some children placed in foster care (5 percent) receive schooling in residential group care homes.

In the comparison of parental background characteristics, we find a lower level of education and a more frequent use of social welfare among parents of children in foster care, as well as a higher use of health care services among the mothers compared to parents of children in residential group care. Likewise, the fraction of deceased parents is higher among children in foster care. On the other hand, we find no difference between parents of children in foster care and children in residential group care in terms of criminal history or the age of the parents when their children were born. Taken together, these findings suggest that children in residential group care tend to have more personal behavioral or health-related risk factors than those placed in foster care, whereas children in foster care seem to be more at risk due to problems originating from their parents.

Outcome Measure

We measured educational attainment based on measures of finishing lower secondary school as well as measures of enrollment in upper secondary education. First, we measured attendance at the school-leaving exams for lower secondary school. Even though these exams mark the end of compulsory schooling in Denmark, not all students attend the exams since it is possible to finish lower secondary education without taking them. Private schools, private independent schools, and boarding schools do not have to provide public school-leaving examination. Individual pupils at public schools can also be exempt from the school-leaving exams based on a teacher assessment. In fact, less than half of the children placed in residential group care attended the school-leaving exams and only 62 percent of the children placed in foster care did so (see Table 2). As another measure of a child's performance during compulsory schooling, we include the average test scores (measured as the standardized deviation from the national average in the year of graduation) for school-leaving exams.

Second, we measured educational attainment by looking at the rate of students enrolling in upper secondary education, either in a general, commercial, or technical discipline, or in a vocational discipline. Table 2 shows that about 40

Table 2 Measures of school performance

	Foster care Mean	Residential group care Mean	Test of difference P value	# observations
Finishing lower secondary school level:				
Attendance at the school-leaving exam	0.62	0.46	0.00***	4530
Deviation from national GPA[a]	−0.75	−0.92	0.00***	2410
Enrollment in upper secondary education:				
Any upper secondary education	0.67	0.51	0.00***	2900
-General upper secondary education	0.33	0.18	0.00***	2900
-Vocational education and training	0.43	0.38	0.01**	2900

The table shows descriptive statistics of outcome measures for children in foster care and residential group care, separately. Subsample differences in the mean values are tested using a t-test

[a]Standard deviation from the national average

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

percent of both children in foster care and children in residential group care continue in a vocational education program after finishing lower secondary education. Another 30 percent of the children placed in foster care continue to the more general type of upper secondary education, whereas this is true for only 18 percent of the children placed in residential group care.

In general, the descriptive statistics of outcome measures shown in Table 2 indicate that, on average, children placed in residential group care achieve lower school performance compared to children placed in foster care. It is likely, however, that part of this difference stems from the non-random selection into either foster care or residential group care. Hence, any method used to estimate the effect of placement type would need to take this selection into account.

Methods

To study the effect of out-of-home care placement type on schooling outcomes, the simple approach would be to regress schooling outcomes on an indicator of placement type. As shown above, there are observable and significant differences in the characteristics of children placed in foster care compared to children placed in residential group. Hence, a regression model with a wide range of controls for observable characteristics of the children and parents would likely still return biased estimates due to unobservable differences.

Our methodological approach rely on the fact that some municipalities are more inclined to place a child in foster care rather than residential group care compared to other municipalities. Specifically, we utilize that differences in the local supply of foster care homes, distance to nearest residential group care facility, and political decisions give rise to municipal variation in the relative use of foster care as placement type. Hence, the variation in the municipal inclination to place children in foster care relative to residential group care results in a situation where, for instance, two children with similar difficulties but with different municipalities of residencies are placed in different placement types as a function of living in different municipalities. Since the child and its parents hardly chose to live in a given municipality because it had a higher or lower inclination to use foster care or residential group care in out-of-home placements, we argue that the decision is equivalent to random from the child's point of view when both foster care and residential group care are relevant placement types. Assuming that the inclination of a municipality to use foster care relative to residential group care is independent of other factors affecting child outcomes, we can then estimate the effect of municipalities' inclination to use foster care on the future school performance of the child.

Equation 1 shows our estimation model to estimate such an effect:

$$Y_{it} = \alpha_0 + \eta Z_{i0} + \pi X_{i\mathbf{0}} + \theta B_{m\mathbf{0}} + \tau S_s + \gamma_T + u_{it} \quad (1)$$

where Y is the schooling outcome, X is a vector of individual characteristics measured in the year of the first placement (see Table 1), and γ is year-of-placement fixed effects. These fixed effects account for any common time trends in the outcome measures and other control variables. We add a range of municipal characteristics, B, such as municipal expenses and average education level in the year of placement. The municipal characteristics are included to account for the possibility that the inclination to use foster care relative to residential group care is related to the municipal budget constraint, which again may affect school expenditure in the municipality and thus the relevant child outcomes (see discussion below). For the same reason, we include average school-performance measures, S, based on

the students who attended grade 9 in the three years prior to each individual's own year of attending grade 9.

The municipal inclination to use foster care as out-of-home placement relative to residential group care is measured for each child separately as the fraction of children in foster care measured 12 months before own placement and in the municipality where the biological parents reside.

In Eq. (1), we refer to η as the reduced form estimate of the effect of placement type. We call the effect estimate a reduced form effect since we expect that children who are placed in foster care because they resided in a municipality with a higher inclination to use foster care will mediate any effect from municipal inclination. It is an intent-to-treat estimate and therefore an average effect for children placed in foster care or residential group care.

Validation of the Design

The key identifying assumption for the reduced form estimates to allow a causal interpretation is the so-called independence assumption. This assumption requires that the local inclination to use foster care is equivalent to random for the child placed out of home, meaning that the inclination of municipalities to use foster care does not share common causes with child outcomes. An argument against this assumption is the possibility that municipalities may preemptively invest in one type of out-home-care based on the vulnerable children/families in the municipality that are not (yet) placed out of home. If this is the case, the local inclination to use one type of placement as opposed to the other will not be random, but instead affected by the municipalities' knowledge of the families.

About half of the sample of children included in this analysis had been in contact with the social authorities before their placement in out-of-home care. Hence, in half of our cases the municipalities had knowledge about the families before the placement. Nonetheless, numerous unknown factors exist, which makes it difficult for the authorities to predict if (and when) a placement in out-of-home care is going to take place. The fact that 53% of our sample of children in residential group care and 35% of our sample of children in foster care have been placed in another municipality suggests that municipalities are unable to perfectly predict the demand for out-of-home care placements. This, combined with budget constraints in most municipalities, prompts us to posit that, for the marginal child on the boundary of placement in either foster care or residential group care, the inclination to use foster care is equivalent to random.

We cannot test the independence assumption, but we examine the plausibility of the assumption using a balance test, which is reported in Table 3. The idea behind this test is that if the inclination to use foster care is equivalent to random then it should be uncorrelated to any characteristics of the children and their parents. The coefficients presented in Table 3 stem from a regression of the municipal inclination to use foster care on characteristics of the children and their parents as well as municipality and school-specific factors and indicators for the year of placement. We test the joint significance of all child and parents-specific characteristic and find that we cannot reject the null hypothesis of no correlation between family-specific characteristics and the municipal inclination to use foster care.

Nonetheless, it is potentially of greater concern that the municipality characteristics are strongly related to the municipal inclination to use foster care. The final section of Table 3 shows that higher inclination to use foster care as opposed to residential group care is associated with higher expenses on special needs education and unemployment benefits and with lower expenses on public schooling, social support for children, and disability pensions. This suggests that the municipal inclination to use foster care might affect children's schooling outcomes through other channels than the type of out-of-home care. This would be a violation of the exclusion restriction, which we discuss further in the next section (Imbens & Angrist, 1994).

In order for us to interpret the regression results of schooling outcomes on the municipal inclination to use foster care as the effect of placement type, there needs to be a strong association between the municipal inclination and the probability of being placed in foster care. Figure 1 plots estimates from a local polynomial smoothing regression of the probability of being placed in foster care against the municipal inclination to use foster care. As expected, the function shows that the probability of placement in foster care increases with the municipal inclination to use foster care. A regression of placement type on the municipal inclination also reveals a statistically significant association.

The Exclusion Restriction

The exclusion restriction implies that the municipal inclination to use foster care affects child outcomes only by operating through the probability of placement in foster care. The assumption of a satisfied exclusion restriction is important for the interpretation of the effect estimates of the inclination to use foster care on schooling performance. If the exclusion restriction is satisfied, then the effect estimates are indicative of the effect of foster care placement relative to residential group care on schooling outcomes. However, if the exclusion restriction is not satisfied then various factors confound the effect estimate.

In our case, as shown in Table 3, municipalities who are inclined to use foster care are also inclined to spend more money on special needs education. If higher spending on special needs education also lead to better

Table 3 Balance test: Regression of municipal inclination to use foster care on child, parent, municipal and school characteristics measured in year of placement

		Coefficient	*P* value
Characteristics of the child	*Age when placed out of home:*		
	- 6 years	−0.011	(0.320)
	- 7 years	−0.018**	(0.044)
	- 8 years	−0.006	(0.425)
	- 9 years	−0.004	(0.555)
	- 10 years	−0.006	(0.369)
	- 11 years	−0.001	(0.899)
	- 12 years	−0.002	(0.750)
	- 13 years	−0.004	(0.428)
	Ethnic minority	0.006	(0.479)
	Boy	0.003	(0.372)
	Diagnoses registered before the year of admission:		
	- Cerebral palsy	−0.007	(0.545)
	- Developmental disability	−0.001	(0.851)
	- Autism	−0.006	(0.258)
	- ADHD	−0.002	(0.632)
	- Down's syndrome	0.036	(0.202)
	- Brain damage	−0.003	(0.649)
	- Epilepsy	−0.000	(0.986)
	- Muscular dystrophies	−0.054*	(0.084)
	Parents' consent to placement	−0.005	(0.319)
	Parents' consent unknown	−0.019**	(0.031)
	Special needs education during the year of first out-of-home care:		
	- Special needs education in class	0.009	(0.449)
	- Special needs education in special school	−0.007	(0.322)
	- Schooling at residential home	−0.009*	(0.093)
	- Schooling at special school	0.005	(0.488)
	Reason for special needs education:		
	- Learning difficulties	0.015	(0.113)
	- Psychological difficulties	0.008	(0.480)
	- Physical difficulties	0.010	(0.594)
	Contact to social authorities:		
	- <1 year before placement	0.010**	(0.030)
	- 1–4 years before placement	0.009**	(0.021)
	- >4 years before placement	0.013***	(0.002)
Characteristics of the mother	Age when child was born	0.001**	(0.046)
	Ethnic minority	−0.009	(0.189)
	Vocational education	−0.001	(0.874)
	Short education (ISCED 1–3)	−0.008	(0.209)
	Long education (ISCED 4–8)	−0.011	(0.284)
	Deceased	−0.003	(0.720)
	Received social welfare in year of placement	−0.003	(0.399)
	Previously convicted[a]	−0.000	(0.993)
	Number of consultations with specialist doctor[b]	0.000	(0.912)
	Number of visits to psychiatric hospital[b]	0.000	(0.459)
	Number of consultations with general practioner[b]	−0.000	(0.726)
	Hospitalized (days)[b]	−0.001	(0.401)
	Not observed	−0.067	(0.497)
	Information missing	0.065	(0.503)
Characteristics of the father	Age when child was born	−0.000	(0.401)
	Ethnic minority	−0.003	(0.642)
	Vocational education	−0.004	(0.275)
	Short education	0.003	(0.743)
	Long education	0.010	(0.290)
	Deceased	−0.010	(0.154)

Table 3 (continued)

		Coefficient	*P* value
	Received social welfare in year of placement	−0.000	(0.894)
	Previously convicted[a]	−0.000	(0.937)
	Number of consultations with specialist doctor[b]	0.001*	(0.077)
	Number of visits to psychiatric hospital[b]	−0.001	(0.169)
	Number of consultations with general practioner[b]	0.000	(0.472)
	Hospitalized (days)[b]	−0.002*	(0.096)
	Not observed	0.026	(0.853)
	Information	−0.034	(0.804)
Characteristics of the municipality	Public schooling budget per 6–16-year-old (DKK)	−0.000***	(0.000)
	Special needs education budget per 6–16-year-old (DKK)	0.000***	(0.008)
	Children and youths with special needs, budget per 0–22 year old (DKK)	−0.000**	(0.042)
	Social welfare and ALMP[c] budget per 17–64-year-old (DKK)	0.000***	(0.000)
	Disability pension budget per 17–64-year-old (DKK)	−0.000***	(0.002)
	Fraction of population with <11 years of education	0.006***	(0.000)
	Fraction of population with 11–15 years of education	0.002	(0.157)
	Fraction of population with >15 years of education	−0.004***	(0.000)
	Urban municipality[d]	−0.074***	(0.000)
	Medium urban municipality[d]	−0.034***	(0.000)
Characteristics of the school	Fraction of 8th graders who attend school leaving exam	0.008	(0.412)
	Average school-leaving exam GPA among those who attend	0.006	(0.224)
	Average level of GPA among those with at least one grade	−0.011**	(0.049)
	Fraction enrolled in upper secondary education among those finishing 9th grade (high-school)	0.000	(0.987)
	Fraction enrolled in upper secondary education among those finishing 9th grade (vocational education)	−0.015	(0.139)
	Missing school average	−0.015	(0.103)
Number of observations		4530	
Corr. R^2		0.374	
Degrees of Freedom		88	

The table shows estimated coefficients from a regression of the municipal inclination to use foster care on child, parental, municipal, and school characteristics. The municipal inclination to use foster care is the fraction of out-of-home children in foster care in the municipality measured 12 months before a given child's placement

[a]Registered in crime statistics

[b]Average yearly contacts measured three years before out-of-home placement

[c]ALMP= active labor market policies

[d]According to Kristensen et al. (2006)

P values in parentheses: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

school performance for the students, then the exclusion restriction will be violated. We examine the plausibility of the exclusion restriction following the approach of Van Kippersluis and Rietveld (2018) by estimating the reduced form model among children not placed in out-of-home care – a zero-first-stage test. If we find correlations between the municipal inclination to use foster care and school performance measures for children not placed in out-of-home care, this will indicate that the municipal inclination to use foster care affects outcomes through other channels than the probability of placement in foster care. In this case, the exclusion restriction is violated. On the other hand, if we find no correlations between the inclination to use foster care and school performance among children not in out-of-home care we see it as a strong indication that any association we find among children placed in out-of-home care is driven by their the probability of placement in foster care. The following section reports the results of the zero-first-stage test along with the regression results for comparison.

Results

One approach to estimating the effect of out-of-home care (OHC) type on educational enrollment is simply to regress outcome on placement in foster care for a sample of OHC children. The results from this straightforward approach are likely biased estimates of the causal effects of placement type, since individual background characteristics and other

factors are likely to confound the effects. Table 4 reports the results from several such regressions where we let the number of control variables increase from column (1) to column (4). The idea is to show what happens to the effect estimate when an increasing number of background characteristics are included as control variables to capture any confounding by differential background characteristics of children in foster care and residential group care, respectively. Column 1 reports an association of 0.17 between placement in foster care and enrollment in upper secondary education, with controls for year of placement only. The size of the estimate decreases slightly with controls for individual and parental factors and municipality characteristics added. Yet, once we add school factors to capture confounding by the quality and type of lower secondary school that the children have attended, the estimate is halved – though remains statistically significant – which suggests that children in foster care are 8 percentage points more likely to enroll in upper secondary education relative to children in residential group care. Even with the wide range of control variables, the estimate must still be considered an uncertain estimate of the causal effect of placement on enrollment in upper secondary education since remaining unobserved characteristics most likely still confound the estimate.

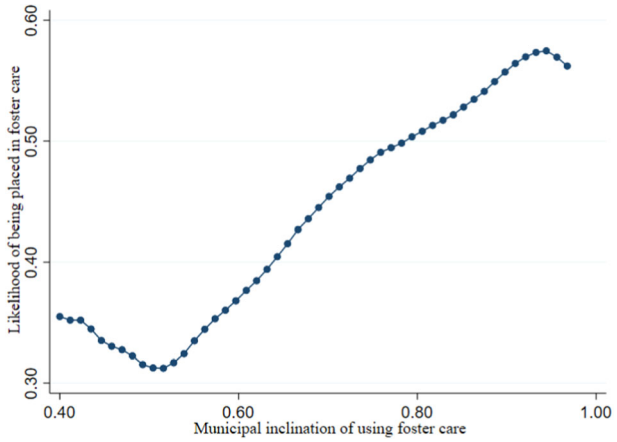


Fig. 1 Association between municipal inclination of using foster and individual likelihood of placement in foster care. Notes: The figure plots the estimated association between the likelihood of placement in foster care and the municipal inclination of using foster care based on a local polynomial smoothing regression

Instead, our alternative strategy is to estimate a *reduced form estimate* by regressing enrollment in upper secondary education on the municipal inclination to use foster care relative to residential group care.

We call the effect estimate a reduced form since we expect any effect from this municipal inclination to be mediated by the children placed in foster care. The inclination is by definition not affected by the individual's characteristics, yet any estimated effect may still correlate with individual, municipal, and school factors due to socio-economic housing patterns and municipal expenditures on school and child welfare. As discussed in Section "The exclusion restriction", for the reduced form model to estimate a valid (indirect) effect of placement type on enrollment in upper secondary education the inclination to use foster care must not be correlated with other factors affecting the probability of enrollment in upper secondary education. To check whether this assumption holds we estimate the reduced form model on a random 5 percent sample of the full population of children *not* in out-of-home care. The bottom row of Table 4 reports the estimate of the association between municipal inclination to use foster care and enrollment in upper secondary education for this sample. Regardless of the number of controls added to the model, we do not find any statistically significant association in the sample of children not in out-of-home care. Hence, we find no evidence that municipal inclination to use foster care is correlated with other factors affecting enrollment in

Table 4 Estimated effects of foster care vs. residential group care on enrollment in upper secondary education

	Year of placement (1)	+ individual and parent factors (2)	+ municipal factors (3)	+ school factors (4)	# obs.
Panel A: Direct (simple) effect of placement type:					
OHC children	0.166*** (0.000)	0.137*** (0.000)	0.134*** (0.000)	0.081*** (0.000)	2900
Panel B: Effect of municipal inclination					
OHC children	0.210** (0.025)	0.236*** (0.001)	0.267*** (0.002)	0.232*** (0.004)	2900
5% random sample of other children¤	−0.014 (0.401)	0.002 (0.921)	−0.003 (0.858)	−0.003 (0.892)	16,760

Direct (simple) effect and effect of municipal inclination

Panel A of the table shows coefficient estimates from regressions of enrollment in upper secondary education on an indicator of placement in foster care with an increasing number of control variables for the sample of OHC children. Panel B of the table shows coefficient estimates from regressions of enrollment in upper secondary on the municipal inclination to use foster care with an increasing number of control variables for the sample of OHC children and for a 5% random sample of children not in OHC, separately

P values in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

¤ A Monte Carlo simulation with 500 draws shows that less than 7% of the draws result in *p* values < 0.05

upper secondary education in the general population of youth. For this reason, we find it likely that municipal inclination to use foster care can provide a valid estimate of the (indirect) effect of placement type.

The reduced form estimate from the sample of OHC children shows a statistically significant positive effect of municipality inclination to use foster care on enrollment in upper secondary education. Hence, children in OHC from municipalities with a relatively high inclination to use foster care – meaning that they are more likely to be in foster care relative to residential group care– have a higher likelihood of enrollment in upper secondary education. Specifically, the estimate in column 4 shows that a 10 percentage point increase in the inclination to use foster care increases the likelihood of enrollment by 2.3 percentage points.

Effects by Gender

As mentioned in the introduction, previous studies have suggested that girls in out-of-home care might be more sensitive to negative peer effects in their out-of-home placement. Therefore, we perform a subsample analysis by gender to see if being placed in foster care relative to residential group care affects girls and boys differently. Table 5 presents the results of this analysis.

The simple direct effect estimate shows a positive and significant association between enrollment in upper secondary education and placement in foster care for both boys and girls, though most strongly for boys. Again, we expect these estimates to be confounded by individual unobservable factors affecting both placement type and schooling outcomes.

The reduced form model also estimates a significant effect from the municipal inclination to use foster care on enrollment in upper secondary education for OHC girls. However, we find no evidence that an increased likelihood of placement in foster care has any effect on the enrollment choices of OHC boys. If the decision to attend the school-leaving exam is in part affected by the choices of peers, then this gender difference corresponds with the findings of previous literature that girls are more susceptible to negative peer effects than are boys. Consequently, these results suggest that the decision on placement type is particularly important in relation to girls, the average girl in OHC being more likely to enroll in upper secondary education if placed in foster care relative to residential group care. Note that this effect applies to the marginal female children, that is, girls who would be placed in residential group care by one municipality, but who would be placed in in foster care if residing in another municipality.

Mechanisms

As shown in the previous section, placement in foster care rather than residential group care has beneficial impacts on the decision to enroll in upper secondary education, primarily for girls. Next, we will present results as to whether the type of OHC affects school performance in lower secondary education. We use the simple approach as well as the reduced form model to study the effects of placement type on whether the children attended the school-leaving exams and on their standardized test score if they attended the exams. Table 6 reports the results.

Using the simple approach, we obtain results showing a strong statistically significant association between placement in foster care and performance in lower secondary school. Not only are children in foster care more likely to attend the school-leaving exams, they also obtain a higher standardized test score relative to children in residential group care. Yet, as shown by the results in the second row, we find no effect from municipal inclination to use foster care on the standardized test score in the school-leaving exams. However, there is still a significant effect on the likelihood of attending the exams. In Appendix Table 7, we show that the effect on attending the schooling-leaving exams appears for girls only, corresponding to the results in Table 5. Therefore, it is not improved scholastic ability that drives the increased likelihood of enrollment in upper secondary education from placement in foster care. Attending the school-leaving exams (and passing the exams) provides access to upper secondary education, and thus the increasing probability of attending the exams is likely part of the explanation for the increased enrollment in upper secondary education. Previous research has identified many factors influencing the school decision-making process such as, for

Table 5 Estimated effects of foster care vs. residential group care on enrollment in upper secondary education split by gender

	Girls	# obs.	Boys	# obs.
Panel A: Direct (simple) effect of placement type:				
OHC children	0.049* (0.068)	1363	0.106*** (0.000)	1537
Panel B: Effect of municipal inclination				
OHC children	0.390*** (0.002)	1363	0.089 (0.406)	1537
5% random sample of other children	0.023 (0.314)	8313	−0.034 (0.205)	8447

Direct (simple) effect and effect of municipal inclination

The table shows gender-specific effect estimates of the type of placement/ municipal inclination to use foster care on enrollment in upper secondary education. Panel A of the table shows coefficient estimates from regressions of enrollment in upper secondary education on an indicator of placement in foster care for the sample of OHC children. Panel B of the table shows coefficient estimates from regressions of enrollment in upper secondary on the municipal inclination to use foster care for the sample of OHC children and for a 5% random sample of children not in OHC, separately. *P* values in parentheses

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 6 Estimated effects of foster care vs. residential group care on lower secondary school outcomes[a]

	Attending exam	Standardized test scores
Panel A: Direct (simple) effect of placement type:		
OHC children	0.070*** (0.000)	0.170*** (0.000)
Panel B: Effect of municipal inclination		
OHC children	0.166** (0.016)	−0.121 (0.555)
Observations	4530	2410
5% random sample of other children¤	−0.019 (0.229)	−0.026 (0.692)
Observations	25487	21081

Panel A of the table shows coefficient estimates from regressions of lower secondary school outcomes on an indicator of placement in foster care for the sample of OHC children. Panel B of the table shows coefficient estimates from regressions of lower secondary school outcomes on the municipal inclination to use foster care for the sample of OHC children and for a 5% random sample of children not in OHC, separately. Column 1 shows results on attendance at the school-leaving exams and column 2 shows results on standardized test scores. P values in parentheses $*p < 0.1$, $**p < 0.05$, $***p < 0.01$

¤ A Monte Carlo simulation with 500 draws of random samples shows that less than 6% of the draws result in a p value < 0.05 for the effect estimate in the model on attending exam. The corresponding share is less than 8% of the draws in the model on standardized test scores

[a]Direct (simple) effect and effect of municipal inclination

instance, cognitive and noncognitive abilities (Carneiro & Heckman, 2002) and parental involvement (Barger et al., 2019; Kraft & Rogers, 2015). Our results indicate that attributes of foster care promotes attendance to the school-leaving exams leading to higher rates of enrollment in further education.

Discussion and Conclusion

Out-of-home care is arguably one of the interventions available to social services that is most disruptive to children and their families. Yet, it remains a necessary instrument for children who cannot continue to live with their families. The process of admitting a child into the out-of-home care system for the first time is highly complex and involves many parties. The decision process takes several factors into account – including the needs of the child – and social services make an assessment of the optimal type of placement. In some cases, it may be obvious which of the two types of placement is optimal for the child in question. In many cases, though, the optimal placement type is less clear and both foster care and residential group care may seem to be viable options. In such instances, the final decision may be guided by the assessment of the assigned caseworker, the availability of suitable foster care families/residential group care homes, or municipal political decisions.

Research on children in out-of-home care indicates that youths in residential group care tend to prosper less in their adulthood than youths placed in foster care. The majority of studies looking at outcomes across adolescents who have formerly been placed in foster care or/and residential group care find evidence supporting foster care over residential group care. At the same time, we know that youths in residential group care suffer more from serious cognitive and behavioral disorders. It is therefore likely that the correlation between foster care and school performance is in part due to the disadvantageous characteristics of children in residential group care. Nevertheless, we lack knowledge about the causal effects of choosing foster care over residential group care, especially with educational attainment as the outcome. In this study, we have investigated the effect of placement in foster care relative to residential group care on the enrollment in upper secondary education and the extent to which performance in lower secondary school is a contributing factor.

The results confirm a positive correlation between placement in foster care and school performance, and even when we use the municipal inclination to use foster care as an indirect measure of placement in foster care the positive association persists for enrollment in upper secondary education. We include children placed in out-of-home care for at least six months only and define the type of care by their first placement. However, we do not make distinctions in the length of their stay and we do not account for potential change in type of out-of-home care since both of these measures potentially affect the type of OHC. Consequently, we measure the effect of the first placement, and since this might be short, we assume the estimate effects to be downward biased. Likewise, we only include children already attending lower secondary education in order to examine the effects for children who are able to finish lower secondary education within the timespan of out sampling period. However, if foster care as opposed to residential group care has a positive effect on entering lower secondary school we are not able to account for this, and this might lead to a downward bias in the estimate of the effect on entering upper secondary education.

We hypothesize two main mechanisms by which the type of out-of-home care can affect school performance and educational attainment among children placed in out-of-home care. Firstly, differences in caretaker involvement and home-school collaboration might affect the school performance of children placed in out-of-home care. Secondly, differences in the peers surrounding the children placed out-of-home might affect their school performance.

Studies have shown that parental involvement is an important factor influencing school attainment (Barger et al., 2019; Kraft & Rogers, 2015), especially among children at risk (Krane & Klevan, 2019). Three important

aspects of parental involvement in child education have been identified as pivotal for children's school performance (Krane & Klevan, 2019). Firstly, parents can support the learning process by assisting the child in homework or introducing other learning activities at home (Catsambis, 2001). Secondly, increasing teacher-parent-communication regarding students' academic and behavioral activities is beneficial (Kraft & Rogers, 2015). Thirdly, parental attitudes towards school and their perceptions of education values affect student achievement (Hill & Tyson, 2009).

Also, the stronger effects of placement type for girls corresponds with research showing that girls are more susceptible to negative peer effects (Belsky et al., 2020; Johansen, 2021). A study has also shown that girls' education, labor market outcomes, and social outcomes are more strongly affected by being placed in kinship care relative to foster care (Lovett & Xue, 2020). This fact might explain why we find that girls are less likely to attend the school-leaving exams and less likely to continue into upper secondary education if they are placed in residential group care rather than foster care.

Actually, the difference in quality/type of schools attended by children in foster homes and residential group homes might also act as a third main mechanism of the effect. Nonetheless, since we include a bunch of factors describing the quality and type of schools attended, the effect we find is beyond these factors. Therefore, the fact that we choose to include school quality measures might underestimate the results.

Our results indicate that the type of out-of-home care does not affect scholastic ability but rather is associated with the choice of action (attending the exams and commencing further education). The decision to not attend the exam might both be a solitary choice made by the child simply by not showing up, but it might also be a choice made beforehand by the child, the school and the caretaker in cooperation. From our results, we are not able to pinpoint exactly what gives rise to this effect. Nevertheless, attributes of foster care appear to have beneficial impacts on participation in school activities. Even though the descriptive statistics show that children in residential group care perform worse, on average, in the school-leaving exams compared to children in foster care this difference is not ascribable to the placement type. Yet, we expect those refraining from attending the exam to have lower expectations (own as well as the school's and guardian's) of their exam performance. Therefore, the zero-effect of foster care on performance at the school-leaving exams is despite the fact that attendance rates increase and this increase is likely to happen among children with expected below-average exam performance. In other words, a higher inclination to use foster care encourages more out-of-home care children to attend school-leaving exams without lowering the average exam result. Further research is needed to provide an understanding of which aspects drive these effects, peer effects, caretakers' attitudes towards education, or a third aspect.

Policymakers and practitioners in this field may benefit from paying attention to our findings, which suggest that children on the margin of either type of out-of-home care will find better support for their educational attainment in foster care than in residential group care. Hence, when the municipal authorities are in doubt, the better choice will be foster care. Nevertheless, our findings lend no support to foster care being a universally better choice compared to residential group care. For example, we are not able to identify any beneficial effects on educational attainment for males in out-of-home care.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Informed Consent We follow the Danish Data Protection Act, Section 10, which allows the use of anonymized personal information without informed consent from each individual when the data is registry data and used for research purposes only.

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Appendix

Table 7

Table 7 Estimated effects of foster care vs. residential group care on lower secondary school factors split by gender – Direct (simple) effect and effect of municipal inclination

	Girls		Boys	
	Attending exam (1)	Standardized test score (2)	Attending exam (3)	Standardized test score (4)
Panel A: Direct (simple) effect of placement type:				
OHC children	0.041* (0.098)	0.183*** (0.002)	0.093*** (0.000)	0.148** (0.011)
Panel B: Effect of municipal inclination				
OHC children	0.204* (0.053)	−0.267 (0.355)	0.110 (0.221)	−0.065 (0.757)
Observations	2084	1258	2446	1152
5% random sample of other children	−0.010 (0.572)	−0.015 (0.873)	−0.028 (0.231)	−0.024 (0.803)
Observations	12,869	10,577	12,869	10,504

The table shows gender-specific effect estimates of the type of placement/ municipal inclination to use foster care on lower secondary school outcomes. Panel A shows coefficient estimates from regressions of lower secondary school outcomes on an indicator of placement in foster care for the sample of OHC children. Panel B shows coefficient estimates from regressions of lower secondary school outcomes on the municipal inclination to use foster care with an increasing for the sample of OHC children and for a 5% random sample of children not in OHC, separately. Column 1 and 3 show results on attendance at the school-leaving exams and column 2 and 4 show results on standardized test scores

p-values in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

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