Child Protection and Child Outcomes: Measuring the Effects of Foster Care

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Abstract:

The child welfare system investigates over two million children each year for parental abuse or neglect, yet little is known about the effect of placing children in foster care. Outcomes are rarely observed, and children removed from home likely have worse family backgrounds than children not in foster care, which makes comparisons difficult. This paper uses the removal tendency of investigators as an instrumental variable to identify a causal effect of foster care placement on a range of long-term outcomes, including juvenile delinquency, teen motherhood, employment and earnings. Investigator removal tendencies are found to predict foster care placement in subsequent investigations, despite a rotational assignment process that results in similar child characteristics across investigators. The results suggest that children on the margin of foster care placement have better employment, delinquency, and teen motherhood outcomes when they remain at home.

This draft is preliminary, and comments are welcome. Please do not cite.

1. Introduction

The child welfare system plays a major role in the lives of a large number of children who appear the most at risk of poor life outcomes: over two million children are investigated for parental abuse or neglect each year in the U.S.; over 900,000 of these children are found to have been abused or neglected (US DHHS, 2004); and over 550,000 children currently reside in foster care while families are either rehabilitated or adoptive homes are sought. To administer these child protective services, states spend approximately $20 billion each year, and foster families devote time and other resources to provide care (Bes et al., 2002).

Meanwhile, foster children are far more likely than other children to commit crimes, dropout of school, enter the homeless population, join welfare, and experience substance abuse problems (Courtney and Piliavin, 1998; Dworsky and Courtney, 2000; US DHHS, 1999; Clausen et al. 1998). Estimates suggest that abused children are three times more likely to die in childhood (Sabotta and Davis, 1992), and 1,400 child deaths each year are attributed to child abuse (US DHHS, 2004). Courtney, Terao, and Bost (2004) surveyed children who will turn 18 in foster care and found that *two-thirds* of the boys and *half* of the girls had a history of delinquency. The group was three times more likely to have mental health needs and four times more likely to have been treated for a sexually transmitted disease compared to the national average.

Despite the large number of children involved, and the potentially large impact foster care placement may have on child wellbeing, little is known about the effect of foster care placement on child outcomes (Courtney, 2000; Gelles, 2000; Jonson-Reid and Barth, 2000; National Research Council, 1998; McDonald et al. 1996). While much has

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been written about the tradeoff between family preservation and child protection in investigations (Barth, 1999; Maluccio, Pine, and Warsh, 1994), little empirical work has been able to support a greater emphasis on either one. Previous research has been limited by a lack of child outcome data and endogeneity problems. When outcomes are observed, worse results for foster children could be due to underlying family backgrounds, as opposed to the effect of foster care placement (Kerman, Wildfire, and Barth, 2002). In addition, those children who are removed are likely those who would benefit most from removal. These benefits may increase with the severity of abuse or neglect, so a comparison of average outcomes may overstate the benefit of removal when considering the effect on a randomly selected case.

This paper uses the removal tendencies of child protection investigators as an instrumental variable to identify a causal effect of foster care placement on child outcomes. Cases are distributed to investigators on a rotational basis within geographic field teams to smooth the caseload. This has the empirical advantage of essentially randomizing families to investigators: one family may receive an investigator that is more likely to recommend foster care placement, while another family may draw an investigator that is more likely to stress family preservation. The assignment process results in family characteristics that are similar across investigators and their placement tendencies provide a plausible instrument to estimate the effect of foster care on outcomes. One advantage of the approach is that the instrumental variables estimates focus on the marginal cases, where investigators may disagree about the recommendation of removal. These are the cases most likely to be affected by policy changes that alter the threshold for placement.

Using a unique dataset that links children investigated in Illinois with a wide range of government programs, it is possible to compare long-term child outcomes including juvenile delinquency, teen motherhood, employment and earnings. As in previous work, children who enter foster care are found to have worse outcomes compared to children who remained at home, on average. The instrumental variables estimates show that foster children on the margin of placement also appear to have worse outcomes compared to children who remained at home. The 2SLS estimates are much larger than the OLS results, though less precise, suggesting some caution in the interpretation. Taken together, however, it appears that children at the margin perform better when they remain at home in terms of these long-term outcomes.

The paper is organized as follows. Section two presents background information on child abuse investigations, along with previous evidence on the effect of foster care placement on child outcomes. Section three describes the data sources and reports summary statistics. Section four discusses investigator assignment and demonstrates that observable child characteristics are relatively unrelated to the investigator placement tendencies. The first-stage relationship between these tendencies and subsequent foster care placements is described as well. Section five considers the interpretation of the instrumental variables approach and presents the results. Section six concludes.

2. Background

Child welfare services have historically struggled with the sometimes conflicting goals of family preservation versus child protection. Trains that transported "street children" from eastern cities to Midwestern farms in the late 19th century were later

condemned and replaced with programs to keep families together. An emphasis on child protection is thought to have gained the upper hand in the 1960s, 1970s and 1980s, while family preservation initiatives became increasingly common in the 1990s (McDonald et al. 1996). This paper uses the idea that some investigators place greater emphasis on child protection than family preservation than others, and the results are aimed at estimating the effect of foster care placement on long-term outcomes for children on the margin of placement—where investigators may disagree about the placement recommendation.

Child Protective Services in Illinois

Reports of abuse or neglect are typically made by physicians, school principals, police, and family members. In Illinois, all reports of abuse or neglect are made through a statewide hotline that connects to the State Central Register (SCR) (Illinois DCFS, 2003). This allows an intake worker to determine if there were any pending or previous investigations that can aid in the investigation and determine the need for emergency services. The case is then referred to a field team that is closest to the child's residence. A typical team covers one county in Illinois and consists of 17 investigators called case managers. These case managers focus on collecting facts for a determination of whether a child should be placed in foster care, and they do not supervise children once they have been placed in care. In general, families are assigned to case managers on a rotational basis in an effort to smooth the caseload.

There are three main reasons why the investigator assignment may predict foster care placement. First, the investigator may remove the child from home on an emergency basis. Second, the investigator may decide that the case does not have merit. Third, the

case manager collects the evidence of the case, and presents this evidence along with a recommendation to a judge in each county's Child Protection Division of the Juvenile Court.

One limitation in using the case manager assignment as a randomization device is that exceptions are made, and the main analysis will focus on cases that are most likely to enter the rotational assignment process. First, some field teams assign case managers to particular neighborhoods. For example, one team divides the county into east and west, with half of the case managers assigned to each sub-team. If particular types of case managers were assigned to neighborhoods that were more likely to have child abuse or neglect, then a comparison across case managers would capture differences in these neighborhoods as well. The analysis here will focus on sub-teams defined as the interaction between the child's ZIP code of residence and the field team assigned.

Second, if a family were investigated more than once, an effort is made to re-assign the same case manager to investigate the most recent allegation. The exogenous variation in case manager assignment stems from the initial investigation. To rely only on this type of variation, the case manager assigned to the family's first investigation will be considered.[1]

Third, if the family speaks only Spanish, an effort is made to assign a Spanish-speaking case manager.[2] Like the neighborhood consideration, if some case managers specialize in Spanish-speaking cases, then differences across case managers would

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[1] Some cases report the initial reporter as the Department of Children and Family Services, the agency that runs the Department of Child Protection. As these referrals are likely the result of previous cases, they were also dropped from the analysis.

[2] There are guidelines on the use of interpreters if the family does not speak English. This includes an effort to use professionals such as teachers or physicians rather than children involved in the case.

incorporate differences in Spanish-speaking versus English-speaking cases as well. For this reason, Hispanic cases will be considered separately.

Fourth, most counties have special case managers assigned to investigate allegations of substance-exposed infants and sexual abuse due to the sensitive nature of those investigations and the active cooperation with police. These allegations are dropped from the analysis as they are less likely to enter the rotational assignment.

In summary, variation in removal and outcomes within investigation teams will be used to identify the effect of removal on child outcomes. These teams are defined as the pool of case managers available to investigate a given family, defined by team x ZIP code x Hispanic cells. Comparing children within ZIP codes has the additional advantage of controlling for neighborhood characteristics as well. While the rotational assignment within these teams may not always be followed, the field team rotational assignment protocol is likely to be self-enforced by case managers who would not want to carry a greater burden than others. Conversations with case managers suggest that this is the case.

In essence, the results will consider the effect of assignment to different types of case managers, categorized by their rate of foster care placement, on long-term child outcomes. It is important to note that these investigators do not supervise the case once a child enters foster care. Their role in child protection is concentrated on determining whether a child should be placed in foster care, which suggests that differences in outcomes across investigators should stem from differences in the likelihood of foster care placement.

Previous Evidence

Few studies have considered the effect of removing children from home on child outcomes. The National Research Council and the Institute of Medicine (1998) reviewed the literature and found three studies that met its criteria for quality research designs. McDonald et al. (1996) provide another extensive review of the literature, finding only ten studies from 1960 to 1996 that employ a comparison group of any kind. Most have small sample sizes, and comparison groups are often the surrounding community. The idea that foster children likely differ from the comparison groups in ways that affect the outcomes of interest is largely acknowledged in the literature. The previous studies are especially useful in highlighting areas to provide extra resources, such as educational support or delinquency prevention.

Five studies are of particular interest for their attempt to measure the effect of foster care placement on outcomes. Runyan and Gould (1985) compared children who were removed from home with children found to be abused but not removed. Little difference was found in juvenile delinquency rates between the two groups, though the study may have lacked the power to find a difference with a sample size of 220. Wald et al. (1998) compared 76 children before and after foster care placement and found that foster children had better school attendance and had higher scores measuring socioemotional well-being. Meanwhile, Elmer (1986) studied 31 infants and found short-term improvements in height and weight when they were placed in foster care, though a decline in interaction skills five months later.

Davidson-Arad, et al. (2003) interviewed 92 children six months after an abuse investigation. Despite similar observable characteristics at the time of the original investigation, quality of life indicators improved for children who were removed from

home, were unchanged for children who were not removed from home, and declined for children when the decision to remove the child was not implemented. One issue, however, is that the well-being measure was collected by the case manager who made the removal decision. These investigators may have been pre-disposed to the value of their earlier judgments. Nevertheless, the study did attempt to directly measure child well-being, and the results suggest that quality of life improves for children who were removed from home.

While most studies suffer from small sample sizes, Jonson-Reid and Barth (2000) link juvenile incarceration and child welfare administrative data in California to compare incarceration rates across 160,000 children. Little difference in incarceration was found between children who were placed in foster care versus those who remained home. In-home services for abused children were associated with somewhat lower incarceration rates, especially for African American and Hispanic children.

Another set of papers find that case managers can disagree as to whether children should be placed, which provides some support for the identification strategy employed here. For example, Nasuti and Pecora (1993) found that case managers using the Utah Risk Assessment Scales reviewing fictional cases had interrater reliability ranging from 57% to 81%. Rossi, Schuermand and Budde (1996) found similar differences in case manager assessments of fictional cases.[3]

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[3] Abuse and neglect assessment tools used by case managers during an investigation have also been considered in the literature. The papers generally focus on the instrument's ability to forecast re-abuse of children who were not placed in foster care. The instruments have been criticized for a lack of empirical tests establishing their effectiveness in predicting reabuse, along with the fact that case managers are not trained to use them (McDonald and Marks, 1991; Lyons, Doueck, Wodarski, 1996; Wald and Woolverton, 1990). In particular, case managers are thought to rely more heavily on practice wisdom to make placement referrals (Cash, 2001).

In addition, the amount of resources available to child protective services may affect placement rates, suggesting that abuse or neglect standards can change over time as well as across case managers (Simon, 1975; Campbell and Downs, 1987; Chamberlain et al., 1992; Doyle and Peters, 2004). One example comes from the introduction of federal funding in foster care in 1962. With the greater resources available, it has been argued that states began placing more children in foster care—implicitly changing the standard for foster care placement (Hegar and Scannapieco, 1995). This suggests that the placement threshold is not fixed, and that variation in the threshold can be used to test the effect of placement on child outcomes.

3. Data Description

A unique data set that matches individuals across a wide array of administrative agencies in Illinois is used to carry out the analysis. Longitudinal, administrative data used by the Illinois Department of Children and Family Services are considered for families whose first investigation occurred between July 1, 1990 to June 30, 2001. The Child Abuse and Neglect Tracking System (CANTS) provides details of the investigation, including the initial reporter of abuse, the allegations, the field team assigned to the case, and the case manager assigned to investigate. CANTS data include the child's age, sex, race, and address as well. The alleged perpetrators are also included in the tracking system. To consider the effect of removal from home, the analysis focuses on the 81% of cases where the alleged perpetrator is a natural parent, step parent, or co-habitating adult. Meanwhile, the Child and Youth Centered Information System (CYCIS) tracks children in foster care and the two systems have been linked to determine

whether the child was eventually removed from home. Placements are observable up through 2003.

Data from these systems, and other social programs, are collected by the Chapin Hall Center for Children, a research institute located at the University of Chicago. These data are linked using name, address, social security number, age, and other identifiers to perform a probabilistic match (Goerge, Van Voorhis, and Lee, 1994). This allows a comparison of longer-term outcomes for children who were ever placed in foster care and those who were never placed in foster care. In particular, the foster care placement measure is uncensored, as these outcomes will be considered for children who are old enough at the end of the sample period to be eligible for each outcome (at least sixteen) and no longer eligible for foster care.[4] The data appendix reports the time period for each data source, as well as the age restriction considered.

First, the prevalence of delinquency suggests that this is an important outcome. For children in and around Chicago, foster care data are linked to data from Juvenile Court of Cook County. The Delinquency File tracks children who enter the juvenile courts, and all entries between July 1, 1990 and December 31, 2000 are considered. These data allow a comparison of the rate at which children come before the juvenile court as a measure of delinquency.

Second, the database includes Medicaid Paid Claims data. These data contain payment records for medical services funded by the Illinois Department of Public Aid (DPA) from January 1, 1990 through June 30, 2003. The variables include demographic measures used in the linkage and service dates, along with diagnosis and procedure

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[4] Few children enter care after sixteen, and if so the placement is quite different. The child often enters an Independent Living arrangement where training is offered.

codes. Teen births have been identified using these diagnosis and procedure codes and are compared across girls investigated for abuse or neglect. The data here are restricted to those at least sixteen at the end of the sample period. One issue is that every foster child is eligible for Medicaid, so teen motherhood measures are available for most foster children, but only for a subset of those who were not removed. This outcome will be compared for children who were already enrolled in Medicaid at the time of the abuse or neglect report.

The Medicaid data do appear informative of health care use. For example, all foster children are supposed to have a medical checkup within ninety days of entering foster care, and entry into foster care is associated with a forty-percent increase in the likelihood of a medical checkup within one year of the abuse report. This also suggests an immediate benefit of foster care entry in terms of preventative health care.[5]

Third, for all of those receiving Medicaid prior to the abuse report, it is also possible to link the children to the Illinois Department of Employment Security's unemployment insurance program. These data provide quarterly employment and earnings data for 2002. According to the Department, businesses that employ one or more individuals within any 20 week period in a calendar year are required to report employee wages on a quarterly basis.[6] The state estimates that approximately 95% of all paid jobs in Illinois are contained in this database. Chapin Hall notes that for a small segment of the population, it is difficult to unduplicate individuals or link them across

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[5] This result is the 2SLS estimate of the effect of foster care entry on medical checkups similar to those presented below for longer-term outcomes. The estimated coefficient on foster care placement is 0.41 and a standard error of 0.09. The mean rate of wellness visits within one year of the abuse report for all Medicaid-enrolled children is 64%.

[6] Some nonprofits and local government entities are exempt.

quarters because of the relatively few linkage variables (name and social security number).

Further, Kornfeld and Bloom (1999) compared UI wage reports and self-reports when considering program evaluations such as the Job Training Partnership Act. They found that comparisons of treatment and control groups where similar regardless of the data source used. One exception was the earnings of individuals with a prior arrest record, where the UI reports substantially understated earnings in the treatment group compared to the control. Given that Courtney, Terao, and Bost (2004) found that among children in Illinois who age out of foster care two-thirds of the boys and half of the girls were found to have a history of delinquency, such concerns appear important. Kornfeld and Bloom's findings also suggest that the earnings differences should be treated with some caution, but that differences in employment appear to be less sensitive to the measurement problems.

Another issue is that in a few cases the delinquency or teen motherhood outcome occurs before the child enters foster care. The wait for removal may have contributed to the delinquency, for example, or the delinquency may precipitate removal, so it is important not to associate these delinquencies with foster care placement. These cases are coded as outcomes associated with not being removed, and cases where the outcome occurs within thirty days of the initial abuse report are excluded from the analysis. The results do not change if these cases are included, however.

Summary Statistics

To better understand the types of allegations, reporters, and child characteristics among children investigated for abuse and neglect, Table 1 reports summary statistics for

one of the linked datasets—those children considered for juvenile delinquency using data from Cook County. The most common reporter of abuse is the family itself (26%). These reports can stem from domestic violence reports or from a concerned grandparent, for example. School personnel (13%), police (13%), and physicians (11%), are known as mandated reporters—they are required by law to report suspected abuse or neglect.   The children considered here tend to be older at the time of the report, with an average age of 12 years old. This is partially due to the restriction that these children are at least sixteen years old in 2000. 63% of the sample are African American and 13% are Hispanic compared to 26% and 20%, respectively, for Cook County as a whole (US Census, 2000). Meanwhile, 47% of the investigated children are boys.

Another characteristic observed is the allegation. Roughly half of the allegations are for abuse, and the other half for neglect. The most common report of neglect is a lack of supervision. This occurs when a child is found unsupervised or when a parent abandons a child. 14% of the allegations are due to environmental neglect, when the child's living conditions are hazardous. Physical abuse is usually noted as bruises, cuts, burns, or broken bones.   Meanwhile, one-quarter of the allegations are "substantial risk of harm", which describes children deemed to be in imminent danger. These cases require case managers to evaluate the actions of parents and the fear of the child. Together, the characteristics in Table 1 describe the types of cases seen by child protective services and will be used as controls in the analysis below, including individual indicators for each age.

4. Case Manger Assignment and Child Protection

Apart from the exceptions listed in section two, cases are supposed to be assigned to investigators on a rotational basis. A family may be assigned to a case manager that is more likely to recommend foster care placement or one that stresses family preservation. One approach to characterize these different investigators would be to use indicator variables for each one as instruments for foster care placement. However, the number of instruments would grow with the sample size and would suffer as weak instruments (Hahn and Hausman, 2003; Stock, Wright, and Yogo, 2002). Instead, a simple frequency estimator is used as a more parsimonious estimate of whether a given case manager is more likely to recommend removal. In particular, all cases assigned to the case manager prior to the family's first case are considered in the calculation. This is an estimate of the case manager's fixed effect in a model predicting removal, using data prior to the family's case and no controls.

Specifically, let i index families initially assigned to case manager c at time t:

$$(1) \ \text{Prior Removal Rate}_{ict} = \frac{\sum_{T<t} \text{Removal}_{ict}}{\sum_{T<t} \text{Investigations}_{ict}}$$

where T<t means refers to all cases that were reviewed by the case manager prior to the month of the family's first report. In the juvenile delinquency sample, there were 703 case managers, and the prior removal rate was calculated with an average of 273 cases. This measure is calculated for all cases where the case manager has had at least ten previous investigations.

The prior removal rate has three main advantages. First, it is predetermined, so the case manager's experience with any given family will not affect the removal rate. Second, this unconditional measure allows a direct examination of whether the rotational

assignment of cases resulted in case manager placement tendencies that are unrelated to the characteristics of future cases. Last, the prior removal rate was found to predict foster care placement slightly better than other candidate measures, such as the removal rate using all other families and removal rates allowed to vary over the case manager's tenure. That said, the results were similar, though less precise, with these other measures.

Some information is known about the case manager as well, including sex, race, experience, educational attainment (master's degree), and Spanish-speaking ability. The most stable relationship in these data is that male case managers are slightly less likely to be associated with foster care placement. These case manager characteristics are less predictive compared to the case manager's prior removal rate, and it appears that differences in removal rates are more idiosyncratic than systematic when it comes to case manager characteristics.

Removal vs. Case Manager Prior Removal Rate

Table 2 compares a model that predicts removal from home with a model that predicts the case manager prior removal rate. If the rotational assignment truly randomized children to case managers, child characteristics should not predict the type of case manager assigned. For child i assigned to an investigator in sub-team j at year t, the following linear probability models are estimated:

$$(2)\ \text{Removed}_{ijt} = \alpha_0 + \alpha_1 X_i + \lambda_t + \partial_j + \varepsilon_{ijt}$$
$$(3)\ \text{Prior Removal Rate}_{ijt} = \beta_0 + \beta_1 X_t + \eta_t + \sigma_j + \mu_{ijt}$$

Two samples are considered in Table 2, the delinquency sample for Cook County and the employment sample for the entire state. In the delinquency sample, 12% are removed, with a standard deviation of 32%. The prior removal rate is higher, 18%, as all children investigated were used to form the prior removal rate, regardless of age at the

time of the report. This measure has a smaller standard deviation of 8%, however, given the nature of the variation at the case manager level as opposed to the child level. For comparability, all models in Table 2 are reported with standard errors clustered at the case manager level.

The first set of columns reports the association between child characteristics and whether the child was removed, with team x ZIP x Hispanic fixed effects denoting the investigative sub-teams. Reports by police, physicians, and family members are found to have higher removal rates, while school reports and anonymous reports tend to result in fewer removals. Younger children are more likely to be removed, as they are at risk of removal for longer periods of time. This suggests that it is important to control for age and year effects. Physical abuse and environmental neglect are allegations that are associated with fewer removals, especially compared to neglect allegations that include lack of adequate food or shelter. Boys are removed at the same rate as girls. Finally, African American children are associated with slightly higher removal propensities.

Further, observable child characteristics are relatively unrelated to the case manager's prior removal rate, as shown in Table 2. In models predicting the prior removal rate, the child characteristic coefficients are much smaller compared to those in the removal equation. While this is expected given the smaller variation in the dependent variable, the large decrease in the magnitudes suggests that the assignment of case managers is not predicted by the child characteristics. For example, children with a report from the police are found to have a ten percentage point increase in the likelihood of removal but only a 0.1 percentage point decrease in the case manager prior removal

rate in the delinquency sample, and a 0.2 percentage point decrease in the employment sample.

One summary of the relationship between the child characteristics and the prior removal rate is an F-test for joint significance. A lack of joint significance is not rejected in the delinquency sample, with an F-statistic of 1.24 and a p-value of 0.20, compared to an F-statistics of 20 for the model predicting removal. In the employment sample, the F-statistic is 1.44 with a p-value of 0.07. In general, the F-statistics are between 1.2 and 2.1 in models that predict the mean removal rate across the different samples considered, as shown in Table 3.

One issue is that the ZIP x team x Hispanic fixed effects may accentuate the role of measurement error and inflate the standard errors leading to smaller F-statistics. When team x Hispanic fixed effects are used instead, the p-value of this test does decrease to 0.06 for the delinquency sample and 0.04 for the employment sample. The ZIP code fixed effects are useful in capturing the assignment of case manager sub-teams to particular neighborhoods, however, and when outcomes are considered they serve to control for neighborhood characteristics. Further, the removal equation does show significant differences across child characteristics with an F-statistic of 20, despite the use of ZIP x team x Hispanic fixed effects.

Predicting Removal using Case Manager Assignment

Children assigned to case managers with high mean removal rates are more likely to be removed as well. This is partly due to the fact that children in areas where abuse is more prevalent tend to have higher removal rates, and, therefore, case managers have higher prior removal rates as well. To control for these neighborhood characteristics and

focus on cases that are likely assigned to case managers on a rotational basis, removal rates are predicted within investigative sub-teams. Models will be compared with and without child characteristics. For child i assigned to an investigator in sub-team j at year t, the estimating equation is:

$$(4)\ \text{Removed}_{ijt} = \gamma_0 + \gamma_1 \text{Prior Removal Rate}_{ijt} + \gamma_2 X_i + \lambda_t + \partial_j + \varepsilon_{ijt}$$

Again, standard errors are clustered at the case manager level.

Table 4 shows that the prior removal rate is positively associated with subsequent foster care placements. Coefficients range from 0.2 to 0.3. Typical differences among case managers in the same team are between 10 and 20 percentage points. A 10 percentage point increase in the case manager prior removal rate is associated with a 2 percentage point increase in removal in the delinquency sample, or 16% of the mean. For the teen motherhood sample the coefficient is 0.31, while the coefficient in the earnings samples is 0.26. The addition of controls to the models does not change the estimates very much, as expected if the observable characteristics are orthogonal to the instrument.

Note that the probability of removal does not increase one-for-one with the case manager removal rate. This appears to be true for a few reasons. First, the case manager of the initial investigation is used to characterize the case manager type, as this is the most exogenous case. With considerable turnover, however, the initial case manager's removal rate may be unrelated to the removal tendency during a follow-up investigation. Second, the case manager is the lead investigator in the case, while a judge has the final say on foster care stays. Third, the use of ZIP x team x Hispanic fixed effects may allow such noise to be more pronounced. Nevertheless, the removal rate is associated with

subsequent placements, with F-statistics over twenty in the delinquency and teen

motherhood samples, and over fifteen in the employment sample.

5. Estimating the Effect of Foster Care on Child Outcomes

While there have been few previous studies of the effect of removing children

from home on child outcomes, the approach has usually been to compare average

outcomes of former foster children with other children in the community. One problem

when considering the average difference is that some children who are removed from

home likely benefit, while others may be harmed by the removal. Indeed, this is a

tension that the child welfare system considers in each case.

To explore the sources of endogeneity, and describe the IV estimator in greater

detail, consider a simple empirical model where a is an index of abuse (higher levels of a

are associated with greater levels of abuse), Y represents a child outcome such as

earnings, $R(a)$ is an indicator that a child is removed from home, and $b_1(a)$ represents the

gain or loss due to removal:

$$(5) \ Y(a) = b_0 + b_1(a) \, R(a) + e(a)$$

Re-writing the model to reflect the usual single parameter, $\overline{b}$ that is estimated:

$$(6) \ Y(a) = b_0 + \overline{b} \, R(a) + [b_1(a) - \overline{b}] \, R(a) + e(a)$$
$$= b_0 + \overline{b} \, R(a) + v(a) + e(a)$$

Some assumptions about the relationship between these terms and the abuse level reveal

an endogeneity problem: $Y'(a) < 0$ and $e'(a) < 0$, as more abusive families likely lead to

worse outcomes; $R'(a) > 0$ as greater abuse levels lead to stronger cases for removal;

$b_1'(a)$ is assumed to be positive, as the benefits of removal likely increase as the abuse is

greater; $b_1(a)>0$ for children who benefit from removal, while $b_1(a)<0$ for children who are injured by the removal, and $b_1(a^*) = 0$ defines a^* as the optimal threshold where the child benefits from removal if $a>a^*$ and the child benefits from staying at home if $a<a^*$.[7]

Two sources of endogeneity are present in this simple model. First, the $Cov(R,e)<0$, as children who are removed tend to have more problems than those who stay home. Meanwhile, the $Cov(R,v) > 0$ due to selection bias, as those that are removed tend to be those who gain the most from removal. In other words, any gain due to removal for a randomly selected child investigated for abuse, or, more importantly, the gain to a child on the margin of removal, will likely be less than the average gain of those who were removed. Overall, the bias in the mean comparison would depend on the relative magnitude of these two sources.[8]

Consider the use of the case manager prior removal rate as an instrumental variable, Z. If case managers were randomized to families, then the abuse level, a, would be unrelated to the case manager tendencies for removal. That is $Cov(Z,e)=Cov(Z,v)=0$. In addition, if $Cov(Z,R)>0$, as suggested by Table 4, then the model could be estimated using 2SLS.

The instrumental variables estimate exploits variation in removal based on case manager removal tendencies—a focus on the marginal cases where case managers may disagree about the recommendation for removal. Consider a distribution of risk levels in Figure 1. Now consider two case manager types: lenient and strict. Each observes the same abuse levels (as would be true if cases were randomized to case managers) but they

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[7] If U(a) is the utility if removed and V(a) is the utility if not removed, then U'(a)>0 and V'(a)<0 and bounding U(0)=0, U(1)=1, V(0)=1, V(1)=0, there would be a unique a such that U(a*)=V(a*) and the child benefits from removal when a>a*.

[8] When the outcome is a negative outcome, such as juvenile delinquency, the signs regarding b(a) are reversed. It can be argued, then, that $Cov(R,e)>0$ and $Cov(R,v)<0$.

are differentiated by their thresholds that determine when to recommend a child for removal. The strict case manager will remove children if a>a1, while the lenient case manger will remove children if a>a2. For high levels of abuse (a>a2), both case managers would recommend removal and the effect of removal on child outcomes in this case would not be evident in the IV estimate. That is, the IV estimate will net out the benefits of removal in cases where all case managers would remove the child. Similarly, in low levels of abuse (a<a1), neither case manager would remove the child and the potential loss to these types of children are also not present in the IV estimate. Instead, the marginal cases (a1<a<a2) are considered. In a policy context, these cases are of interest, as extreme abuse cases are unlikely to be affected in any policy change. In a welfare analysis of child protection as a whole, however, it would be necessary to consider the benefits to those who are removed regardless of the case manager assigned as well.

If the case manger removal thresholds were both less than the optimal, so that both case manger types are too strict (a1<a* and a2<a*), then the increase in removal associated with assignment to a more strict case manager would be associated with worse outcomes. If the thresholds were greater than the optimal, that is both types are too lenient, then an increase in removal should be seen to improve child outcomes. Last, if the optimal is between the case manager thresholds, then the outcomes will be a weighted average of those who benefit from removal and those who are injured by it. In the empirical analysis, there are more than two types of case managers, but the simple

comparison highlights the variation used to identify the effect of removal on child

outcomes: assignment to different types of case managers.[9]

The empirical model that uses within sub-team variation in removal and outcomes

for child i assigned to an investigator in sub-team j at year t is given by:

$$(7)\ Y_{ijt} = \pi_0 + \pi_1 R_i + \pi_2 X_i + \mu_t + \varphi_j + \upsilon_{ijt}$$

where X represents observable child characteristics and the case manager prior removal

rate will be used as an instrument for removal. To the extent that the instrument is

unrelated to the observed (and potentially the unobserved) child characteristics, the 2SLS

estimate should not be sensitive to the inclusion of the control variables.

This approach is similar to that of Kling (2004), who studied the effect of prison

sentences on employment and earnings. In that study, the tendencies of randomly

assigned judges to impose different prison sentences is used as an instrumental variable.

The approach here uses the assignment of case managers who are the investigators in

each case. In an analogy to criminal proceedings, these investigators are similar to

detectives who are the key witnesses in each case. To the extent that differences in

placement tendencies capture case managers' emphasis on family preservation versus

child protection, then assignment to a "tougher" case manager should monotonically

increase the probability of placement for any given case. The differences in outcomes

across these case managers can then be used to measure a treatment effect for the

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[9] As discussed above, the assignment of families to case managers is not perfectly random, though it appears that the use of the rotational assignment in most cases results in children being similar across case managers. To the extent that strict case managers are assigned to more difficult cases that are more likely to result in removal, the first stage estimate would be upward biased. The bias in the IV estimate would depend on the relative magnitude of the upward bias due to the negative relationship between the instrument and unobserved characteristic that affect outcomes like delinquency and the upward bias in the first stage.

marginal cases where case managers may disagree about whether the child should be recommended for foster care placement.

Given that the 2SLS estimates consider differences in child outcomes based on differences in case manger removal rates, another issue that arises is whether case managers with higher removal rates also differ in terms of the types of services provided. Previous work suggests that the case manager type does not predict the type of foster care placement, such as traditional foster care, group home, or placement with a relative (Doyle, 2005). In addition, these investigators do not supervise the case once a child enters foster care. As discussed in section 2, their main focus is gathering the facts to determine whether a child should be placed in foster care, suggesting that the assignment process can yield insights into the effect of foster care placement on child outcomes.

The Effect of Foster Care on Child Outcomes: Juvenile Delinquency

Juvenile delinquency is a common occurrence for this group. Of the 36,943 children considered here, 18% of those who were removed from home are found to be delinquent compared to 6% for those who were not removed. Delinquency is higher for boys, as found in previous work. 12% of the boys were found to go before the Juvenile Court of Cook County, while 4% of girls did so.

Table 5 reports the results when within-investigative team variation is used to estimate the difference in delinquency across the groups. The OLS estimates within sub-teams mirror the difference in means, with children who were removed from home showing a twelve percentage point increase in delinquency. This difference is similar with and without controls for child characteristics.

Delinquency differences are found to be greater when estimated with 2SLS: a coefficient of 0.225 with a standard error of 0.11. The addition of controls for child characteristics does not change the point estimate, as expected given the OLS comparison with and without controls and the fact that the instrument appears unrelated to the observed characteristics.

The implied difference in the IV point estimate is quite large. Consider if 10% of these marginal cases were placed in foster care and that the delinquency rate were 7%. A twenty-two percentage point difference would imply delinquency rates of 27% for those who were removed versus 5% for those who remained at home.[10] One reason for the difference between the OLS and IV estimates is that the IV estimates focus on marginal cases. These are cases where the abuse or neglect is likely less extreme, so children who remain home may not suffer poor outcomes, and those who are removed may be particularly harmed in comparison. Nevertheless, the size of the effect and the relative imprecision of the estimates suggest caution in the interpretation.

Teen Motherhood

For girls, teen pregnancy is often cited as a correlate to other problems such as poverty, less educational attainment, and welfare dependency. As discussed above, the Medicaid data include children throughout Illinois who were eligible prior to receiving the abuse report. For this subgroup, there are 23,780 girls who were at least 16 at the end of the sample period, and 35% are found to have a teen birth.

Table 6 shows the results of models using the within-investigative team variation. Children who entered foster care are found to have a nine percentage point higher teen birth rate. This difference is similar with and without controls for child characteristics.

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[10] The calculation uses the weighted average: 0.9*5% + 0.1*27% = 7%

When the case manager prior removal rate is used as an instrument for removal, girls who were removed from home are found to have even higher teen birth rates, with a coefficient of 0.221 and a standard error of 0.192. While the estimates are again imprecise, the increase in the point estimate is consistent with the earlier results showing that these children on the margin of removal tend to have worse outcomes compared to those who were not removed from home.

Employment and Earnings

Employment and earnings are also of interest as a measure of stability and long-term success for these children. Like the teen motherhood comparison, the employment and earnings data are considered for children who were receiving public aid prior to the abuse or neglect report.

The employment data considered are for 2002, and children who were at least 18 in 2002 are considered as described in section three. The data are available on a quarterly basis, and the employment measure is the fraction of quarters that the individual was employed in 2002. The earnings measure is the average quarterly earnings, including those who had zero earnings. Given the large dropout rate in this group, most of the observations should be in the labor force by 18. Nevertheless, this group has low employment and earnings levels, with the average individual found employed 35% of the time earning $1068 in an average quarter (including zero earnings).

The first stage estimates for this sub-group were reported in Table 4. Tables 7A and 7B show that there are small differences in employment and earnings between those who were removed and not removed. Using within investigation team variation, the children who were removed are found to have one percentage point higher employment

and almost no difference in terms of earnings. When the removal is instrumented, the children who were removed are associated with an eighteen percentage point reduction in the fraction of quarters worked, and $1200 fewer earnings. The results are imprecise, however, with standard errors of 0.19 and $840, respectively.

While the lack of precision should provide some caution when interpreting the estimates, the IV results taken together are fairly consistent. The direction of the change in estimates from OLS to IV, when the marginal cases are considered, consistently finds worse outcomes for children placed in foster care. [11]

High School Dropout Rates & Short-term Outcomes

Preliminary evidence on high school dropout rates also suggests that foster care placement for children on the margin results in worse outcomes. Further, some evidence on short term outcomes is also available and the subject of current work. These include wellness visits and injuries within one year of the abuse report, and reading and math scores for children in Chicago Public Schools. Initial results suggest that children who enter foster care are much more likely to receive a wellness visit, as expected given the mandate that every child who enters foster care should receive such a checkup. This suggests that the Medicaid data are informative. Injuries, primarily broken bones, are found to increase with removal. This may be partly due to better care resulting in more trips to receive necessary medical attention, or worse oversight leading to greater injuries.

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[11] A propensity score matching exercise was also conducted which revealed probability of removal rates of between 0 and 40%. The estimates were somewhat noisy, but suggested that those who were placed in foster care had worse outcomes than children who appear similar on observable characteristics but who were not removed from home. This was found especially for those whose removal propensities were in the low to mid ranges. It appears that those who are less likely to be removed from home do relatively poorly in terms of delinquency, teen motherhood, and employment, consistent with the 2SLS results that marginal cases have worse outcomes if they are placed in foster care.

Last, reading and math scores are found to improve slightly in the OLS estimates, while the 2SLS estimates show larger improvements. These estimates are too imprecise, however, to offer a strict interpretation.

Limitations

One of the main limitations of the above approaches is that the outcome data are only available for children who remain in Illinois. For example, if families who are investigated leave the state, they will not be removed, and they will not be found in the outcome data. This may partly explain the increases in juvenile delinquency and teen motherhood found, though this explanation would generally not be consistent with the decline in employment. Further, when the analysis is restricted to children who were found in the public aid data through age 10, similar point estimates are found (though the standard errors increase with the smaller sample sizes).

Another limitation is that the empirical strategy does not lend itself to an analysis of the effect of length of stay in foster care on outcomes. Rather, the difference across placement status is considered. When models are considered for children who were either not removed or were in foster care for more than one year, the results are unchanged. This is partly due to the fact that most children are in care for more than a year in these datasets that focus on older children.

A third limitation is that the benefit of foster care placement in terms of child safety is only addressed through its impact on the outcomes studied here. The initial results on broken bones suggests that a lack of removal does not result in more broken bones, though such a result could reflect more cautious foster parents or case workers being more likely to take the child to the hospital. While the outcomes studied here

represent a wider range of outcomes than previously studied, there are likely unobserved

benefits and costs to be considered in future research.

7. Conclusion

The child welfare system directly impacts millions of children at risk of poor life

outcomes each year, yet there is very little previous evidence on the effect of foster care

on child outcomes. Given the tradeoff between family preservation and child protection,

it is important to know whether children on the margin of placement benefit from

removal.

Like previous work, mean differences suggest that foster children have worse

outcomes in terms of juvenile delinquency and teen motherhood. This type of

comparison suffers from endogeneity bias, however, as those removed are likely to differ

from those who remain at home in ways that can affect the outcomes.

One way to break the link between unobserved child characteristics and the

removal decision is to consider the case manager assigned to investigate each case.

These assignments are done on a rotational basis, and child characteristics are found to be

similar across investigators. While this suggests that the instrument should be unrelated

to unobserved family characteristics that can affect outcomes, case manager removal

tendencies are found to be associated with subsequent foster care placements. A ten

percentage point increase in the case manager prior removal rate is associated with a two

to three percentage point increase in the likelihood of removal.

When child outcomes are compared across children who were assigned to case

managers with different removal tendencies, the comparison focuses on children on the

margin of removal. In other words, these are cases where case managers may disagree about the recommendation of removal. These may be the most policy relevant cases, as children who are already safe or at extreme risk are unlikely to be affected by changes in child protection policy. A limitation of the approach, however, is that the effect of removal for these cases is not measured with this approach.

When these marginal cases are compared using the IV approach, children who are removed from home are found to have worse delinquency, teen motherhood, and employment outcomes. While the estimated differences are quite large, the earlier evidence documenting the enormous problems associated with foster children suggests that large differences in these outcomes are possible. That said, the precision of the estimates suggest caution when interpreting the point estimates. Rather, the direction of change in point estimates from OLS to 2SLS along a range of outcomes suggests that children on the margin likely perform better by staying at home in terms of these outcomes.

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Data Appendix

Source	Time Frame	Key Variables	Age Restriction
Child Abuse and Neglect Tracking System, Illinois Department of Children and Family Services	July 1 1990- June 30, 2001	Investigation Data	Infant – Age 16 at time of the report
Child and Youth Centered Information System, Illinois Department of Children and Family Services	July 1 1990- June 30, 2003	Removal	Infant – Age 16 at time of the report
Online Data Entry and Display System, Illinois Department of Employment Security	January 1, 2002-December 31, 2002	Employment and Earnings	Child at least 18 in 2002.
Medicaid Management Information system, Illinois Department of Public Aid	July 1, 1990 – December 31, 2002	Teen Births	Girls at least 16 in 2002.
Delinquency File Juvenile Court of Cook County, Illinois	July 1, 1990- December 31, 2000	Juvenile Delinquency	Child at least 16 in 2000

Figure 1: Abuse Thresholds for Removal
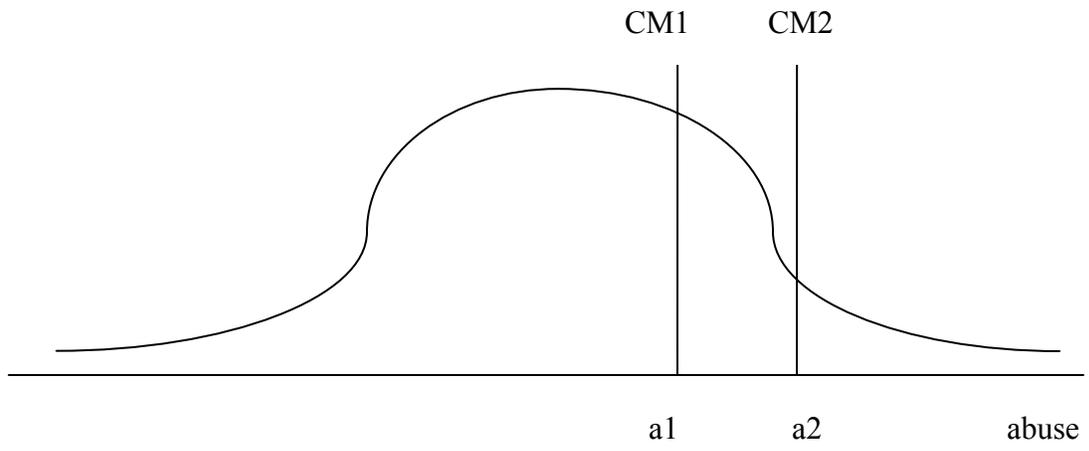
Table 1: Summary Statistics:

Variable		Mean	Std Dev
	Foster Care Placement	0.12	0.32
Initial Reporter	physician	0.11	0.31
	school	0.13	0.34
	police	0.13	0.33
	family	0.26	0.44
	neighbor	0.07	0.26
	other government	0.10	0.30
	anonymous	0.17	0.38
	other reporter	0.03	0.18
Age at Report	age	12.2	2.57
Sex	boy	0.47	0.50
Race	white	0.22	0.42
	African American	0.63	0.48
	Hispanic	0.13	0.34
Allegation	lack of supervision	0.33	0.47
	environmental neglect	0.14	0.35
	other neglect	0.05	0.22
	substantial risk of harm	0.25	0.43
	physical abuse	0.22	0.41
	Observations	36943	

Juvenile Delinquency Sample
Children in Cook County who received an abuse/neglect report
between July 1, 1990 & December 31, 2000 and were at least 16 in 2000.

Table 2: Child Characteristics, Removal and Case Manager Assignment

Variable	Dependent Variable:	Delinquency Sample						Employment Sample		
		Removed			Case Manager Prior Removal Rate			Case Manager Prior Removal Rate		
		Coeff.	t	p-value	Coeff.	t	p-value	Coeff.	t	p-value
Initial Reporter	physician	0.080	(6.32)**	0.000	0.003	(0.97)	0.334	0.003	(0.95)	0.343
(Other Reporter	school	0.039	(3.63)**	0.000	0.003	(1.10)	0.271	0.001	(0.22)	0.825
Excluded)	police	0.103	(8.70)**	0.000	-0.001	(0.23)	0.821	-0.002	(0.62)	0.537
	family	0.060	(6.07)**	0.000	-0.001	(0.50)	0.618	-0.002	(0.56)	0.578
	neighbor	0.012	(0.99)	0.321	-0.002	(0.67)	0.502	0.002	(0.66)	0.507
	other government	0.072	(6.36)**	0.000	0.002	(0.53)	0.598	0.000	(0.09)	0.931
	anonymous	-0.012	(1.28)	0.200	-0.002	(0.81)	0.420	0.000	(0.05)	0.96
Age at Report	age 6	0.137	(3.79)**	0.000	-0.008	(1.18)	0.236	-0.002	(0.48)	0.629
(Oldest age	age 7	0.035	(2.69)**	0.007	0.003	(0.92)	0.356	-0.003	(1.30)	0.193
Excluded)	age 8	0.040	(3.90)**	0.000	-0.001	(0.42)	0.676	0.000	(0.01)	0.992
	age 9	0.037	(3.97)**	0.000	-0.001	(0.63)	0.528	-0.003	(1.66)	0.097
	age 10	0.033	(3.86)**	0.000	-0.002	(0.95)	0.344	-0.004	(2.13)*	0.033
	age 11	0.030	(4.09)**	0.000	0.000	(0.10)	0.919	-0.001	(0.77)	0.443
	age 12	0.021	(3.03)**	0.002	-0.001	(0.61)	0.539	0.001	(0.44)	0.663
	age 13	0.017	(2.53)*	0.011	-0.001	(0.92)	0.360	-0.003	(1.90)	0.058
	age 14	0.016	(2.33)*	0.020	-0.002	(1.13)	0.257	-0.002	(1.42)	0.156
	age 15	0.004	(0.61)	0.542	-0.001	(0.99)	0.321	-0.001	(0.87)	0.387
Allegation	lack of supervision	0.0006	(0.06)	0.956	0.002	(0.90)	0.369	0.003	(1.38)	0.168
(Other neglect	environmental neglect	-0.046	(4.08)**	0.000	0.0007	(0.31)	0.757	0.000	(0.01)	0.989
Excluded)	substantial risk of harm	-0.025	(2.21)*	0.027	0.003	(1.49)	0.136	0.004	(2.28)*	0.023
	physical abuse	-0.047	(4.84)**	0.000	0.001	(0.56)	0.575	0.002	(1.22)	0.223
Sex	boy	-0.004	(1.15)	0.251	-0.001	(1.76)	0.078	-0.001	(1.84)	0.066
Race	white	-0.011	(0.86)	0.388	0.003	(0.99)	0.320	0.003	(0.71)	0.48
	African American	0.034	(2.51)*	0.012	0.008	(2.17)*	0.030	0.005	(1.36)	0.175
	Mean of Dependent Variable	0.12			0.18			0.15		
	Standard Deviation	0.32			0.08			0.08		
	F-statistic of joint significance	19.90			1.24			1.44		
	p-value	0.0000			0.20			0.07		
	Observations	36943						30934		

Delinquency data are for children in Cook County. Employment data are for all children in Illinois enrolled in Medicaid prior to the abuse report.

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).

t-statistics and F-statistics are calculated using standard errors clustered by case manager; *=5% significance **=1% significance

Table 3: Case Manager Assignment & Child Characteristics

Dependent Variable: Case Manager Prior Removal Rate

	Sample:	Delinquency	Teen Motherhood	Employment
		(1)	(2)	(3)
F-statistic of joint significance		1.24	2.09	1.44
p-value		0.20	0.001	0.07
Mean of Dep. Var.		0.18	0.15	0.15
Std. Dev. of Dep. Var.		0.08	0.08	0.08
Observations		36943	23780	30934

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).
t-statistics and F-statistics are calculated using standard errors clustered by case manager.

Table 4: Case Manager Assignment as a Predictor of Removal

<u>Dependent Variable: Removed from Home</u>

	Delinquency Sample		Teen Motherhood Sample		Employment Sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Case Manager Prior Removal Rate	0.195	0.192	0.313	0.312	0.259	0.264
	(0.044)	(0.041)	(0.070)	(0.069)	(0.070)	(0.069)
Mean of Dep. Var.	0.12		0.210		0.225	
Observations	36943		23780		30934	
Full Controls	No	Yes	No	Yes	No	Yes

Standard errors are reported, clustered at the case manager level.

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).

Table 5: Removal & Long-Term Outcomes: Juvenile Delinquency

Dependent Variable:	Juvenile Delinquency			
	OLS	OLS	2SLS	2SLS
	(1)	(2)	(3)	(4)
Removed from Home	0.122	0.116	0.225	0.225
	(0.007)	(0.007)	(0.107)	(0.109)
Mean of Dep. Var.	0.077			
Full Controls	No	Yes	No	Yes
Observations	36943			

Data are for the Court of Cook County Juvenile Justice Division who were at least 16 in 2000.

Standard errors are reported, clustered at the case manager level.

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).

Table 6: Removal & Long-Term Outcomes: Teen Motherhood

Dependent Variable:	Teen Pregnancy			
	OLS	OLS	2SLS	2SLS
	(1)	(2)	(3)	(4)
Removed from Home	0.091	0.086	0.221	0.237
	(0.011)	(0.011)	(0.192)	(0.184)
Mean of Dep. Var.	0.348			
Full Controls	No	Yes	No	Yes
Observations	23780			

Data are for girls enrolled in Medicaid prior to abuse report and at least 16 in 2003.

Standard errors are reported, clustered at the case manager level.

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).

Table 7A: Long-Term Outcomes: Employment in 2002

Dependant Variable:	Fraction of Quarters Working			
	OLS	OLS	2SLS	2SLS
	(1)	(2)	(3)	(4)
Removed from Home	0.010	0.012	-0.145	-0.183
	(0.008)	(0.007)	(0.196)	(0.192)
Mean of Dep. Var.	0.347			
Full Controls	No	Yes	No	Yes
Observations	30934			

Standard errors are reported, clustered at the case manager level.

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).

Table 7B: Long-Term Outcomes: Quarterly Earnings in 2002

Dependent Variable:	Average Quarterly Earnings			
	OLS	OLS	2SLS	2SLS
	(1)	(2)	(3)	(4)
Removed from Home	-26.503	-3.018	-1101	-1167
	(39.932)	(39.998)	(864)	(838)
Mean of Dep. Var.	1068			
Full Controls	No	Yes	No	Yes
Observations	30934			

Average quarter earnings include those with zero earnings.

Standard errors are reported, clustered at the case manager level.

All models include year indicators and investigation sub-team fixed effects (team x ZIP x Hispanic).