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The Effect of Paying Parents to Adopt: Evidence from Minnesota's Foster-Care System*

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Abstract: Aimed at increasing the adoption rate of older children, Minnesota's 2015 Northstar Care Program eliminated the adoption penalty (the decrease in fostering-based financial transfers associated with adoption) for children aged six and older, while maintaining it for children under age six. Using a difference-in-differences estimation strategy that controls for a rich set of covariates, we find that parents responded positively to this change in direct financial payments; the annual adoption rate of older foster children aged six to eleven increased by approximately 7 percentage points (22% at the mean) as a result of the program. We additionally find evidence of strategic adoption behavior as the adoption rate of younger children temporarily increased by 11 percentage points (26% at the mean) in the year prior to the program's implementation.

Keywords: Family Policy, Government Transfers, Adoption, Foster Care
JEL Classification: D1, J13, I38, H75

Resumen: Con el objetivo de aumentar la tasa de adopción de niños mayores, el programa Northstar Care, implementado en el estado de Minnesota en el año 2015, eliminó la penalización a la adopción (la disminución de las transferencias financieras asociadas a la adopción) para niños de seis y más años, mientras que las mantuvo para niños menores de seis años. Usando una estrategia de estimación de diferencias-en-diferencias y controlando por un abundante conjunto de variables, se encuentra que los padres respondieron positivamente al cambio en los pagos financieros directos, toda vez que la tasa anual de adopción para niños entre seis y once años aumento en aproximadamente 7 puntos porcentuales (22% en la media) como resultado del programa. Adicionalmente, se encuentra evidencia de comportamiento estratégico, ya que la tasa de adopción de los niños más pequeños aumentó temporalmente en 11 puntos porcentuales (26% en la media) en el año anterior a la implementación del programa.

Palabras Clave: Política Familiar, Transferencias del Gobierno, Adopción, Sistema de Acogida

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*Data used were made available by the National Data Archive on Child Abuse and Neglect, Cornell University, Ithaca, NY, and have been used with permission. Data from the Adoption and Foster Care Analysis and Reporting System (AFCARS) were originally collected by the Children's Bureau. The collector of the original data, the funder, the Archive, Cornell University, and their agents or employees bear no responsibility for the analyses or interpretations presented here.

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1 Introduction

The foster-care system in the United States is intended to provide a safety net for abused and neglected children in the form of residential placements outside of the parental home. In 2018, there were almost half a million children in foster care and this number has increased in each year since 2012 (U.S. Department of Health and Human Services, 2021). These children are disproportionately at risk for negative outcomes; foster children are more likely to receive treatment for mental health issues (including post-traumatic stress disorder), more likely to spend time incarcerated, more likely to bear children during their teenage years, more likely to live in poverty, and less likely to complete education at all levels (Casey Family Foundation, 2005). In addition, American taxpayers contributed approximately twenty-eight billion dollars in 2014 in the form of child welfare services, for both foster-care program administration and adoption incentives.[1] Historically, the vast majority of the foster-care budget has been focused on maintaining children in foster care. More recently, government policies have shifted funds toward providing financial incentives for the adoption of children out of foster care and into permanent family outcomes,[2] as adoption has been found to significantly improve the outcomes of foster children (Triseliotis, 2002).

This study analyzes the effects of a major 2015 policy in the State of Minnesota, the Northstar Care Program, which was targeted at increasing the number of older children who are adopted out of foster care. It is a costly program that incentivizes the adoption of foster children aged six and older through the continuation of large financial transfers to parents post-adoption. Prior to the implementation of the Northstar Care Program, monthly payments from the state to parents fell by 62% following adoption for children under the age of six, 57% for children between the ages of six and eleven, 59% for children between the ages of twelve and fourteen, and by 51% for children over the age of fifteen. This reduction in payments following adoption is typically referred to as the "adoption penalty." After the implementation of the program, a fifty-percent adoption penalty was continued for children under

[1] This excludes spending on other programs focused on child welfare more generally. For example, Temporary Assistance to Needy Families or TANF (with an annual budget of over seventeen billion dollars in 2014) contributes to the protection of foster children. At the extensive margin, TANF keeps children from entering the system; household income is the most important predictor for child maltreatment (Paxson and Waldfogel, 1999) and entry into foster care (Lindsey, 1991). TANF also contributes inframarginally; more than one-third of the children in child-only TANF cases are under the guardianship of a non-parental relative (U.S. Department of Health and Human Services, 2004).

[2] The Family First Prevention Services Act, which was signed into law in 2018 but has not yet been implemented, increases overall funds to adoption services, yet decreases its budget share. In its budget, an increased share of program funds go to keeping biological families together.

the age of six but was completely eliminated for children over the age of six (adoptive parents received the same financial transfer as did foster parents).

At the same time, Minnesota sought to increase the number of children placed with relatives through the Kinship Assistance portion of the Northstar Care Program by increasing the monthly payments to kin in the foster-care system. Prior to the implementation of the policy, kin would receive only a fraction of the payments paid to non-kin foster parents and these payments were means-tested for kin (unlike the monthly payments to non-kin foster parents). Under the 2015 program, foster payments to kin were set to parity with non-kin foster parents. Thus, post January 2015, monthly payments to kin increased by over 130% on average as a result of the program.[3] In all years, kin faced no adoption penalty. Thus, the Kinship Assistance portion of the program would incentivize kin to foster (and possibly adopt) at higher rates, but it would also impact the decisions of non-kin parents by introducing a competitive channel; as kin were given preference in placement decisions, the risk of "losing" a foster child to their kin was dramatically increased post-implementation.[4]

We implement a difference-in-differences estimation strategy that takes advantage of this large policy change in which direct financial transfers to parents were increased substantially. Our focus is to see how the financial incentives for adoptive parents impacted a child's probability of adoption. To do this, we employ a rich panel dataset describing the universe of children in foster care in the United States during the calendar years 2012 through 2018. These data come from the Adoption and Foster Care Analysis and Reporting System (AFCARS) and follow each child until they exit the system through either adoption, parental reunification, emancipation, or aging-out at age eighteen. We focus our analysis on children under the age of sixteen whose parental rights have already been terminated; for these children, adoption is the only route to exiting the system in our panel. We use this data to isolate the age-specific impacts of the January 2015 policy while controlling for a rich set of child characteristics, including gender, race and ethnicity, disability status, and time spent in foster care, along with location and time-period fixed effects.

We find that the majority of the targeted older children, for whom monthly transfers more than doubled, saw large and statistically-significant increases in their probability of adoption out of foster care. Specifically, children aged six through eleven saw their probability of adoption increase by 7 percentage points (22% at

[3]This average is taken over each age-of-child figure, weighted evenly.

[4]In addition to this risk, non-kin parents who sought to provide permanency through adoption could be given preference in placement decisions over non-kin parents who did not plan to adopt. This channel would provide a similar competitive threat.

the mean) in the four years post-implementation. For the younger children, from birth through age five, we found small and statistically insignificant effects. This is not surprising as there was little contemporaneous change in the financial incentives to adopt; if anything, one might expect parents to delay adoption until the child's future sixth birthday.

It is important to note that this policy change was not unexpected; parents in the system were told about the impending changes at the end of 2013. Allowing for the announcement of the policy to serve as a separate treatment, we do find significant but temporary effects of the announcement. Specifically, we find that children under the age of six experienced an 11-percentage-point increase (26% at the mean) in their probability of adoption in the year prior to the Northstar Care Program's implementation. This is consistent with parents reacting to the increased risk of competition; both kin and non-kin adoptive parents (who would be facing increased financial transfers in the following calendar year) would be given precedence in placement decisions.

By studying this large-scale policy change with multiple incentives for adoptive parents, this paper speaks to a number of literatures. First, it speaks directly to the ability of financial transfers to improve the wellbeing of foster children who are some of the most vulnerable members of our society and where much of the existing literature has been inconclusive. Much of the existing literature on the effect of financial transfers within the foster-care system has been focused on the effect of financial incentives on the decision to become a foster parent, versus the decision to adopt a child out of the system. Early studies found inconclusive results of the effect of financial transfers on the number of foster parents registered in the system (Simon, 1975) and insignificant results on the effect of transfers on the number of children within each foster home (Campbell and Downs, 1987). Later studies, however, found a significant effect of financial transfers. Doyle and Peters (2007) found that the overall supply of adults willing to serve as foster parents is positively impacted by the levels of financial payments in their state. Duncan and Argys (2007) reported that more generous payments for foster families increase the probability that foster children live in a foster home (versus an institutional setting) and decrease the probability that the child will be removed from that setting in a future period. Finally, Doyle (2007a) found that less-generous payments to non-parental family members reduce the probability that they will serve as foster parents. A smaller, but even more recent literature has sought to describe the impacts of subsidies on adoption out of foster care. This, too, has provided mixed conclusions. In cross-state analyses that exploit differences in the age of eligibility for federally-

funded adoption subsidies, Argys and Duncan (2013) and Buckles (2013) found that subsidy-eligibility increases a child's probability of adoption out of foster care. Likewise, Brehm (2021) finds that the federal adoption tax credits increase adoption from foster care. Conversely, in a difference-in-differences analysis of a major, age-based national policy reform, Brehm (2018) found that the transfer of federal funds to individual states has effectively no impact on the adoption rates of the targeted, older children (aged nine and above).[5]

Second, this analysis adds to the larger literature related to the impact of financial transfers on family-size decisions. This literature finds a limited impact of direct government payments (through pro-natalist policies) on family-size decisions. Perhaps the largest government transfer in the United States that directly affects fertility decisions is the federal income-tax subsidy for children. Using data from 1913 to 2005, Crump et al. (2011) did not find evidence that these United States subsidies affect the level of fertility. Baughman and Dickert-Conlin (2003) found that the fertility effects of the Earned Income Tax Credit (EITC) program are both small and concentrated on first-birth decisions among non-white, income-eligible women. These results mirror those of the earlier literature on government transfers and fertility, reviewed in Hoynes (1997) and Moffitt (1998), which mainly found small and/or insignificant impacts in the United States. Studies on direct government transfers in other nations have produced similarly inconclusive results for pro-natalist policies. For example, Milligan (2005) found that Canadian tax subsidies have a positive impact on fertility while Parent and Wang (2007) found that Canadian subsidies only affect the timing of fertility decisions. González (2013) found that Spanish tax subsidies increased overall fertility while Cohen et al. (2013) found that the positive fertility impacts of Israeli tax subsidies are concentrated among low-income mothers specifically. In contrast, our results suggest that adoptive parents are relatively sensitive to financial transfers in their family-composition decisions although we are unable to rule out long-run intertemporal substitution patterns in the data or to control for the income of adoptive families.

Finally, our paper is related to the policy-evaluation literature used to inform policy-makers about the effectiveness of costly government programs. Using our estimates, this program induced 363 additional adoptions on net (among children less than eleven years old). As this includes adoptions that occurred in 2014 and were likely reflective of long-run intertemporal substitution patterns, we focus on the 51 additional adoptions that occurred on net in the year 2015, the 64 additional

[5]In this case, it was unclear how much, if any, of the $\$4,000$ or $\$8,000$, one-time transfers were passed on to adoptive parents from the states, as the use of funds was not stipulated in the federal policy.

adoptions that occurred on net in the year 2016, the 71 additional adoptions that occurred on net in the year 2017, and the 80 additional adoptions on net in the year 2018. We assume that these 266 adoptions (among children aged six to eleven) would not have occurred otherwise. Aggregating the age-specific costs for these children, along with the age-specific transfers to the 3,117 adopted children who would have been adopted even in the absence of this policy between 2015 and 2018, we estimate the financial burden of the Northstar Care Program to be $377.2 million in transfers to adoptive parents alone, with an average cost per policy-induced adoption of $86,065.

This paper proceeds as follows: Section 2 describes the Northstar Care Program, Section 3 describes our panel dataset, Section 4 presents our estimation approach, Section 5 discusses our results and policy implications, and Section 6 concludes.

2 The Northstar Care Program

The number of foster children in the United States had been both large and growing. In 2012, after thirteen years of continued decline in both the overall foster-care population and in the share of children in foster care, the trend reversed with relatively more children entering the system in each year 2012-2018. This increase was mainly driven by the opioid epidemic, specifically children being removed from their home due to parental drug use or parental neglect which was thought to be the result of drug use (National Conference of State Legislature, 2019; National Council for Adoption, 2019).

The goal for these children is typically described as permanency. Foster children who attain permanent living situations have been found to fare better in a variety of outcomes than children who do not (Triseliotis, 2002). At any given time, birth parents' rights are legally intact for approximately three-quarters of foster children. The preferred permanent outcome for these children is reunification with the birth parents. For the remaining one-quarter of foster children, birth parents' rights have been legally terminated by the state and reunification is not an option. Thus, for the foster children in the most dire situation where parental rights have been terminated, adoption (by kin or other foster parents) is the preferred permanent outcome.[6]

To directly address these concerns, the State of Minnesota passed into law the Northstar Care Program in May of 2013. This program was directly communicated to foster families in late 2013 and took effect on January 1, 2015. By changing

[6]The alternative, less attractive, permanent outcome is transferral of legal custody to an agency (Gueinzius and Hillel, 2014).

key financial incentives associated with age-based monthly payments, this program sought to increase permanency through adoption for foster children in Minnesota. The payments for the 2014 and 2015 calendar years are shown for each age group in Table 1. Note that post-2015 payments are adjusted annually based on changes to the USDA's Estimates of the Cost of Raising a Child index.

Table 1: Monthly Payments to Foster and Adoptive Families in Minnesota

	Pre-Northstar				Post-Northstar			
Age	I Foster (non-kin)	II Foster (kin)	III Adopt (<6)	IV Adopt (≥6)	V Foster (non-kin)	VI Foster (kin)	VII Adopt (<6)	VIII Adopt (≥6)
0-5	$650	$247	$247	-	$565	$565	$283	-
6-11	$650	$277	$277	$277	$670	$670	$335	$670
12	$750	$307	$307	$307	$670	$670	$335	$670
13-14	$750	$307	$307	$307	$790	$790	$395	$790
15-18	$775	$377	$377	$377	$790	$790	$395	$790

Notes: Table 1 shows the basic monthly payments received by foster and adoptive parents before and after the implementation of the Northstar Care Program. All payments vary with the child's age, and are presented in five age bins (age 0-5, age 6-11, age 12, age 13-14, and age 15-18). Columns I to IV exhibit payments before the Northstar Care Program, and columns V to VIII exhibit payments after. Columns I and V present the payments received by parents when they foster, and do not have a prior relationship with the child. Columns II and VI present the payments received by parents when they foster a child with whom they have a prior relationship with. Columns III and VII exhibit the payments received by parents when they adopt a child younger than age six. Columns IV and VIII exhibit the payments received by parents when they adopt a child older than age six.
Source: Minnesota Department of Human Services (2014).

First, the Northstar Program eliminated the financial penalty associated with the adoption of children aged six and older by equalizing the monthly payments of fostering and adopting for non-relative foster parents. For example, the difference in total payments associated with adopting a six year old child in 2014 (shown in Column I of Table 1), relative to fostering until the child's eighteenth birthday (shown in Column IV of Table 1) is $57,132. The same relative difference post-implementation (using the payments described in Columns V and VIII) is $0. Notably, it may be seen by comparing Columns V and VII of Table 1 that the adoption penalty remained post-implementation for the adoption of younger children; by adopting a newborn in 2015, a foster family would be foregoing $72,144 in transfers from the state which is only slightly lower than the pre-program adoption penalty of $86,148. Thus, older children would be relatively more attractive to adopt

post policy (when compared with older child pre-policy or younger children post-policy). Younger children would be relatively more attractive to adopt post-policy when compared with younger children pre-policy, but relatively less attractive to adopt post-policy when compared with older children post-policy.

Second, the program changed payments to kin (relative) foster parents through Kinship Assistance. This may be seen by comparing Columns II and VI. Pre-Northstar, kin caregivers received at most the post-adoption rate given to non-kin, as it was means tested. This meant that in the pre-period, kin did not face an adoption penalty. Post-Northstar, payments to kin more than doubled for all age groups, these payments were not means tested, and parents still did not face an adoption penalty. The effects of this would likely be seen through increased competition for children, as kin are given preference in placement decisions.

Finally, the program modified the overall level of payments to non-kin foster parents. This may be seen by comparing Columns I and V. Specifically, the monthly payments given to families with new foster placements was increased for children older than six years old (with the exception of children aged twelve, for whom the subsidy dropped by approximately 11%) and decreased for placements involving children below age six by 13.1%.[7] The effects of this would likely be seen in the decision to become foster parents on the extensive margin, making older children more attractive relative to younger ones.

In terms of policy-relevance, Minnesota is a larger-than-average state with a 2015 population of approximately 5.5 million people (Minnesota State Demographic Center, 2015). It is also a relatively-representative U.S. state in terms of demographics, as the makeup of Minnesota's population described by percentage of the population under age eighteen (23 percent versus 24 percent), percentage of the population living in an urban area (73 percent versus 80 percent), and percentage of the population that reports as non-white (19 percent versus 28 percent) roughly matches the United States as a whole.[8]

3 Data

The data employed in this study cover the period of January 2012 through December 2018 and come from the Adoption and Foster Care Analysis Reporting System

[7]The subsidy was increased by 3.1% for placements involving children aged six to eleven, 5.3% for children aged thirteen to fourteen, and 1.9% for children aged fifteen to eighteen.

[8]These are 2010 statistics taken from the U.S. Census Bureau.

(AFCARS).[9] This time period corresponds to three years prior to the implementation of the Northstar Care Program through four years after and includes the most recently-available, full-calendar-year AFCARS data.

The federal government requires all states and territories to collect and submit data describing the children and families in the state's foster-care system, including the reason for a child's exit of the system. We access AFCARS administrative records containing unique identifiers for all children in the foster care system, and constructed an unbalanced panel of children.[10]

Table 2: Foster Children Sample Statistics, 2012-2018

	MN $obs = 16,362$		AS $obs = 28,913$		MW $obs = 179,284$	
	Mean	sd	Mean	sd	Mean	sd
Adopted	0.37	0.48	0.50	0.50	0.42	0.49
Disabled	0.50	0.50	0.38	0.49	0.40	0.49
Female	0.49	0.50	0.48	0.50	0.47	0.50
White	0.44	0.50	0.52	0.50	0.55	0.50
Black	0.17	0.38	0.18	0.39	0.26	0.44
Hispanic	0.11	0.31	0.11	0.31	0.08	0.27
Age 0-5	0.50	0.50	0.52	0.50	0.47	0.50
Age 6-11	0.34	0.47	0.34	0.48	0.35	0.48
Age 12	0.04	0.20	0.04	0.20	0.05	0.21
Age 13-14	0.08	0.27	0.07	0.25	0.09	0.28
Age 15	0.05	0.21	0.03	0.17	0.04	0.21
Title IV-E Eligible	0.51	0.50	0.39	0.49	0.41	0.49
Years since PRT*	1.20	1.41	1.05	1.42	1.30	1.57

Notes: Data are from the Adoption and Foster Care Analysis and Reporting System (AFCARS). Means and standard deviations are calculated for child-year observations and describe children younger than age 16 relinquished for adoption. The MN sample includes children in the state of Minnesota. The AS sample includes children children in the Adjacent States of Iowa, North Dakota, South Dakota, and Wisconsin. The MW sample includes children in the Midwest Census Division, i.e., in the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
*PRT stands for Parental Rights Terminated.

[9]These data were accessed through the National Data Archive on Child Abuse and Neglect at Cornell University.

[10]Unfortunately, the same cannot be done for foster parents in our data due to lack of identifiable covariates. For the parents, we see only race and ethnicity, marital status, and age. We do not control for these in our analysis, as parents with a current foster child represent only a subset of the potential pool of adoptive parents.

The data include a rich set of covariates describing the children in the foster-care system, including month and year of birth, gender, race and ethnicity, and disability status.[11] We additionally observe whether the child is eligible for additional federal funds through Title IV-E of the Social Security Act. These children, who are deemed to require a greater deal of care, are eligible for additional medical-assistance funds in the State of Minnesota.[12] We limit our sample to those children living within the Census Division of the Midwest (MW), i.e., the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin, and focus on the subset of children who are eligible for adoption, i.e., those children for whom parental rights had already been terminated. In addition, we exclude children aged 16 and above from all of our analyses as these children often exit the system through legal emancipation, as opposed to the younger children for whom adoption is the only contemporaneous route out of the foster-care system. This leaves us with a final sample of 97,270 children across the Midwestern United States and 8,892 in Minnesota specifically. Our preferred control group in estimation is the set of 17,403 foster children residing in the four adjacent states (AS) to Minnesota of Iowa, North Dakota, South Dakota, and Wisconsin. Summary statistics for all of our estimation samples are provided in Table 2. In the Appendix, Table A1 shows summary statistics for the full sample of children with and without parental rights terminated.

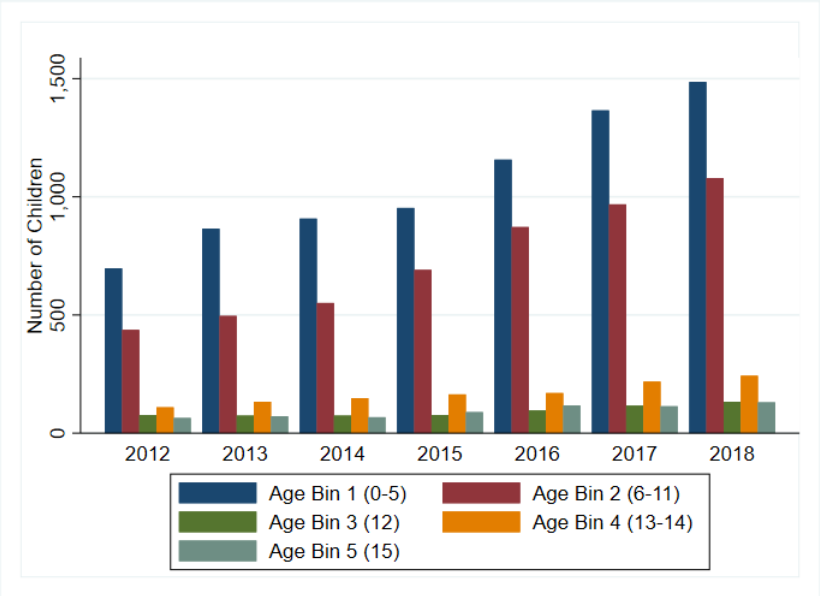
As may be seen in this table, foster children in Minnesota are less likely to be adopted and more likely to be disabled relative to both control groups, and more likely to be Hispanic relative to the MW control group. The underlying differences in disability status likely reflect the same underlying differences observed in Title IV-E eligibility.

For our empirical implementation, we create a set of age bins that correspond to the age groups defined by State of Minnesota's Department of Human Services that faced the same treatment (age 0-5, age 6-11, age 12, age 13-14, and age 15, as shown in Table 1), using age defined on the last day of the year. The number of children in each age bin over time in Minnesota is shown in Figure 1. There, it may be seen that the numbers of children with parental rights terminated in the youngest two age bins are relatively large when compared with the numbers of children in the oldest three age bins. In addition, the growth rates in these older bins were

[11] Note that we do not observe the presence of siblings, which could be an important factor in adoption decisions.

[12] The State of Minnesota also has an internal assessed level of required care that entitles parents to additional funds called Minnesota Assessment of Parenting for Children and Youth, or MAPCY. We do not observe MAPCY scores in our data. Thus, our indicator for Title IV-E status may additionally proxy for MAPCY.

Figure 1: Number of Minnesota Children by Age Bin, 2012 to 2018



Notes: Data are from the Adoption and Foster Care Analysis and Reporting System (AFCARS). Figure 1 shows, by age bin, the raw number of children in Minnesota whose parental rights are terminated for each year between 2012 and 2018. Age bin 1 considers children aged zero to five years old, age bin 2 are children aged six to eleven years old, age bin 3 considers only children aged 12 years old, age bin 4 contains children aged 13 and 14 years old, and age bin 5 considers only children aged 15 years old.

significantly lower than for the younger age bins. Our preferred specifications focus on the children in the youngest two age bins, i.e., ages zero through eleven, given the sample sizes.

4 Empirical Strategy

To recover the effects of the Northstar Care Program in Minnesota, we use a difference-in-differences estimation approach where we take advantage of the fact that the financial incentive associated with adoption changed in January of 2015. As this policy was passed in May of 2013 by the Minnesota state legislation and was formally announced to parents at the end of 2013, we allow for two separate treatment effects: one for the announcement which we define starting in January of 2014 and one for the enactment in January of 2015. Hence, we run the following

linear-probability regression:

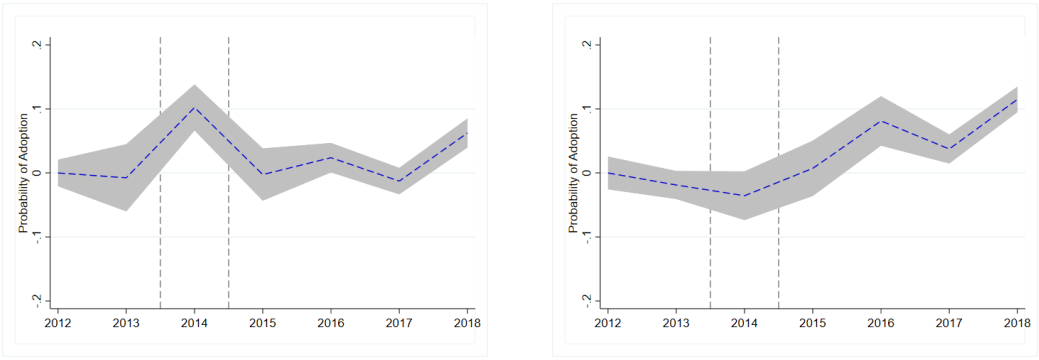
$$\begin{aligned} adopted_{i,j,t} = \beta X_i + \gamma Z_{i,t} + \delta_j + \psi^1(Minn_{i,t} \cdot agebin^1_{i,t}) + \psi^2(Minn_{i,t} \cdot agebin^2_{i,t}) \\ + \sum_{t=2012}^{2018} \zeta^1_t agebin^1_{i,t} + \sum_{t=2012}^{2018} \zeta^2_t agebin^2_{i,t} \\ + \lambda^1(announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}) + \lambda^2(announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}) \\ + \phi^1(post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}) + \phi^2(post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}) + \epsilon_{i,j,t} \quad (1) \end{aligned}$$

where the dependent variable, $adopted_{i,j,t}$, is an indicator that takes the value of 1 if child i, living in state j, is adopted during year t. We allow the effects of these treatments to differ over two age bins, corresponding to the first two age-range specific treatments laid out by the Northstar Care Program. That is, $agebin^1_{i,t}$ is an indicator that takes the value of 1 if child i is aged zero to five years old in year t and $agebin^2_{i,t}$ is an indicator that takes the value of 1 if child i is aged six to eleven in year t. X_i is a vector of time-invariant characteristics of the child comprised of gender, race, ethnicity, a dummy for whether the child has ever been diagnosed with a disability, and a dummy for whether the child is eligible for additional federal funding (all are measured at the end of the panel). $Z_{i,t}$ is a vector of time-varying characteristics of the child comprised of the time (in months) since they entered foster care and the time (in months) since parental rights were terminated (all measured at year's end). The variable $Minn_{i,t}$ is an indicator that takes the value of 1 if child i is living in Minnesota in year t. δ_j is a vector of state-level fixed effects, which controls non-parametrically for any cross-state differences in adoption rates. The ζ_t terms non-parametrically control for any agebin-specific trends in adoption rates over time. Finally, the variable $announce_t$ is an indicator that takes the value of 1 if year t is 2014 while $post_t$ is an indicator that takes the value of 1 if year t is 2015 or later.

We use the AS sample as our main control group, i.e., the children available for adoption in the four adjacent states of Iowa, North Dakota, South Dakota, and Wisconsin.[13] As a robustness check, we additionally estimate specifications with the MW control group and with all Continental US states as a control group. To the best of our knowledge, there were no major policy changes in the control groups that

[13]One potential concern with any control group might be the possibility of interstate adoptions out of the Minnesota foster-care system. In these cases, however, financial payments to families would not continue post-adoption, as the home agency's responsibilities end when the child is legally adopted according to the Interstate Compact on the Placement of Children. This compact covers all interstate placements of foster children between all fifty states, Washington D.C., and the U.S. Virgin Islands.

Figure 2: Pre-Trends in the Probability of Adoption for Children in Foster Care, Relative to States Adjacent, 2012 to 2018



(a) Age Bin 1 (b) Age Bin 2

Notes: Data are from the Adoption and Foster Care Analysis and Reporting System (AFCARS). Figure 2 shows, for age bin 1 and 2, the effect of being a child in Minnesota relative to being a child in the Adjacent States for each year between 2012 to 2018. Estimates to the left of the first vertical dash line are in the pre-announcement period, estimates between the first and second vertical dash lines are in the post-announcement and pre-implementation period, and the estimates to the right of the second vertical dash line are in the post-implementation period. The figure plots effects of the coefficients on the interaction terms from Equation 2 and 95 percent confidence intervals. We control for demographic characteristics, and state and year fixed effects. There are not significant effects in the pre-announcement period.

would influence our results. As additional robustness checks, we run specifications that include the year-specific total number of children available for adoption in the each state's foster-care system, and specifications that include year 2011. Finally, as a robustness check, we run specifications that include all children under the emancipation age of sixteen. In these cases, we include five age bins corresponding to the different age-specific treatments described in Table 1.

The difference-in-differences empirical strategy relies on the identifying assumption of common trends in the probability of adoption between Minnesota and the control group. To provide supportive evidence for this identifying assumption, we estimate an event study replacing $announce_t$ and $post_t$ in Equation 1 with indicators for each year over the sample periods 2012 through 2018:

$$adopted_{i,j,t} = \beta X_i + \gamma Z_{i,t} + \delta_j + \psi^1(Minn_{i,t} \cdot agebin^1_{i,t}) + \psi^2(Minn_{i,t} \cdot agebin^2_{i,t}) + \sum_{t=2012}^{2018} \zeta^1_t agebin^1_{i,t} + \sum_{t=2012}^{2018} \zeta^2_t agebin^2_{i,t} + \sum_{k=2012}^{2018} \gamma^1_k (1[year = k] \cdot Minn_{i,t} \cdot agebin^1_{i,t}) + \sum_{k=2012}^{2018} \gamma^2_k (1[year = k] \cdot Minn_{i,t} \cdot agebin^2_{i,t}) + \epsilon_{i,j,t} \quad (2)$$

Table 3: Impacts on the Annual Probability of Adoption

	I	II	III	IV
	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.1064*** (0.0215)	0.1103*** (0.0219)	0.0961*** (0.0201)	0.1222*** (0.0172)
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0257 (0.0181)	-0.0216 (0.0196)	-0.0105 (0.0200)	-0.0074 (0.0192)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.0239 (0.0181)	0.0368 (0.0262)	0.0127 (0.0165)	0.0244 (0.0199)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.0738*** (0.0178)	0.0864*** (0.0266)	0.0894*** (0.0193)	0.0482** (0.0203)
state-level supply of children		X		
control group	AS	AS	AS	MW
years	2012-2018	2012-2018	2011-2018	2012-2018
observations	34,415	34,415	38,485	143,111

Notes: All specifications control for demographic characteristics, and state and year fixed effects. The first column, which uses the Adjacent States as the control group, is our preferred specification. The second column additionally controls for the number of children in the system. The third column includes the same controls as the first column incorporating the calendar year 2011. The forth column includes the same controls as the first column but uses the entire Midwest Census Division as the control group. Standard errors are cluster at the state-year level and shown in parentheses. $^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Figure 2 shows the pre-trends relative to the AS control group for Age Bin 1 (figure 2a) and Age Bin 2 (figure 2b). As may be seen, the differential adoption rate prior to 2014 is not significantly different in Minnesota relative to AS control group. There is, however, a noticeable effect of both the policy's announcement in 2014 and the policy's implementation in 2015. We performed additional analysis to test for the parallel trend assumption, the results are presented in the Appendix.[14]

5 Results

The results from the estimation of Equation 1 are shown in Table 3, Column I. For the effect of the announcement, we find that for the children in the first age bin (age 0-5), the probability of adoption increases by 10.64 percentage points or 26% of the mean adoption rate in the year prior to the program's implementation. Intertemporally substituting post-implementation adoptions to the pre-implementation

[14]We estimate Equation 1 using only pre-treatment data (years 2012-2013). We drop the $announce_t$ variable, and redefine $post_t$ as an indicator that takes the value of 1 if year t is 2013 and zero otherwise. Results are presented in Table A2.

period is at odds with parents' financial incentives; if anything, waiting until the child reaches the age of six would be optimal from a financial standpoint. It is, however, consistent with parents reacting to the outside threat of either kin foster parents or non-kin adoptive parents competing for children in their care. The announcement period had statistically insignificant effects for children in the second age bin (age 6-11). In terms of the effect of program implementation, we find small and statistically insignificant positive results for children in the first age bin (age 0-5). We find a relatively-large and statistically-significant effects for the children in the second age bin (age 6-11) whose probability of adoption increased by 7.38 percentage points or 22% of the mean adoption rate following the implementation of the policy. This is consistent with the stated goals of the program to increase adoption rates for older children using financial incentives.

A potential concern might be the omission of a time-varying control for the number of children in each state, in light of the increasing burdens on states' foster systems over this time period. Therefore, the results shown in Column II come from a specification where we include the state-specific number of children with parental rights terminated in each year. The control group here is the set of adjacent states to Minnesota. As may be seen in the Table, results are relatively robust to this inclusion. Furthermore, as a robustness check, in Column III we show the results from a specification where we include the calendar year 2011.[15] As may be seen, results are also relatively robust to this inclusion.

Additionally, we show that our results are relatively robust to an alternate control group. In Column IV, we show the results of the estimation of equation 1 where we use the entire Midwest Census Division as the control group. The results are qualitatively similar, although the effect of the program on the older children is 35% smaller than with the preferred control group. Table A3 shows the results using the entire, non-Minnesota Continental United States as the control and again find qualitatively similar results.

In the Appendix, Table A4 provides the estimated coefficients for the child covariates for all specifications consider in Table 3, and Table A5 shows that our results are robust to the inclusion of the older children, aged twelve through fifteen. As an additional robustness check, table A6 presents the results from the estimation of equation 1 as a logit model, and table A7 provides the estimates coefficients when female is the placebo outcome, that is, the depend variable $adopted_{i,j,t}$ in Equation 1 is replaced by $female_{i,j,t}$ that takes the value of 1 if child i, living in state j, is a

[15] We excluded year 2011 from our main specification because federal policies surrounding foster-care funding may have impacted this year.

female during year t. Finally, we perform robustness checks regarding the clustering of the standard errors (clustered at the state-year level). Table A8 shows that the significance of the coefficients remains unchanged when we calculate the standard errors through a clustered bootstrapping procedure.

6 Conclusion

This analysis takes advantage of the recent state law governing the adoption of children out of foster care in the State of Minnesota that was implemented on January 1, 2015. The policy, the Northstar Care Program, sought to create "a uniform set of benefits and processes for children age 6 and older in foster care."[16] In addition to streamlining the adoption process by combining three major programs (Family Foster Care, Kinship Assistance, and Adoption Assistance), the Northstar Care Program changed the value of monthly payments for foster families, changed the value of monthly payments to placements with relatives (kin), and changed the value of monthly payments to all adoptive families, eliminating the adoption penalty for all children over age 6. These changes greatly altered parents' incentives to adopt from the foster care system.

Employing a difference-in-differences estimation strategy that takes into account both the announcement and the implementation of the Northstar Care Program, we find that parents reacted to a myriad of new incentives. First, we find that the program was a success in its stated goals; the adoption rates of older children aged 6 to 11 increased by 22%. For these children, the financial penalty associated with adoption was removed. We do not find a post-implementation effect for children under age 6 for whom the adoption penalty was not removed. Second, we find that parents of the youngest children aged 0 to 5 were induced to adopt in the pre period; the adoption rates of these children temporarily spiked in the announcement period by 26%. This is consistent with the risk of other parents offering permanency in the post period and a desire to maintain physical custody of a child. We do not find evidence of parents strategically delaying adoption until a child's sixth birthday.

These results have important policy implications for government policy dictating family composition decisions. To date, the literature has been inconclusive with regards to family-size responses to financial incentives. This paper provides one more example of parents' sensitivity.

[16] Minnesota Department of Human Services, DHS Program Resources, 2018. http://www.dhs.state.mn.us/.

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7 Appendix

Table A1: Foster Children Sample Statistics, 2012-2018

	MN rights intact $n = 42,714$		MN rights term. $n = 16,362$		AS rights intact $n = 91,849$		AS rights term. $n = 28,913$		MW rights intact $n = 542,991$		MW rights term. $n = 179,284$	
	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd
Adopted			0.37	0.48			0.50	0.50			0.42	0.49
Age	8.06	4.93	6.81	4.40	7.97	4.81	6.63	4.12	7.56	4.73	7.14	4.27
Disabled	0.23	0.42	0.50	0.50	0.15	0.36	0.38	0.49	0.22	0.42	0.40	0.49
Female	0.47	0.50	0.49	0.50	0.47	0.50	0.48	0.50	0.48	0.50	0.47	0.50
White	0.37	0.48	0.44	0.50	0.53	0.50	0.52	0.50	0.56	0.50	0.55	0.50
Black	0.14	0.35	0.17	0.38	0.19	0.39	0.18	0.39	0.25	0.43	0.26	0.44
Hispanic	0.09	0.29	0.11	0.31	0.10	0.30	0.11	0.31	0.09	0.28	0.08	0.27
Title IV-E	0.20	0.40	0.51	0.50	0.26	0.44	0.39	0.49	0.27	0.45	0.41	0.49
Mth in FC*	11.35	14.68	26.35	17.55	14.14	17.30	32.88	21.29	15.84	18.06	36.96	23.13
Mth since PRT**			14.39	16.96			12.64	17.10			15.62	18.85

Notes: Data are from the Adoption and Foster Care Analysis and Reporting System (AFCARS). Means and standard deviations are calculated for child-year observations. Samples restrict attention to children younger than age 16. MN restricts attention to children in the state of Minnesota. AS includes only children in Iowa, North Dakota, South Dakota, and Wisconsin. MW includes children in Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. 'Rights intact' restricts attention to children whose parental rights are intact, and 'rights term.' restricts attention to children whose parental rights are terminated.

*FC stands for Foster Care.

**PRT stands for Parental Rights Terminated.

Table A2: Test of Parallel Trend Assumption, Placebo Year 2013

	Coefficient (s.e.)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	-0.0074 (0.0259)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0175 (0.0189)
control group	AS
years	2012-2013
observations	8,238

Notes: The specification corresponds to Equation 1 using only pre-treatment data (years 2012-2013). It drops the $announce_t$ variable, and redefines $post_t$ as an indicator that takes the value of 1 if year t is 2013 and zero otherwise. The specification controls for child's demographics, states indicators, and year fixed effects for each age-bin. The control group is the set of children in the adjacent states of Minnesota. Standard errors are cluster at the state-year level and shown in parentheses. $^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Table A3: Impacts on the Annual Probability of Adoption Relative to Continental United States

	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.1179*** (0.0135)
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0095 (0.0107)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.0124 (0.0185)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.0445*** (0.0159)
control group	US
years	2012-2018
observations	646,125

Notes: The specification controls for child's demographics, states indicators, and year fixed effects for each age-bin. The control group is the set of children in the Continental United States. Standard errors are cluster at the state-year level and shown in parentheses. $^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Table A4: Impacts on the Annual Probability of Adoption, Child's Characteristics Shown

	I	II	III	IV
	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.1064*** (0.0215)	0.1103*** (0.0219)	0.0961*** (0.0201)	0.1222*** (0.0172)
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0257 (0.0181)	-0.0216 (0.0196)	-0.0105 (0.0200)	-0.0074 (0.0192)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.0239 (0.0181)	0.0368 (0.0262)	0.0127 (0.0165)	0.0244 (0.0199)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.0738*** (0.0178)	0.0864*** (0.0266)	0.0894*** (0.0193)	0.0482** (0.0203)
Age Bin 2	-0.1360*** (0.0186)	-0.0885** (0.0331)	-0.1321*** (0.0173)	-0.1437*** (0.0234)
Female	0.0112*** (0.0040)	0.0111*** (0.0040)	0.0101** (0.0038)	0.0150*** (0.0029)
Black	-0.0750*** (0.0164)	-0.0748*** (0.0164)	-0.0742*** (0.0147)	-0.0771*** (0.0058)
Hispanic	-0.0435*** (0.0157)	-0.0434*** (0.0157)	-0.0462*** (0.0143)	-0.0249*** (0.0075)
Disability	-0.0133 (0.0172)	-0.0132 (0.0172)	-0.0166 (0.0156)	-0.0064 (0.0240)
Receiving Title IV-E	0.0246** (0.0095)	0.0252** (0.0095)	0.0303*** (0.0095)	0.0019 (0.0132)
state-level supply of children		X		
control group	AS	AS	AS	MW
years	2012-2018	2012-2018	2011-2018	2012-2018
observations	34,415	34,415	38,485	143,111

Notes: All specifications control for demographic characteristics, and state and year fixed effects. The first column, which uses the Adjacent States as the control group, is our preferred specification. The second column additionally controls for the number of children in the system. The third column includes the same controls as the first column incorporating the calendar year 2011. The forth column includes the same controls as the first column but uses the entire Midwest Census Division as the control group. Standard errors are cluster at the state-year level and shown in parentheses. $^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Table A5: Impacts on the Annual Probability of Adoption Relative to Adjacent States, All Age Bins

Independent Variable	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.1062***
	(0.0215)
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0260
	(0.0174)
$announce_t \cdot Minn_{i,t} \cdot agebin^3_{i,t}$	-0.0716
	(0.0607)
$announce_t \cdot Minn_{i,t} \cdot agebin^4_{i,t}$	-0.0396
	(0.0361)
$announce_t \cdot Minn_{i,t} \cdot agebin^5_{i,t}$	-0.1078**
	(0.0419)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.0230
	(0.0184)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.0693***
	(0.0172)
$post_t \cdot Minn_{i,t} \cdot agebin^3_{i,t}$	0.0321
	(0.0597)
$post_t \cdot Minn_{i,t} \cdot agebin^4_{i,t}$	0.0159
	(0.0287)
$post_t \cdot Minn_{i,t} \cdot agebin^5_{i,t}$	-0.0388
	(0.0413)
control group	AS
years	2012-2018
observations	40,461

Notes: The specification controls for child's demographics, states indicators, and year fixed effects for each age-bin. The control group is the set of children in the adjacent states of Minnesota. Standard errors are cluster at the state-year level and shown in parentheses. $^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Table A6: Impacts on the Annual Probability of Adoption, Logit

	I	II	III	IV
	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.4348*** (0.0903) [0.1080]	0.4829*** (0.0862) [0.1197]	0.3923*** (0.0839) [0.0975]	0.4983*** (0.0704) [0.1239]
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.1210 (0.0759) [-0.0300]	-0.0724 (0.0879) [-0.0180]	-0.0577 (0.0839) [-0.0144]	-0.0409 (0.0829) [-0.0100]
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.1002 (0.0750)	0.2414** (0.1053)	0.0538 (0.0680)	0.1013 (0.0815)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.3153*** (0.0771) [0.0787]	0.4527*** (0.1136) [0.1126]	0.3810*** (0.0830) [0.0948]	0.2125** (0.0873) [0.0528]
state-level supply of children		X		
control group	AS	AS	AS	MW
years	2012-2018	2012-2018	2011-2018	2012-2018
observations	34,415	34,415	38,485	143,111
Log likelihood	-23,065	-23,062	-25,785	-95,462

Notes: All specifications control for demographic characteristics, and state and year fixed effects. The first column, which uses the Adjacent States as the control group, is our preferred specification. The second column additionally controls for the number of children in the system. The third column includes the same controls as the first column incorporating the calendar year 2011. The forth column includes the same controls as the first column but uses the entire Midwest Census Division as the control group. Logit coefficients with average partial effects are in brackets. Standard errors are cluster at the state-year level and shown in parentheses.
$^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Table A7: Impacts on the Annual Probability of Adoption, Placebo Outcome (Female)

	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.0186 (0.0127)
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.0056 (0.0070)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	-0.0140 (0.0090)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0036 (0.0093)
control group	AS
years	2012-2018
observations	34,415

Notes: The specification corresponds to Equation 1 replacing the depend variable $adopted_{i,j,t}$ for $female_{i,j,t}$ that takes the value of 1 if child i, living in state j, is a female during year t. The specification controls for child's demographics, states indicators, and year fixed effects for each age-bin. The control group is the set of children in the adjacent states of Minnesota. Standard errors are cluster at the state-year level and shown in parentheses. $^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.

Table A8: Impacts on the Annual Probability of Adoption, Cluster Bootstrap

	I	II	III	IV
	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)
$announce_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.1064***	0.1103***	0.0961***	0.1222***
	(0.0237)	(0.0280)	(0.0253)	(0.0206)
$announce_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	-0.0257	-0.0216	-0.0105	-0.0074
	(0.0281)	(0.0307)	(0.0249)	(0.0257)
$post_t \cdot Minn_{i,t} \cdot agebin^1_{i,t}$	0.0239	0.0368	0.0127	0.0244
	(0.0162)	(0.0232)	(0.0178)	(0.0147)
$post_t \cdot Minn_{i,t} \cdot agebin^2_{i,t}$	0.0738***	0.0864***	0.0894***	0.0482***
	(0.0228)	(0.0240)	(0.0174)	(0.0184)
state-level supply of children		X		
control group	AS	AS	AS	MW
years	2012-2018	2012-2018	2011-2018	2012-2018
observations	34,415	34,415	38,485	143,111

Notes: All specifications control for demographic characteristics, and state and year fixed effects. The first column, which uses the Adjacent States as the control group, is our preferred specification. The second column additionally controls for the number of children in the system. The third column includes the same controls as the first column incorporating the calendar year 2011. The forth column includes the same controls as the first column but uses the entire Midwest Census Division as the control group. Standard errors are clustered at the state-year level and shown in parentheses.
$^{***}P < 0.01$; $^{**}P < 0.05$; $^{*}P < 0.10$.