

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 out of foster care, Minnesota’s 2015 Northstar-Care Program effectively eliminated the “adoption penalty” (i.e., the post-adoption decrease in financial transfers associated with fostering) for children aged six and older. Using a difference-in-differences estimation strategy and controlling for a rich set of covariates, we find that prospective parents were responsive to this policy; the annual adoption rate of foster children age six to eleven increased by approximately 7 percentage points (22% at the mean). These findings suggest that financial incentives are successful and imply a cost-per-induced-adoption of approximately \$150,000.

JEL Classification Numbers: H2, H3, J1

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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 birth-parental home. In 2018, there were almost half-a-million children in foster care, and this number increased in each year 2012 to 2016 ([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, as adoption has been found to significantly improve the outcomes of foster children ([Triseliotis, 2002](#)).²

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 caregivers post-adoption. Prior to the implementation of the Northstar Care Program, monthly payments from the state to parents fell by at least fifty percent upon adoption from the foster-care system. This reduction in payments is typically referred to as the “adoption penalty.” After the implementation of the Northstar Care program, a fifty-percent adoption penalty was continued for children under the age of six but was completely eliminated for children aged six and over (adoptive parents received the same financial transfer as did foster parents).

¹This 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](#)).

²The Family First Prevention Services Act of 2018 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.

At the same time, Minnesota sought to increase the number of children placed with relatives through the Kinship Assistance arm of the Northstar Care Program by increasing the monthly payments to kin who serve in the foster-care system. Thus, the program would incentivize kin to provide care at higher rates and could also impact the decisions of non-kin caregivers by introducing a competitive channel; kin are given preference in placement decisions in both the pre-Northstar and post-Northstar periods and, therefore, the risk of “losing” a foster child to their kin was dramatically increased as a result of the program.³

We implement a difference-in-differences estimation strategy that takes advantage of this large policy change in which direct financial transfers to caregivers 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 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 the foster-care system, along with location and time-period fixed effects.

Among the targeted older children, for whom monthly transfers more than doubled post-adoption, we find 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 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 change in the financial incentive 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; caregivers 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 find significant but temporary effects of the announcement. Specifically, we find that children under the age

³In addition to this risk, non-kin parents who seek to provide permanency through adoption could be given preference over non-kin parents who do not seek permanency through adoption. This channel provides a similar competitive threat.

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 well-being 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 more recent literature has sought to describe the impacts of subsidies on adoption out of foster care. This, too, has found inconclusive results. In cross-state analyses that exploit differences in the age of eligibility for federally-funded adoption subsidies, Argys and Duncan (2013) and Buckles (2013) find that subsidy-eligibility increases a child’s probability of adoption out of foster care. Likewise, exploiting both cross-sectional and time variation in a model of aggregate adoption rates at the state-year level, Hansen (2007) finds that an aggregate measure of subsidies increase adoption from foster care. Conversely, in a difference-in-differences analysis of a major, age-based national policy reform, Brehm (2018) finds that the transfer of federal funds to individual states had effectively no impact on the adoption rates of the targeted, older children (aged nine and above).⁴ Finally, both Brehm (2021) and Rodgers and Wallace (2020) study the 2010-2011 refundability

⁴In 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.

of the federal tax credits. [Brehm \(2021\)](#) finds that at the national level, the expiration of these tax credits increased adoptions by almost 1,800 adoptions. [Rodgers and Wallace \(2020\)](#) finds an increase of 265 adoptions within the state of Florida alone.⁵ This analysis complements the positive effects found in this literature.

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 substitutions in the data or to control for the income of adoptive families.

Finally, our paper is related to the large and growing policy-evaluation literature used to inform policy-makers about the effectiveness of costly government programs. Using our estimates, we calculate the number of policy-induced adoptions in each year and the financial costs associated with increased transfers to all adoptive parents. These figures imply an average cost per policy-induced adoption of \$154,841.

This paper proceeds as follows: Section 2 describes the Northstar Care Program, Section 3 describes our data, Section 4 presents our estimation approach and results, and Section 5 provides a discussion and concludes.

⁵In both analyses, the gains are close to offset under the assumption that parents could inter-temporally substitute the timing of adoptions over a six month window.

2 Minnesota’s Northstar Care Program

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, 2012-2016. 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](#)). At the end of September in 2014, there were approximately 415,000 children in the system nationwide and over 6,300 in Minnesota (Casey Foundation, 2023).

The goal for foster children in the United States is typically described as permanency. Foster children who attain permanency 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 route of permanency 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 whose parental rights have been terminated, adoption is the preferred path to permanency.⁶ To directly target the goal of permanency through adoption, the State of Minnesota eliminated the adoption penalty for eligible children as part of the Adoption Assistance arm of the Northstar Care Program. This new program was communicated to foster families in late 2013 and took effect on January 1, 2015.

First, the Northstar Care Program updated the payments associated with the previous Adoption Assistance program by eliminating the financial penalty associated with the adoption of eligible children aged six and older. The program did not change the eligibility requirements for post-adoption financial assistance. To be eligible for post-adoption payments, a child must satisfy the following: (i) be in the foster-care system, (ii) have had parental rights terminated, either voluntarily or involuntarily, and (iii) have a special-needs determination.⁷ In addition to Minnesota’s Adoption Assistance program, adoptive families could be eligible for additional reimbursements from the state or federal government, based on the specific needs of the child.

The pre-Northstar financial penalty was large; in 2014, adoptive caregivers would be foregoing \$373 per month for a child aged six to eleven, \$443 per month for a child aged

⁶The alternative, less common, permanent outcome is transferal of legal custody to an agency ([Gueinzus and Hillel, 2014](#)).

⁷Special needs include being part of a sibling group, having a diagnosed physical, mental, emotional, or behavioral disability, and being at risk for developing such a disability in the future, and is determined on a case-by-case basis.

twelve to fourteen, and \$398 per month for a child aged fifteen or older. Thus, adopting a six-year-old foster child in 2014 would be associated with a \$43,448 adoption penalty (NPV, assuming a 5% annual discount rate until the child's eighteenth birthday). In percentage terms, this penalty was over 50%. In 2015, after the implementation of Northstar, this adoption penalty was \$0. The monthly payments for the 2014 and 2015 calendar years are shown for each age group in Table A1. For younger children under the age of six, a large adoption penalty remained in place after the implementation of Northstar. For example, by adopting a newborn in 2015, a foster family would face a 50% adoption penalty, foregoing approximately \$45,840 (NPV) in transfers from the state until the child turned eighteen.⁸

In addition to changes to the Adoption Assistance arm of the program, Northstar changed payments to kin foster parents through the Kinship Assistance arm of the program. Pre-Northstar, kin caregivers received at most the post-adoption monthly payments given to non-kin, but the payments were means tested. Post-Northstar, payments to kin caregivers more than doubled for all age groups and these payments were not means tested. In all periods, there was no adoption penalty. Thus, Northstar would not have affected kin's incentives to adopt but increased the financial incentive to foster. This would could additionally impact non-kin foster parents through a competitive channel, as kin were given preference in placement decisions throughout the time period.

Finally, the program slightly changed the Foster Care arm of the program by modifying the overall level of monthly payments for new, non-kin foster placements. Specifically, payments were increased for children older than six years old (with the exception of children aged twelve, for whom monthly payments decreased by approximately 11%) and decreased for children under the age of six by 13.1%.⁹ This would likely not affect the decision to adopt; the effects would likely be seen in the decision to foster, and would make older children financially more attractive to foster relative to younger ones. As we do not have a unique identifier for caregivers, our data do not allow us to study the decision to foster.

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.¹⁰

⁸In 2014, the adoption of a newborn would have been associated with a 58% adoption penalty.

⁹Monthly payments were 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.

¹⁰These are 2010 statistics taken from the U.S. Census Bureau.

3 Data

The federal government requires all states and territories to collect and submit data describing the children and families in their foster-care system each year, including the reason for a child’s exit from the system.¹¹ We access these administrative records containing unique identifiers for all children in the foster-care system for the years 2011 through 2018 from the Adoption and Foster Care Analysis Reporting System (AFCARS). These data were accessed through the National Data Archive on Child Abuse and Neglect at Cornell University. In our main analyses, we drop the data for 2011, given the refundability of Adoption Tax Credits at the federal level that existed in 2010 and 2011 and may have had differential effects by state (see [Brehm \(2021\)](#) for a discussion of the effects of this policy on adoptions from foster care). The 2012-2018 time period corresponds to three years prior to and four years after the implementation of the Northstar Care Program. We use these data to construct an unbalanced panel of children in the foster-care system in the United States, from their entry into the system until their exit.¹²

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, which is a binary variable denoting a previous diagnosis of a disability. We additionally observe whether the child is eligible for additional federal funds through Title IV-E of the Social Security Act, but not whether the child is eligible for additional state funds. While we do not observe monthly payments, any received Title IV-E funds could potentially close the adoption penalty post-adoption. Thus, we present a robustness check excluding IV-E-eligible children in [Table A5](#) in the Appendix. We also do not observe the presence of siblings, which is an important factor in adoption decisions.

We limit our sample to those children whose parental rights have been terminated, as they are the children who are eligible for adoption.¹³ We provide evidence that the probability of parental rights being terminated was not affected by the policy in [Section 4.2](#). In addition, we limit our sample to children who are under the age of sixteen, as older children are eligible for legal emancipation, and often exit the system through this route. Summary statistics for eligible children in Minnesota are in [Column I](#) of [Table 1](#).

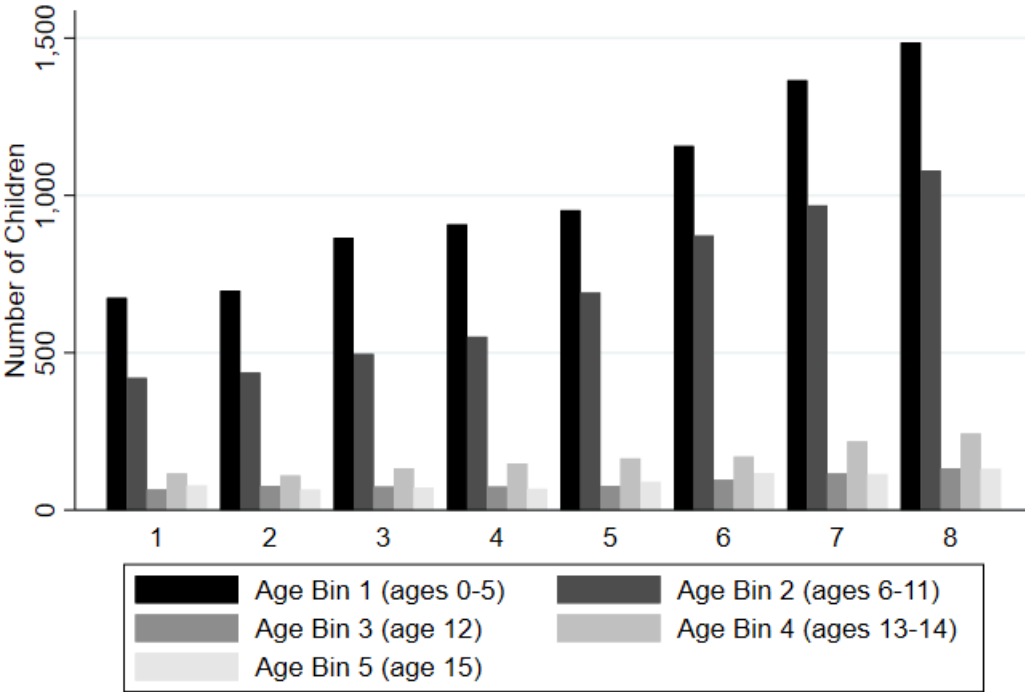
¹¹Children can exit the foster-care system through re-unification with their parents, adoption, or emancipation. We observe children enter in each period so the nature of the data does not mechanically generate compositional changes.

¹²Unfortunately, the same cannot be done for foster parents in our data due to lack of identifiable covariates. For the currently-matched foster parents, we see only race and ethnicity, marital status, and age. We do not control for these in our analysis, as children may transition to adoption via alternate routes than from current foster placements.

¹³[Table A2](#) in the Appendix shows how the summary statistics for this sample change separately for Minnesota, its adjacent states, and the entire Midwest Census Division.

The number of foster children eligible for adoption under the age of sixteen in Minnesota is large and increasing over our sample period. Figure 1 shows the number of children falling into each age bin in each year. The age bins correspond to the age groups defined by 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). In all years, the number of eligible children in the youngest two age bins is relatively large when compared with the number of eligible children in the oldest three age bins, even after adjusting for the number of ages in each bin. In addition, over time, the growth rate of eligible children in the youngest two age bins is relatively large when compared with the growth rate of the oldest three age bins. Our preferred specifications will focus on the children in the youngest two age bins, i.e., children under the age of twelve.

Figure 1: Number of Minnesota Children by Age Bin, 2011 to 2018



Notes: Data are from the Adoption and Foster Care Analysis and Reporting System (AFCARS). This figure shows, by age bin, the annual number of observations of children in Minnesota whose parental rights had been terminated. The age bins are defined by the age of the child at the end of the calendar year. The x-axis is measured in years, 2011 to 2018.

In our difference-in-differences estimation approach, we compare the probability of adoption for children in the state of Minnesota to the probability of adoption for children living in the states directly adjacent to Minnesota (i.e., Iowa, North Dakota, South Dakota, and Wisconsin). In a robustness check, we compare the probability of adoption for children

Table 1: Summary Statistics of Observations of Adoption-Eligible Foster Children

	I		II		III	
	Minnesota <i>obs</i> = 16,362		Adjacent States <i>obs</i> = 28,913		Midwest <i>obs</i> = 179,284	
	mean	s.d.	mean	s.d.	mean	s.d.
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
Non-Hispanic White	0.44	0.50	0.52	0.50	0.55	0.50
Non-Hispanic Black	0.17	0.38	0.18	0.39	0.26	0.44
Non-Hispanic Native American	0.11	0.32	0.10	0.30	0.02	0.04
Non-Hispanic Asian	0.02	0.13	0.01	0.08	0.00	0.05
Non-Hispanic Pacific Islander	0.00	0.01	0.00	0.00	0.00	0.02
Non-Hispanic Mult. Race	0.15	0.35	0.09	0.28	0.09	0.28
Hispanic (All Races)	0.11	0.31	0.11	0.31	0.08	0.27
Age Bin 1 (ages 0-5)	0.50	0.50	0.52	0.50	0.47	0.50
Age Bin 2 (ages 6-11)	0.34	0.47	0.34	0.48	0.35	0.48
Age Bin 3 (age 12)	0.04	0.20	0.04	0.20	0.05	0.21
Age Bin 4 (ages 13-14)	0.08	0.27	0.07	0.25	0.09	0.28
Age Bin 5 (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 in foster care	2.19	1.46	2.74	1.77	3.08	1.93
# years since parental rights term.	1.20	1.41	1.05	1.42	1.30	1.57

Notes: Annual data describing 2011-2018 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 whose parental rights have been previously terminated. The Minnesota sample includes children in the state of Minnesota. The Adjacent States sample includes children in Iowa, North Dakota, South Dakota, and Wisconsin. The Midwest sample includes children in the Midwest Census Division not including Minnesota, i.e., Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

in Minnesota to that of children living in the remaining Midwest Census Division of the United States (i.e., Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin). We refer to these control groups as “Adjacent States” and “Midwest,” respectively. Summary statistics for these control groups are

shown in Columns II and III of Table 1.¹⁴

As may be seen in Table 1, foster children living in the state of Minnesota were less likely to be adopted than foster children living in both control areas during our sample period, but had spent slightly less time in the foster-care system, on average. In addition, foster children living in Minnesota were more likely to be disabled relative to foster children living in both control groups. These underlying differences in disability status are likely also reflected in the differences observed in Title IV-E eligibility. Finally, it may be seen that the racial distribution in Minnesota follows that observed in the Adjacent States, including the share of children who are Non-Hispanic Native American.

4 Empirical Strategy and Results

4.1 Empirical Specification

To recover the effects of the Northstar Care Program, we employ a difference-in-differences framework where we take advantage of the fact that the financial incentive associated with adoption changed on January 1, 2015. As this policy change was formally announced to parents at the end of 2013, we allow for two separate treatment effects: one for the announcement, which we define as occurring on January 1, 2014, and one for the implementation that occurred on January 1, 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 the treatments to differ over the youngest two age bins 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 age zero to five in year t and $agebin^2_{i,t}$ is an indicator that takes the value of 1 if child i is age six to eleven in year t .

¹⁴In an alternative specification, we define a control group, ‘‘Contiguous,’’ comprised of eligible foster children in the Contiguous United States. Summary statistics for this group are shown in Table A2 in the Appendix. Given that 2011 is the first year in which data for all states is available through AFCARS, our ability to use synthetic-control methods is limited.

X_i is a vector of time-invariant characteristics of the child comprised of gender, race and ethnicity, a dummy for whether the child has ever been diagnosed with a disability, and a dummy for whether the child is eligible for Title IV-E funds.¹⁵ $Z_{i,t}$ is a vector of time-varying characteristics of the child comprised of the years since they entered foster care and the years since parental rights were terminated (measured at the end of year t). 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, that 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.

4.2 Results

We estimate Equation (1) using data describing eligible foster children in Minnesota and in the Adjacent State sample.¹⁶ The main results of this estimation are shown in Table 2, Column I. The coefficients on the remaining controls are shown in Appendix Table A3.¹⁷ We find a relatively large and statistically-significant effect for the children in the second age bin (age six to eleven) whose probability of adoption increased by 7.38 percentage points, or 22% of the mean adoption rate, in the four years 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. We also find a small negative effect of the announcement, suggesting that parents delayed the adoption of children in the second age bin until the Northstar Program took effect. This effect is, however, not statistically different from zero.

For the children in the first age bin (under the age of six), for whom the policy did not meaningfully change the adoption penalty, the impact of the program’s implementation is much smaller and not statistically different from zero. In a static sense, this result is intuitive; there was no meaningful change in the financial incentive to adopt. In a dynamic sense, however, these parents faced strong financial incentives to delay the adoption of a child in this age bin until the child’s sixth birthday, ensuring the full stream of payments

¹⁵All time-invariant covariates are observed in the child’s final period in the unbalanced panel.

¹⁶One potential concern might be the possibility of interstate adoptions out of Minnesota. However, Northstar benefits would not continue post-adoption per the Interstate Compact on the Placement of Children.

¹⁷The coefficient on the indicator for Title IV-E eligibility indicates that eligible children are more likely to be adopted. To see if eligibility affects the treatment effect of the Northstar policy, we add Table A5 in the Appendix.

Table 2: Impacts on the Annual Probability of Adoption

	I	II	III	IV	V
	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)
$announce \cdot Minn \cdot agebin^1$	0.1064 (0.0215)	0.1103 (0.0219)	0.0961 (0.0201)	0.1062 (0.0215)	0.1222 (0.0172)
$announce \cdot Minn \cdot agebin^2$	-0.0257 (0.0181)	-0.0216 (0.0196)	-0.0105 (0.0200)	-0.0260 (0.0174)	-0.0074 (0.0192)
$post \cdot Minn \cdot agebin^1$	0.0239 (0.0181)	0.0368 (0.0262)	0.0127 (0.0165)	0.0230 (0.0184)	0.0244 (0.0199)
$post \cdot Minn \cdot agebin^2$	0.0738 (0.0178)	0.0864 (0.0266)	0.0894 (0.0193)	0.0693 (0.0172)	0.0482 (0.0203)
state fixed effects	X	X	X	X	X
year-by-agebin fixed effects	X	X	X	X	X
# eligible children as control		X			
2011 in sample			X		
all age groups in sample				X	
control group	Adj. States	Adj. States	Adj. States	Adj. States	Midwest
observations	34,415	34,415	38,485	40,461	143,111

Notes: Coefficients on the control variables are shown in Appendix Table A3. Column I is our preferred specification. Column II includes as an additional control the state-level number of children who are eligible for adoption (i.e. parental rights have been terminated). Column III includes an additional year of data (2011) in the estimation sample. Column IV includes additional, older children (ages 12 to 15) in the estimation sample. Column V uses an alternative group of states (the Midwest Census Division versus the set of Adjacent States to Minnesota) to define the control group. Analytical standard errors are clustered at the state-year level and are shown in parentheses. We show robustness to the choice of cluster in Appendix Table A10, where we alternatively cluster at the level of state, which produces smaller standard errors. We show robustness to bootstrapping standard errors in Appendix Table A11.

until the child’s eighteenth birthday. However, we find that for these youngest children, the probability of adoption *increased* by 10.64 percentage points or 26% of the mean adoption rate in the year prior to the program’s implementation. This is counter-intuitive when only considering caregivers’ financial incentives. It is, however, consistent with foster parents of young children reacting to the potential increased presence of kin, who would face increased financial incentives to fostering (and would be given priority in foster-placement decisions) in the Post-Northstar environment. Reliable data describing kin foster placements is not available so we cannot test this directly. However, within Minnesota, there is a striking

change in adoptions by kin beginning in 2015.¹⁸ This supportive evidence is shown in Appendix Figure A1.

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 before the implementation of the policy. 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:

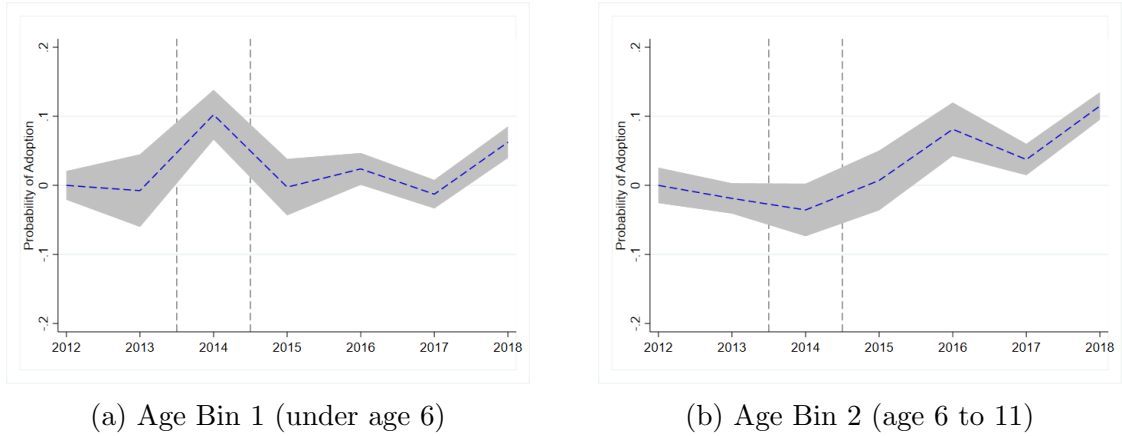
$$\begin{aligned}
adopted_{i,j,t} = & \beta X_i + \gamma Z_{i,t} + \delta_j + \psi^1(Minn_{i,t} \cdot agebin^1_{i,t}) + \psi^2(Minn_{i,t} \cdot agebin^2_{i,t}) \\
& + \sum_{t=2012}^{2018} \zeta_t^1 agebin^1_{i,t} + \sum_{t=2012}^{2018} \zeta_t^2 agebin^2_{i,t} \\
+ \sum_{k=2012}^{2018} \gamma_k^1 (1[year = k] \cdot Minn_{i,t} \cdot agebin^1_{i,t}) & + \sum_{k=2012}^{2018} \gamma_k^2 (1[year = k] \cdot Minn_{i,t} \cdot agebin^2_{i,t}) + \epsilon_{i,j,t}
\end{aligned} \tag{2}$$

Figure 2 shows the coefficients from this event study relative to the control group of the Adjacent States for children under the age of six (Figure 2a) and for children age six to age eleven (Figure 2b). Appendix Figure A2 plots coefficients when age-bins are pooled. As may be seen in the two panels of Figure 2, the adoption rate prior to the program’s announcement in 2014 are not significantly different in Minnesota relative to the control group. We note that two years is a short period over which to test pre-trends. In Panel (a) there is the noticeable effect of the policy’s announcement in 2014 described above. In Panel (b), the parallel pre-trends hold over three years until program implementation.

In addition, we perform a set of placebo tests to support our empirical design. First, we treat January 1, 2013 as the “placebo” date of our policy implementation. Specifically, we estimate a version of Equation 1 using only data from the pre-announcement years (2012 and 2013), dropping the $announce_t$ variable, and redefining $post_t$ to be an indicator for the year 2013 only. Results, shown in Appendix Table A6 find no evidence of treatment effects for either age bin. Second, we define the foster children living in the Adjacent States as the “placebo” treated group and the foster children living in the remaining states of the Midwest Census Division as the control group. Results, shown in Appendix Table A7, show no impact of the Northstar Care program on the probability of adoption. Finally, we define a “placebo” outcome of whether parental rights are terminated. This outcome, which would speak to selection concerns in our model, should not be impacted by the

¹⁸Unfortunately, reliable data describing kin adoptions in the control states is also not available.

Figure 2: The Probability of Adoption in Minnesota Relative to in its Adjacent States



Notes: Panels (a) and (b) show the year-specific and Age-Bin-specific probability of adoption for a foster child in Minnesota relative to a foster child in an Adjacent State for each year between 2012 to 2018, according to Equation 2. Each panel displays two dashed vertical lines. One corresponding to January 1, 2014 that we treat as the announcement of the Northstar Care program and one corresponding to January 1, 2015 that is the implementation of the Northstar Care program. Estimates to the left of the earlier date are, therefore, considered to be in the pre-announcement period and estimates to the left of the later date are in the pre-implementation period.

Northstar Care Program. Like our baseline specification, we define the treated group as foster children in Minnesota and the control group as foster children in the Adjacent States. Results, shown in Appendix Table A8 reassuringly show no impact.¹⁹

4.3 Sensitivity Analysis

Table 2 additionally presents four alternative specifications of Equation (1). First, as the number of children with parental rights terminated is increasing in both age groups over the sample period (i.e., the trends seen in Figure 1 for Minnesota) we assess whether the increase in adoptions was driven by a change in the number of eligible foster children by including the total number of foster children eligible for adoption in the state as an additional control. The results of this specification, shown in Column II, indicate that this was not the case. In fact, both the large positive impact of implementation on children in the second age bin and the large positive impact of announcement on children in the first age bin become slightly larger in magnitude.

Second, we assess the impact of including data from the year 2011 in the results shown in Column III of Table 2. As previously described, we exclude year 2011 from our main

¹⁹We likewise find no impact on the “placebo” outcome of whether an observation is female (Appendix Table A9). This speaks to any concerns about compositional changes due to the policy.

specification because of the federal adoption policies that were in place during 2010-2011 that may have had differential impacts across states. We find, however, that the results are robust to this inclusion.

Third, we include all children under the age of sixteen in the estimation of Equation (1), allowing the effect of the announcement and the effect of the implementation of the Northstar Care program to vary with the five age bins defined in Figure 1. Results for the two youngest age bins are shown in Column IV of Table 2 and are similar to the results shown in Column I. Coefficients for the remaining age bins are shown in Table A3. With the exception of a statistically-significant negative impact of the announcement on the probability of adoption for exactly-fifteen-year-old children,²⁰ the coefficients are relatively small and not statistically different from zero. As the numbers of observations in these age bins are small (i.e., these three age bins comprise less than fifteen percent of the total sample), we choose to exclude them from our primary analysis.²¹

Fourth, we assess the impact of using the Adjacent States as our control group. While these states are likely to be the most similar to Minnesota in unobserved ways, our choice of control group could have, nonetheless, impacted our findings. Column V of Table 2 shows the coefficients from the estimation of Equation (1) when we alternatively use the non-Minnesota states of the entire Midwest Census Division to define the control group.²² These results are qualitatively similar to those shown in Column I, although the effect of implementation in the second age bin, while retaining statistical significance, is 35% smaller in magnitude. Table A4 shows the results when alternatively using the entire, non-Minnesota Contiguous United States to define the control group. Results are effectively unchanged from those shown in Column V of Table 2.

Additionally, we find robustness to our preferred calculation of standard errors. Specifically, Table A10 shows robustness for the five specifications in Table 2 to alternatively clustering (analytical) standard errors at the coarser state-level. Table A11 shows robustness for the five specifications shown in Table 2 to alternatively bootstrapping standard errors clustered at the state-year level, alleviating concerns about asymptotic bias (Conley and Taber (2011)).

²⁰For these children, the probability of adoption fell by 3.65 percentage points or 22% of the mean adoption rate. This effect would be consistent with forward-looking parents who chose to postpone adoption until the post-Northstar period. However, the effect of the implementation of Northstar was also negative for these oldest children (although statistically-indistinguishable from zero) and, thus, not supportive of a strategic delay in adoptions.

²¹The coefficients on the interactions with age-bin dummies for these older groups are jointly insignificant at the 95% level, providing support for their exclusion.

²²To the best of our knowledge, there were no major policy changes in these control groups that would influence our results.

Finally, following [Wooldridge \(2022\)](#), we find robustness to the linear functional form assumed in Equation 1. Table A12 presents the average marginal effects from Logit specifications corresponding to the five columns of Table 2.

5 Discussion and Conclusion

By equalizing the monthly payments paid to foster parents and adoptive parents of older children in the State of Minnesota, the Northstar Care Program had large and statistically-significant impacts on the probability of adoption for the targeted older children. We find that the probability of adoption increased by 7.38 percentage points for children age six through eleven in the four years following the implementation of the program.

Using these estimates, along with the age-specific numbers of eligible children in Minnesota in each year 2015 to 2018, we calculate the number of policy-induced adoptions among children aged six to eleven. We find that Northstar’s elimination of the adoption penalty induced 266 additional adoptions in the years 2015 to 2018 among children aged six to eleven. Specifically, we find 53 additional adoptions among six year olds, 48 additional adoptions among seven year olds, 47 additional adoptions among eight year olds, 44 additional adoptions among nine year olds, 39 additional adoptions among ten year olds, and 35 additional adoptions among eleven year olds. We assume that these 266 adoptions would have continued as foster placements in the absence of the program. Aggregating the age-specific monthly payments for these children until their eighteenth birthdays, along with the age-specific monthly payments for the 1,049 children in this age bin who would have been adopted during this time even in the absence of the policy, we estimate the financial cost of the Northstar Care Program to exceed \$40 million in monthly payments to adoptive parents of children in this age bin alone. This implies an average cost per policy-induced adoption of \$154,841. We note that this estimate omits the costs of implementation and other costs associated with the large, Northstar program. Additionally, we leave the important question of how any costs compare to the welfare impacts associated with adoption for children and families to future research.

To conclude, this paper provides an analysis of a major reform to the foster-care system in Minnesota in 2015. This reform, the Northstar Care Program, was targeted at increasing the adoption rate of older foster children. Our results, which are robust to many alternative specifications of our empirical design, show that the policy induced a large increase in adoptions, and directly speak to government’s ability to pay caregivers to adopt.

References

- ALM, J. AND L. A. WHITTINGTON (1997): “Income Taxes and the Timing of Marital Decisions,” *Journal of Public Economics*, 64, 219–240.
- ARGYS, L. AND B. DUNCAN (2013): “Economic Incentives and Foster Child Adoption,” *Demography*, 50, 933–954.
- BARTH, R. P., C. K. LEE, J. WILDFIRE, AND S. GUO (2006): “A Comparison of the Governmental Costs of Long Term Foster Care and Adoption,” *Social Service Review*, 80, 127–158.
- BAUGHMAN, R. AND S. DICKERT-CONLIN (2003): “Did Expanding the EITC Promote Motherhood?” *American Economic Review*, 93, 247–251.
- BERTRAND, M., E. DUFLO, AND S. MULLAINATHAN (2004): “How Much Should We Trust Differences-In-Differences Estimates?,” *The Quarterly Journal of Economics*, 119, 249–275.
- BLAU, D. M. AND P. K. ROBINS (1989): “Fertility, Employment, and Child-Care Costs,” *Demography*, 26, 287–299.
- BREHM, M. E. (2018): “The Effects of Federal Adoption Incentive Awards for Older Children on Adoptions From U.S. Foster Care,” *Journal of Policy Analysis and Management*, 37, 301–330.
- (2021): “The Federal Adoption Tax Credit and Adoptions from Foster Care,” *Journal of Human Resources*, 56, 1031–1072.
- BUCKLES, K. S. (2013): “Adoption Subsidies and Placement Outcomes for Children in Foster Care,” *Journal of Human Resources*, 48, 596–627.
- CAMPBELL, C. AND S. W. DOWNS (1987): “The Impact of Economic Incentives on Foster Parents,” *Journal of Policy Analysis and Management*, 61, 599–609.
- CASEY FAMILY FOUNDATION (2005): “Improving Family Foster Care: Findings from the Northwest Foster Care Alumni Study,” Retrieved from <https://www.casey.org/northwest-alumni-study/>.
- COHEN, A., R. DEHEJIA, AND D. ROMANOV (2013): “Financial Incentives and Fertility,” *Review of Economics and Statistics*, 95, 1–20.
- CONLEY, T. G. AND C. R. TABER (2011): “Inference with Difference in Differences with a Small Number of Policy Changes,” *The Review of Economics and Statistics*, 93, 113–125.
- CRUMP, R., G. S. GODA, AND K. J. MUMFORD (2011): “Fertility and the Personal Exemption: Comment,” *American Economic Review*, 101, 1616–1628.

- DICKERT-CONLIN, S. AND A. CHANDRA (1999): “Taxes and the Timing of Births,” *Journal of Political Economy*, 107, 161–177.
- DOYLE, J. J. (2007a): “Can’t Buy me Love? Subsidizing the Care of Related Children,” *Journal of Public Economics*, 91, 281–304.
- (2007b): “Child Protection and Child Outcomes: Measuring the Effects of Foster Care,” *American Economic Review*, 97, 1583–1610.
- DOYLE, J. J. AND H. E. PETERS (2007): “The Market for Foster Care: An Empirical Study of the Impact of Foster Care Subsidies,” *Review of Economics of the Household*, 5, 329–351.
- DUNCAN, B. AND L. ARGYS (2007): “Economic Incentives and Foster Care Placement,” *Southern Economic Journal*, 74, 114–142.
- GONZÁLEZ, L. (2013): “The Effect of a Universal Child Benefit on Conceptions, Abortions, and Early Maternal Labor Supply,” *American Economic Journal: Economic Policy*, 5, 160–188.
- GUEINZIUS, A. T. AND J. HILLEL (2014): “Permanency Best Practices for Minnesota’s Foster Care Youth,” *American Economic Journal: Economic Policy*, 40, 10.
- HANSEN, M. E. (2007): “Using Subsidies to Promote the Adoption of Children from Foster Care,” *Journal of Family and Economic Issues*, 28, 377–393.
- HOYNES, H. W. (1997): “Work, Welfare, and Family Structure: What Have We Learned?” in *Fiscal Policy: Lessons From Economic Research*, Alan B. Auerbach, ed. (Cambridge, MA: MIT Press).
- LALIVE, R. AND J. ZWEIMÜLLER (2009): “How Does Parental Leave Affect Fertility and Return to Work? Evidence from Two Natural Experiments,” *The Quarterly Journal of Economics*, 124, 1363–1402.
- LINDSEY, D. (1991): “Factors Affecting the Foster Care Placement Decision: An Analysis of National Survey Data,” *American Journal of Orthopsychiatry*, 61, 272–281.
- MILLIGAN, K. (2005): “Subsidizing the Stork: New Evidence on Tax Incentives and Fertility,” *The Review of Economics and Statistics*, 87, 539–555.
- MINNESOTA DEPARTMENT OF HUMAN SERVICES (2014): “Northstar Care for Children: Supporting Safe, Permanent Families for Children,” Retrieved from <https://www.northhomes.org/wp-content/uploads/Northstar-Care-for-Children-guide.pdf>.
- MINNESOTA STATE DEMOGRAPHIC CENTER (2015): “PopFinder For Minnesota, Counties, and Regions,” Retrieved from <https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/pop-finder1.jsp>.

- MOFFITT, R. A. (1998): “The Effect of Welfare on Marriage and Fertility,” *Welfare, the Family, and Reproductive Behavior: Research Perspectives*. Washington, DC: National Academy Press, 59–97.
- NATIONAL CONFERENCE OF STATE LEGISLATURE (2019): “Substance Abuse and Child Welfare Resources,” Retrieved from <https://www.ncsl.org/research/human-services/substance-abuse-and-child-welfare-resources.aspx>.
- NATIONAL COUNCIL FOR ADOPTION (2019): “Your Guide to 2018’s Foster Care Statistics,” Retrieved from <https://adoptioncouncil.org/article/your-guide-to-2018s-foster-care-statistics/>.
- PARENT, D. AND L. WANG (2007): “Tax Incentives and Fertility in Canada: Quantum vs Tempo Effects,” *The Canadian Journal of Economics*, 40, 371–400.
- PAXSON, C. AND J. WALDFOGEL (1999): “Parental Resources and Child Abuse and Neglect,” *American Economic Review*, 89, 239–244.
- RODGERS, L. P. AND C. T. WALLACE (2020): “Who responds to changes to the federal adoption tax credit? Evidence from Florida,” *Southern Economic Journal*, 87, 483–516.
- SIMON, J. L. (1975): “The Effect of Foster-Care Payment Levels on the Number of Foster Children Given Homes,” *Social Service Review*, 49, 405–411.
- TRISELIOTIS, J. (2002): “Long-term Foster Care or Adoption? The Evidence Examined,” *Child and Family Social Work*, 7, 23–33.
- U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (2004): “Children in Temporary Assistance for Needy Families Child-Only Cases with Relative Caregivers,” Retrieved from <https://aspe.hhs.gov/reports/children-temporary-assistance-needy-families-tanf-child-only-cases-relative-caregivers-1>.
- (2021): “The AFCARS Reports,” Retrieved from <https://www.acf.hhs.gov/cb/research-data-technology/statistics-research/afcars>.
- WOOLDRIDGE, J. M. (2022): “Simple Approaches to Nonlinear Difference-in-Differences with Panel Data,” *Working Paper*.

A Supplemental Appendix for Online Publication

A.1 Monthly Payments in the State of Minnesota

Table A1: Monthly Payments to New 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+	\$775	\$377	\$377	\$377	\$790	\$790	\$395	\$790

Notes: This table 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, according to five age bins (age 0-5, age 6-11, age 12, age 13-14, and age 15+). Columns I to IV exhibit the pre-policy payments and Columns V to VIII exhibit the post-policy payments. *Source:* [Minnesota Department of Human Services \(2014\)](#). According to the policy, payments in subsequent years are adjusted annually based on changes to the USDA’s Estimates of the Cost of Raising a Child index. We note that the Northstar Care Program equated post-implementation foster payments and adoption payments. Existing caregivers in 2014 became eligible for Northstar Care payments upon a change in status (like adoption or a new foster match). Thus, existing foster caregivers would receive the payments shown in Column I in 2015 and move to the payments in Column VIII post-adoption. This implies a negative adoption “penalty” for some age groups.

A.2 Additional Summary Statistics

Table A2: Summary Statistics by Whether Parental Rights (PR) Terminated

	Minnesota				Adjacent States				Midwest			
	PR intact <i>n</i> = 42, 714		PR term. <i>obs</i> = 16, 362		PR intact <i>n</i> = 91, 849		PR term. <i>obs</i> = 28, 913		PR intact <i>n</i> = 542, 991		PR term. <i>obs</i> = 179, 284	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Adopted	–	–	0.37	0.48	–	–	0.50	0.50	–	–	0.42	0.49
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
Non-Hisp. 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
Non-Hisp. 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
Non-Hisp. Native Am.	0.11	0.32	0.24	0.43	0.10	0.30	0.11	0.31	0.02	0.04	0.02	0.15
Non-Hisp. Asian	0.02	0.13	0.02	0.15	0.01	0.08	0.01	0.09	0.00	0.05	0.00	0.06
Non-Hisp. Pacific Isl.	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.04	0.00	0.02	0.00	0.03
Non-Hisp. Mult. Race	0.15	0.35	0.12	0.33	0.09	0.28	0.06	0.24	0.09	0.28	0.07	0.25
Hispanic (All Races)	0.09	0.29	0.11	0.31	0.10	0.30	0.11	0.31	0.09	0.28	0.08	0.27
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
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
# yrs in system	0.95	1.22	2.19	1.46	1.18	1.44	2.74	1.77	1.32	1.50	3.08	1.93
# yrs since PR term.	–	–	1.20	1.41	–	–	1.05	1.43	–	–	1.30	1.57

Note: Annual data describing 2012-2018 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 under the age of sixteen.

A.3 Additional Results

Table A3: All Coefficients from the Main Results Table

	I	II	III	IV	V
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ¹	0.1064 (0.0215)	0.1103 (0.0219)	0.0961 (0.0201)	0.1062 (0.0215)	0.1222 (0.0172)
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ²	-0.0257 (0.0181)	-0.0216 (0.0196)	-0.0105 (0.0200)	-0.0260 (0.0174)	-0.0074 (0.0192)
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ³				-0.0716 (0.0607)	
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ⁴				-0.0396 (0.0361)	
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ⁵				-0.1078 (0.0419)	
<i>post</i> · <i>Minn</i> · <i>agebin</i> ¹	0.0239 (0.0181)	0.0368 (0.0262)	0.0127 (0.0165)	0.0230 (0.0184)	0.0244 (0.0199)
<i>post</i> · <i>Minn</i> · <i>agebin</i> ²	0.0738 (0.0178)	0.0864 (0.0266)	0.0894 (0.0193)	0.0693 (0.0172)	0.0482 (0.0203)
<i>post</i> · <i>Minn</i> · <i>agebin</i> ³				0.0321 (0.0597)	
<i>post</i> · <i>Minn</i> · <i>agebin</i> ⁴				0.0159 (0.0287)	
<i>post</i> · <i>Minn</i> · <i>agebin</i> ⁵				-0.0388 (0.0413)	
<i>agebin</i> ²	-0.1360 (0.0186)	-0.0885 (0.0331)	-0.1321 (0.0173)	-0.1241 (0.0170)	-0.1437 (0.0234)
<i>agebin</i> ³				-0.2023 (0.0300)	
<i>agebin</i> ⁴				-0.2111 (0.0220)	
<i>agebin</i> ⁵				-0.2684 (0.0247)	
Female	0.0112 (0.0040)	0.0112 (0.0040)	0.0101 (0.0038)	0.0131 (0.0041)	0.0150 (0.0029)
Non-Hispanic Black	-0.0750 (0.0164)	-0.0750 (0.0164)	-0.0742 (0.0147)	-0.0780 (0.0149)	-0.0771 (0.0058)
Non-Hispanic Native American	-0.0991 (0.0206)	-0.0990 (0.0206)	-0.1033 (0.0190)	-0.0890 (0.0181)	-0.0902 (0.0156)
Non-Hispanic Asian	-0.0322 (0.0426)	-0.0322 (0.0426)	-0.0315 (0.0412)	-0.0180 (0.0412)	-0.0380 (0.0344)
Non-Hispanic Pacific Islander	-0.0050 (0.0875)	-0.0040 (0.0876)	-0.0014 (0.0821)	-0.0320 (0.0843)	-0.0180 (0.0670)
Non-Hispanic Mult. Race	-0.0501 (0.0113)	-0.0501 (0.0113)	-0.0485 (0.0112)	-0.0451 (0.0115)	-0.0338 (0.0068)
Hispanic	-0.0435 (0.0157)	-0.0435 (0.0157)	-0.0462 (0.0143)	-0.0384 (0.0143)	-0.0249 (0.0075)
Disability	-0.1333 (0.0172)	-0.0135 (0.0172)	-0.0166 (0.0156)	-0.0175 (0.0162)	-0.0064 (0.0240)
Title IV-E	0.0246 (0.0095)	0.0247 (0.0096)	0.0303 (0.0096)	0.0251 (0.0085)	0.0019 (0.0132)
# years in system	-0.0043 (0.0054)	-0.0042 (0.0054)	-0.0028 (0.0050)	-0.0002 (0.0035)	0.0095 (0.0026)
# years since PR term.	0.0137 (0.0124)	0.0137 (0.0123)	0.0162 (0.0117)	-0.0117 (0.0064)	0.0049 (0.01046)
state fixed effects	X	X	X	X	X
year-by-agebin fixed effects	X	X	X	X	X
# eligible children as control 2011 in sample		X			
all age groups in sample control group				X	
observations	Adj. States 34,415	Adj. States 34,415	Adj. States 38,485	Adj. States 40,461	Midwest 143,111

Note: Column I is our preferred specification. Column II includes as an additional control the state-level number of children who are eligible for adoption. Column III includes an additional year of data (2011) in the estimation sample. Column IV includes additional, older children (ages 12 to 15) in the estimation sample. While we find a statistically-significant negative effect of the announcement for the oldest children, the nine coefficients that include age bins 3 through 5 are jointly insignificant. Column V uses an alternative group of states (the Midwest Census Division versus the set of Adjacent States to Minnesota) to define the control group. Analytical standard errors are clustered at the state-year level. The excluded race is Non-Hispanic White.

Table A4: Impacts on the Annual Probability of Adoption Relative to the Contiguous US

	Coefficient (s.e.)
$announce \cdot Minn \cdot agebin^1$	0.1179 (0.0135)
$announce \cdot Minn \cdot agebin^2$	-0.0095 (0.0107)
$post \cdot Minn \cdot agebin^1$	0.0124 (0.0185)
$post \cdot Minn \cdot agebin^2$	0.0445 (0.0159)
control group	Contiguous US
observations	646,125

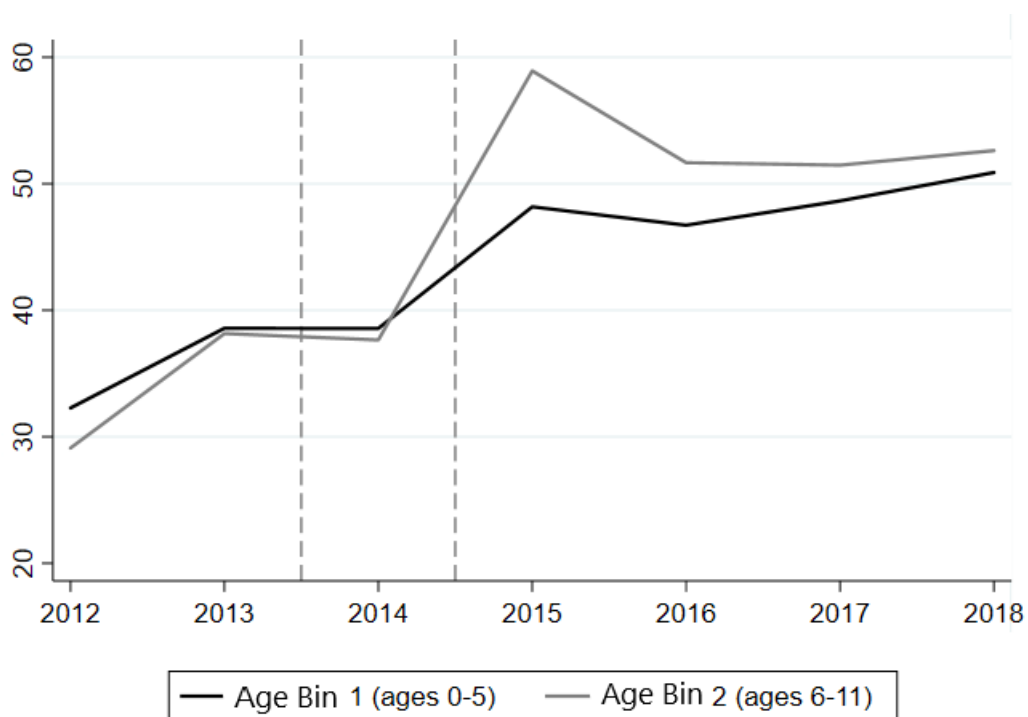
Notes: The specification is analogous to Columns I and V in Table 2 but with the Contiguous US defining the control group. We include state fixed effects and year fixed effects for each age bin, and use data from 2012 to 2018. Standard errors are clustered at the state-year level and are shown in parentheses.

Table A5: Impacts on the Annual Probability of Adoption, Non Title IV-E Eligible Children

	Coefficient (s.e.)
$announce \cdot AS \cdot agebin^1$	0.0680 (0.0250)
$announce \cdot AS \cdot agebin^2$	-0.0162 (0.0121)
$post \cdot AS \cdot agebin^1$	0.0512 (0.0225)
$post \cdot AS \cdot agebin^2$	0.0912 (0.0170)
control group	Adjacent States
observations	18,763

Notes: The specification corresponds to Equation 1 using only children who were ineligible for Title IV-E funds. We include state fixed effects and year fixed effects for each age bin, and define the control group as foster children living in the Adjacent States to Minnesota of Iowa, North Dakota, South Dakota, and Wisconsin. Standard errors are clustered at the state-year level and shown in parentheses. As eligibility of IV-E funds could have provided additional adoption assistance in the pre-period (although not observed in the data), we would expect the treatment effect to be potentially larger for the non- IV-E eligible group. The results here imply a moderately increased treatment effect of 9.1 percentage points (compared with the 7.4 percentage points when all children are included) on the probability of adoption for the older children.

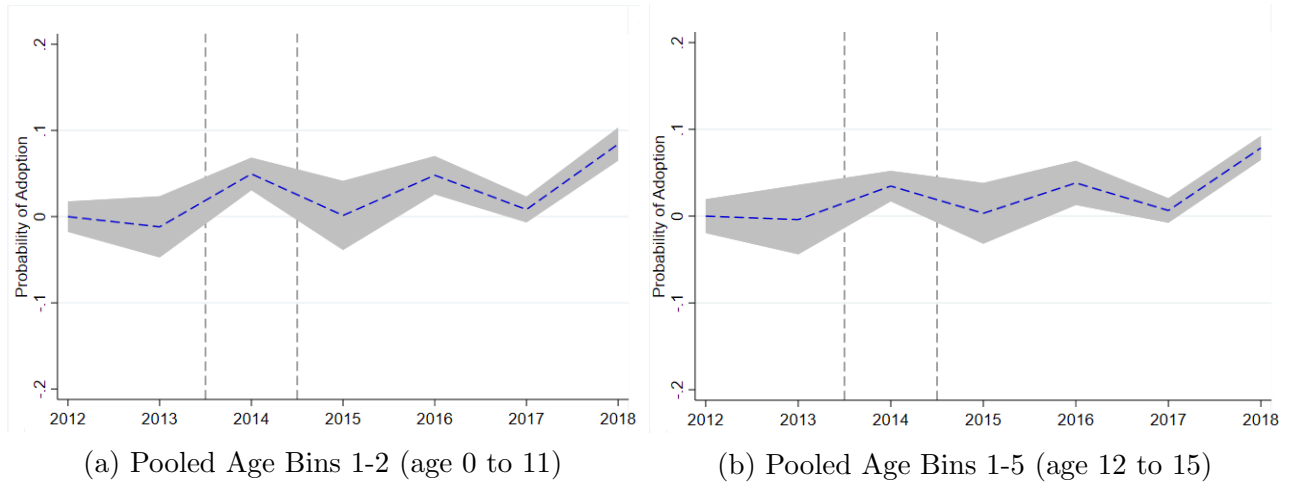
Figure A1: Share of Minnesota Foster-Care Adoptions by Kin, 2012 to 2018



Notes: This figure shows, by age bin, the annual number of observations of adopted children in Minnesota who are adopted by kin in that year. Data are from the adoption files from the Adoption and Foster Care Analysis and Reporting System (AFCARS). These files, which are not those used in our main analysis (foster-care files), do not include a unique identifier to link children across files.

A.4 Pre-Trends for Pooled Age Bins

Figure A2: The Probability of Adoption in Minnesota Relative to in its Adjacent States



Notes: Panels (a) and (b) show the year-specific probability of adoption for a foster child in Minnesota relative to a foster child in an Adjacent State for each year between 2012 to 2018, according to Equation 2. Each panel displays two dashed vertical lines. One corresponding to January 1, 2014 that we treat as the announcement of the Northstar Care program and one corresponding to January 1, 2015 that is the implementation of the Northstar Care program. Estimates to the left of the earlier date are, therefore, considered to be in the pre-announcement period and estimates to the left of the later date are in the pre-implementation period.

A.5 Placebo Tests

Table A6: Impacts on the Annual Probability of Adoption, Placebo Year (2013)

	Coefficient (s.e.)
$post \cdot Minn \cdot agebin^1$	-0.0074 (0.0259)
$post \cdot Minn \cdot agebin^2$	-0.0175 (0.0189)
control group	Adjacent States
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, as we are only using years from the pre-announcement period, and redefines $post_t$ to be an indicator that takes the value of 1 if the year is 2013 and zero otherwise. We include state fixed effects and year fixed effects for each age bin, and define the control group as foster children living in the Adjacent States to Minnesota of Iowa, North Dakota, South Dakota, and Wisconsin. Standard errors are clustered at the state-year level and shown in parentheses.

Table A7: Impacts on the Annual Probability of Adoption, Placebo Group (Adjacent States)

	Coefficient (s.e.)
$announce \cdot AS \cdot agebin^1$	0.0203 (0.0290)
$announce \cdot AS \cdot agebin^2$	0.0231 (0.0289)
$post \cdot AS \cdot agebin^1$	0.0012 (0.0234)
$post \cdot AS \cdot agebin^2$	-0.0290 (0.0255)
control group	Remaining Midwest
years	2012-2018
observations	130,585

Notes: The specification corresponds to Equation 1 where the treated group is comprised of eligible foster children in the Adjacent State (AS) group of Iowa, North Dakota, South Dakota, and Wisconsin. The control group is comprised of eligible foster children in the remaining, non-Minnesota, non-Adjacent State, Midwest Census Division (Illinois, Indiana, Kansas, Michigan, Missouri, Nebraska, and Ohio). The specification controls for child’s demographics, state fixed effects, and year fixed effects for each age-bin. Standard errors are clustered at the state-year level and shown in parentheses.

Table A8: Impacts on the Annual Probability of Adoption, Placebo Outcome (Parental Rights)

	Coefficient (s.e.)
$announce \cdot Minn \cdot agebin^1$	-0.0014 (0.0127)
$announce \cdot Minn \cdot agebin^2$	-0.0170 (0.0154)
$post \cdot Minn \cdot agebin^1$	-0.0188 (0.0104)
$post \cdot Minn \cdot agebin^2$	-0.0148 (0.0105)
control group	Adjacent States
years	2012-2018
observations	123,591

Notes: The specification corresponds to Equation 1 replacing the dependent variable $adopted_{i,j,t}$ for $PRterm_{i,j,t}$ that takes the value of 1 if the parental rights to child i , living in state j , have been terminated during year t . The specification controls for child’s demographics, state fixed effects, and year fixed effects for each age-bin. The estimation sample includes all children with both parental rights intact and parental rights terminated. The control group is the set of children in the set of Adjacent States to Minnesota. Standard errors are clustered at the state-year level and shown in parentheses.

Table A9: Impacts on the Annual Probability of Adoption, Placebo Outcome (Female)

	Coefficient (s.e.)
$announce \cdot Minn \cdot agebin^1$	0.0186 (0.0127)
$announce \cdot Minn \cdot agebin^2$	0.0056 (0.0070)
$post \cdot Minn \cdot agebin^1$	-0.0140 (0.0090)
$post \cdot Minn \cdot agebin^2$	-0.0036 (0.0093)
control group	Adjacent States
years	2012-2018
observations	34,415

Notes: The specification corresponds to Equation 1 replacing the dependent 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, state fixed effects, and year fixed effects for each age-bin. The control group is the set of children in the set of Adjacent States to Minnesota. Standard errors are clustered at the state-year level and shown in parentheses.

A.6 Robustness to Clustering and Bootstrapping Standard Errors

Table A10: Impacts on the Annual Probability of Adoption, Clustering at the State Level

	I	II	III	IV	V
	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)
$announce \cdot Minn \cdot agebin^1$	0.1064 (0.0070)	0.1103 (0.0056)	0.0961 (0.0103)	0.1062 (0.0064)	0.1222 (0.0172)
$announce \cdot Minn \cdot agebin^2$	-0.0257 (0.0150)	-0.0216 (0.0199)	-0.0105 (0.0160)	-0.0260 (0.0164)	-0.0074 (0.0204)
$post \cdot Minn \cdot agebin^1$	0.0239 (0.0145)	0.0368 (0.0319)	0.0127 (0.0119)	0.0230 (0.0146)	0.0244 (0.0279)
$post \cdot Minn_{i,t} \cdot agebin^2$	0.0738 (0.0074)	0.0864 (0.0235)	0.0894 (0.0104)	0.0693 (0.0074)	0.0482 (0.0290)
state fixed effects	X	X	X	X	X
year-by-agebin fixed effects	X	X	X	X	X
# eligible children as control		X			
2011 in sample			X		
all age groups in sample				X	
control group	Adj. States	Adj. States	Adj. States	Adj. States	Midwest
observations	34,415	34,415	38,485	40,461	143,111

Notes: Analytical standard errors are shown in parentheses. These standard errors are clustered at the relatively coarser level of the state. Column I is our preferred specification. Column II includes as an additional control the state-level number of children who are eligible for adoption (i.e. parental rights have been terminated). Column III includes an additional year of data (2011) in the estimation sample. Column IV includes additional, older children (ages 12 to 15) in the estimation sample. Column V uses an alternative group of states (the Midwest Census Division versus the set of Adjacent States to Minnesota) to define the control group.

Table A11: Impacts on the Annual Probability of Adoption, Bootstrapped Standard Errors

	I	II	III	IV	V
	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)	Coeff. (s.e.)
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ¹	0.1064 (0.0303)	0.1103 (0.0328)	0.0961 (0.0282)	0.1062 (0.0292)	0.1222 (0.0221)
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ²	-0.0257 (0.0266)	-0.0216 (0.0309)	-0.0105 (0.0288)	-0.0260 (0.0262)	-0.0074 (0.0258)
<i>post</i> · <i>Minn</i> · <i>agebin</i> ¹	0.0239 (0.0300)	0.0368 (0.0422)	0.0127 (0.0289)	0.0223 (0.0305)	0.0244 (0.0261)
<i>post</i> · <i>Minn</i> · <i>agebin</i> ²	0.0738 (0.0327)	0.0864 (0.0445)	0.0894 (0.0335)	0.0693 (0.0317)	0.0482 (0.0276)
state fixed effects	X	X	X	X	X
year-by-agebin fixed effects	X	X	X	X	X
# eligible children as control		X			
2011 in sample			X		
all age groups in sample				X	
control group	Adj. States	Adj. States	Adj. States	Adj. States	Midwest
observations	34,415	34,415	38,485	40,461	143,111

Notes: Standard errors are bootstrapped using 1,000 repetitions and are clustered at the state-year level. Column I is our preferred specification. Column II includes as an additional control the state-level number of children who are eligible for adoption (i.e. parental rights have been terminated). Column III includes an additional year of data (2011) in the estimation sample. Column IV includes additional, older children (ages 12 to 15) in the estimation sample. Column V uses an alternative group of states (the Midwest Census Division versus the set of Adjacent States to Minnesota) to define the control group.

A.7 Robustness to a Non-Linear Specification

Table A12: Impacts on the Annual Probability of Adoption, Logit Specification

	I	II	III	IV	V
	AME (s.e.)	AME (s.e.)	AME (s.e.)	AME (s.e.)	AME (s.e.)
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ¹	0.1056 (0.0223)	0.1099 (0.0226)	0.0950 (0.0207)	0.1017 (0.0220)	0.1213 (0.0173)
<i>announce</i> · <i>Minn</i> · <i>agebin</i> ²	-0.0282 (0.0175)	-0.0238 (0.0189)	-0.0135 (0.0196)	-0.0273 (0.0157)	-0.0096 (0.0194)
<i>post</i> · <i>Minn</i> · <i>agebin</i> ¹	0.0237 (0.0179)	0.0378 (0.0262)	0.0127 (0.0161)	0.0214 (0.0176)	0.0240 (0.0194)
<i>post</i> · <i>Minn</i> · <i>agebin</i> ²	0.0744 (0.0183)	0.0882 (0.0268)	0.0898 (0.0196)	0.0667 (0.0172)	0.0502 (0.0208)
state fixed effects	X	X	X	X	X
year-by-agebin fixed effects	X	X	X	X	X
# eligible children as control		X			
2011 in sample			X		
all age groups in sample				X	
control group	Adj. States	Adj. States	Adj. States	Adj. States	Midwest
observations	34,415	34,415	38,485	40,461	143,111

Notes: Average Marginal Effects (AMEs) are shown. All specifications control for demographic characteristics, state fixed effects, and year fixed effects for each age bin. Column I is a non-linear version of our preferred specification. Column II includes as an additional control the state-level number of children who are eligible for adoption (i.e. parental rights have been terminated). Column III includes an additional year of data (2011) in the estimation sample. Column IV includes additional, older children (ages 12 to 15) in the estimation sample. Column V uses an alternative group of states (the Midwest Census Division versus the set of Adjacent States to Minnesota) to define the control group. Analytical standard errors are clustered at the state-year level and are shown in parentheses.