THE EFFECTS OF MEDICAID EXPANSION ON SPECIAL EDUCATION ENROLLMENT

by

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TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

LIST OF TABLES

LIST OF TABLES CONTINUED

Table Page

LIST OF FIGURES

Figure Page

ABSTRACT

This paper examines the effects of Medicaid eligibility on special education enrollment, exploiting variation in childhood Medicaid eligibility arising from the Medicaid expansions of the 1980s and 1990s. I find that these expansions led to increased special education enrollment rates, particularly among children with “non-severe” disabilities. Further, I find evidence that the effects are largely concentrated in late elementary school. The results suggest that broadened public healthcare access promotes student welfare through improved evaluation and identification of children with disabilities, primarily among low-income children.

INTRODUCTION

Special education enrollment grew strongly in the decades following the passage of the Individuals with Disabilities Education Act (IDEA) in 1975. The first school year after the IDEA was passed, 8 percent of all K-12 students enrolled in U.S. public schools received special education services.[1] This number increased to 13 percent by 2000 and 14 percent by 2019.

The growth in special education enrollment during the 1980s and 1990s was largely driven by increases in special education enrollment among students diagnosed with "non-severe" disabilities, including emotional disturbances, other health impairments, and specific learning disabilities.[2, 3] The *non-severe* disability category includes disabilities like anxiety, attention-deficit/hyperactivity disorder (ADHD), and dyslexia. In contrast, special education enrollment rates among children with *severe* disabilities (e.g., autism, intellectual disabilities, visual impairments, etc.) remained relatively constant.

Despite the large increases in special education enrollment, research on potential impacts of healthcare on special education enrollment is scarce. This is surprising given that special education enrollment lies at the intersection between health and education. Special education

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[1] https://nces.ed.gov/fastfacts/display.asp?id=64
[2] For the purpose of this study, I follow Dhuey & Lipscomb (2011) in adopting a classification of disabilities into two categories: "severe" and "non-severe" (see Section II).
[3] Other health impairments include asthma, attention-deficit/hyperactivity disorder (ADHD), diabetes, epilepsy, heart conditions, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome. (https://sites.ed.gov/idea/regs/b/a/300.8/c/9)

enrollment requirements provide avenues through which Medicaid eligibility could impact special education enrollment. In addition, previous research on effects of Medicaid eligibility and other factors on child disability and special education enrollment suggest pathways by which Medicaid eligibility could impact special education enrollment.

Increased childhood Medicaid eligibility could potentially increase or decrease special education enrollment rates. On the one hand, Medicaid eligibility could increase special education enrollment as more children are diagnosed with disabilities and subsequently enroll in special education. Alternatively, Medicaid eligibility could decrease special education enrollment rates as fewer children need special education accommodations due to healthcare intervention. Further, it is plausible that effects of Medicaid eligibility could differ for students with different types of disabilities.

I find robust evidence that increased Medicaid eligibility during childhood increases special education enrollment. An additional year of Medicaid eligibility during childhood increases overall special education enrollment by approximately 2 percentage points, or 17 percent based on the mean special education enrollment rate of 12 percent for the sample. Further, with the exception of speech or language impairments, special education enrollment is most sensitive for those enrolled with *non-severe* disabilities (i.e. emotional disturbances, specific learning disabilities, and other health impairments). I also find evidence that the positive effects of Medicaid eligibility on special education enrollment are largely concentrated in late elementary school.

I identify the effect of childhood Medicaid eligibility on special education enrollment using variation in Medicaid eligibility arising from a series of federal and state Medicaid expansions in the 1980s and 1990s. These expansions generated substantial variation in Medicaid eligibility across states and time as Medicaid eligibility requirements were relaxed differentially by child age, family income, and family structure. As a result, children born in the same year in different states, and children born in the same state at different times, could experience very different eligibility rates as they aged. To account for endogenous variation in Medicaid eligibility arising from changes in family structures and incomes, I isolate the variation in Medicaid eligibility resulting from changes in Medicaid policy by using the simulated Medicaid eligibility instrument approach developed by Currie & Gruber (1996b) and Cutler & Gruber (1996a). I use this exogenous measure of eligibility to instrument for the fraction of children eligible for Medicaid by birth cohort, state, and year. I combine this measure with special education enrollment rates. To my knowledge, this is the first paper to study the effects Medicaid eligibility on special education enrollment.

BACKGROUND

A. The Individuals with Disabilities Education Act

Since 1975, the IDEA has provided the legislative framework to ensure that all eligible children with disabilities in the U.S. have access to a free appropriate public education, including special education and related services, in the least restrictive environment possible.[4, 5] Prior to the IDEA, many children with disabilities could not access public education, and some states had laws explicitly excluding blind and deaf children and those with emotional disturbances and intellectual disabilities from public schools.[6] Indeed, more than half of children with disabilities in the U.S. had only limited access to the public education system prior to 1975.[7]

There is no definitive rule for determining special education eligibility, and referrals for evaluation of eligibility can come from parents, teachers, or other school personnel.[8] To be eligible, a student must be evaluated as having at least one of the disabilities specified in the IDEA, and the disability must create a need for special education and related services.[9] Child

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[4] The legislation was initially titled the Education of All Handicapped Children Act but was renamed in 1990.
[5] The IDEA requires that eligible students be provided with a public education without expense to their families and among their peers to the maximum extent appropriate.
[6] https://sites.ed.gov/idea/IDEA-History#Pre-EHA-IDEA
[7] https://sites.ed.gov/idea/IDEA-History#1975
[8] The "child find" mandate of the IDEA requires school districts to identify, locate, and evaluate all students who are in need of special education and related services, regardless of the severity of their disability. (https://sites.ed.gov/idea/statute-chapter-33/subchapter-ii/1412)
[9] The IDEA specifies 13 disability categories: autism, deaf-blindness, deafness, emotional disturbance, hearing impairments, intellectual disabilities, multiple disabilities, orthopedic impairments, other health impairments,

disabilities may be diagnosed either by schools (for free, by school psychologists or other specialists) or via private evaluation by other healthcare professionals (e.g., child psychologists, pediatricians, etc.).[10] To determine need for special education and related services, an evaluation is conducted by a team of teachers, administrators, school psychologists or other specialists, and parents, and can be based on a variety of information including the student's medical history, educational testing, parent and teacher reports, and classroom observations.[11, 12] If the student is determined to be eligible, this team drafts an Individualized Education Program (IEP) that describes the special education services needed and develops methods to provide these services and assess the student's progress. Given these diagnostic pathways, it is plausible that increased Medicaid eligibility could impact special education enrollment via expanded access to healthcare. Further, the impact of improved healthcare access could either increase special education enrollment due to increased identification of students with disabilities in need of

specific learning disabilities, speech or language impairments, traumatic brain injury, and visual impairments. The IDEA also covers children ages 3-9 experiencing developmental delays.

[10] Private evaluation of a child for a disability can be very expensive for families. Schools may also consider an independent education evaluation (IEE), in which school use an evaluation by a qualified examiner not employed by the school district as part of its evaluation process (https://www.understood.org/en/school-learning/evaluations/evaluation-basics/outside-evaluations-the-difference-between-private-and-independent).

[11] After evaluation is completed, this group determines a child's eligibility for special education and related services at an IEP eligibility meeting.

[12] Children not diagnosed with a disability specified in the IDEA may be eligible for a 504 Plan under Section 504 of the Rehabilitation Act of 1973. 504 plans are not part of special education and are outside of the scope of this paper (https://www.understood.org/en/school-learning/special-services/504-plan/the-difference-between-ieps-and-504-plans).

special education accommodations or decrease special education enrollment via decreased need for special education accommodations.

“Severe and “Non-severe” Disabilities and the Typical Marginal Special Education Enrollee

I follow Dhuey & Lipscomb (2011) in adopting a classification that groups disabilities specified in the IDEA into two categories: “severe” and “non-severe”. They classify emotional disturbances, other health impairments, specific learnings disabilities, and speech or language impairments as “non-severe” disabilities, and all remaining disabilities as “severe” (i.e., autism, deaf-blindness, developmental delays, hearing impairments, intellectual disabilities, multiple disabilities, orthopedic impairments, traumatic brain injuries, and visual impairments).[13, 14] In general terms, the *non-severe* disability category includes many disabilities that may be relatively more difficult to detect either because they are diagnosed using more subjective criteria, or may be less visible or less severe in nature (e.g., ADHD, anxiety, dyslexia), while the *severe* category includes many disabilities that are diagnosed using more objective criteria, and

[13] Dhuey & Lipscomb (2011) justify the severe/non-severe classification because it “closely approximates the difference between lower- and higher-cost disabilities,” and suggest that the non-severe disability category is made up of the four individual disability categories with the lowest average per pupil costs of accommodation. These authors also note that, “assigning severity at the category of disability level is a rough approximation of the severity of individual student needs.”

[14] Similarly, Cullen (2003) splits these disabilities into “non-physical” and “physical” disabilities, such that non-physical disabilities includes the same individual disability categories as the “non-severe” disability category used by Dhuey & Lipscomb (2011). Besides excluding *developmental delays* and *multiple disabilities*, the physical disability category in Cullen (2003) includes the same disability categories as the “severe” disability category used in Dhuey & Lipscomb (2011).

may be more visible (e.g., autism, blindness, cerebral palsy, down syndrome).[15] The growth in special education enrollment over time implies that the typical marginal enrollee is likely either a child with a *non-severe* disability that is relatively inconspicuous, or for which intervention is most effective in reducing need for special education accommodations.[16] Thus, if increased Medicaid eligibility impacts special education enrollment, the impact likely varies for students with different disabilities.

Trends in Special Education Enrollment

More than 7 million students between the ages of 3 and 21 received special education services under the IDEA in 2017.[17] These students accounted for 14 percent of total public-school enrollment, nearly twice the rate observed just after the IDEA was introduced. The growth in special education enrollment is primarily driven by increases in students diagnosed with *non-severe* disabilities, and the proportion of children enrolled for *severe* disabilities has remained relatively constant over time. For example, from 1976 to 2017, special education enrollment rates for those with *non-severe* disabilities increased from 6 to 11 percent of total

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[15] For example, Section 300.8 of the IDEA entitled "Child with a disability," the diagnosis criteria for children with *non-severe* disabilities include terminology like: "imperfect," "inappropriate," "limited," and "satisfactory." (https://sites.ed.gov/idea/regs/b/a/300.8/a).

[16] For example, children that are young relative to their classmates have a higher propensity for being diagnosed with ADHD (Dhuey & Lipscomb, 2010; Elder, 2010; Evans et al., 2010; Krabbe et al., 2014; Layton et al., 2018; Schwandt & Wupperman, 2016). In contrast, children with ADHD may be prescribed medication or receive therapies such that they no longer need special education accommodations.

[17] https://nces.ed.gov/programs/digest/d18/tables/dt18_204.30.asp

student enrollment, while enrollment for those with *severe* disabilities fell slightly (from 2.7 to 2.6 percent).[18]

While there is no prevailing explanation for the rise in special education enrollment, several possibilities have been suggested. There is causal evidence that healthcare decreases long-run adult disability rates and utilization of some special education services (Acton et al., 2019; Goodman-Bacon, 2016). Other research finds that many factors not directly related to health impact special education enrollment, including school accountability programs, special education funding models, welfare program incentives, and children's age relative to their classmates (see Section III). Further, descriptive evidence suggests higher propensity for disabilities among children in low-income families, and increased mental healthcare services among the publicly insured (Clemans-Cope et al., 2015; Cuellar & Markowitz, 2007; Dhuey & Lipscomb, 2011; Finkelstein et al., 2012; Glied et al., 1997; Kubik, 1999; Li, 2017; Ohlson 1998).[19] Another explanation is the relative "newness" of many mental disabilities during the second half of the 20th century (Kubik, 1999).[20] Finally, Dhuey & Lipscomb (2011) suggest that

[18] Author's calculation using special education enrollment data from the U.S. Department of Education. These calculations exclude the "deaf-blindness," "developmental delay," and "traumatic brain injury," categories because I exclude these categories in this paper (see Section IV). (https://nces.ed.gov/programs/digest/d18/tables/dt18_204.30.asp)

[19] For example, Cuellar & Markowitz (2007) suggest that from 1991 to 2001 enrollment in Medicaid managed care plans that cover mental health services increased from less than 10,000 individuals to nearly 8 million and the fraction of Medicaid enrollees in managed care plans for mental health services increased from less than 1 percent to 38 percent.

[20] For example, the term "learning disability" was coined in 1963, and autism and developmental delay were not added to the IDEA until 1990 and 1997, respectively (http://www.ldonline.org/article/11244/).

some of the increases in adult and child disability rates may be attributable to "changes in cultural norms regarding what constitutes a disability."

B. Medicaid

Authorized by the Social Security Amendments of 1965, Medicaid is a joint federal-state program introduced to provide health insurance coverage to low-income children, pregnant women, individuals with disabilities, and the elderly. Medicaid programs were implemented in 26 states by the end of 1966, and in all states by 1982. Because of its strong initial tie to receipt of cash assistance from the Aid to Families with Dependent Children (AFDC) program, Medicaid eligibility varied widely across states, and early child Medicaid recipients were almost exclusively from AFDC-eligible families (i.e., children of low-income, single mothers).[21]

In 1967, Medicaid established the Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit, which provides child recipients with comprehensive healthcare services through age 20. These services include early assessment and identification of child health conditions at periodic, age-appropriate intervals, as well as screening tests to detect physical, mental, developmental, hearing, and vision impairments. When health risks are

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[21] Eligibility for AFDC was based on need standards and income and resource limits that varied widely across states. In 1983, for example, single-parent families with incomes below 100 percent of the federal poverty line (FPL) were eligible in Vermont, while only those with incomes below 24 percent of the FPL were eligible in Kentucky (Hendrix & Stock, 2021).

identified, they are followed by diagnostic tests and treatment aimed at controlling, correcting, or reducing these risks.[22] Insofar as Medicaid mandates these services for all child recipients, the EPSDT benefit provides a direct avenue through which Medicaid eligibility could impact special education enrollment. Further, Medicaid eligibility could both increase identification of children with disabilities and provide treatment for children with disabilities.

In the 1980s and 1990s, a series of federal mandates and optional state programs expanded Medicaid eligibility substantially by decoupling Medicaid eligibility from AFDC receipt, removing family structure requirements, and extending Medicaid eligibility to older children and those in relatively higher-income families.

The Deficit Reduction Act of 1984 (DEFRA) mandated Medicaid coverage for children under age 5 born after September 30, 1983 living in AFDC income-eligible families, regardless of family structure. It also required that states cover low-income women pregnant for the first time (who would otherwise be eligible for AFDC only after giving birth) and pregnant women in two-parent unemployed families. The Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) mandated Medicaid coverage for all remaining AFDC-eligible pregnant women, regardless of family structure.

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[22] States are also required to provide additional healthcare services covered under the federal Medicaid program, regardless of coverage status under state Medicaid plans, if these services are deemed "medically necessary" to address these health risks (https://www.medicaid.gov/medicaid/benefits/early-and-periodic-screening-diagnostic-and-treatment/index.html).

The Omnibus Budget Reconciliation Act of 1986 (OBRA-86) allowed states to expand Medicaid coverage to infants under age one and pregnant women in families with income up to 100 percent of the federal poverty level (FPL). The OBRA-87 allowed states to expand Medicaid coverage to infants under age one and pregnant women in families with incomes up to 185 percent of the FPL. It also allowed states to cover children under age eight in families with incomes up to 100 percent of the FPL.

The Medicare Catastrophic Coverage Act of 1988 required states to phase-in Medicaid coverage for infants under age one in families with incomes up to 100 percent of the FPL. The Family Support Act of 1988 required states to cover unemployed two-parent families meeting AFDC income and resource standards. It also required states to extend one year of Medicaid coverage to families coming off AFDC benefits due to increased wage income. The OBRA-89 required states to cover children under age six and pregnant women in families with income up to 133 percent of the FPL, and the OBRA-90 required states to phase-in coverage for all children under age 19 born after September 30, 1983 in families with incomes up to 100 percent of the FPL.[23]

In 1996, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) repealed and replaced the AFDC program with the Temporary Assistance for Needy

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[23] For the OBRA-89 expansion, if a state's income threshold for AFDC was higher than 133 percent of the FPL, the AFDC income threshold was used.

Families (TANF) program. The PRWORA also required state expansion of Medicaid eligibility to families meeting July 16, 1996 AFDC eligibility criteria and allowed states to establish higher income eligibility thresholds. Finally, the Balanced Budget Act of 1997 created the State Children's Health Insurance Program (SCHIP). The SCHIP provided federal matching funds to states to expand coverage to children who did not previously qualify for Medicaid coverage in families with incomes up to 200 percent of the FPL.

After the Medicaid expansions of the 1980s and 1990s, all children ages under age 6 in families with incomes up to 133 percent of the FPL, as well as children under age 19 in families with incomes up to 100 percent of the FPL, were eligible for Medicaid coverage, regardless of family structure. States also had the option to offer Medicaid coverage to all children under age 19 in families with incomes up to 200 percent of the FPL.

Because these Medicaid expansions relaxed family income requirements, the marginal entrants to Medicaid were from relatively higher-income families than their peers in earlier periods. Given that children from low-income families have a higher propensity for special education enrollment, this implies that the marginal entrant to Medicaid also has a relatively lower propensity for special education enrollment, than their peers in earlier periods.

Trends in Medicaid Eligibility

The Medicaid expansions of the 1980s and 1990s resulted in large increases in childhood Medicaid eligibility. Among children born in 1976, 13 percent were eligible for Medicaid at birth, compared to 52 percent of children born in 2005.[24] Similarly, the average Medicaid eligibility rate for children age 0-18 in 1994 was 24 percent, but this figure had climbed to 44 percent of children by 2005. Finally, the average child born in 1976 received an average of 2 years of Medicaid eligibility from birth through age 18, while the average child born in 1987 was Medicaid-eligible for more than 6 years.

C. Summary

Overall, the 1980s and 1990s saw dramatic increases in both special education enrollment and childhood Medicaid eligibility. Further, the special education enrollment process includes avenues through which Medicaid eligibility could impact special education enrollment. Thus, it is likely that the typical marginal special education enrollee via Medicaid eligibility has a *non-severe* disability and a higher propensity for special education enrollment because they are low-income. However, this propensity may decrease among children in higher income states and states that expanded Medicaid the most. Although this is the first study to explicitly examine linkages between these trends, several other researchers have examined these trends separately.

[24] Author's calculations using eligibility estimates calculated using March Current Population Survey (CPS) and Medicaid eligibility data.

LITERATURE REVIEW

Two branches of literature inform this study. The first focuses on the effects of Medicaid on an array of health and related outcomes, while the second examines factors that influence special education enrollment. By bridging these literatures, this is the first paper to study the impacts of Medicaid eligibility on special education enrollment.

A. Medicaid

Medicaid and Health

There is a large body of research that examines the impacts of Medicaid on health and health-related outcomes. The strong consensus from this research is that Medicaid eligibility increases utilization of primary, prenatal, preventative, and hospital care, and as a result, improves recipients' health (Boudreaux et al., 2016; Bronchetti, 2014, Currie & Gruber, 1996a; Currie & Thomas, 1995; Currie et al., 2008; De La Mata, 2012; Finkelstein et al., 2012; Goodman-Bacon, 2018; Wherry et al., 2018).[25]

Research also finds that Medicaid eligibility is associated with an array of short- and long-term improvements in child health. Medicaid significantly decreases child and infant

[25] There is also evidence that Medicaid take-up is imperfect and that increases in Medicaid coverage often result in substantial crowd out of private insurers (Bansak & Raphael, 2007; Blumberg et al., 2000; Bronchetti, 2014; Buchmueller, 2008; Busch & Duchovny, 2005; Card & Shore-Sheppard, 2004; Currie & Gruber, 1996a; Cutler & Gruber, 1996a; Cutler & Gruber, 1996b; Dave et al., 2010; De La Mata, 2012; Finkelstein et al., 2012; Gruber & Simon, 2008; Ham & Shore-Sheppard, 2005; Shore-Sheppard et al., 2000; Wolfe & Scrivner, 2005).

mortality and childhood hospitalizations and positively impacts birthweight and immunization rates (Currie & Grogger, 2002; Currie & Gruber, 1996a; Currie & Gruber, 1996b; Dafny & Gruber, 2005; Dave et al., 2008; East et al., 2017; Goodman-Bacon, 2018; Joyce & Racine, 2003; Kaestner et al., 2001).[26]

Studies also find long-run effects of childhood Medicaid eligibility on a variety of adult health outcomes, including decreases in chronic health conditions, hospitalizations, and self-reported disability rates (Boudreaux et al., 2016; Goodman-Bacon, 2016; Miller & Wherry, 2019; Thompson, 2017; Wherry et al., 2018).[27] Goodman-Bacon (2016) and Wherry & Meyer (2016) find that *in utero* Medicaid eligibility significantly decreases adult mortality.

Medicaid and Education

There is a growing literature examining whether effects of Medicaid eligibility spillover to non-health outcomes including education, employment and earnings, welfare participation, marriage, and even crime and incarceration.[28] In terms of Medicaid's impact on education,

[26] Some of these studies find mixed evidence. Dafny & Gruber (2005) find increases in total hospitalizations overall, but relatively smaller increases in preventable hospitalizations compared to increases in non-preventable hospitalizations. Kaestner et al. (2001) find robust decreases in hospitalizations among children age 2-6 from very low-income areas, while their results for older and less poor groups are less consistent. Dave et al. (2008) do not find statistically significant effects changes in Medicaid eligibility on birthweight or incidence of low birthweight.
[27] Notably, Currie et al. (2008) and De La Mata (2012) do not find these same significant effects in the short- and medium-run, suggesting that some of these health improvements may take many years to manifest.
[28] These papers include Arenberg et al. (2020), Borjas (2003), Boudreaux et al. (2016), Brown et al. (2015), Cohodes et al. (2016), Dave et al. (2015), Finkelstein et al. (2012), Garthwaite et al. (2014), Goodman-Bacon (2016), Gross & Notowidigdo (2011), Gruber & Yelowitz (1999), Hendrix & Stock (2021), Levine & Schanzenbach (2009), Levy et al. (2019), Leininger et al. (2010), Miller & Wherry (2019), Moffitt & Wolfe (1990), Strumpf (2011), Wen et al. (2017), Winkler (1991), Yelowitz (1994), Yelowitz (1995), and Yelowitz (1998).

Levine & Schanzenbach (2009) find children eligible for health insurance at birth exhibit significant increases in reading scores, and Cohodes et al. (2016) find that expanded childhood Medicaid eligibility increases high school and college completion rates. Finally, Miller & Wherry (2019) find increased high school graduation rates among children who were Medicaid eligible in their first year of childhood and whose mothers received Medicaid eligibility during pregnancy (*in utero* eligibility).

In sum, researchers have found that Medicaid expansions improve healthcare access and the use of healthcare services, and that they resulted in both tangible health improvements and positive impacts on non-health outcomes, including education, employment, and earnings. Given that special education enrollment lies at the intersection between healthcare and education, it is plausible that special education enrollment is sensitive to the healthcare access provided by the Medicaid expansions.

B. Special Education Enrollment

I posit that Medicaid expansions, by improving healthcare access, impact special education enrollment rates. Although no previous research examines the effects of Medicaid eligibility on special education enrollment, Goodman-Bacon (2016) finds significant long-run decreases in self-reported disability rates among adults exposed to Medicaid coverage during childhood.[29] In a different context, Acton et al. (2019) find no change in autism identification, but do find decreased utilization of some special education services, following a Michigan mandate requiring private insurers to cover autism therapies.

Several other researchers have found that a number of non-health factors also influence child disability and special education enrollment rates, particularly for *non-severe* disabilities. First, school accountability programs and special education funding models both impact special education enrollment.[30] Second, special education enrollment interacts with welfare programs, including Supplemental Security Income (SSI) and AFDC/TANF (Benson, 2018; Garrett & Glied, 1997; Kubik, 1999; Yelowitz, 1998). Third, children's age relative to their classmates impacts ADHD diagnoses.[31] These findings suggest that controlling for these factors is important for isolating the impacts of Medicaid eligibility on special education enrollment.

C. Summary

Overall, I propose that special education enrollment may be sensitive to Medicaid eligibility via improved healthcare access. Previous research documenting effects of Medicaid

[29] Goodman-Bacon (2016) exploits variation in childhood Medicaid eligibility arising from the introduction of state Medicaid programs from 1966-1970.
[30] See Bokhari & Schneider (2011), Figlio & Getzler (2002), Cullen & Reback (2006), Deming et al. (2016), Dhuey & Lipscomb (2011), Greene & Forster (2002), Jacob (2005), Kwak (2010), Mahitivanichcha & Parrish (2005), Morrill (2018), and Stock & Carriere (2021).
[31] See Dhuey and Lipscomb (2010), Elder (2010), Evans et al. (2010), Krabbe et al. (2014), Layton et al. (2018), and Schwandt & Wupperman (2016).

expansion on child health and non-health outcomes support this possibility. Further, there is strong evidence that special education enrollment is sensitive to a variety of factors, including healthcare. This paper contributes to the literatures on the impacts of Medicaid and on factors impacting special education enrollment as the first to study the effects of Medicaid eligibility on special education enrollment. I examine the effects of Medicaid eligibility on special education enrollment overall and for a variety of separately identifiable disabilities.

DATA

Two sets of data form the foundation for the analysis in this paper. The first provides information on special education enrollment, while the second provides information on childhood Medicaid eligibility.

A. Special Education Enrollment

I combine U.S. Department of Education special education child count and total student enrollment count data to construct special education enrollment rates (U.S. Department of Education, 2019; NCES, 2019). Section 618 of the IDEA requires states to report annually on the number of children with disabilities receiving special education and related services under Part B of the IDEA (i.e., children ages 3-21). In some years, special education enrollment is reported only for aggregated disability categories, while in other years enrollment is disaggregated across each individual disability category specified in the IDEA. Further, in some years special education enrollment counts are reported for individual ages of students, while in other years these enrollment counts are only available by aggregated age groups.

As mentioned in Section II, I follow Dhuey & Lipscomb (2011) in grouping disabilities into two categories: “non-severe”, which includes emotional disturbance, other health impairments, specific learning disabilities, and speech or language impairments, and “severe”, which includes autism, hearing impairments, intellectual disabilities, orthopedic disabilities, and visual impairments.[32, 33]

I convert special education enrollment counts into enrollment rates using total student enrollment by state, year, and grade from the U.S. Department of Education NCES Common Core of Data (NCES 2019). For each state and year, I divide special education enrollment by total enrollment, matching special education enrollment by age with total enrollment by grade to compute special education enrollment rates.[34] For each age, state, and year, I compute special education enrollment rates aggregated across all disabilities, separately for *severe* and *non-severe* disabilities, as well as for each of the nine individual disability categories. Due to data limitations, I focus my analysis on special education enrollment for cohorts of children born in 1984, 1985, 1986, and 1987.[35] I then link these enrollment rates to Medicaid eligibility measures (described in part B of this section) by state and each age from 6-18 for each of these cohorts.

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[32] Specific learning disabilities include perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia (https://sites.ed.gov/idea/regs/b/a/300.8).
Other health impairments include asthma, attention-deficit/hyperactivity disorder (ADHD), diabetes, epilepsy, heart conditions, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome (https://sites.ed.gov/idea/regs/b/a/300.8).
[33] I exclude 4 disability categories from my analysis due to inconsistent reporting by states. These excluded disability categories are "deaf-blindness," "deafness," "traumatic brain injury." and "multiple disabilities." In states and years that are reported, the numbers are small, so their exclusion is unlikely to affect my results.
[34] This calculation requires the assumption that a single age corresponds to a single grade in school. I match special education enrollment counts of 6-year-olds with kindergarten total enrollment rates, 7-year-olds with 1st grade, and so on.
[35] Ages of observation are constrained to ages 6-18, due to inconsistent reporting of special education enrollment counts for children ages 3-5 and 19-21. The exclusion of these groups is not a concern for this paper because these age ranges fall outside of the traditional ages of children in primary and secondary school. The 1984 cohort is the

Trends in Special Education Enrollment

Figure 1 illustrates the trends in special education enrollment for the 1984-1987 birth cohorts. For the cohort born in 1984, for example, an average of 11.5 percent of the cohort were enrolled in special education when they were ages 6-18. Special education enrollment rates increased for each successive cohort such that the average enrollment rate over ages 6-18 was 12.5 percent for the 1987 cohort. For reference, using the 1984 cohort's enrollment as a benchmark, a 1 percentage point increase in special education enrollment is equivalent to approximately 51,000 more students in special education.

To further illustrate the change in enrollment over time, Table 1 details how average enrollment rates for those with *non-severe* disabilities increased for each successive cohort. *Specific learning disabilities*, the individual disability category constituting the largest fraction of special education enrollment, grew from 5.9 percent of the 1984 cohort to 6.3 percent of the 1987 cohort. Although it accounts for a smaller fraction of overall special education enrollment, the enrollment rate for children with *other health impairments* also grew dramatically, from 0.4 percent of the 1984 to 0.7 percent of the 1987 cohort.[36] In contrast, enrollment rates for those with *severe* disabilities remained fairly constant across birth cohorts, accounting for between 1.7 and 1.8 percent of overall special education enrollment.

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earliest cohort for which I observe special education enrollment rates for all ages from 6-18 because special education child counts are reported for individual ages starting in 1990.

[36] Enrollment rates also grew slightly for children with autism, emotional disturbance, and intellectual disabilities.

Figure 2 compares trends in special education enrollment rates at each age of childhood and separately for the quartiles of states that had the largest and smallest Medicaid expansions (i.e., "large" and "small" expansion states).[37] Special education enrollment rates tend to increase dramatically through elementary school (i.e., ages 6-11), then plateau in middle school and slowly decline throughout high school, before decreasing dramatically between ages 17 and 18. The special education enrollment rates are relatively high in small expansion states during elementary school, after which they are relatively low compared to large expansion states.

B. Medicaid Eligibility

I combine March Current Population Survey (CPS) data and Medicaid eligibility rules to compute average cumulative years of Medicaid eligibility by state, year, and age during 1984-2005 (Ruggles et al. 2019).[38] By comparing family structures and incomes of children in state-year CPS household samples against their corresponding state-year Medicaid eligibility rules, I assign each child an eligibility indicator. Then I calculate the percent of children eligible for Medicaid by computing the mean of these indicator values for each state, year, and age. I refer to this percentage as the "contemporaneous" eligibility rate. I convert contemporaneous eligibility

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[37] I assign states with small, medium, and large Medicaid expansion designations based on quartiles of the change in cumulative years of Medicaid eligibility through age 18 for the 1984 and 1987 birth cohorts. Eligibility in small expansions states grew at or below the 25th quartile, while eligibility in large expansions states grew at or above the 75th quartile. Small expansion states are AL, AK, AZ, DE, IL, MA, MI, NJ, UT, VA, WA, and WI. Large expansion states are AR, DC, KY, MN, MS, MO, NH, NM, NC, TN, TX, and VT.

[38] The eligibility thresholds are built from code provided by Tal Gross and Kosali Simon.

rates to cumulative years of Medicaid eligibility by summing the percent eligible across each age of childhood for each birth cohort. Thus, I observe average cumulative years of Medicaid eligibility, at each age of childhood for each cohort by state. Due to data limitations, I focus my analysis on Medicaid eligibility for cohorts born from 1984-1987 at each age from 0-18.[39]

Trends in Medicaid Eligibility

Figure 3 demonstrates the variation in Medicaid eligibility caused by the Medicaid expansions of the 1980s and 1990s, separating out average contemporaneous Medicaid eligibility rates at each age for each cohort. Despite the prevailing trend toward higher rates of eligibility for older children and those in relatively higher-income families, Figure 3 captures the erratic nature of eligibility rates for any one group at a single point in time during the expansion period. The Medicaid expansions resulted in substantial variation in Medicaid eligibility because each expansion often impacted each cohort uniquely and at different ages. For example, in the year following the OBRA-89 mandate, eligibility increased sharply for the 1985, 1986 and 1987 cohorts at ages 3, 4 and 5, respectively, but not the 1984 cohort, who were beyond the age cutoff for eligibility.[40] In contrast, eligibility increased sharply for all cohorts in 1998, the year after

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[39] I include eligibility data for observations from ages 0 through 5 in my panel, taking advantage of my cumulative construction of Medicaid eligibility. Additionally, I only calculate Medicaid eligibility through 2005 due to limited Medicaid rule change data. As a result, the 1987 cohort is the latest cohort for which I observe Medicaid eligibility for all ages from 0 to 18.

[40] The OBRA-89 increased the federally mandated age threshold from under age 1 to under age 5 and income threshold from up to 100 percent of the FPL to up to 133 percent of the FPL.

SCHIP was created (e.g., when the 1987 cohort was 11).[41] While the effects of these federally mandated expansions on eligibility rates are the most obvious in this figure, much of the less obvious variation in eligibility resulted from each state adopting optional expansions to varying degrees in different years.

Figure 4 reveals the variation in average contemporaneous Medicaid eligibility rates during each age of childhood that drive the divergence of cumulative years of eligibility for small and large expansion states. While contemporaneous eligibility rates at birth are similar for these groups and respond similarly to eligibility shocks (e.g., Medicaid policy age cutoffs, expansions of income eligibility thresholds), eligibility rates in large expansion states consistently outpace those in small expansion states. The compound effects of these contemporaneous differences in each year of childhood result in large differences in eligibility by the end of childhood. Figure 5 illustrates these divergent trends in cumulative years of eligibility by age in small and large expansion states. Children in large expansion states average more years of eligibility by the end of childhood because they accumulate eligibility at consistently faster rates.

Figure 6 shows the average cumulative years of Medicaid eligibility through age 18

[41] SCHIP offered states the option to extend coverage to all children under age 19 in families with incomes up to 200 percent of the FPL.

for each cohort in states that underwent small, medium, and large Medicaid expansions. Cohorts in states that expanded Medicaid the most tend to accumulate more years of Medicaid eligibility during childhood. Because policies expanded Medicaid over time as well as across state, eligibility increases for each successive cohort. For example, the average difference in cumulative years of Medicaid eligibility through age 18 between large and small expansion states is more than one year for the 1984 cohort, and more than two for the 1987 cohort.

C. Other Data

I control for several characteristics likely correlated with childhood Medicaid eligibility or special education enrollment rates. First, other welfare programs are likely correlated because Medicaid eligibility was heavily linked to AFDC eligibility requirements prior to the Medicaid expansion of the 1980s and 1990s. For example, states with higher AFDC/TANF payments or more inclusive requirements may indirectly attract higher Medicaid participation. I control for this using state and year real AFDC/TANF minimum eligibility thresholds and maximum benefit levels.[42] Second, as shown by Kubik (1999), there is a linkage between Supplemental Security Income (SSI), AFDC, and special education. The difference between AFDC/TANF and SSI benefits vary by state, child receipt of SSI requires a disability, and children may only receive

[42] AFDC/TANF data are for a family of three from the Urban Institute's Welfare Rules Database (www.urban.org).

benefits from one of these programs.[43] To control for state-level differences between AFDC/TANF and SSI over time I also include controls for SSI participation rates and real average SSI income by state and year, which I calculate using the same CPS samples I use to calculate Medicaid eligibility (Ruggles et al. 2018). Third, I control for differences in demographics by calculating the percent of students that are black, Hispanic, white, or another race/ethnicity for each state and year using expenditure data from the U.S Department of Education (NCES 2019).[44] To control for changing economic conditions that might impact incomes (and therefore Medicaid and healthcare access via employer-provided health insurance) I include state-year average unemployment rates from the Bureau of Labor Statistics.[45] I control for state education characteristics that could impact special education enrollment using state-year instructional expenditure per student and student teacher ratios, which I calculate using data from the U.S. Department of Education (NCES 2019).[46]

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[43] Child disabilities that qualify for SSI are not the same as the disabilities specified in the IDEA. The definition of disability for children under SSI includes that the disability must be "medically determinable" and result in "marked and severe functional limitations" (https://www.ssa.gov/disability/professionals/childhoodssi-pub049.htm).
[44] These calculations use the *blackstudents, hispanicstudents, whitestudents*, and *totalstudents* variables from the Public Elementary/Secondary School Universe Survey. I divide the student count for each group by total student counts by state and year.
[45] Unemployment rate data are from Bureau of Labor Statistics (BLS) Local Area Unemployment Statistics Series.
[46] These calculations use the *teacherfte* and *totalenrollment* variables from the Public Elementary/Secondary School Universe Survey and *instructionalexpenditure* variable from the National Public Education Finance Survey.

As discussed in Section III, researchers have found that education policies also impact special education enrollment.[47] I control for school accountability programs by assigning observations state-year school accountability program indicator values using "Table 1. States with consequential accountability prior to NCLB" from Dee & Jacobs (2011). I account for changes in special education funding models by assigning observations state-year census funding model indicator values using "Figure 2: State Special Education Financing Systems" from Stock & Carriere (2021).[48] Finally, I control for state compulsory education laws using minimum dropout ages.[49]

D. Data Restrictions

My data include special education enrollment rates, average cumulative years of Medicaid eligibility by age, state, and year, and state-year control variables. Due to data limitations, I focus my analysis on cohorts born in 1984-1987 during each year of childhood at

[47] See Bokhari & Schneider (2011), Figlio & Getzler (2002), Cullen & Reback (2006), Deming et al. (2016), Dhuey & Lipscomb (2011), Greene & Forster (2002), Jacob (2005), Kwak (2010), Mahitivanichcha & Parrish (2005), Morrill (2018), Stock & Carriere (2021).
[48] Census funding models are also called "capitation" funding models. Capitation refers to making payments based on total student enrollment. This is in opposition to "bounty" funding, which provides funding based on the number enrolled in special education.
[49] The minimum dropout age data for 2000-2005 was obtained from Table A1 of Gilpin & Pennig (2015). Data for earlier years were provided by Greg Gilpin.

ages 6-18 in all US states (4 cohorts • 13 ages • 51 states = 2,652 observations).[50] My level of analysis is at the cohort, state, and year level.

E. Summary Statistics

Table 2 contains summary statistics for aggregated and disaggregated special education enrollment rates. The average special education enrollment rate from ages 6-18 for *all disabilities* is 12 percent of total student enrollment, of which 10 percent are enrolled for *non-severe* disabilities and 2 percent for *severe* disabilities. Enrollment rates for *all* and *non-severe* disabilities track very closely with one another, while variation in *severe* disability enrollment is low. *Specific learning disability* is the individual disability category with the highest average enrollment rate at 6 percent. The disability categories with the next highest average enrollment rates are speech or language impairment (2 percent), and intellectual disability and emotional disturbance (1 percent each). Average enrollment rates for the remaining disability categories (autism, hearing impairments, other health impairments, orthopedic disabilities, and visual impairments) are less than 1 percent.

Summary statistics for Medicaid eligibility are reported in Table 3. The average contemporaneous fraction of children eligible for Medicaid is 31 percent, ranging from 0 percent

[50] Special education child count data limits observations to cohorts born in 1984 and later, and to ages 6-18 (see part A of this section). Medicaid eligibility data limits observations to cohorts born in 1987 and earlier (see part B of this section).

to 83 percent eligibility.[51] Alternatively, the average cumulative years of Medicaid eligibility through age 18 is 5.5 years, ranging from under 3 years to over 10 years.[52] Because cumulative eligibility through age 18 is a sum of contemporaneous eligibility from ages 0-18, 3 years of cumulative eligibility through age 18 is equivalent to an average contemporaneous eligibility rate of just 16 percent in every year of childhood.[53] In contrast, 10 years of cumulative eligibility through age 18 is equivalent to an average contemporaneous eligibility rate of over 55 percent. Overall, these statistics demonstrate how Medicaid eligibility varies greatly by cohort, state, and year.

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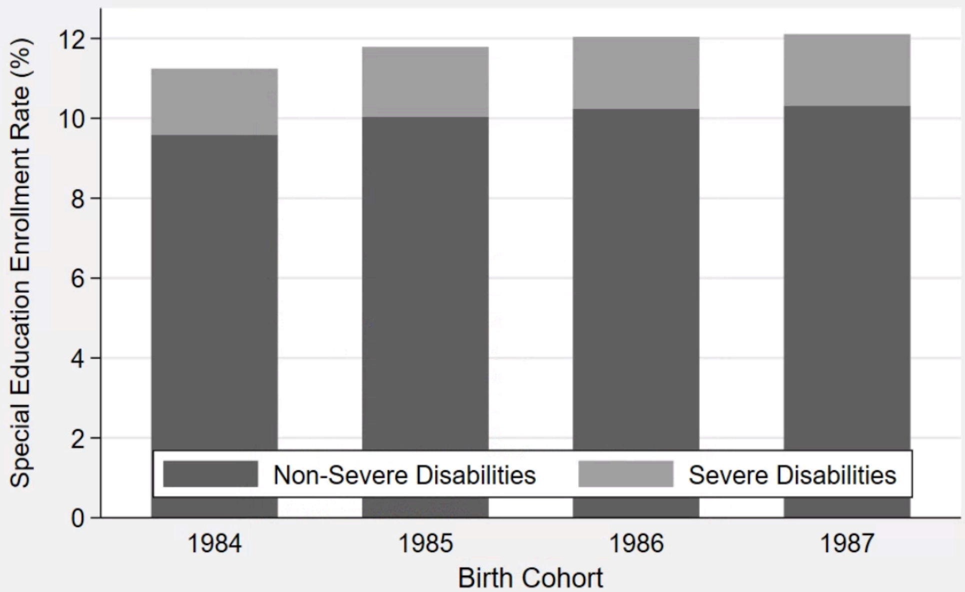
[51] The Medicaid eligibility rate was 0 in 1994 for cohorts over the age of 6 in many states. The Medicaid eligibility rates was 83 percent in 1994 for nine-year-olds in Minnesota.

[52] Average cumulative eligibility through age 18 was 2.9 years for the 1984 cohort in North Dakota and 10.4 years for the 1987 cohort in DC.

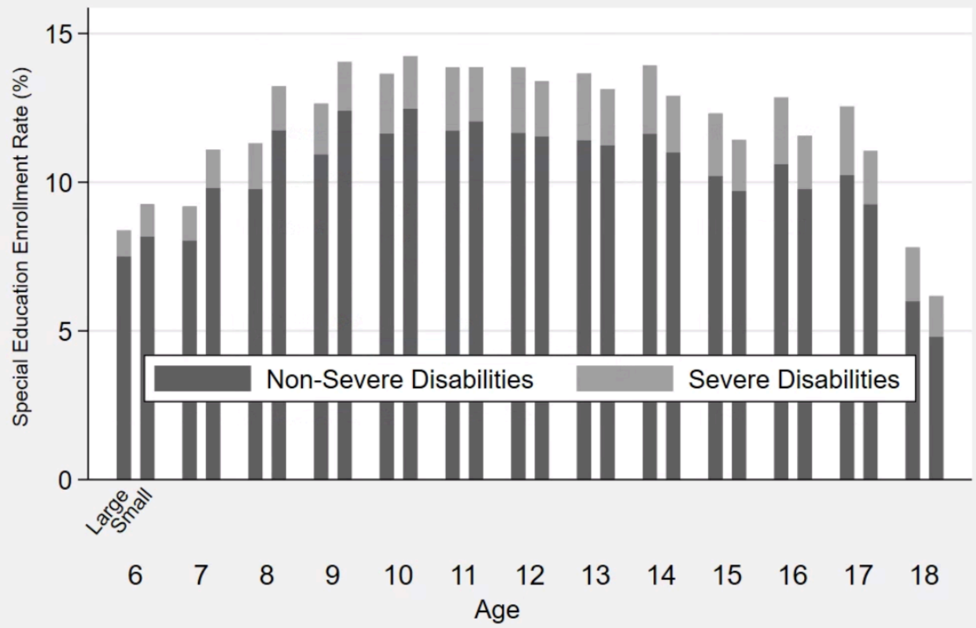
[53] (3 years of Medicaid eligibility)/(18 years of childhood) = 17 percent average contemporaneous eligibility rate.

Figure 1: Special Education Enrollment Rates by Disability Type



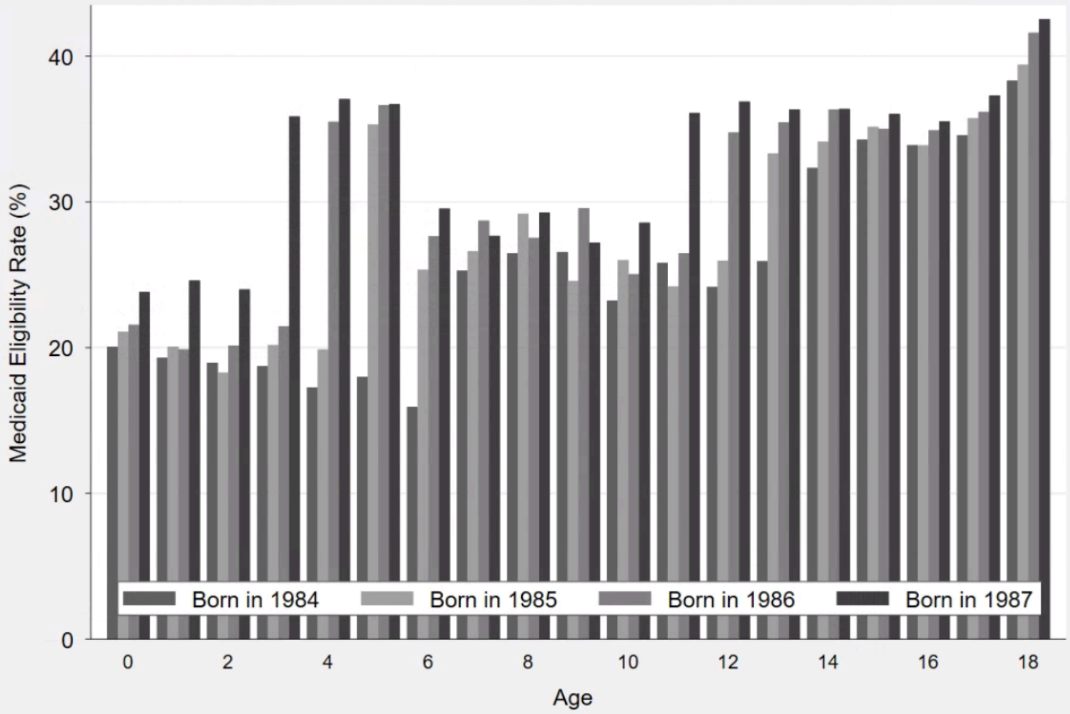
Source: Author's calculations based on special education enrollment and total student enrollment from the U.S. Department of Education. See text for description of method used to calculate special education enrollment rates. Special education enrollment rates are averaged across all ages (6-18), birth cohort (1984-1987), and U.S. states.

Figure 2: Special Education Enrollment Rates by Medicaid Expansion Size



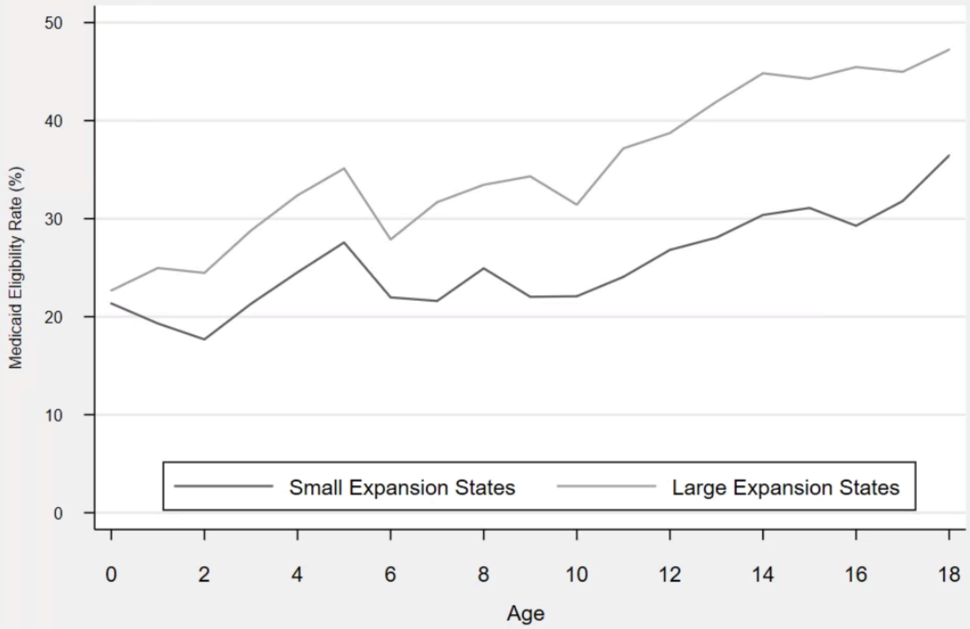
Source: Author's calculations based on special education enrollment and total student enrollment from the U.S. Department of Education. See text for description of method used to calculate special education enrollment rate. 'Small Expansion' and 'Large Expansion' refer to quartiles of states with the smallest and largest expansions in Medicaid eligibility for the 1984 vs. 1987 cohorts. Special education enrollment rates are averaged across small and large Medicaid expansion states and birth cohort born in 1984-1987 for each age from 6-18.

Figure 3: Contemporaneous Medicaid Eligibility by Birth Cohort



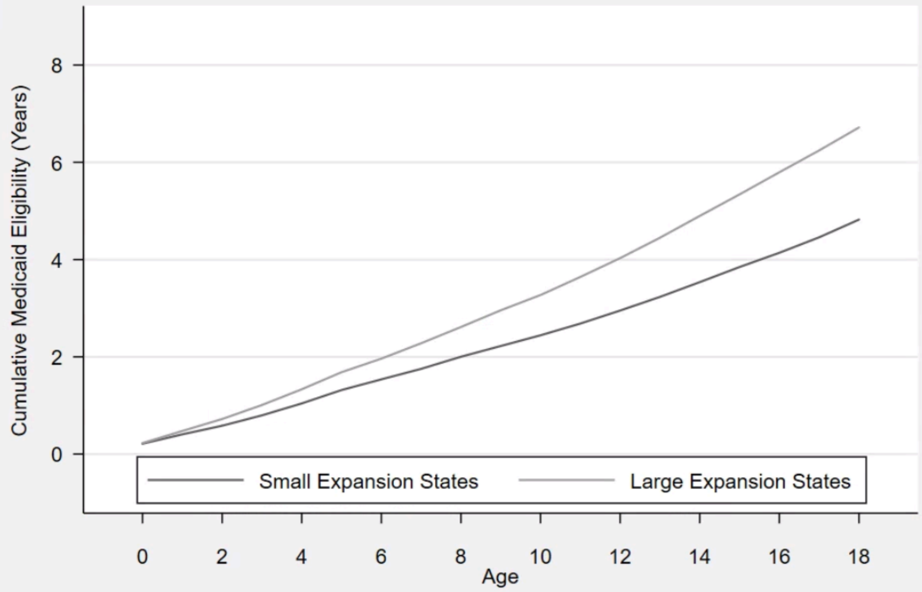
Source: Author's calculations based on CPS data. See text for description of the method used to calculate contemporaneous Medicaid eligibility rates. Contemporaneous Medicaid eligibility rates are averaged across all U.S. states for cohorts born in 1984-1987 for each age from 0-18.

Figure 4: Contemporaneous Medicaid Eligibility by Medicaid Expansion Size



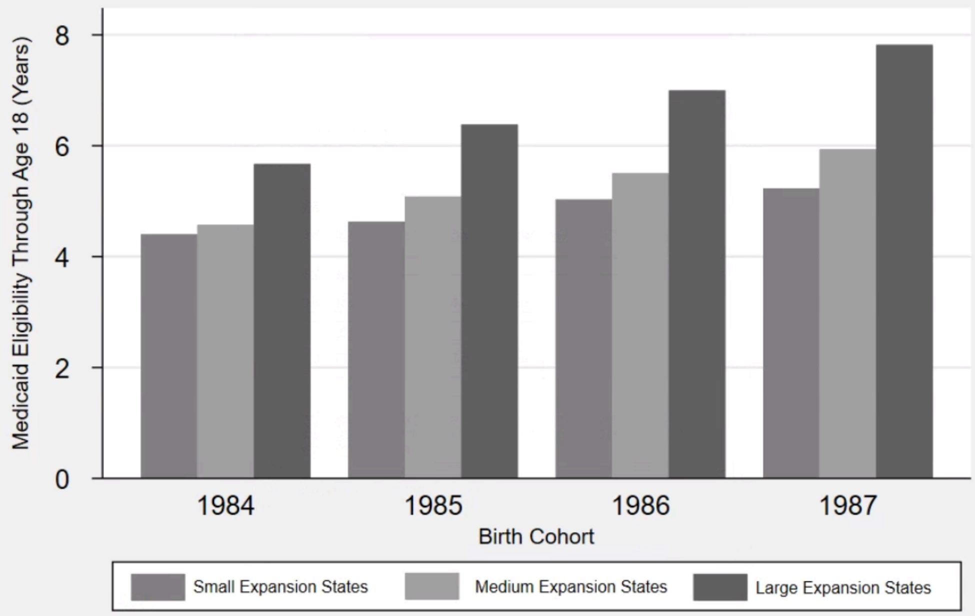
Source: Author's calculations based on CPS data. See text for description of the method used to calculate contemporaneous Medicaid eligibility rate. 'Small Expansion' and 'Large Expansion' refer to quartiles of states with the smallest and largest expansions in Medicaid eligibility for the 1984 vs. 1987 cohorts. Contemporaneous Medicaid eligibility rates are averaged across small and large Medicaid expansion states and cohorts born in 1984-1987 for each age from 0-18.

Figure 5: Cumulative Years of Medicaid Eligibilty by Medicaid Expansion Size



Source: Author's calculations based on CPS data. See text for description of the method used to calculate cumulative Medicaid eligibility. 'Small Expansion' and 'Large Expansion' refer to quartiles of states with the smallest and largest expansions in Medicaid eligibility for the 1984 vs. 1987 cohorts. Cumulative years of Medicaid eligibility are averaged across small and large Medicaid expansion states and cohorts born in 1984-1987 for each age from 0-18.

Figure 6: Cumulative Medicaid Eligibility Through Age 18 by Medicaid Expansion Size



Source: Author's calculations based on CPS data. See text for description of the method used to calculate cumulative years of Medicaid eligibility through age 18. 'Small Expansion' and 'Large Expansion' refer to quartiles of states with the smallest and largest expansions in Medicaid eligibility for the 1984 vs. 1987 cohorts, respectively. Cumulative years of eligibility through age 18 are averaged across small, medium, and large Medicaid expansion states for each birth cohort born in 1984-1987.

Table 1: Special Education Enrollment Rates

	1984 Cohort	1985 Cohort	1986 Cohort	1987 Cohort
All Disabilities	**0.115**	**0.121**	**0.124**	**0.125**
Non-Severe Disabilities	**0.096**	**0.100**	**0.102**	**0.103**
Emotional Disturbance	0.010	0.010	0.010	0.010
Other Health Impairment	0.004	0.005	0.001	0.007
Specific Learning Disability	0.059	0.062	0.062	0.063
Speech or Language Impairment	0.023	0.024	0.023	0.023
Severe Disabilities	**0.017**	**0.017**	**0.018**	**0.018**
Autism	0.001	0.001	0.001	0.001
Hearing Impairment	0.001	0.001	0.001	0.001
Intellectual Disability	0.013	0.013	0.014	0.014
Orthopedic Disability	0.001	0.001	0.001	0.001
Visual Impairment	0.000	0.000	0.000	0.001

Number of observations is 663 per cohort. Special education enrollment rates are computed as the fraction of total public school students enrolled in special education, averaged across all age (6-18) and U.S. states for each birth cohort born in 1984-1987.

Table 2: Special Education Enrollment Rates Summary Statistics

	Mean	Std. Dev.
All Disabilities	0.120	0.032
Non-Severe Disabilities	0.100	0.029
Emotional Disturbance	0.010	0.007
Specific Learning Disability	0.062	0.027
Speech or Language Impairment	0.023	0.025
Other Health Impairment	0.006	0.005
Severe Disabilities	0.017	0.009
Autism	0.001	0.001
Hearing Impairment	0.001	0.000
Intellectual Disability	0.013	0.009
Orthopedic Disability	0.001	0.001
Visual Impairment	0.000	0.000

Number of observations is 2,652. Special education enrollment rates are computed as the fraction of total public school students enrolled in special education, averaged across all ages (6-18), birth cohorts (1984-1987), and U.S. states.

Table 3: Medicaid Eligibility Summary Statistics

	Mean	Std. Dev.
Contemporaneous Eligibility Rate (%)	31.13	12.38
Cumulative Eligibility Through Age 18 (Years)	5.51	1.38
Cumulative Eligibility (Years)	3.48	1.54

Number of observations are 2,652 for Contemporaneous Eligibility Rate (%) and Cumulative Eligibility (Years). Contemporaneous Eligibility Rate (%) is computed as the fraction of children eligible for Medicaid by birth cohort, state, and year. Cumulative Eligibility (Years) is computed as the sum of contemporaneous Medicaid eligibility rates from age 0 to each age in childhood. Reported rates for Contemporaneous Eligibility Rate (%) and Cumulative Eligibility (Years) are averaged across all ages (6-18), birth cohorts (1984-1987), and U.S. states. Cumulative Eligibility Through Age 18 (Years) is the sum of contemporaneous eligibility from age 0 through age 18. The number of observations for Cumulative Eligibility Through Age 18 is 204 because it is summed across ages 0-18. Reported rates for Cumulative Eligibility Through Age 18 (Years) are averaged across all birth cohorts (1984-1987) and U.S. states.

Table 4: Controls Variables Summary Statistics

	Mean	Std. Dev.
Other Policy Controls		
SSI participation rate (%)	0.30	0.32
Average SSI income ($)	385.54	143.39
Maximum AFDC/TANF benefit level ($)	452.50	186.08
Minimum AFDC/TANF eligibility threshold ($)	705.91	279.71
Sociodemographic Controls		
Percent of students black (%)	15.52	16.44
Percent of students Hispanic (%)	8.65	10.98
Percent of students white (%)	70.07	19.60
Unemployment rate (%)	5.16	1.44
School Controls		
Per student instructional expenditure ($)	6,929.82	1,639.44
Student teacher ratio	16.43	2.34
School accountability program indicator (0/1)	0.31	0.46
Census funding model indicator (0/1)	0.24	0.43
Minimum dropout age	16.65	0.86

Number of observations is 2,652. Other policy controls, sociodemographic controls, and school controls are measured by state and year for each cohort (1984-1987). Summary statistics for control variables are averaged across states and years.

EMPIRICAL STRATEGY

I hypothesize that increased childhood Medicaid eligibility will impact special education enrollment rates in one of two ways. On the one hand, Medicaid eligibility could increase special education enrollment rates as more children are diagnosed with disabilities and subsequently enroll in special education. Alternatively, Medicaid eligibility could decrease special education enrollment rates as fewer children need special education and related services due to healthcare intervention.[54]

A. Ordinary Least Squares

Equation 1 presents a baseline OLS estimating equation to test for effects of Medicaid eligibility on special education enrollment.

$$(1)\ \textit{Special education enrollment}_{c,s,y} = \beta_0 + \beta_1\ \textit{Eligibility}_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

$\textit{Special education enrollment}_{c,s,y}$ is the fraction of total public-school students enrolled in special education by cohort, state, and year. In some specifications, this measures enrollment across all disability categories, while in others it measures enrollment in disaggregated disability categories. $\textit{Eligibility}_{c,s,y}$ is the average cumulative years of Medicaid eligibility from birth

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[54] Healthcare intervention includes management and treatment (e.g., with medication or other therapeutics), as well as prevention.

through each age of childhood by cohort, state, and year. Modeling Medicaid eligibility using this cumulative construction accounts for eligibility in previous years of childhood that likely impact contemporaneous special education enrollment. It also preserves variation in Medicaid eligibility and special education enrollment by age and allows for the inclusion of Medicaid eligibility for each observation from ages 0-5.[55]

The vector $X_{s,y}$ includes state-year controls for welfare program generosity, sociodemographic and education characteristics, and education policies as mentioned in Section IV. Summary statistics for these control variables are reported in Table 4. I also control for unobserved variation in special education enrollment and Medicaid eligibility using birth cohort (C_c), state (S_s), and year (Y_y) fixed effects. The birth cohort fixed effects control for cross-cohort differences that may be related to special education enrollment and Medicaid eligibility. It is likely that childhood experiences differ from being different ages at the same point in time (e.g., different cohorts may face different economic conditions over time). The state fixed effects control for time-invariant state characteristics that may be related to special education enrollment and Medicaid eligibility (For example, Alabama generally votes more conservatively than California, which likely has implications on state-level policy decision-making). The year fixed effects control for time-variant changes common to all states that may be related to special

[55] It is likely that sustained Medicaid eligibility is more impactful that sporadic eligibility. I estimate effects of Medicaid eligibility on special education enrollment using a variety of alternative constructions of Medicaid eligibility as robustness checks in Section VII.

education enrollment and Medicaid eligibility. These include things like shocks to the national economy from economic recessions that may increase utilization of social programs or impact children's health, or shocks from federal policy changes or U.S. Supreme Court decisions.[56] I also control for time-variant changes across states using state-specific time trends ($\delta_{s,y}$). For instance, it is likely that economic recessions affect Washington differently over time than Wyoming. Finally, I cluster my standard errors at the state level because my residuals are unlikely to be independent within the same state over time.

B. Simulated Medicaid Eligibility

Because Medicaid eligibility is calculated using state-year CPS samples, it varies both exogenously from changes in Medicaid policy and endogenously from changes in sociodemographic characteristics. Because of this endogeneity, using the eligibility computation described in Section IV would result in biased estimates of the impact of Medicaid expansion (β_1 in Equation 1). I address this endogeneity and establish causality by instrumenting eligibility using a simulated Medicaid eligibility instrument and two stage least squares framework, both described below.

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[56] For example, the 1990 U.S. Supreme Court ruling in Sullivan v Zebley resulted in the redefining of child SSI requirements, which resulted in large increases in child SSI participation (Garrett & Glied, 1997). In 1996, The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) tightened child SSI eligibility requirements (https://www.ssa.gov/policy/docs/ssb/v63n1/v63n1p3.pdf).

The endogenous variation in Medicaid eligibility precludes the use of a simple OLS model for estimation because I cannot address it with control variables, fixed effects, or time trends. Sociodemographic factors associated with higher Medicaid eligibility are likely also correlated with special education enrollment rates. Because Medicaid eligibility is disproportionally higher for single-parent and low-income families, estimates from a simple OLS model will likely reflect impacts on special education enrollment arising from changes in sociodemographic characteristics in addition to Medicaid policy changes. Further, because Medicaid eligibility varies due to sociodemographic factors (i.e., family structure and income) and income is negatively related to Medicaid eligibility, my measure of eligibility will overestimate eligibility from Medicaid policy changes for states with relatively low-income populations and underestimate Medicaid eligibility from policy changes for states with relatively high-income populations.[57] The direction of any expected bias from sociodemographic factors depends on whether these factors lead to overestimation or underestimation of Medicaid eligibility *on average* for the sample.

I separate the impacts of policy on Medicaid eligibility from other changes that affect eligibility by computing a measure of eligibility that only varies from changes in Medicaid

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[57] Existing descriptive evidence indicates that income and special education enrollment are negatively related (Glied et al., 1997; Li, 2017; Ohlson, 1998).

policy *by construction*.[58] By comparing family structures and incomes for children in a nationally representative CPS household sample against the corresponding Medicaid eligibility rules for each state and year, I can calculate the "simulated" percent of children eligible for Medicaid using the same process described in Section IV. Because I use a nationally representative CPS sample to compute simulated Medicaid eligibility, changes in simulated eligibility only arise from changes in Medicaid policy. Alternatively, changes in "actual" eligibility can arise from both Medicaid policy and changes in family structures and incomes. I convert contemporaneous simulated eligibility rates to average cumulative years of simulated Medicaid eligibility by summing contemporaneous simulated eligibility rates from birth to each age of childhood for each birth cohort. Thus, I observe simulated average cumulative years of Medicaid eligibility in each year of childhood for each cohort in each state. I predict actual eligibility using simulated eligibility and then include predicted eligibility values in regressions of special education enrollment on Medicaid eligibility.

Figure 7 plots actual and simulated Medicaid eligibility at each age for the 1984-1987 cohorts. The two measures track very closely, although simulated eligibility is slightly larger than actual eligibility. That simulated eligibility is slightly larger than actual eligibility suggests that the nationally representative CPS samples used to create simulated eligibility have

[58] Developed by Currie & Gruber (1996b) and Cutler & Gruber (1996a), the use of a simulated Medicaid eligibility instrument to isolate variation in Medicaid eligibility resulting from changes in Medicaid policy is now common in the Medicaid literature (e.g., Brown et al., 2015; Cohodes et al., 2016; Miller & Wherry, 2019).

sociodemographic characteristics that make them slightly *more* Medicaid eligible on average. In other words, expansion was larger on average in states with higher income populations. Thus, I would expect negatively biased estimates from a simple OLS model.

The exclusion restriction for simulated Medicaid eligibility to identify the causal effect of Medicaid eligibility on special education enrollment is that it only affects special education enrollment via its impact on actual eligibility. Simulated eligibility also satisfies the relevance condition for an instrument (i.e., simulated eligibility must be correlated with actual eligibility) because simulated eligibility is highly correlated with actual eligibility. This strong correlation is demonstrated in Figure 7 and first stage estimates in the first row of Table 5. Thus, simulated Medicaid eligibility is an appropriate instrument for actual eligibility because it causes variation in actual eligibility and is uncorrelated with special education enrollment when conditioned on actual eligibility.

Finally, identification also requires that Medicaid expansions are independent of special education enrollment. Because it is unlikely that policymakers set Medicaid policy as a function of future special education enrollment, the two are likely independent.

C. Estimating Equations

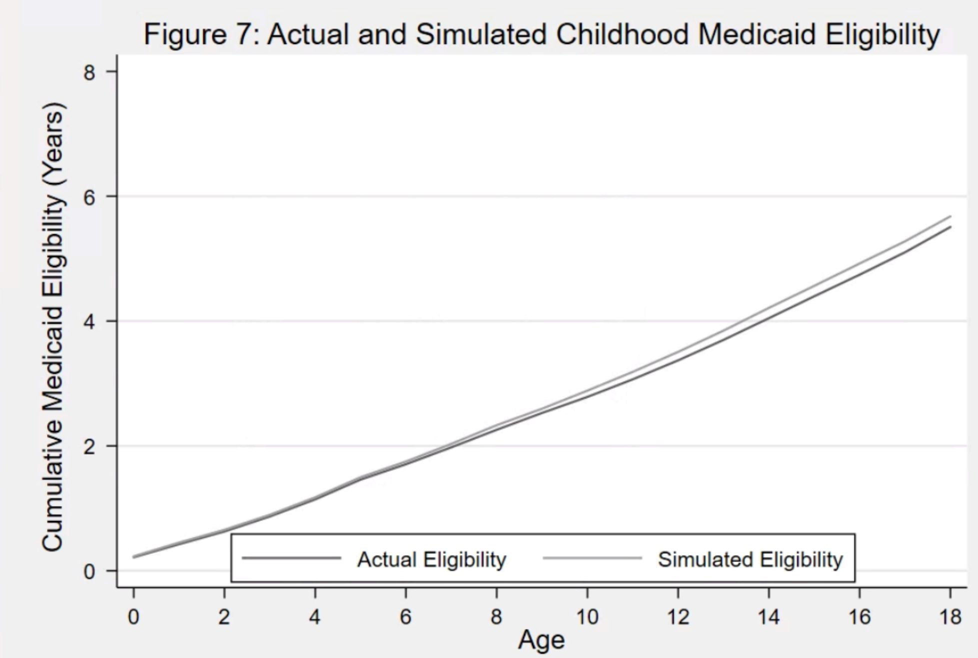
I estimate the effects of average cumulative years of Medicaid eligibility from changes in Medicaid policy on contemporaneous special education enrollment rates using a two stage least squares framework. I instrument actual eligibility with simulated eligibility, as in Equation 2. Equation 3 is the second stage regression in this instrumental variables model.

$$(2)\ Eligibility_{c,s,y} = \alpha_0 + \alpha_1\ Simulated\ Eligibility_{c,s,y} + X_{s,y} + C_c + Y_y + S_s + \delta_{s,y} + \varepsilon_{c,y}$$

(3) $Special\ education\ enrollment_{c,s,y} = \beta_0 + \beta_1\ Predicted\ Eligibility_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$

In Equation 2, $Simulated\ Eligibility_{c,s,y}$, is the simulated average cumulative years of Medicaid eligibility from birth through each age in childhood by cohort, state, and year. Equation 2 and 3 include the same state-year control variables, fixed effects, and state-specific time trends as in Equation 1. The coefficient estimates (α_0, α_1, etc.) from Equation 2 are used to obtain predicted values of actual eligibility, $Predicted\ Eligibility_{c,s,y}$, which vary from changes in Medicaid policy only. Thus, the instrumented values of actual eligibility are used to estimate causal effects of Medicaid eligibility on special education enrollment.

The coefficient on predicted Medicaid eligibility, β_1, captures the impact of an additional year of average cumulative Medicaid eligibility on the percent of children enrolled in special education. Thus, the impact of childhood Medicaid eligibility depends on whether or not the increased access to healthcare increases or decreases children's enrollment in special education. If Medicaid expansion generated increases in special education enrollment, β_1, will be positive. Alternatively, if Medicaid expansion generated decreases in special education enrollment, β_1, will be negative.



Source: Author's calculations based on CPS data. See text for description of the methods used to calculate actual and simulated cumulative Medicaid eligibility. 'Small Expansion' and 'Large Expansion' refer to quartiles of states with the smallest and largest expansions in Medicaid eligibility for the 1984 vs. 1987 cohorts. Both measures are averaged across small, medium, and large Medicaid expansion states and birth cohorts born in 1984-1987 for each age 0-18.

RESULTS

A. Baseline Estimates

The first and second rows of Table 5 present first and second stage estimates for enrollment across *all disabilities*. The first stage estimate shows a strong correlation between actual and simulated Medicaid eligibility measures.[59] The second stage estimate indicates a positive and statistically significant impact of Medicaid eligibility on special education enrollment. On average, an additional year of Medicaid eligibility during childhood increases special education enrollment at ages 6-18 by 2 percentage points. Given the mean special education enrollment rate of 12 percent, the estimate implies a 17 percent increase in special education enrollment. The third and fourth rows of Table 5 report estimates from models that exclude state-specific time trends, and state-specific time trends and state-year control variables, respectively.[60] Both estimates are consistently positive and statistically significant.

For comparison, the fifth and sixth rows of Table 5 report estimated effects from simple OLS and reduced form specifications.[61] Both estimates are positive, statistically significant, and

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[59] Lee et al. (2020) show that a true 5 percent test requires an F-statistic greater than 104.7 and maintaining 10 as a threshold requires replacing the critical value 1.96 with 3.43.
[60] Dave et al. (2008) suggest that estimates in previous papers that use the simulated Medicaid eligibility instrument empirical strategy are often sensitive to the addition of state-specific time trends, often erasing significant effects.
[61] Simple OLS regresses special education enrollment on un-instrumented actual eligibility. Alternatively, reduced form regresses special education enrollment on simulated eligibility.

smaller in magnitude than second row estimates. Comparing the OLS and IV estimates confirms that failing to address endogeneity in Medicaid eligibility results in negatively biased estimates.

B. Heterogeneous Treatment Effects

Heterogeneous Treatment Effects by Disability Category

The baseline estimates identify the effects of Medicaid eligibility on special education enrollment rates across *all disabilities*. However, it is likely that impacts of Medicaid eligibility on special education enrollment are different for students with different types of disabilities. For example, Cullen (2003) and Dhuey & Lipscomb (2011) find heterogeneous treatment effects of census funding on disability rates and special education enrollment by disability type. I present estimates for *severe* and *non-severe* disability categories in Table 6, and for each individual disability category in Table 7.

Estimates of the impacts of Medicaid eligibility on special education enrollment for those with *non-severe* disabilities are almost identical to the baseline estimates, while estimates for *severe* disabilities are small, positive, and only significant at the 90 percent confidence level. Further, among the individual disability categories the estimated effects are only positive and significant for *non-severe* disabilities, except for speech or language impairments (i.e., emotional disturbance, other health impairments, and specific learning disabilities).[62] In contrast, effects are not significant for any individual disability categories in the *severe* category (i.e., autism, hearing impairments, intellectual disabilities, orthopedic disabilities, and visual impairments). These findings support the assumption that the typical marginal special education enrollee has a *non-severe* disability. Because estimated effects for *all* and *non-severe* disabilities trend closely together, estimates for only *non-severe* and *severe* disabilities are provided hereafter.

Heterogeneous Treatment Effects During Different Stages of School

Disabilities are often diagnosed during different stages of childhood. For instance, many severe disabilities are diagnosed prior to a child's first year of school, while some non-severe disabilities are often not diagnosed until a few years after entering school.[63] Equation 4 presents a specification for estimating effects of Medicaid eligibility during elementary, middle, and high school on corresponding special education enrollment rates.

$$(4)\ \textit{Special education enrollment (Elementary School)}_{c,s,y} = \beta_0 + \beta_1\ \textit{Predicted Eligibility (Elementary School)}_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

[62] When state-specific time trends are excluded, estimated effects are not statistically significant for specific learning disabilities, and statistically significant at the 90 percent confidence level for speech or language impairments (0.6 ppt).
[63] For example, many specific learning disabilities may not become apparent in children until a few years after entering school (https://prntexas.org/when-where-and-how-are-disabilities-diagnosed/).

Estimated effects of Medicaid eligibility on special education enrollment during different stages of schooling are reported in Table 8. These estimates reduce variation as sample sizes shrink. For example, estimated effects during elementary school use 1,224 observations (4 cohorts • 6 ages • 51 states), as opposed to 2,652. Estimates during different stages of school indicate that an additional year of Medicaid eligibility during elementary school led to 1.8 percentage point increases in elementary school special education enrollment for non-severe disabilities, but to small (0.3 ppt) declines in elementary school special education enrollment for those with severe disabilities. Additionally, estimates are negative for special education enrollment during high school for those with non-severe disabilities (-1.3 percentage points), though only significant at the 90 percent confidence level.[64] Overall, these findings suggest that the effects of Medicaid eligibility on special education enrollment are concentrated in elementary school. This is plausible as much of special education enrollment occurs prior to age 11 (see Figure 2).[65]

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[64] I also estimated heterogeneous treatment effects during middle and high school combined. Estimates for this aggregate middle/high school group reduces sample sizes less (1,428 observations vs. 612 observations for the middle school and 816 observations for the high school group, respectively). None of the estimates for the middle/high school sample are statistically different from zero.

[65] In comparison, Cullen (2003) finds that "the non-physical disability rate is responsive to fiscal gains at both elementary and secondary grade levels, though the point estimate is over twice as large for the elementary grades."

Heterogeneous Treatment Effects by Age

$$(5)\ \textit{Special education enrollment}_{c,s,y} = \beta_0 + \beta_1\ \textit{Predicted Eligibility}_{c,s,y} + \beta_2\ \textit{Predicted Eligibility*Age 7}_{c,s,y} + \beta_3\ \textit{Predicted Eligibility*Age 8}_{c,s,y} + \ldots + \beta_{13}\ \textit{Predicted Eligibility*Age 18}_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

I also estimate effects by age using a model that includes interaction terms of Medicaid eligibility with each age (7-18), excluding age 6, as in Equation 5. These estimates are presented in Table 9. First row estimated effects of Medicaid eligibility on both non-severe and severe special education enrollment are negative and statistically significant for 6-year-olds. Estimates on each of the interaction terms (rows 2-13) are interpreted as the differential effects of Medicaid eligibility on special education enrollment, relative to effects for 6-year-olds. These estimates are all positive and statistically significant. Net effects tend to become less negative in each subsequent grade of early elementary school for both non-severe and severe disability enrollment. Net effects are positive for non-severe disability enrollment for ages 9-17.[66] However, standard errors are large and tend to increase at older ages. In contrast, net effects on severe disability enrollment after early elementary school grades are very close to zero.

Overall, these estimates suggest that the positive effects of Medicaid eligibility during elementary school for those with non-severe disabilities may be concentrated in late elementary

[66] The pattern of net effects of Medicaid eligibility on non-severe disability enrollment at each age in Table 9 is largely consistent with the trends in non-severe disability enrollment in Figure 2.

school. However, these estimated net effects are interpreted with caution as confidence intervals tend to include zero. Further, these estimates provide evidence that the effects of Medicaid eligibility on special education enrollment may be negative for both non-severe and severe disability enrollment at early ages of elementary school.[67]

Heterogeneous Treatment Effects by Birth Cohort

(6) $Special\ education\ enrollment_{c,s,y} = \beta_0 + \beta_1\ Predicted\ Eligibility_{c,s,y} + \beta_2\ Predicted\ Eligibility{*}Born\ in\ 1985_{c,s,y} + \beta_3\ Predicted\ Eligibility{*}Born\ in\ 1986_{c,s,y} + \beta_4\ Predicted\ Eligibility{*}Born\ in\ 1987_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$

The Medicaid expansions of the 1980s and 1990s extended coverage to progressively older children, relatively higher income families, and more inclusive family structures. It is plausible that effects of Medicaid eligibility may differ across birth cohorts. Equation 6 presents a specification for estimating effects by birth cohort, which includes interaction terms of Medicaid eligibility with the 1985, 1986, and 1987 birth cohorts. Estimates using this specification are presented in Table 10. These estimates indicate that net effects of Medicaid eligibility are positive for the 1985, 1986, and 1987 cohorts. Relative to the 1984 cohort, the

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[67] I also estimated heterogeneous effects for each age separately. Estimates by age greatly reduce variation as age variation is removed and sample sizes shrink from 2,652 to 204 (4 birth cohorts • 1 age • 51 states). These estimates are only significant at the 90 percent confidence level for 16-year-old children enrolled in special education with non-severe disabilities (1 percentage point).

effects of Medicaid eligibility on special education enrollment for those with non-severe disabilities are larger in each subsequent cohort.[68] Overall, these estimates suggest that effect sizes increased as Medicaid eligibility levels increased.

[68] I also estimated heterogeneous treatment effects for each birth cohort separately. Estimates by cohort greatly reduce variation as cross-cohort variation is removed and sample sizes shrink from 2,652 to 663 (1 birth cohort • 13 ages • 51 states). None of the estimated effects by birth cohort are statistically significant. However, estimated effects of Medicaid eligibility on non-severe enrollment are positive, statistically significant, and similar to baseline estimates for each cohort when state-specific time trends are excluded.

Table 5: Baseline Estimates

	(1) **Actual Eligibility**	(2) **Enrollment for Any Disability**
Baseline Specification		
Cumulative Eligibility	0.879***	-
	(0.063)	
	[81,565.66]	
Cumulative Eligibility (IV)	-	0.020**
		(0.008)
Alternate Controls		
Cumulative Eligibility (IV) FEs and controls only	-	0.017***
		(0.005)
Cumulative Eligibility (IV) FEs only	-	0.015**
		(0.006)
Alternate Specifications		
Actual Cumulative Eligibility (OLS)	-	0.009***
		(0.003)
Simulated Cumulative Eligibility (RF)	-	0.018**
		(0.007)

Number of observations is 2,652. Column (1) reports the estimate of α_1 from Equation 2 in the text. Columns (2) report estimates of β_1 from variants of Equation 1 and 3 in the text. Standard errors, reported in parentheses, are clustered at the state level. *F*-statistic, reported in brackets, is reported for the first stage estimate. Models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4, with the exception of Cumulative Eligibility (IV) FEs and controls only (which exclude state-specific time trends) and Cumulative Eligibility (IV) FE only (which exclude state-year control variables and state-specific time trends). Cumulative Eligibility estimate is from first stage regression of actual cumulative eligibility on simulated cumulative eligibility. Cumulative Eligibility (IV) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility for enrollment. Cumulative Eligibility (OLS) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility. Cumulative Eligibility (RF) estimates are from special education enrollment rates regressed on simulated cumulative years of Medicaid eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 6: Heterogeneous Treatment Effects by Disability Category

	(1) **Enrollment for Any Disability**	(2) **Enrollment for Non-Severe Disability**	(3) **Enrollment for Severe Disability**
Cumulative Eligibility	0.020**	0.019**	0.001*
	(0.008)	(0.008)	(0.001)

Number of observations is 2,652. Columns (1)-(3) report estimates of β_1 from Equation 3 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4. Cumulative Eligibility estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 7: Treatment Effects by Disaggregated Disability Categories

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Panel A: Non-Severe Disabilities					Panel B: Severe Disabilities			
	Emotional Disturbance	**Specific Learning Disability**	**Speech or Language Impairment**	**Other Health Impairment**	**Autism**	**Hearing Impairment**	**Intellectual Disability**	**Orthopedic Disability**	**Visual Impairment**
Cumulative Eligibility	0.003**	0.013**	-0.000	0.003***	0.000	0.000	0.001	0.000	0.000
	(0.001)	(0.005)	(0.005)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)

Number of observations is 2,652. Columns (1)-(9) report estimates of β_1 from Equation 3 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, and the control variables listed in Table 4. Cumulative Eligibility estimate is from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility for enrollment. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 8: Heterogeneous Treatment Effects During Different Stages of School

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility (Elementary School)	0.018**	-0.003**
	(0.008)	(0.001)
Cumulative Eligibility (Middle School)	0.004	0.000
	(0.004)	(0.001)
Cumulative Eligibility (High School)	-0.013*	0.000
	(0.007)	(0.002)

Number of observations are 1,224 for elementary school, 612 for middle school, and 816 for high school. Columns (1)-(2) report estimates of β_1 from Equation 4 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4. Cumulative Eligibility (Elementary School) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for children ages 6-11 only. Cumulative Eligibility (Middle School) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for children ages 12-14 only. Cumulative Eligibility (High School) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for children ages 15-18 only. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 9: Heterogeneous Treatment Effects by Age

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility	-0.020***	-0.006***
	(0.007)	(0.001)
Cumulative Eligibility*Age 7	0.008***	0.002***
	(0.002)	(0.000)
Cumulative Eligibility*Age 8	0.019***	0.003***
	(0.007)	(0.000)
Cumulative Eligibility*Age 9	0.023***	0.004***
	(0.004)	(0.001)
Cumulative Eligibility*Age 10	0.026***	0.005***
	(0.004)	(0.001)
Cumulative Eligibility*Age 11	0.026***	0.005***
	(0.005)	(0.001)
Cumulative Eligibility*Age 12	0.026***	0.005***
	(0.005)	(0.001)
Cumulative Eligibility*Age 13	0.026***	0.006***
	(0.006)	(0.001)
Cumulative Eligibility*Age 14	0.027***	0.006***
	(0.006)	(0.001)
Cumulative Eligibility*Age 15	0.025***	0.005***
	(0.007)	(0.001)
Cumulative Eligibility*Age 16	0.026***	0.006***
	(0.007)	(0.001)
Cumulative Eligibility*Age 17	0.026***	0.006***
	(0.007)	(0.001)
Cumulative Eligibility*Age 18	0.019**	0.005***
	(0.008)	(0.001)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 through β_{13} from Equation 5 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include interaction terms of Cumulative Eligibility with an indicator variable for each age, except age 6 (7-18), in addition to cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4. Cumulative Eligibility estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 10: Heterogeneous Treatment Effects by Birth Cohort

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility	-0.002	-0.001
	(0.010)	(0.001)
Cumulative Eligibility*Born in 1985	0.005***	0.001***
	(0.000)	(0.000)
Cumulative Eligibility*Born in 1986	0.010***	0.001***
	(0.001)	(0.000)
Cumulative Eligibility*Born in 1987	0.015***	0.001***
	(0.002)	(0.000)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 through β_4 from Equation 6 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include interaction terms of Cumulative Eligibility with each birth year, except 1984 (1985-1987), in addition to cohort, state, and year fixed effects, state-specific linear time trends, and the state-year control variables listed in Table 4. Cumulative Eligibility estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

ROBUSTNESS CHECKS

In this section, baseline estimates are tested for sensitivity to alternative constructions of Medicaid eligibility, the inclusion of different sets of controls variables, and estimates from a restricted baseline sample are compared against estimates from an alternate sample.

A. Effects of Birth Year Medicaid Eligibility

Equation 7 – Effects of Birth Year Medicaid Eligibility (Second Stage)

$$(7)\ \textit{Special education enrollment}_{c,s,y} = \beta_0 + \beta_1\ \textit{Predicted Eligibility (Birth Year)}_{c,s} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

Previous research suggests the importance of *in utero* Medicaid eligibility, specifically (Goodman-Bacon 2016, Levine and Schanzenbach 2009, Miller and Wherry 2019, Wherry and Meyer 2016). Equation 8 presents a specification to estimate the effects of birth year Medicaid eligibility on special education enrollment rates.[69] These estimates are reported in Table 11. There is a negative effect for severe disability enrollment (-0.8 percentage points), though only significant at the 90 percent confidence level.[70] These findings imply that *in utero* Medicaid eligibility may decrease severe disabilities but has less impact on non-severe disabilities.

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[69] Birth year eligibility serves as a proxy for *in utero* eligibility.
[70] I do not find any statistically significant effects of birth year Medicaid eligibility when I exclude state-specific time trends.

B. Effects of Medicaid Eligibility Through Different Stages of Childhood

Equation 8 – Effects of Medicaid Eligibility Through Different Stages of Childhood (Second Stage)

$$(8)\ \textit{Special education enrollment (Ages 6-18)}_{c,s,y} = \beta_0 + \beta_1\ \textit{Eligibility (Ages 0-5)}_{c,s} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

Table 12 presents estimates for the effects of cumulative Medicaid eligibility through different stages of childhood. For example, I estimate the effects of cumulative eligibility in early childhood (i.e., ages 0-5) on all future contemporaneous special education enrollment rates (ages 6-18). These estimates are positive and statistically significant for effects of cumulative eligibility from ages 0-11 on non-severe disability enrollment rates during ages 11-18, though only at the 90 percent confidence level.[71] Similar to effects of Medicaid eligibility during different stages of school (see Section VI), these finding suggest that effects of Medicaid eligibility on special education enrollment are largely concentrated in elementary school.

[71] I do not find any statistically significant effects of Medicaid eligibility during different stages of childhood when state-specific time trends are excluded.

C. Delayed Effects of Medicaid Eligibility

Equation 9 – Delayed Effects of Medicaid Eligibility (Second Stage)

$$(9)\ \textit{Special education enrollment}\ (t)_{c,s,y} = \beta_0 + \beta_1\ \textit{Eligibility}\ (t\text{-}d)_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y} \quad (\textit{such that } d = 1, 2, \dots, 6 \textit{ and } t = 6, 7, \dots, 18)$$

Several papers in the Medicaid literature suggest that some impacts of eligibility may take many years to manifest (Boudreaux et al. 2016, Currie et al. 2008, De La Mata 2012, Goodman-Bacon 2016, Miller and Wherry 2018, Thompson 2017, Wherry and Meyer 2016, Wherry et al. 2018). There may also be long-term effects of Medicaid eligibility on special education enrollment. For example, a child with a disability may gain access to Medicaid but not immediately visit a doctor or receive a diagnosis. Equation 9 presents a specification used to estimate delayed effects of Medicaid eligibility on special education enrollment. Table 13 reports these estimates.

Estimated delayed effects of Medicaid eligibility on non-severe enrollment are positive and statistically significant for eligibility from up to six years prior, increasing for each successive year between eligibility and enrollment.[72] Trends in estimated effects on non-severe disability enrollment are largely mirrored by severe disability enrollment, though effect sizes are

[72] Many estimated effects are also positive and statistically significant for delayed effects of Medicaid eligibility from more than 6 years prior on both non-severe and severe disability enrollment in time *t*. However, these effects are estimated using reduced samples sizes to accommodate the estimation of effects over longer time horizons.

much smaller. Overall, these large delayed estimated effects that tend to increase over time (through several years after receiving Medicaid eligibility) suggest that impacts of Medicaid eligibility on special education enrollment are long-lasting.

D. Non-linear Effects of Medicaid Eligibility

Equation 10 – Non-linear Effects of Medicaid Eligibility
(Second Stage)

$$(10)\quad \textit{Special education enrollment}_{c,s,y} = \beta_0 + \beta_1\, \textit{Predicted Eligibility}_{c,s,y} + \beta_2\, (\textit{Predicted Eligibility})^2_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

It is possible that there are diminishing marginal returns to Medicaid eligibility. Estimates from the baseline specification are tested for non-linear effects of Medicaid eligibility in Table 14, adding a squared term for Medicaid eligibility, as in Equation 10. There is no evidence of non-linear effects of Medicaid eligibility on special education enrollment.

E. Elasticity of Medicaid Eligibility and Special Education Enrollment

Equation 11 – Elasticity of Cumulative Medicaid Eligibility and Special
Education Enrollment (Second Stage)

$$(11)\quad Ln(\textit{Special education enrollment})_{c,s,y} = \beta_0 + \beta_1\, Ln(\textit{Predicted Eligibility})_{c,s,y} + X_{s,y} + C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

Further testing for non-linear effects of Medicaid eligibility, I calculate elasticities of Medicaid eligibility and special education enrollment rates using the specification presented in Equation 11. Table 15 presents these estimates. These estimates suggest that, on average, a doubling of average cumulative years of Medicaid eligibility increases non-severe disability enrollment rates by 34 percent.

F. Effects of Contemporaneous Medicaid Eligibility

Equation 12 – Effects of Contemporaneous Medicaid Eligibility
(Second Stage)

$$(12)\ \textit{Special education enrollment}_{c,s,y} = \beta_0 + \beta_1\ \textit{Predicted Contemporaneous Eligibility}_{c,s,y} + X_{s,y}\ C_c + S_s + Y_y + \delta_{s,y} + \varepsilon_{c,y}$$

Equation 13 presents a specification that estimates the effects of contemporaneous Medicaid eligibility on special education enrollment. Table 16 presents these estimates. Estimated effects are negative for severe disability enrollment (-0.3 percentage points) and only significant at the 90 percent confidence level.[73]

G. Effects of Cumulative Medicaid Eligibility Through Age 18

Equation 13 – Effects of Cumulative Medicaid Eligibility Through Age 18
(Second Stage)

$$(13)\ \textit{Cumulative years of special education enrollment (Age 18)}_{c,s} = \beta_0 + \beta_1\ \textit{Predicted Eligibility (Age 18)}_{c,s} + X_{c,s} + C_c + S_s + \delta_s + \varepsilon_c$$

Effects of cumulative years of Medicaid eligibility through age 18 on *cumulative* years of special education enrollment through age 18 are estimated in Table 17 using the specification

[73] I do not find any statistically significant effects of contemporaneous Medicaid eligibility when state-specific time trends are excluded.

presented in Equation 13.[74] This specification greatly reduces observations from 2,652 to 204 because these measures do not vary by age. There is no evidence for an effect of cumulative years of Medicaid eligibility through age 18 on cumulative years of special education enrollment through age 18.

H. Including Cohort-Specific Time Trends

Equation 14 – Including Cohort-Specific Time Trends (Second Stage)

$$(14)\quad \textit{Special education enrollment}_{c,s,y} = \beta_0 + \beta_1\, \textit{Predicted Eligibility}_{c,s,y} + X_{s,y}\ \ C_c + S_s + Y_y + \delta_{s,y} + C_c{*}\textit{Trend}_{c,y} + \varepsilon_{c,y}$$

Equation 14 presents a specification that includes cohort-specific time trends ($C_c*Trend_{c,y}$) in addition to state-specific time trends, the state-year controls from Table 4, and cohort, state, and year fixed effects. The inclusion of cohort-specific time trends controls for time-variant changes within cohorts. Estimates from this specification, in Table 18, are not statistically significant and close to zero for both severe and non-severe disabilities.[75]

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[74] I construct *Cumulative years of special education enrollment (Age 18)* the same way I construct average cumulative years of Medicaid eligibility through age 18, summing contemporaneous enrollment percentages for each year across ages 6-18 for each cohort in each state.

[75] Estimated effects on non-severe enrollment are positive, statistically significant and similar to baseline estimates when state-specific time trends are excluded.

I. Comparing Estimates from “Alternate” and “Restricted Baseline” Samples

Due to data limitations (discussed in Section IV), baseline analyses include birth cohorts born in 1984-1987 to accommodate the estimation of effects for all ages (6-18). This is because, *ex ante*, Medicaid eligibility may impact special education enrollment at all ages of childhood. However, my findings suggest that much of the effect of Medicaid eligibility on special education enrollment is concentrated in elementary school.

I test the robustness of estimates of Medicaid eligibility on special education enrollment for these relatively young groups using an alternate sample. This alternate sample consists of children born in 1988-1994 at ages 6-11. I compare estimates from this alternate sample with estimates from a “restricted baseline” sample, which consists of children born in 1984-1987 at ages 6-11.[76] Using these samples, I compare baseline estimates for “restricted baseline” and “alternate” samples for ages 6-11. I also compare estimated effects of Medicaid eligibility on special education enrollment during elementary school, and through early and elementary school stages of childhood. Finally, I compare estimated effects across samples for birth year eligibility.

[76] The “restricted baseline” sample consists of the same cohorts I use for baseline estimates but restricts ages to 6-11. This restricted baseline sample allows for a direct comparison of estimates from the alternate sample to baseline estimates.

Comparing Baseline Estimates

Table 19 compares baseline estimates (similar to Table 5 using Equations 1, 2, and 3) for the restricted baseline and alternate samples. Second stage point estimates of effects on enrollment for any disability are identical (1.6 percentage points).[77] OLS estimates are small, positive, and not statistically significant for both samples. This provides additional evidence for the importance of addressing the endogenous variation in Medicaid eligibility from changes in sociodemographic factors with the simulated Medicaid eligibility instrument.

Comparing Heterogeneous Treatment Effects of Medicaid Eligibility During Elementary School

Estimating effects during different stages of school for the baseline sample, much of the effect of Medicaid eligibility on special education enrollment is concentrated in elementary school (see Table 8). I compare estimates for effects of Medicaid eligibility on elementary school age special education enrollment for the restricted baseline and alternate samples in Table 20.

Estimated effects from the alternate sample are positive, statistically significant, and similar to estimates for elementary school age children from the restricted baseline sample for non-severe disability enrollment (2.1 vs 1.8 percentage points). In contrast to estimates from the restricted baseline sample, there are no significant effects of Medicaid eligibility on severe

[77] Overall, baseline estimates for both samples are very similar, though many estimates for the restricted baseline sample are only significant at the 90 percent confidence level. This is likely due to the smaller sample size for the restricted baseline sample, relative to the alternate sample (1,224 vs. 2,142).

disability enrollment for the alternate sample. Overall, these estimates provide strong support for the estimated effects of Medicaid eligibility on non-severe disability enrollment during elementary school from the baseline sample.

Comparing Effects of Medicaid Eligibility Through Early Childhood and Elementary School

The alternate sample is also used to test the robustness of estimated effects of cumulative eligibility through different stages of childhood. These results are presented in Table 21. Estimated effects of early childhood Medicaid eligibility (i.e., ages 0-5) on elementary school age (i.e., ages 6-11) contemporaneous special education enrollment rates are negative and statistically significant for non-severe and severe disability enrollment (-1.8 percentage points and -0.4 percentage points, respectively).[78]

Comparing Effects of Birth Year Medicaid Eligibility

The alternate sample is also used to test the robustness of estimated effects of birth year Medicaid eligibility. These results are presented in Table 22. Similar to estimates from the restricted baseline sample, estimated effects are negative for severe disability enrollment and only statistically significant at the 90 percent confidence level, and not statistically different from

[78] This large, negative, statistically significant effect is very different from previous effects of Medicaid eligibility on non-severe disability enrollment.

zero for non-severe disabilities.[79] I also find a large, positive, statistically significant effect for non-severe disabilities from the restricted baseline sample.

J. Interstate Migration

One potential concern for identification is interstate migration because I cannot track individuals across states over time. If interstate migration is uncorrelated with Medicaid eligibility, this measurement error will bias estimates toward zero. If, however, families with children who have a relatively higher propensities for special education enrollment (i.e., low-income children) are more likely to migrate into states with higher levels of Medicaid eligibility, this bias could lead me to overestimate effects of Medicaid eligibility on special education enrollment. This direction of migration follows that posited by the "welfare magnet" hypothesis: that states with high levels of public benefits will attract poor migrants.

First, the threat of interstate migration to my identification strategy is weak because effects are estimated for cumulative eligibility on contemporaneous enrollment rates during childhood.[80] Second, there is little empirical evidence to support the welfare magnet hypothesis,

[79] Similar to estimates from the baseline sample, I do not find any statistically significant effects of birth year Medicaid eligibility when state-specific time trends are excluded.
[80] Interstate migration is a larger concern for studies that estimate effects over longer time horizons, such as effects of childhood Medicaid eligibility on later life outcomes.

particularly with respect to Medicaid.[81] Thus, interstate migration is an unlikely source of bias for my estimates.

[81] Cohodes et al. (2016) and Schwarts & Sommers (2014) find no evidence to support interstate migration consistent with the welfare hypothesis in response to Medicaid expansions, while Brueckner (2000) finds mixed evidence in a survey of previous literature that is not specific to Medicaid.

Table 11: Effects of Birth Year Medicaid Eligibility

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Birth Year Eligibility	0.024	-0.008*
	(0.020)	(0.005)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 from Equation 7 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4. Birth Year Eligibility estimates are from special education enrollment rates regressed on actual contemporaneous Medicaid eligibility instrumented by simulated contemporaneous eligibility, for birth year eligibility only. *p < 0.10, **p < 0.05, ***p < 0.01.

‘

Table 12: Effects of Medicaid Eligibility Through Different Stages of Childhood

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility (Ages 0-5)	0.003	-0.001
	(0.005)	(0.001)
Cumulative Eligibility (Ages 6-11)	0.004	-0.000
	(0.003)	(0.001)
Cumulative Eligibility (Ages 0-11)	0.003*	-0.000
	(0.002)	(0.001)
Cumulative Eligibility (Ages 12-18)	-0.007	0.002
	(0.017)	(0.003)

Number of observations are 2,652 for Cumulative Eligibility (Ages 0-5), 1,632 for Cumulative Eligibility (Ages 6-11) and (Ages 0-11), and 204 for Cumulative Eligibility (Ages 12-18). Columns (1)-(2) report estimates of β_1 from Equation 8 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, the state-year control variables listed in Table 4. Cumulative Eligibility (Ages 0-5) estimates are from special education enrollment rates during ages (6-18) regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 0-5 only. Cumulative Eligibility (Ages 6-11) estimates are from special education enrollment rates during ages (12-18) regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 6-11 only. Cumulative Eligibility (Ages 0-11) estimates are from special education enrollment rates during ages (12-18) regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 0-11 only. Cumulative Eligibility (Ages 12-18) estimates are from special education enrollment rates at age 18 regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 12-18 only. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 13: Delayed Effects of Medicaid Eligibility

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility	0.019**	0.001*
	(0.008)	(0.001)
Cumulative Eligibility (t-1)	0.017**	0.002**
	(0.007)	(0.001)
Cumulative Eligibility (t-2)	0.018**	0.002***
	(0.007)	(0.001)
Cumulative Eligibility (t-3)	0.025***	0.003***
	(0.007)	(0.001)
Cumulative Eligibility (t-4)	0.030***	0.004***
	(0.007)	(0.001)
Cumulative Eligibility (t-5)	0.035***	0.005***
	(0.007)	(0.001)
Cumulative Eligibility (t-6)	0.039***	0.005***
	(0.007)	(0.001)

Number of observations is 2,652 for each model. Columns (1)-(2) report estimates of β_1 from Equation 9 in the text for cumulative year of eligibility from up to 6 years earlier (i.e. t = 0, 1, … , 6). Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4. Cumulative Eligibility (t-*d*) estimates are from special education enrollment rates in time *t* regressed on actual years of Medicaid eligibility instrumented by simulated years of eligibility, for cumulative eligibility from *d* years prior to time *t.* For example, Cumulative Eligibility (t-1) estimates are from special education enrollment rates at age 6-18 regressed on corresponding predicted cumulative year of Medicaid eligibility from at ages 5-17. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 14: Non-linear Effects of Medicaid Eligibility

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility	0.024***	0.000
	(0.008)	(0.001)
Cumulative Eligibility (squared)	-0.001	0.000
	(0.001)	(0.000)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 from Equation 10 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include a squared term for eligibility, in addition to cohort, state, and year fixed effects, state-specific time trends, the state-year control variables listed in Table 4. Cumulative Eligibility and Cumulative Eligibility (squared) estimates are from special education enrollment rates regressed on a linear and squared term for actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 15: Elasticity of Medicaid Eligibility and Special Education Enrollment

	(1) **Log Enrollment for Non-Severe Disability**	(2) **Log Enrollment for Severe Disability**
Log Cumulative Eligibility	0.337**	-0.047
	(0.154)	(0.120)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 from Equation 11 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4. Log Cumulative Eligibility estimates are from logged special education enrollment rates regressed on logged actual percent change in cumulative years of Medicaid eligibility instrumented by simulated percent change in cumulative years of Medicaid eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 16: Effects of Contemporaneous Medicaid Eligibility

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Contemporaneous Eligibility	0.002	-0.003*
	(0.010)	(0.002)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 from Equation 12 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, the state-year control variables listed in Table 4. Contemporaneous Eligibility estimates are from special education enrollment rates regressed on contemporaneous actual Medicaid eligibility rates instrumented by contemporaneous simulated Medicaid eligibility rates. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 17: Effects of Cumulative Medicaid Eligibility Through Age 18

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility (Age 18)	-0.007	0.007
	(0.072)	(0.019)

Number of observations is 204. Columns (1)-(2) report estimates of β_1 from Equation 13 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort and state fixed effects, state-specific time trends, and state-year control variables listed in Table 4 averaged over ages (6-18) for each cohort and U.S. state. Cumulative Eligibility (Age 18) estimates are from "cumulative years of special education enrollment through 18" regressed on actual cumulative years of Medicaid eligibility through age 18 instrumented by simulated cumulative years of Medicaid eligibility through age 18. See text for description of "cumulative years of special education enrollment through 18." *p < 0.10, **p < 0.05, ***p < 0.01.

Table 18: Effects of Medicaid Eligibility (including Cohort-Specific Time Trends)

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility	-0.002	-0.001
	(0.006)	(0.001)

Number of observations is 2,652. Columns (1)-(2) report estimates of β_1 from Equation 14 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort-specific time trends, in addition to cohort, state, and year fixed effects, state-specific time trends, the state-year control variables listed in Table 4. Cumulative Eligibility estimate is from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 19: Baseline Estimates for Alternate and Restricted Baseline Samples

	(1) **Actual Eligibility**	(2) **Enrollment for Any Disability**
Baseline Specification		
Cumulative Eligibility	0.979***	-
[Restricted baseline sample]	(0.081)	
Cumulative Eligibility	0.965***	-
[Alternate sample]	(0.099)	
Cumulative Eligibility (IV)	-	0.016*
[Restricted baseline sample]		(0.008)
Cumulative Eligibility (IV)	-	0.016***
[Alternate sample]		(0.004)
Alternate Controls		
Cumulative Eligibility (IV) FEs and controls only	-	0.014***
[Restricted baseline sample]		(0.004)
Cumulative Eligibility (IV) FEs and controls only	-	0.013***
[Alternate sample]		(0.005)
Cumulative Eligibility (IV) FEs only	-	0.016***
[Restricted baseline sample]		(0.004)
Cumulative Eligibility (IV) FEs only	-	0.015**
[Alternate sample]		(0.006)
Alternate Specifications		
Actual Cumulative Eligibility (OLS)	-	0.005
[Restricted baseline sample]		(0.004)
Actual Cumulative Eligibility (OLS)	-	0.002
[Alternate sample]		(0.003)
Simulated Cumulative Eligibility (RF)	-	0.015*
[Restricted baseline sample]		(0.008)
Simulated Cumulative Eligibility (RF)	-	0.016***
[Alternate sample]		(0.004)

Number of observations is 1,224 for the restricted baseline sample and 2,142 for the alternate sample. These samples are described in Section VII, I of the text. Column (1) reports the estimate of α_1 from Equation 2 in the text. Columns (2) report estimates of β_1 from variants of Equation 1 and 3 in the text. Standard errors, reported in parentheses, are clustered at the state level. Models include cohort, state, and year fixed effects, state-specific time trends, and the state-year control variables listed in Table 4, with the exception of *Cumulative Eligibility (IV) FEs and controls only* (which excludes state-specific time trends) and *Cumulative Eligibility (IV) FEs only* (which excludes state-year controls and state-specific time trends). Cumulative Eligibility estimates are from first stage regression of actual cumulative eligibility on simulated cumulative eligibility. Cumulative Eligibility (IV) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility. Cumulative Eligibility (OLS) estimates are from special education enrollment rates regressed on actual cumulative eligibility. Cumulative Eligibility (RF) estimates are from special education enrollment rates regressed on simulated cumulative eligibility. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 20: Alternate and Restricted Baseline Samples – Effects of Medicaid Eligibility During Elementary School

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility (Elementary School)	0.018**	-0.003**
[Restricted baseline sample]	(0.008)	(0.001)
Cumulative Eligibility (Elementary School)	0.021***	-0.000
[Alternate sample]	(0.004)	(0.001)

Number of observations is 1,224 for the restricted baseline sample and 2,142 for the alternate sample. These samples are described in Section VII, I of the text. Columns (1)-(2) report estimates of β_1 from Equation 4 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific linear time trends, and the control variables listed in Table 4. Cumulative Eligibility (Elementary School) estimates are from special education enrollment rates regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for children ages 6-11. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 21: Alternate and Restricted Baseline Samples – Effects of Medicaid Eligibility Through Different Stages of Childhood

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility (Age 0-5) [Restricted baseline sample]	0.014 (0.011)	-0.005*** (0.002)
Cumulative Eligibility (Age 0-5) [Alternate sample]	-0.018** (0.007)	-0.004** (0.002)
Cumulative Eligibility (Age 6-11) [Restricted baseline sample]	-0.004 (0.010)	-0.001 (0.003)
Cumulative Eligibility (Age 6-11) [Alternate sample]	-0.001 (0.006)	-0.003 (0.003)
Cumulative Eligibility (Age 0-11) [Restricted baseline sample]	-0.007 (0.008)	-0.001 (0.002)
Cumulative Eligibility (Age 0-11) [Alternate sample]	0.009 (0.012)	-0.002 (0.002)

Number of observations is 1,224 for Cumulative Eligibility (Age 0-5) and 204 for Cumulative Eligibility (Age 6-11) and Cumulative Eligibility (Age 0-11) for the restricted baseline sample. Number of observations is 2,142 for Cumulative Eligibility (Age 0-5) and 357 for Cumulative Eligibility (Age 6-11) and Cumulative Eligibility (Age 0-11) for the alternate sample. These samples are described in Section VII, I of the text. Columns (1)-(2) report estimates of β_1 from Equation 8 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific time trends, the state-year control variables listed in Table 4. Cumulative Eligibility (Ages 0-5) estimates are from special education enrollment rates from ages (6-11) regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 0-5. Cumulative Eligibility (Ages 6-11) estimates are from special education enrollment rates at age 11 regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 0-11. Cumulative Eligibility (Ages 0-11) estimates are from special education enrollment rates at age 11 regressed on actual cumulative years of Medicaid eligibility instrumented by simulated cumulative eligibility, for eligibility from age 0-11. *p < 0.10, **p < 0.05, ***p < 0.01.

Table 22: Alternate and Restricted Baseline Samples – Effects of Birth Year Medicaid Eligibility

	(1) **Enrollment for Non-Severe Disability**	(2) **Enrollment for Severe Disability**
Cumulative Eligibility (Birth Year) [Restricted baseline sample]	0.092**	-0.020***
	(0.038)	(0.006)
Cumulative Eligibility (Birth Year)	-0.011	-0.006*
[Alternate sample]	(0.012)	(0.004)

Number of observations is 1,224 for the restricted baseline sample and 2,142 for the alternate sample. These samples are described in Section VII, I of the text. Columns (1)-(2) report estimates of β_1 from Equation 7 in the text. Standard errors, reported in parentheses, are clustered at the state level. All models include cohort, state, and year fixed effects, state-specific linear time trends, and the state-year control variables listed in Table 4. Cumulative Eligibility (Birth Year) estimates are from special education enrollment rates regressed on actual birth year Medicaid eligibility instrumented by simulated birth year eligibility, all for children ages 6-11. *p < 0.10, **p < 0.05, ***p < 0.01.

CONCLUSION

This paper provides the first estimates of the impacts of childhood Medicaid eligibility on special education enrollment for a variety of separable disabilities. I find statistically significant increases in special education enrollment resulting from increased childhood Medicaid eligibility, primarily among children enrolled in special education with “non-severe” disabilities. I also find evidence that these effects are largely concentrated in elementary school. These estimates are robust to a variety of tests and indicate that an additional year of cumulative Medicaid eligibility increases special education enrollment rates by approximately 2 percentage points.

These findings suggest that Medicaid eligibility aids in the enrollment of children with disabilities in special education. Increased special education enrollment from Medicaid eligibility is indicative of more children with disabilities receiving necessary special education accommodations. Thus, Medicaid eligibility likely improves student welfare for children with disabilities and their peers.

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