The Effects of Fiscal Incentives in Special Education: Evidence from Capitation Finance Reforms

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Abstract

This study measures how state capitation reforms for special education finance affected student disability and placement rates from 1991-92 to 2003-04. Capitation refers to distributing funds based on the size of the entire student population. We conclude that capitation lowered disability rates, most strongly in subjectively diagnosed categories and in early and late grades. Findings suggest that capitation reforms led to an immediate decline in less severe disability rates but a lagged policy response in more severe categories. The evidence supports an increased use of outside school placements among severe disabilities that is consistent with an incentive-based response. The disability rate decline among high school students partly reflects a higher rate of program exiting. We find little evidence that capitation raised mean state-level request rates for dispute resolution. Finally, we present evidence of differential effects of capitation reforms based on both the pre-reform system and the strength of the incentive change.

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1. Introduction

Special education programs provide additional services to students with disabilities based on their individual needs. Accordingly, educating students with disabilities constitutes a significant financial commitment for school districts. One recent study estimates that districts spend 90 percent more money on the average special education student than they do on the average regular education student (Chambers, Parrish, and Harr, 2004). Between 1991 and 2003, the U.S. special education enrollment rate grew steadily from 11.6 percent to 13.5 percent, suggesting that the nation's financial commitment to special education is growing as well.

In recent years, several economic studies have focused on changes in program funding incentives as a determinant of the steady growth in the special education enrollment rate. Cullen (2003) attributes 40 percent of the growth in special education enrollment in Texas between 1992 and 1997 to changes in incentives to identify disabilities. More recently, Kwak (2008) concludes that California's special education enrollment rate declined in response to a finance reform that instituted a capitation model in part to curtail the fiscal incentive to identify student disabilities. Mahitivanichcha and Parrish (2005a) reach qualitatively similar conclusions about the average effect of adopting capitation finance reforms using a state-level panel.[1]

This study builds on the work of Mahitivanichcha and Parrish (2005a) to answer additional questions about fiscal incentives in special education. The analysis utilizes evidence from a natural experiment brought about by states adopting capitation finance reforms for special education that are predicted to change the incentive to identify

[1] See Greene and Forster (2002) for a similar analysis, and Mahitivanichcha and Parish (2005b) for a more thorough review of the literature.

disabilities. Specifically, nine states between 1991 and 2003 began distributing special education funds to districts based on total student enrollment rather than traditional factors like special education enrollment, resources used, or actual expenditures.[2] The literature refers to these reforms as "census funding." Census-based models try to remove the link between funding and local decision making over disability identification and placement. The link exists because school districts should be more likely to provide special education services as the additional compensation they receive from the state rises in relation to the additional cost. Under the capitation model, districts do not receive additional funds by identifying additional children with disabilities or by providing them additional services.

Our study adds to the literature on capitation reforms in special education by considering a more diverse set of outcomes, by examining a longer time period, and by testing for differential effects of reform policies. For instance, we investigate the effects of capitation finance reforms at the category of disability level and by grade.[3] We also include specifications with three lead and lag variables of the policy change both to examine the year-to-year policy response and to test for possible pre-existing differences in enrollment rate trends. Other sections of the analysis consider whether capitation reforms had distributional effects across educational placement settings, increased the rate of program exiting, contributed to a higher rate of dispute resolution requests, or affected school resource usage. Lastly, we use several strategies to examine whether

[2] The states are Alabama, Alaska, California, Connecticut, Idaho, Massachusetts, Montana, North Dakota, and Pennsylvania. See Appendix for further details.

[3] The list of federal disability categories includes emotional disturbance, learning disabilities, other health impairments, speech and language impairments, autism, deaf-blindness, developmental delay, hearing impairments, mental retardation, multiple disabilities, orthopedic impairments, and traumatic brain injury.

states experienced heterogeneous effects due to capitation reforms based on their pre-reform funding system or the strength of their incentive change.

The results contribute to the general literature on cost containment strategies for public service provision, where fee-for-service type payment can lead to excessive spending. Health care plans like Medicare increasingly use capitation rather than fee-for-service as the reimbursement model for providers. Providers who are part of Health Maintenance Organizations (HMOs) generally receive a fixed payment to treat plan members. The capitation model reduces the inherent moral hazard problem in a fee-for-service system but increases a provider's incentive to avoid costly patients and to provide as little care as possible (Newhouse, 1996). Hill and Brown (1990) present evidence that is consistent with healthier individuals choosing to enroll in HMOs in larger numbers. Krueger (1990) and Kubik (1999) also examine the sensitivity of disability caseloads to benefit generosity. Much of the literature in these areas has focused on programs where families are the target of the financial incentives rather than institutions. Special education differs because the financial implications of student placements are for the school and not the family.[4]

Using a state-level panel, we find that census-funding reforms are associated with an eight to ten percent reduction in state special education enrollment rates between 1991-92 and 2003-04. The data also reveals a marginally significant association between census reform and less special education funding per pupil. However, revenue changes explain only a small part of capitation's effect on disability rates. Most of the enrollment rate decline occurred in the categories of specific learning disabilities and mental

[4] Parents and schools share the authority of determining special education eligibility and designing individualized educational programs for each disabled student. Our state-level data is generated by the outcome of this collection decision-making process.

retardation.[5] These disabilities are known as "soft" disabilities because diagnosing them is more subjective and less medically determined than diagnosing impairments like deafness or blindness (Parrish, 2002). Mental retardation, however, is oftentimes more severe than most learning disabilities. Thus, the effect of implementing census-based reforms was not confined only to non-severe disabilities. In fact, we find that the severe disability rate declined more as a percentage of its baseline rate, although more gradually.

The reductions in these "soft" categories affected the share of disabled children served in different educational environments. Most notably, census funding increased the rate of outside school placement among students with severe disabilities. This particular finding arguably reflects an incentive-based response along with the compositional shift in disability types. Outside placements are the most expensive and the most seldom used treatment option. Yet all census systems contain exceptions for extraordinarily high-cost student needs. Our findings are consistent with school districts relying more heavily on outside school placements because they became more cost minimizing on the margin than providing services in-house.[6]

Disability rates declined under census funding either because student exiting from special education programs grew or because disability identification itself fell. We explore all eight federally recognized reasons for exiting special education programs and find that, among 9th through 12th grade students with disabilities, census funding is associated with an increased dropout rate and marginally significant increases in both transfers to regular education and graduation with a diploma. Higher program exit rates

[5] Cullen (2003) finds that the largest responses to incentive changes in Texas were in the categories of learning disability and speech impairment.
[6] Similarly, Cullen (2003) finds that the use of different placement settings in Texas relates to the funding weight attached to each.

among these students support our additional finding that the earliest and latest grades experienced the largest enrollment rate effects. Growth in exit rates, however, explains only a minority of the overall enrollment rate decrease in these grades. The residual decline represents either more frequent exiting at earlier ages or a latent reduction in disability identification.

The next part of the analysis considers whether census-based reforms increase special education dispute resolution requests. A capitation system could lead to more disputes on the margin between parents and school districts because the state does not reimburse districts for providing additional services. The results with available data are positive but statistically imprecise, and provide little support for growth in mean state-level dispute rates per special education student due to census funding.

The last section of the analysis tests for heterogeneous effects of census policies. First, we interact the census variable with each state's disability rate in the first year of the sample period to proxy for the presumed strength of incentive changes. Second, we consider differential effects based on the type of pre-reform system in place. Third, we expand our definition of census systems to include states that use capitation in part, and then test for different effects. The findings in each case provide support for heterogeneous effects on student disability rates.

2. The Disability Identification and Placement Process

The Individuals with Disabilities Education Act (IDEA) requires that children with disabilities have access to a free appropriate public education that is tailored to their specific needs. The federal law describes the framework that districts need to follow for

identifying disabilities and developing special education programs. Disability identification and placement under IDEA is a collaborative process. The identification process begins with a referral by either a child's parent or a qualified school employee, such as a teacher. A school's psychologist, a physician, or an educational diagnostician then conducts an evaluation to assess whether the child has a disability. School officials along with the child's parents determine eligibility for special education based on the outcome of the evaluation.

If a child is identified to have a disability, a team is formed to draft an Individualized Education Program (IEP). An IEP is a legal document that outlines the services that districts must provide, the anticipated frequency and duration of the services, how the child is assessed, and how progress toward annual goals is measured. The IEP team consists of the parents, regular education teacher, a special education teacher, a qualified district official, an individual trained in assessment evaluation, and in some cases the child.

A key feature of the federal identification and placement process is that school officials and parents make all the decisions. This allows for subjectivity in the decision-making process and for practices to vary across states. For instance, the special education enrollment rates in California and Rhode Island in 2003 were 10.5 and 19.9 percent, respectively. Local decision-making also permits enrollment rates to vary over time within states even if the incidence of disabilities does not. This paper investigates whether differences in funding incentives drive part of this variation.

3. Special Education Funding Systems

Special education funding systems are very complex and differ by state. They all require that districts provide services to meet special education needs. The differences lie in how funding formulas distribute revenue for special education to districts. Parrish et al. (2003) classify state special education finance systems into six broad categories: pupil weights, flat grant, resource-based, percentage reimbursement, variable block grant, and census. These systems typically make district apportionments a function of factors like special education enrollment, the services provided, or the number and type of staff members employed. Pupil weights attach a funding weight to each disability category. Flat grants provide a fixed amount per special education student. A resource-based formula weights the educational inputs that districts use, such as types of special education teachers. The percentage reimbursement formula subsidizes a portion of special education expenditures. Finally, variable block grants base apportionments on prior year allocations, expenditures, and special education enrollment.

The census funding model is different because the vast majority of funding is based solely on total district enrollment or average daily membership. Equally sized districts receive practically the same grant regardless of whether they have one child with an identified disability or one thousand. From an economic perspective, census funding does not eliminate fiscal incentives so much as it redirects them in the opposite direction. Like all capitation reforms, census-based models incentivize reducing caseloads and services provided as a cost-containment strategy.[7] It forces the districts that spend more

[7] Census-based reforms could create additional incentives to indentify more children if large increases in benefit generosity accompany them. In practice, however, expenditures on children with disabilities exceed the special education funds that most districts receive. Additional special education funds are likely to induce at least partial fiscal substitution on the part of districts rather than increasing special education

on special education than they receive from the state to pay for the full difference by raising additional taxes or by reducing expenditures in other areas of the budget. In contrast, the other models effectively reduce the per-unit price of providing special education services. This fundamental shift in the way that funding incentives are aligned led to a reduction in enrollment rates and a change in the distribution of educational placements in census states.

4. Data Sources

The U.S. Department of Education collects annual state-level data on identified disability counts, the educational environments serving children with disabilities, and program exits.[8] This study uses data on all 50 states from 1991-92 to 2003-04.[9] The total sample size is 650 state-year observations. We combine these data with state-level measures from the Common Core of Data, the *Digest of Education Statistics*, and other government documents.

The Department of Education's disability count data tabulates the number of students in each disability category by age. Over 70 percent of all children with disabilities have either a specific learning disability or a speech or language impairment, which are generally classified as "non-severe." Learning disabilities alone represent over half of special education enrollment. Since funding incentives may affect the identification of non-severe and severe disabilities differently, we consider them separately as well as together. Following California's designation that is outlined in

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spending. In general, any reason to increase identification because of census funding makes our estimates conservative.

[8] These data are available online at https://www.ideadata.org/StateLevelFiles.asp.

[9] The exit data are first available in 1993. We do not include the 2003 data in the analysis because of substantial missing observations.

Parrish et al. (2000), we define non-severe disabilities to include specific learning disabilities, speech or language impairments, emotional disturbances, and other health impairments. Although other health impairments is a miscellaneous category, it is used for children diagnosed with ADD or ADHD. All remaining categories form our severe disability definition.

Assigning severity at the category of disability level is a rough approximation of the severity of individual student needs. However, we believe our distinction between non-severe and severe disabilities is reasonable because it closely approximates the difference between lower and higher cost disabilities. Chambers, Shkolnik, and Pérez (2003) estimate per pupil spending in each disability category for 1999-00. The four lowest cost disabilities in Exhibit 1 of their report are the four categories included in the non-severe grouping.

Figure 1A combines the child count data with total student enrollment from the *Digest of Education Statistics* and plots the special education enrollment rate trend between 1976 and 2003. The figure corroborates the widely documented growth in special education enrollment. Figure 1B focuses on the sample period used in this research and reveals that disability rates increased in both non-severe and severe categories.

The educational environment data, provided by the U.S. Department of Education, disaggregates the child count data by the type of instructional setting. There are eight educational environment categories that can be separated into two main groups: in-school placements and outside placements. About 96 percent of all special education students are educated in regular schools. Students in this group differ in how much of the

school day they spend receiving special education instruction outside the regular classroom. Children with speech impairments, for example, typically spend most of the day in a regular classroom and receive targeted special education services on a periodic basis. In contrast, children with severe disabilities may receive most of their education in special day classes.

The educational environment categories for in-school placements count the number of children by disability spending less than 21 percent, 21 percent to 60 percent, and more than 60 percent of their school days outside the regular classroom. The remaining education environments are outside placements, which we aggregate, given the small number of children in these settings.[10] This leaves us with four educational environment categories in the analysis.

Figures 2A-2D depict the trends for each educational environment. Each line represents the percent of children in the appropriate disability category placed in a given educational environment. Collectively, these figures suggest that children with disabilities are spending more time in the regular classroom. For example, Figure 2A shows that between 1991 and 2003, the fraction of special education enrollment spending less than 21 percent of the school day out of the regular class increased 15 percentage points from 35 percent to 50 percent. This increase was matched by reductions in each of the more intensive environment categories. The trends are particularly clear for severe disabilities. Figure 2A and 2B show steady increases in the percentage of students with severe disabilities spending most of the school day in the regular classroom. In contrast,

[10] Outside school educational environments are: homebound/hospital, private residential facilities, private separate schools, public residential facilities, and public separate schools.

Figure 2C and 2D show steady declines in the percent of placements outside the regular class more than 60 percent of the school day and outside the regular school altogether.

Figures 1 and 2 illustrate an important special education trend over this period: special education enrollment rates grew while children with disabilities spent less time, on average, outside the regular classroom. Figure 2 may reflect changes in the way districts are treating disabilities or a reduction in the average severity level of children with identified disabilities. We believe that compositional change is a particularly compelling explanation given the changes in enrollment reported in Figure 1B.

The program exit data counts the number of 14-22 year old students with disabilities in each state and year who leave special education programs. The data separate exits by the following categories: transfers to regular education, drop outs, graduates with a diploma, graduates with a certificate of completion, students who move and are known to be continuing, students who move and are not known to be continuing, students reaching the maximum age, and death.[11] Since the program exit data starts being collected at age 14, we calculate exiting rates by dividing the number of students in each category by total special education enrollment among 9^{th} through 12^{th} graders.

Finally, dispute resolution data comes from Ahearn (2002). Parents and school districts have a right to due process in the event that disagreements arise. In practice, most disagreements are resolved before by the parties and not through formal adjudication. Our dispute resolution analysis uses data on due process hearings requested.

[11] According to the data definitions, dropouts refer to traditional dropouts, runaways, GED recipients, expulsions, status unknown, and other students not specified in other categories. GED recipients may be counted as graduates with a certificate of completion if they can enroll in a GED program and secondary school simultaneously.

5. Empirical Framework

Our base specification is the following empirical model:

$$Y_{st} = \beta_0 + \beta_1 C_{st} + X_{st}\gamma + T_t\delta + S_s\phi + \varepsilon_{st}\,.$$

The subscript *s* denotes states and the subscript *t* denotes years from 1991 to 2003. The dependent variable Y_{st} varies by regression equation. For the initial part of the analysis, Y_{st} represents the fraction of total state enrollment with an identified disability.[12] We then separate the enrollment rate into non-severe and severe categories and then by individual disability categories. Next, Y_{st} describes the educational environment. It is the fraction of special education enrollment placed in each environment calculated separately for non-severe and severe disabilities. In the third part of the analysis, Y_{st} represents program exit rates. Finally, Y_{st} is the number of requests for dispute resolution per 1,000 special education students. The vector T is a set of year indicators that capture average annual changes in the dependent variable. The vector S is a set of state fixed effects that isolate all time invariant factors.

The variable C_{st} is an indicator for whether state *s* used census funding in year *t*. Parrish et al. (2003) surveyed states about their special education funding systems up to 1999-00. *Education Week* (2004) updated the Parrish et al. survey data to 2003-04. The Appendix lists the nine states that adopted census funding and the school year these reforms became effective. X_{st} is a vector of time-varying controls. It includes the state unemployment rate, the percent enrolled in free lunch, the percent black, Hispanic, or other race, the average monthly Supplemental Security Income disability payment, an

[12] Most of the analysis uses special education enrollment among children who are 6-21 years old. Restricting special education enrollment to 6-17 year olds leads to similar findings.

indicator for the date of the introduction of an accountability system, and an indicator for whether plaintiffs have won a school finance case at the state Supreme Court level.[13]

The coefficient of interest is β_1, the net effect of switching financing regimes that may include a change in the level of funding per student. Because states adopting census funding used different pre-reform funding mechanisms, the size of the incentive change differs across states. Our estimates of β_1 are average effects and we report clustered standard errors at the state level.

Whenever identification comes from a policy change there is a concern about endogeneity related to a state's motivation for implementing the policy. In this case, states enacted census funding in part to mitigate funding incentives that promoted disability identification. From the standpoint of measuring the average state response to the policy, this is not problematic so long as omitted time-varying factors are uncorrelated with both the implementation of census funding and the dependent variables. To the best of our knowledge, census reforms were not bundled with other policy changes that would cause a spurious relationship. Nevertheless, our vector of control variables helps account for this possibility.

Another possible issue is whether states introduced census funding after a period of rapid special education enrollment rate growth. The concern is that the effects we attribute to census funding reflect the degree of pre-reform growth, growth that plateaus

[13] Most of these variables come from the Common Core of Data or the *Digest of Education Statistics*. The SSI data was collected from the Social Security Bulletin - Annual Statistical Supplement for each year. Data regarding accountability systems are from Hanushek and Raymond (2005) and supplemented by government documents. Data on school finance cases comes from the National Center for Education Statistics. Murray, Evans, and Schwab (1998) show that school finance reform affected the distribution of educational resources. Finally, state-level unemployment data was collected from the BLS. Data on Limited English Proficiency (LEP) is available from 1998-2003. Including the available LEP data along with an indicator for missing information does not qualitatively change any results and the LEP variable is statistically insignificant. These results are available from the authors upon request.

and falls on its own. In this case, census funding may not have an independent effect. Our examination of state level trends indicates that census states did not have special education growth rates exceeding the national average in the years preceding reform.[14] We also include specifications that add three lead and lag terms of C_{st} to directly test for deviations in trend.

Lastly, changing budget sizes, enrollment trends, resource costs, and resource usage may be important predictors of changing disability rates that are related to census funding. These factors are endogenous and are not part of X_{st}., meaning that our estimates are net of their influence. Nevertheless, we do include a couple specifications that control for them to characterize the extent to which they attenuate β_1. Specifically, these select specifications include the log of total state enrollment, special education revenue per pupil, the difference between total and special education revenue per pupil, the log of average teacher salaries, and the pupil teacher ratio along with X_{st}.[15] In the analysis, we also run parallel regressions that use these endogenous controls as dependent variables to directly test for associations with adopting census funding.

6. Results

A. Special Education Enrollment Rates

Table 1 presents the first set of empirical results. The dependent variable is the number of 6 to 21 year old children identified with disabilities divided by total student enrollment.[16] The specification in column 1 includes only state and year fixed effects as controls and is not population weighted. The unweighted results treat each state equally

[14] State level special education enrollment trends are available from the authors upon request.
[15] These controls were collected from the *Digest of Education Statistics.*
[16] Total enrollment includes all students in grade 1 through grade 12 plus students in ungraded classes.

regardless of size. They are arguably the most policy relevant because they estimate the average response in census states to the policy change.[17] The coefficient indicates that the average effect of adopting census funding is a 1.25 percentage point reduction in the special education enrollment rate.[18]

Our preferred specification is column 2, which includes a vector of time-varying controls along with the state and year fixed effects but leads to a similar coefficient on census funding. Based off a mean of 12.86, the coefficient implies a 9.7 percent reduction, which is similar to estimates reported by Mahitivanichcha and Parrish (2005a).[19] The only statistically significant control variable is a negative coefficient on percent Hispanic. The lack of significance on the introduction of a state accountability system is particularly interesting in light of findings from several recent state and local level studies that accountability systems are associated with increased special education placement (Cullen and Reback, 2006; Figlio and Getzler, 2002; Jacob, 2005). To our knowledge, the only other national study investigating this issue is Hanushek and Raymond (2005), which finds a similarly insignificant response for 1995-2000.

The point estimate on census funding in column 2 is net of changing state enrollment trends, funding levels, and resource usage, factors that may explain why disability rates fell. The third column explores this issue by adding several potentially endogenous control variables to gauge the extent to which they attenuate the coefficient on census funding. In this specification, total enrollment has a statistically negative point

[17] Findings are qualitatively similar in total enrollment-weighted specifications, but the coefficient on census funding is somewhat smaller in magnitude.
[18] The findings are qualitatively similar by individually omitting each census state from the analysis. Results in all specifications are also similar with regional time trends.
[19] Their Table 2 includes a main effect of census funding and an interaction with a linear time trend. For 1995 – the midpoint of their sample – we interpret a 10.2 percent reduction based off a mean rate of 11.5.

estimate and special education revenue per pupil has a statistically positive coefficient, but both may be purely mechanical relationships. The more interesting finding is that the coefficient on census funding falls by only 14 percent to 1.07, implying an 8.3 percent effect size. In other words, just a small part of the effect of census funding on disability rates appears to operate through changes in these other variables.

A more direct way to analyze the endogenous controls is to treat them as outcome variables in a series of parallel regressions. The results, provided in Table 2, show a marginally significant correlation between census reforms and a reduction in special education funding per pupil. The findings are insignificant for changes in other school revenue per pupil, teacher salaries, the pupil teacher ratio, and total enrollment. Collectively, Table 2 provides some evidence that census funding affected special education revenue levels but little evidence that it affected enrollment trends or school resource usage.[20]

Table 3 separately examines the percent of total enrollment identified with non-severe and severe disabilities. Cullen (2003) found that the response to incentive changes was strongest for non-severe disabilities in Texas. Our results indicate that adopting census funding decreased the enrollment rate in both categories.

Once again, we use three different specifications for each level of severity. We find little difference in the coefficients in columns 1 and 2 and for columns 4 and 5. Some attenuation occurs when we add the potentially endogenous controls in columns 3 and 6. The linearity of the specifications means that the point estimates in each respective set of non-severe and severe results adds to the point estimates for all disabilities in Table 1.

[20] In unreported results, we find a statistically imprecise relationship between census funding and overall revenue and expenditure levels per student.

Thus, the evidence from our preferred specifications (columns 2 and 5) suggest that 74 percent of the total percentage point decline is due to a reduction in non-severe disability categories. The percent decline implied by the point estimates, however, is actually larger for severe disabilities (14.1 percent versus 8.7 percent) when compared to each respective baseline rate.

We explore these results further in Table 4 by considering how quickly rates of non-severe and severe disabilities responded to the change in fiscal incentives. The specifications look like columns 2 and 5 in Table 3 except that they represent census reforms through three lag and lead variables along with a variable to indicate the reform year.[21] The table also reports corresponding F-statistics that test for year-to-year differences in the effects.

The findings suggest that the rate of severe disabilities responded more gradually than the rate of non-severe disabilities. The F-statistic is statistically significant in the reform year for non-severe disabilities, indicating a quick response. In contrast, F-statistics are insignificant for severe disabilities until two and three years following the reform year. The more gradual policy response for severe disabilities suggests that school districts have relatively less flexibility over classifying students in these categories and in changing the status of already classified students.

Both specifications report insignificant coefficient estimates and F-statistics in pre-reform years. The lack of significant relationships helps to mitigate the concern that what we are calling a policy-based response is actually a pre-existing difference in trend between census and non-census states. As with most reform initiatives, state legislatures

[21] We define the third lead variable as "3 or more years after reform." The reference group includes state-year observations that are four or more years prior to reform.

debated capitation reforms prior to passing them. For instance, California's finance reform passed in 1997 even though it did not become effective until 1998. It is likely that educators in other census states anticipated their impending finance reform as well. The findings for non-severe disabilities do show some imprecise evidence of reductions immediately prior to reform. Yet the predominant response appears to be in the reform year itself.

Table 5 completely disaggregates disabilities into the thirteen federally recognized categories. The advantage of this approach is a finer level of detail with which to examine the effects of the policy change. Panel A shows the point estimates on census funding for non-severe disability categories whereas Panel B displays the point estimates for the severe disabilities. The four point estimates in Panel A sum to the point estimate in column 2 of Table 3. The only precisely estimated coefficient at the five percent level is for specific learning disabilities (i.e. dyslexia, developmental aphasia, etc.), which fell by about 7.5 percent.

Panel B displays the results for severe disability categories. Most of the estimates are close to zero in magnitude and only two are statistically significant. First, census funding appears to have led to a small, but statistically significant, drop in visual impairment. We know of no previously documented evidence to corroborate this finding. The largest contributor by far to the decline in severe disability rates is mental retardation. We find that the introduction of census funding decreased the rate of mental retardation by 0.28 percentage points of the overall 0.32 percentage point decline for severe disabilities.

Drops in severe disability rates suggest that some definitions may be subjectively applied. In particular, Parrish (2002) refers to mental retardation as a "soft" disability for this reason. IDEA defines mental retardation as "…significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance."[22] The definition provides no context for what constitutes subaverage intellectual functioning or a deficit in adaptive behavior, let alone which adaptive behaviors must apply. The American Association of Mental Retardation (AAMR) quantifies subaverage intellectual functioning as an IQ score of 70-75 or below.[23] The IQ threshold that school districts choose in practice helps distinguish between cases of mild mental retardation and cases of severe learning disability.

At least one study documents the role of definitional changes in affecting disability rates. Shattuck (2006) concludes that part of the growth in autism in the U.S. is due to diagnostic substitution in specific learning disabilities and mental retardation. Further related evidence comes from Parrish (2002), who concludes that states with special education funding formulas based on categories of disabilities – in contrast to census models – are more likely to over-identify minorities in mental retardation.

The coefficient in the mental retardation specification reflects the combination of children reclassified to another disability category and out of the special education system entirely. To the extent that diagnostic substitution into non-severe categories exists, our estimates under-represent changes that are occurring in non-severe categories.[24]

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[22] 20 U.S.C. 1401(3); 1401(30)
[23] See www.aamr.org.
[24] Part of the debate about the rise of autism includes concerns about subjective identification. The results in Table 5 suggest it may not be as subjective as other categories.

B. Educational Environments

The next set of results, found in Table 6, pertain to the educational environment in which students are placed. Panels A and B report results separately for non-severe and severe disability categories. The dependent variable in each column is the share of special education enrollment placed in each special education environment category. The findings suggest how census funding affected placements among students with identified disabilities.

The general result is that census funding shifted the distribution of educational environments toward more time outside the regular classroom during a period when the nationwide trend was the opposite. The finding is interesting because the effect is theoretically ambiguous. On one hand, capitation is a cost-containment strategy that could lead to less time outside the regular classroom because special education services are expensive.[25] On the other hand, it is associated with reduced disability rates. This would increase the average share of the day outside the regular classroom by increasing the average severity of the disabled population, assuming that students who are marginally in need of special education services are the ones who are no longer identified as disabled.

The results indicate that the compositional effect on educational placement settings was stronger. Panel A reveals that census funding affected the least intensive environments most strongly among students with non-severe disabilities. Specifically, it is associated with a 7.50 percentage point or 13.7 percent decline in the proportion of students that spend less than 21 percent of the school day in a special education

[25] Special education aides can be assigned to children with disabilities in regular classrooms. As a result, children can continue to receive special education instruction in that environment.

environment outside the regular classroom. The distributional shift is marked by an equivalent cumulative percentage point rise in the other educational environments.

Panel B indicates that changes to the share of children with severe disabilities across educational environments are somewhat different. The key result is the 29.7 percent increase in outside placements. Unlike in Panel A, there is reason to believe this is an incentive-based response because all census reforms contain provisions for reimbursing exceptionally high cost placements (Parrish et al, 2003). For example, California continued to reimburse 100 percent of the "excess cost" of some nonpublic school placements. Excess costs are those that exceed a district's average annual per pupil spending level. The continued subsidy in California made nonpublic school placements more cost minimizing on the margin than if school districts provided services themselves.

The finding about outside school placements is consistent with observations in the health insurance literature about hospital "upcoding" of Medicare patients to more highly reimbursed diagnoses. Medicare provides a fixed payment to hospitals for each eligible patient they treat within certain diagnosis categories. Silverman and Skinner (2004) find that the share of patients with pneumonia and respiratory infections in the most highly reimbursed diagnosis category rose 10 to 37 percentage points between 1989 and 1996. Dafney (2005) uses a 1988 Medicare reform that changed the reimbursement rates for a large number of patients to show that hospitals upcoded patients to the categories with the largest reimbursement increases. Dafney further notes that diagnostic upcoding augments hospital revenue without changing any real aspects about patient care. Switching children with disabilities to an outside school placement is different because these settings

typically involve higher levels of both service intensity and special education spending. Nevertheless, state reimbursements make these high-cost educational placements attractive under capitation finance from a district budgetary perspective, even if they do not contain costs from the perspective of states.

C. Program Exiting

Students with disabilities can exit special education programs through a variety of means. For example, they can transfer to regular education, drop out of school, graduate, move, or reach the maximum age required by law to provide services. This section explores whether census reforms are associated with an increased exit rate from special education programs. If so, the findings provide evidence on a possible mechanism through which census funding may reduce the enrollment rate.

Table 7 reports the results from the exiting analysis.[26] Panel A shows the coefficient on census funding using the number of 14-22 year old special education students who exited in each category, divided by 9th through 12th grade special education enrollment, as the dependent variable. Although the data report that only five percent of these students drop out in a given year, census funding is associated with a significant 25.9 percent increase in dropping out. This association may partly reflect compositional changes to enrollment. More severely disabled students may be more likely to drop out, and children with the least disabling conditions in each category may be the ones who are enrolling less in special education programs. The findings also provide marginally significant evidence of increased rates of transferring to regular education and graduation

[26] These specifications control for changes in compulsory education laws in addition to the previous controls listed in column 2 of Table 1.

with a diploma. These estimates convert to 38.9 percent and 16.4 percent increases, respectively. The results for the remaining categories, such as moving and death, are imprecise and numerically small.

While the findings present evidence that census funding increased program exits, they also indicate that exiting explains less than half of the total enrollment rate decline for high school aged students. Panel B illustrates this by replacing the denominator of each dependent variable with overall 9^{th} through 12^{th} grade enrollment. Although most of the resulting coefficients are insignificant, each represents the part of the decline in the special education enrollment rate among high school students that can be explained by each category of program exiting. Together, they show a 0.35 percentage point increase in exiting overall due to census funding.

In contrast, the bottom of Table 7 notes that the reduction in the special education enrollment rate among 9^{th} through 12^{th} grade students due to census funding is 1.21 percentage points. In other words, more frequent exiting in high school explains only 29 percent of enrollment rate decrease. This is important because increased exiting and decreased disability identification are the only two possible mechanisms through which census funding could decrease the enrollment rate. Based on Table 7, we conclude that the residual enrollment rate decline is evidence of either greater exiting in earlier grades or a latent reduction in disability identification.

D. Grade Level Responses

The next set of results addresses the question of whether census funding had differential effects on grade-level disability rates. The IDEA data includes information on

childhood disabilities by age. Along with information from the *Digest of Education Statistics* on enrollments per grade, in Table 8 we calculate a measure of the percent of children who are receiving special education services in each grade.[27] Therefore, the dependent variable in column 1 is the disability rate in grade 1, measured by the number of disabled six year olds divided by the enrollment in first grade in each year and in each state. Each subsequent grade is calculated similarly.

We find some evidence that the beginning of census funding affects the special education rate differently depending on the point in the educational process. Although grade-to-grade differences in the estimates are not statistically different, they tend to be larger in the earliest and latest grades when disability rates are smaller. For instance, the estimated 1.12 percentage point decline in 1st grade implies a 12.4 percent reduction. We estimate only a 6.8 percent reduction by the end of elementary school, but find an 11.7 percent reduction in grade 12.

E. Requests for Dispute Resolution

Capitation finance may also be associated with an increase in dispute resolution requests for special education matters. In collaborative processes like determining special education eligibility and placement, disagreements are bound to arise in some cases. IDEA guarantees parents and school districts the right to due process in resolving special education disputes. In practice, the vast majority of disputes settle before they are adjudicated by an administrative law judge, making the request for a due process hearing a more relevant outcome variable than the number of judicial decisions issued.

[27] The measure will include measurement error because school entry cut-off dates, retention, and delayed entry may cause each grade to have children of different ages. However, our state and time fixed effects should pick up much of these differences.

It seems plausible that disagreements would become more frequent under census funding because school districts incur additional costs but no longer obtain state reimbursement for providing additional special education services. We are able to test whether the introduction of census funding affects requests for due process hearings using data collected by Ahearn (2002). Column 1 of Table 9 provides the results from a specification that uses the total number of requests for due process hearings as the dependent variable. The findings reveal a positive but statistically imprecise relationship.

Lipscomb (2009) finds that placement settings are the most frequently cited issue of dispute in California, a state with one of the highest rates of dispute resolution requesting. This suggests that census funding may be associated with a higher rate of dispute resolution requests per special education enrollment. Column 2 provides these estimates, but finds a similarly insignificant average effect.[28]

F. Heterogeneous Effects of Census Funding Policies

The last section of the analysis conducts several tests for differential effects of census-based reform policies. For example, we first ask whether disability rates fell more in states where switching to capitation represented a larger incentive change. As a proxy for the strength of incentives, we use each state's disability rate in 1991-92, the initial year of our sample. We interact the initial student disability rate with the census-based reform indicator and include the interaction as an additional regressor. Panel A of Table 10 contains the results, which are run separately for the overall disability rate and by severity. The interaction term has a statistically negative coefficient in all three

[28] Lipscomb (2009) finds a larger and statistically precise point estimate on census funding using a population-weighted approach, suggesting that the policy change had a more sizable effect in larger states. If additional years of data were available, a statistically precise unweighted effect may emerge as well.

specifications, supporting the argument that states experiencing larger presumed incentive changes also experienced a larger decline in disability rates.

In Panel B, we ask whether census reform had differential effects on disability rates based on the type of pre-reform system. Our specifications include three main explanatory variables: indicators for census states that switched from pupil weighting models, percent reimbursement models, and other types.[29] Each variable is associated with a statistically significant reduction in the overall special education enrollment rate. The key result is that switching from a pupil weighting system leads to a more substantial drop in the disability rate than does switching from a percent reimbursement model. In other words, the evidence suggests that capitation has a larger effect in states where pre-reform allocations were a function of identified disability counts rather than a percentage of special education spending. We see similar patterns by focusing just on non-severe or severe disabilities, although the estimates are somewhat noisier.

Currently, several states use hybrid finance models that involve both capitation and another type of funding process. We might expect that finance reform in these states had a smaller effect on disability rates than it did in states that switched entirely to capitation funding. We examine this possibility by including an indicator for adopting a partial census model. We also expand our definition of census-based reform to include these additional states. [30] The findings in Panel C again support differential effects for

[29] See Table 10 for the pre-reform system used in each census state.

[30] The states are Missouri, South Dakota, Utah, and Vermont. Funding formulas in these states involve both total district size and factors related to resource usage or identified needs. Missouri's formula uses average daily membership and the number and type of special education staff. South Dakota uses a census-based model for non-severe disability categories and a pupil-weighting model for other categories. Utah bases funding amounts on changes to total district enrollment and a measure of reported special education needs in 1989-90. Finally, Vermont uses a cost reimbursement framework along with average daily membership (Parrish et al, 2003).

overall and non-severe disability rates. For example, full census models are associated with a 1.24 percentage point decline in the overall disability rate but partial models are associated with a 0.16 percentage point rise. The two effects are statistically different and we fail to reject a zero effect on partial census models.

In Panel C, column 3, we do not reject equal effects for severe disabilities. The similarity of the two models in this case highlights for policymakers that the predicted effects of partial capitation reforms will depend on the details of the system designed. The empirical findings for severe disabilities based on the partial census models currently in use suggest that they may place greater emphasis on reducing severe disability rates than non-severe disability rates.

7. Conclusion

During the 1990s, disability rates climbed steadily and special education students spent less time out of the regular classroom. By examining only the trends, it is difficult to see that the introduction of capitation funding reforms had an opposite effect. This paper shows that there was a significant decrease in the number of students enrolled with both non-severe and severe disabilities, and that there were significant shifts in the environments serving these students. It also presents evidence that census funding increased special education exit rates among high school aged students.

The findings suggest that census-based reforms affected special education enrollment more strongly in the earliest and the latest grades, and their effects likely took more than a year to be fully realized in the case of severe disabilities. We see little evidence that census funding increased the average state rate of due process hearing

requests to resolve disputes. However, we do present evidence from three tests showing differential effects of census policies based on the type of pre-reform system and the presumed change in fiscal incentives.

An enticing question is whether census funding leads to under-identification and under-serving of disabilities. The funding model certainly refocuses incentives in that direction. The problem is that we do not know the extent to which disabilities were previously over-identified or over-served. What we can say is that census funding changed how fiscal incentives are aligned and districts responded to these changes. As other states debate the implementation of census-based reforms, they should view fiscal incentives in the finance formula as one variable that influences the identification and placement of children with disabilities.

At the same time, policymakers and researchers ought to consider how special education classification affects students' schooling experiences. To what extent do schools provide additional services to students without disabilities based on their individual needs? Do special education programs increase student performance? Is it beneficial or detrimental to have more classmates with identified disabilities?

Research evidence on student outcomes is remarkably rare. Most of the research comes from Hanushek, Kain, and Rivkin (2002), who find that special education programs boost math achievement among students with disabilities in Texas. Moreover, a higher enrollment rate does not appear to be a detriment to students with no reported disability. Similarly, Friesen, Hickey, and Krauth (2008) find that attending a school with a higher special education enrollment rate does not have a large effect on the test scores of either disabled or non-disabled students in British Columbia. Given the financial

commitment involved in special education, further research along these lines would contribute greatly to education policy debates.

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Table 1
The effect of switching to census funding on the percent of 6-21 year olds in special education, 1991-2003

Census funding	**-1.251**	**-1.242**	**-1.068**
	(0.285)	(0.301)	(0.220)
Plaintiff victory		-0.434	-0.135
		(0.387)	(0.305)
Percent free lunch		1.582	0.765
		(1.184)	(0.996)
Accountability system		0.205	0.124
		(0.141)	(0.144)
SSI payment		-0.003	0.112
		(0.188)	(0.174)
Unemployment Rate		-0.021	-0.027
		(0.080)	(0.067)
Black		-0.060	0.058
		(0.140)	(0.120)
Hispanic		**-0.114**	0.143
		(0.054)	(0.101)
Other race		-0.018	0.047
		(0.151)	(0.108)
ln(Enrollment)			**-7.934**
			(2.447)
Special Ed Revenue per pupil			**0.986**
			(0.411)
Other School Revenue per pupil			0.106
			(0.172)
ln(Average teacher salary)			-0.447
			(0.986)
Pupil teacher ratio			0.109
			(0.092)
Dependent var. mean	12.859	12.859	12.859
Dependent var. sd	(2.023)	(2.023)	(2.023)

Note: All regressions include state and year fixed effects. Columns 2 and 3 also include an indicator for missing free lunch data. SSI payments are reported in $1,000's. Standard errors are clustered at the state level and each regression contains 650 observations. Bold coefficients are significant at the 5% level.

Table 2
The effect of switching to census funding on school resource levels, 1991-2003

	Coefficient (Std. Dev.)	Dep. Var. Mean (Std. Dev.)
Special education revenue per pupil	-0.107	0.324
	(0.059)	(0.287)
Other school revenue per pupil	-0.121	8.912
	(0.245)	(1.905)
Ln(Average teacher salary)	-0.007	3.869
	(0.024)	(0.171)
Pupil teacher ratio	-0.252	16.296
	(0.308)	(2.265)
Ln(enrollment)	0.004	13.165
	(0.015)	(0.980)

Note: Special education revenue per pupil and other school revenue per pupil are reported in $1,000's. Average teacher salary was converted to $1,000's before taking the natural log. All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Number of observations is 650. Bold coefficients are significant at the 5% level.

Table 3
The effect of switching to census funding on the percent in special education, by severity

	Non-severe disabilities			Severe disabilities		
Census funding	**-0.919**	**-0.920**	**-0.778**	**-0.332**	**-0.323**	**-0.291**
	(0.275)	(0.274)	(0.197)	(0.133)	(0.130)	(0.123)
Plaintiff victory		-0.249	0.050		-0.185	-0.185
		(0.335)	(0.312)		(0.153)	(0.158)
Percent free lunch		1.544	0.763		0.038	0.002
		(1.045)	(0.917)		(0.563)	(0.545)
Accountability system		0.177	0.100		0.028	0.025
		(0.149)	(0.146)		(0.063)	(0.060)
SSI payment		0.010	0.111		-0.013	0.001
		(0.186)	(0.176)		(0.053)	(0.053)
Unemployment Rate		-0.001	-0.014		-0.021	-0.013
		(0.079)	(0.068)		(0.029)	(0.032)
Black		-0.090	0.022		0.031	0.036
		(0.157)	(0.142)		(0.056)	(0.059)
Hispanic		-0.079	0.161		**-0.035**	-0.018
		(0.051)	(0.104)		(0.016)	(0.029)
Other race		-0.028	0.041		0.010	0.006
		(0.143)	(0.107)		(0.040)	(0.038)
ln(Enrollment)			**-7.575**			-0.359
			(2.557)			(0.732)
Spec. Ed Revenue per pupil			**0.785**			0.201
			(0.346)			(0.145)
Other School Revenue per pupil			0.048			0.059
			(0.198)			(0.055)
ln(Avg teacher salary)			-0.049			-0.398
			(1.012)			(0.293)
Pupil teacher ratio			0.089			0.020
			(0.091)			(0.033)
Dependent var. mean	10.571	10.571	10.571	2.288	2.288	2.288
Dependent var. sd	(1.920)	(1.920)	(1.920)	(0.818)	(0.818)	(0.818)

Note: All regressions include state and year fixed effects. Columns 2, 3, 5 and 6 also include an indicator for missing free lunch data. SSI payments are reported in $1,000's. Standard errors are clustered at the state level. Each regression contains 650 observations. Bold coefficients are significant at the 5% level.

Table 4
Including lag and lead effects of switching to census funding on the percent enrolled in special education, by severity

	Non-severe disabilities		Severe disabilities	
	Coefficient (Std. Dev.)	F statistic test $year_t$-$year_{t-1}$=0	Coefficient (Std. Dev.)	F statistic test $year_t$-$year_{t-1}$=0
3 Years Before Reform	-0.41		0.01	
	(0.28)		(0.07)	
2 Years Before Reform	-0.65	2.24	0.28	1.38
	(0.37)		(0.25)	
1 Year Before Reform	-0.60	0.04	-0.03	1.25
	(0.41)		(0.08)	
Reform Year	-0.93	**8.66**	-0.06	0.49
	(0.49)		(0.09)	
1 Year After Reform	**-1.08**	3.11	-0.11	2.78
	(0.50)		(0.10)	
2 Years After Reform	**-1.20**	1.67	-0.18	**6.59**
	(0.46)		(0.12)	
3 or More Years After Reform	**-1.59**	1.37	**-0.37**	**5.23**
	(0.51)		(0.17)	

Note: All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Rates based on disabilities identified in children aged 6-21. Number of observations is 650. Bold coefficients are significant at the 5% level.

Table 5
The effect of switching to census funding on the percent in special education, by disability

	Coefficient (Std. Dev.)	Dep. Var. Mean (Std. Dev.)
Panel A: Non-severe Disabilities		
Emotional Disturbances	-0.172	1.068
	(0.137)	(0.533)
Other Health Impairments	-0.191	0.547
	(0.101)	(0.509)
Specific Learning Disabilities	**-0.477**	6.356
	(0.223)	(1.414)
Speech and Language	-0.080	2.600
	(0.098)	(0.719)
Panel B: Severe Disabilities		
Autism	-0.004	0.122
	(0.012)	(0.109)
Deaf - Blindness	-0.004	0.005
	(0.005)	(0.008)
Developmental Delay	-0.0003	0.120
	(0.058)	(0.223)
Hearing Impairments	-0.015	0.159
	(0.008)	(0.035)
Mental Retardation	**-0.277**	1.440
	(0.114)	(0.804)
Multiple Disabilities	-0.002	0.263
	(0.072)	(0.335)
Orthopedic Impairments	-0.004	0.145
	(0.017)	(0.166)
Traumatic Brain Injury	-0.001	0.032
	(0.007)	(0.035)
Visual Impairments	**-0.011**	0.057
	(0.004)	(0.016)

Note: All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Rates based on disabilities identified in children aged 6-21. Number of observations is 650 except in the developmental delay regression where it is 350. Bold coefficients are significant at the 5% level.

Table 6
The effect of census funding on the percent placed in each special education environment

	In school placement			Placement outside school
	Out of regular class <21% of school day	Out of regular class 21% to 60% of school day	Out of regular class >60% of school day	
Panel A: Non-severe disabilities				
Census funding	**-7.50**	**6.46**	0.87	0.18
	(3.03)	(2.77)	(0.86)	(0.24)
Dependent var. mean	54.92	30.77	11.84	2.46
Dependent var. sd	(14.88)	(12.69)	(7.42)	(1.67)
Panel B: Severe disabilities				
Census funding	-2.57	3.59	-4.07	**3.06**
	(3.01)	(2.24)	(3.49)	(1.08)
Dependent var. mean	19.81	25.93	43.97	10.29
Dependent var. sd	(12.66)	(11.72)	(14.55)	(8.24)

Note: All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Rates based on disabilities identified in children aged 6-21. Number of observations is 650. Bold coefficients are significant at the 5% level.

Table 7
The effect of census funding on exiting from special education programs among 14-22 year old students by exit category, 1993-2002

	Regular Education	Dropped Out	Graduated		Moved		Reached Max Age	Died
			Diploma	Certificate	Known	Not Known		
Panel A: Exits per 9th-12th Grade Special Ed Enrollment								
Census Funding	1.648	**1.313**	1.413	0.160	1.216	-0.241	0.037	0.017
	(0.884)	(0.483)	(0.762)	(0.344)	(0.663)	(0.893)	(0.075)	(0.014)
Dependent var. mean	4.238	5.056	8.639	1.767	7.431	3.202	0.295	0.105
Dependent var. sd	(3.447)	(1.945)	(2.973)	(2.189)	(3.723)	(2.237)	(0.332)	(0.046)
Panel B: Exits per 9th-12th Grade Total Enrollment								
Census Funding	0.171	0.111	0.027	-0.016	0.085	-0.028	0.002	0.001
	(0.127)	(0.070)	(0.107)	(0.035)	(0.102)	(0.100)	(0.010)	(0.001)
Dependent var. mean	0.548	0.668	1.161	0.231	0.974	0.411	0.038	0.014
Dependent var. sd	(0.419)	(0.283)	(0.518)	(0.298)	(0.526)	(0.279)	(0.041)	(0.006)
Sample size	488	500	500	464	489	490	490	492

Note: The overall reduction in the special education enrollment rate among 9th-12 grade students is 1.21 percentage points. All regressions include state and year fixed effects. Additional controls include compulsory education laws, state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Bold coefficients are significant at the 5% level.

Table 8
The effect of switching to census funding on the percent in special education, by grade

	Grade											
	1	2	3	4	5	6	7	8	9	10	11	12
Census Funding	**-1.12**	**-1.31**	**-1.37**	**-1.17**	**-1.08**	**-0.94**	**-1.06**	**-1.04**	**-0.91**	**-1.02**	**-1.22**	**-1.26**
	(0.46)	(0.41)	(0.35)	(0.29)	(0.31)	(0.30)	(0.27)	(0.31)	(0.31)	(0.29)	(0.28)	(0.30)
Percent effect	-12.4%	-11.7%	-10.5%	-8.4%	-7.6%	-6.8%	-8.1%	-8.1%	-7.9%	-8.5%	-10.3%	-11.7%
Dependent var. mean	9.03	11.21	13.01	14.01	14.16	13.73	13.16	12.96	11.46	12.00	11.85	10.75
Dependent var. sd	(2.27)	(2.36)	(2.23)	(2.16)	(2.16)	(2.20)	(2.27)	(2.36)	(2.21)	(2.53)	(2.84)	(2.75)

Note: All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Rates based on disabilities identified in children aged 6-21. Number of observations is 650. Bold coefficients are significant at the 5% level.

Table 9
The effect of switching to census funding on due process hearings requested, 1991-2000

	Total Requests	Requests per 1,000 Students with disabilities
Census Funding	122.28	0.25
	(103.02)	(0.23)
Dependent var. mean	137.98	1.20
Dependent var. sd	(278.66)	(1.32)
Sample size	464	464

Note: All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Bold coefficients are significant at the 5% level.

Table 10
Tests for heterogeneous effects of census funding on the percent in special education, by severity

	All Disabilities	Non-Severe	Severe
Panel A: Strength of Pre-Reform Incentives			
Census	**2.66**	**2.45**	**0.34**
	(0.97)	(0.94)	(0.13)
Initial Disability Rate * Census	**-0.33**	**-0.34**	**-0.33**
	(0.08)	(0.10)	(0.04)
Panel B: Pre-Reform Funding Structure			
Pupil Weight	**-2.233**	**-1.730**	-0.503
	(0.401)	(0.493)	(0.366)
Percent Reimbursement	**-0.855**	-0.681	-0.174
	(0.422)	(0.407)	(0.098)
Other (Flat Rate/Resource/Excess Cost)	**-1.193**	**-0.769**	-0.424
	(0.404)	(0.199)	(0.266)
F statistic: Pupil - Reimbursement=0	**4.96**	2.62	0.86
F statistic: Pupil - Other=0	3.37	3.50	0.03
F statistic: Reimbursement - Other=0	0.37	0.04	0.76
Panel C: Partial Census Funding			
Expanded Census Indicator	**-1.24**	**-0.91**	**-0.33**
	(0.30)	(0.28)	(0.13)
Partial Census Indicator	**1.40**	**1.36**	0.04
	(0.45)	(0.37)	(0.18)
F statistic: Census + Partial Census = 0	0.21	2.06	**5.68**
Dependent var. mean	12.86	10.57	2.29
Dependent var. sd	(2.02)	(1.92)	(0.82)

Note: All regressions include state and year fixed effects. Additional controls include state level unemployment rate, percent free lunch, percent black, Hispanic and other race, average monthly SSI disability payment, an indicator for a plaintiff victory in a school finance case at the supreme court level, an indicator for the date of introduction of accountability system and an indicator for missing free lunch data. Standard errors are clustered by state. Rates based on disabilities identified in children aged 6-21. Number of observations is 650. Bold coefficients are significant at the 5% level.

Panel A: 1991-92 is the year used for the initial special education enrollment rate in each state.

Panel B: Pupil weight states include AK and MA. Percent reimbursement states include CT, ID, MT, ND. Other states include AL (flat grant), CA (resource based), and PA (excess cost).

Panel C: The expanded census indicator includes the four states with partial census models along with the nine states with full census models. The marginal effect for adopting a partial census model is the sum of the two coefficient estimates.

Appendix

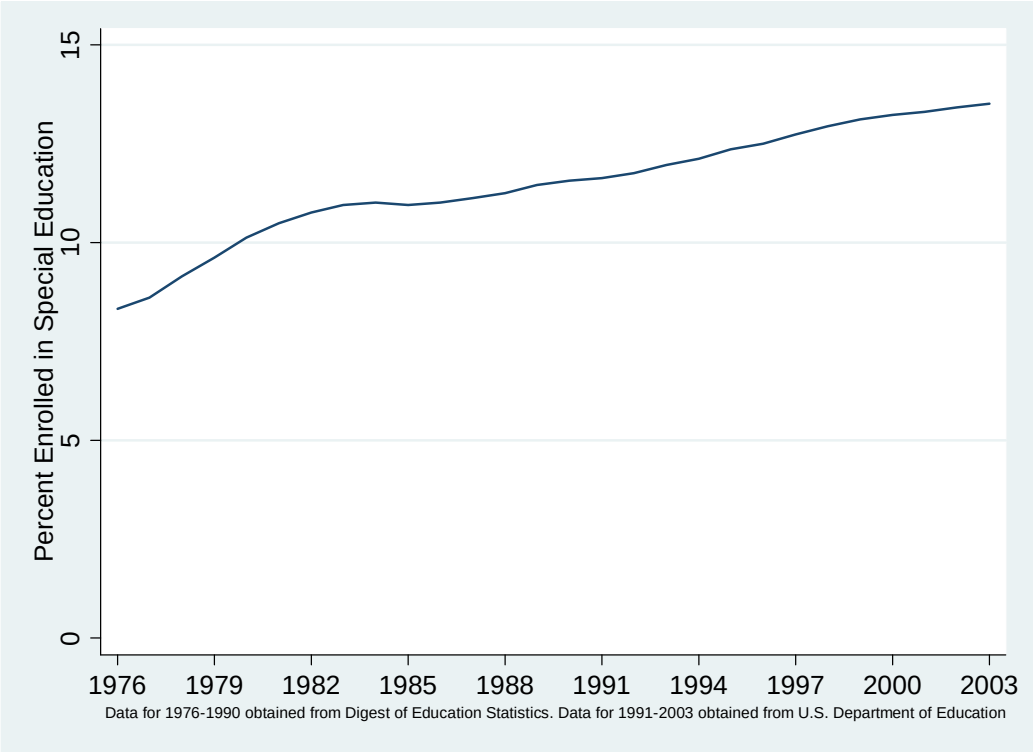
States using census funding for special education, 1991-2003

	School year of change (fall)
Alabama	1995
Alaska	1998
California	1998
Connecticut	1995
Idaho	1994
Massachusetts	1993
Montana	1994
North Dakota	1995
Pennsylvania	1992

Note: Missouri (1998), South Dakota (1998), Utah (1991), and Vermont (1991) use either total district enrollment or average daily membership as the basis for a portion of special education funding.

Figure 1: Enrollment Rates for Children with Disabilities

1A: U.S. Special Education Enrollment Rates, 1976-2003



1B: U.S. Special Education Enrollment Rates, 1991-2003

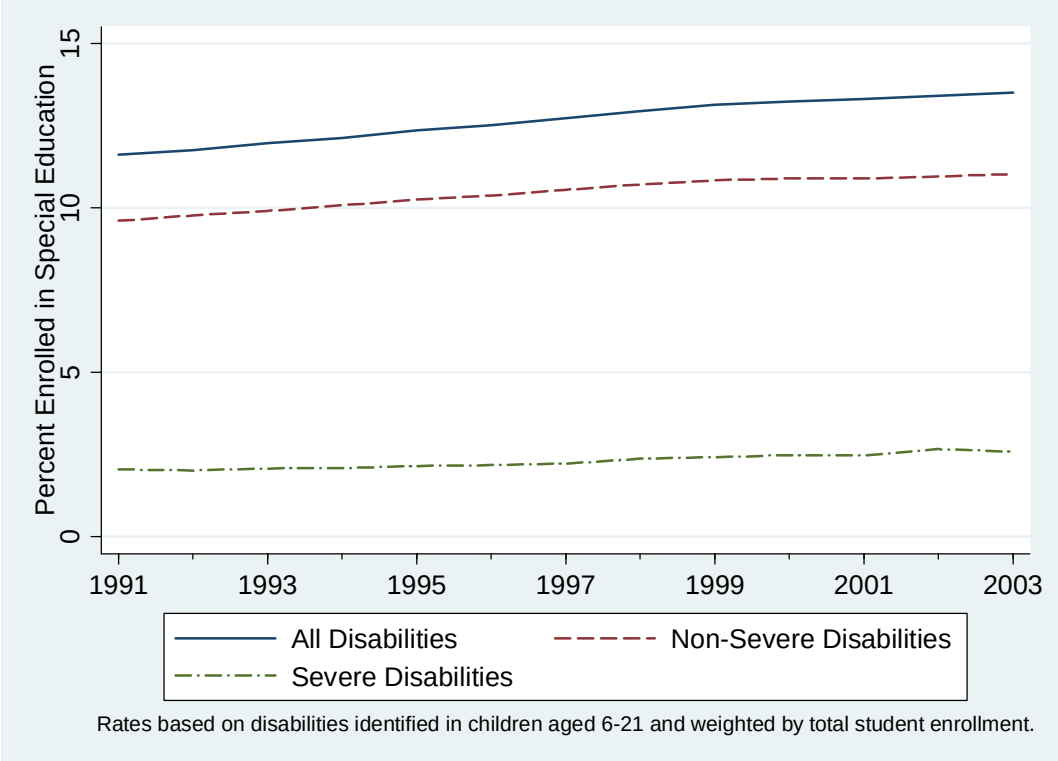
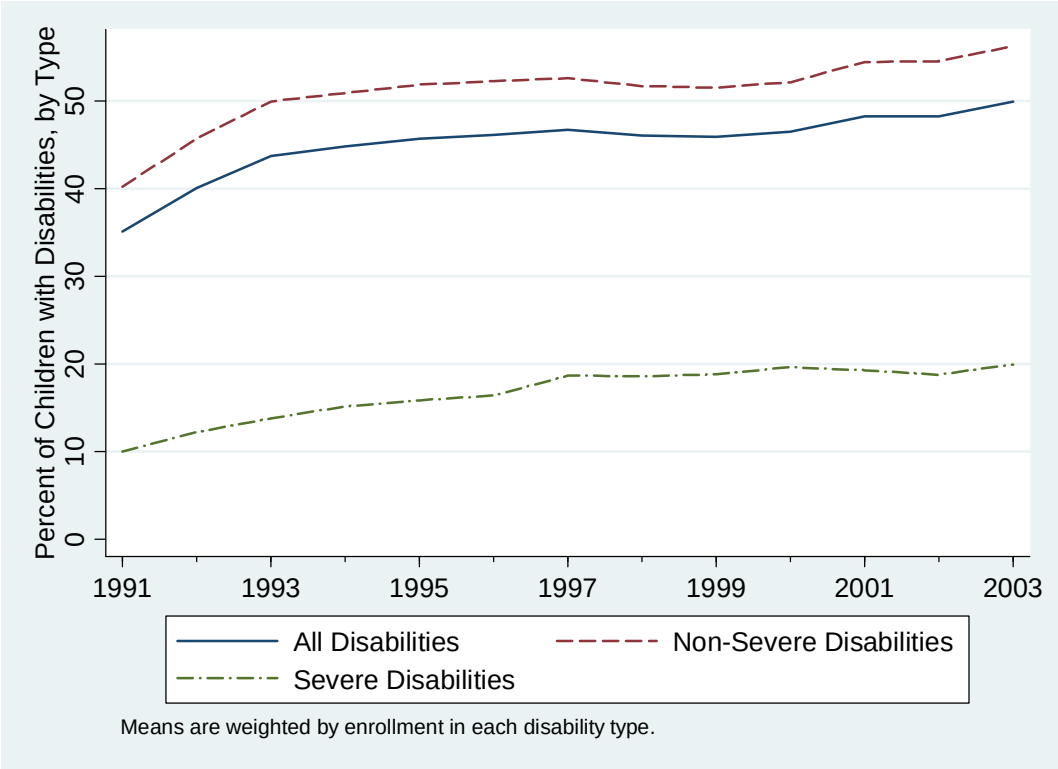


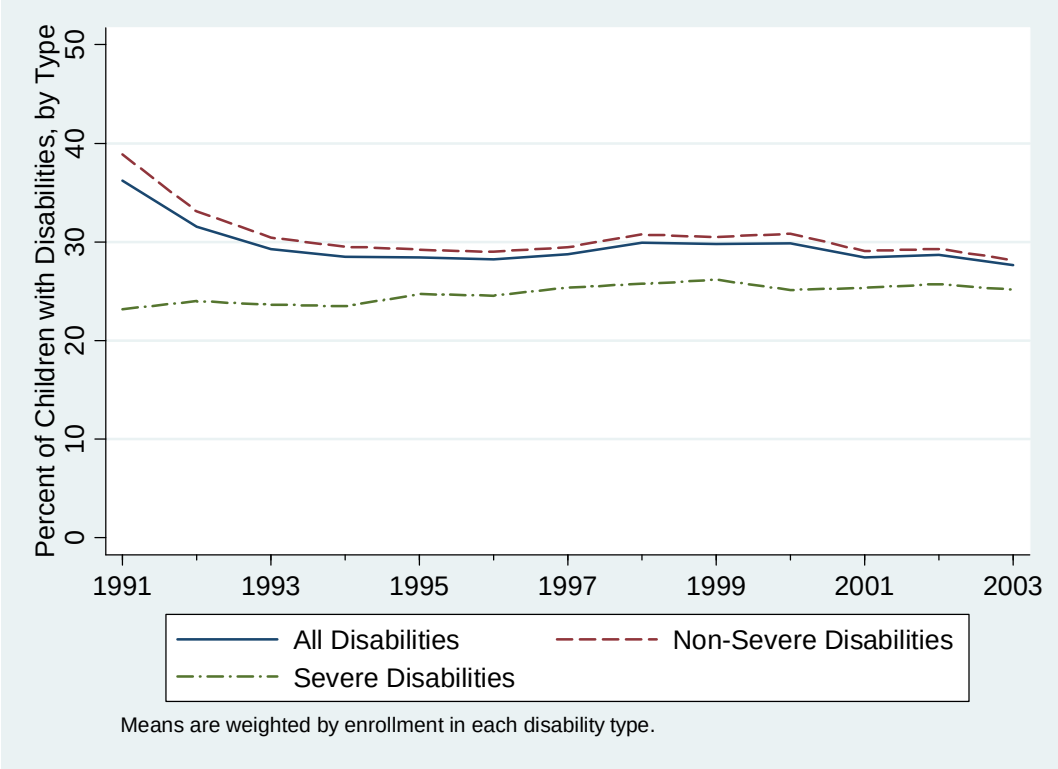
Figure 2: Educational Environments for Children with Disabilities, 1991-2003

2A: Out of the Regular Class <21% of the School Day



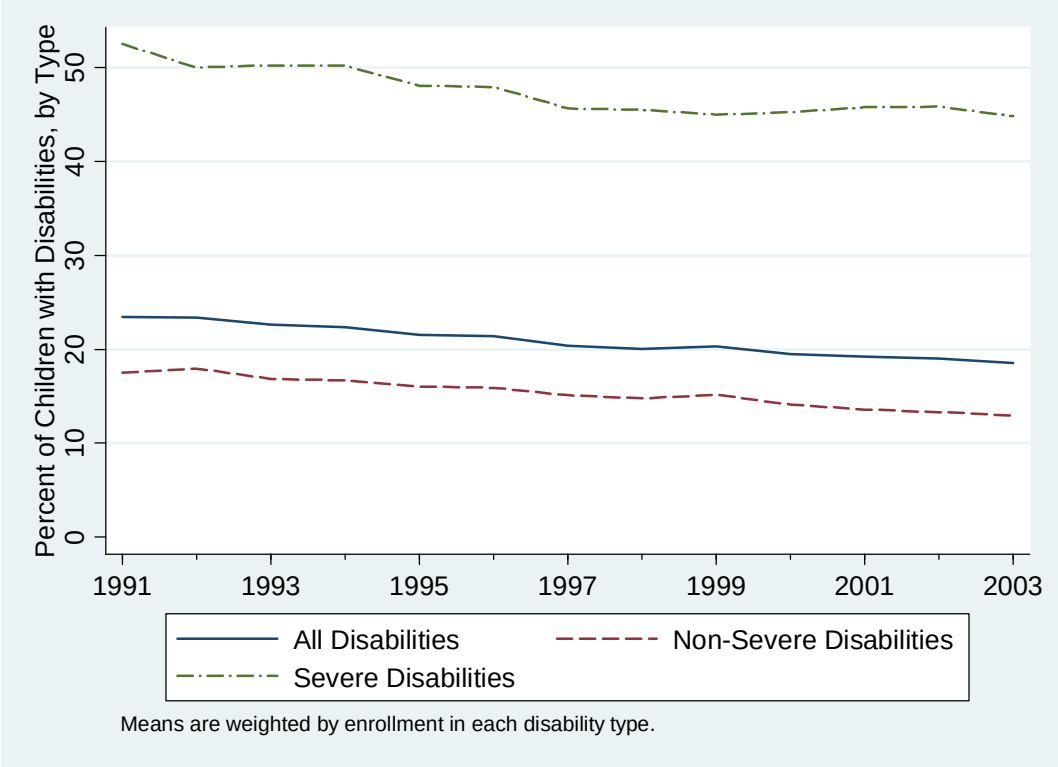
Means are weighted by enrollment in each disability type.

2B: Out of the Regular Class 21% to 60% of the School Day



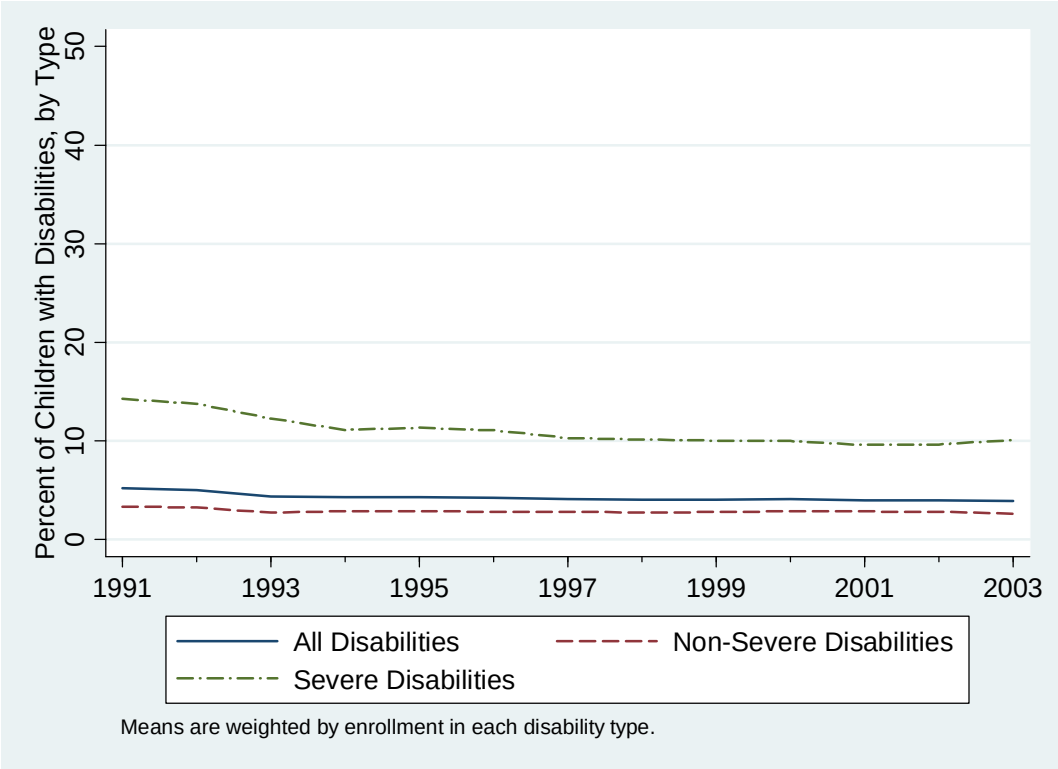
Means are weighted by enrollment in each disability type.

2C: Out of the Regular Class >60% of the School Day



Means are weighted by enrollment in each disability type.

2D: Placement Outside School



Means are weighted by enrollment in each disability type.