FINANCING SPECIAL EDUCATION: SPENDING, INCENTIVES, AND CROSS-SUBSIDIZATION IN MICHIGAN'S PUBLIC AND CHARTER SCHOOLS

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ABSTRACT

FINANCING SPECIAL EDUCATION: SPENDING, INCENTIVES AND CROSS-SUBSIDIZATION IN MICHIGAN'S PUBLIC AND CHARTER SCHOOLS

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This dissertation consists of three papers that explore the special education financing system in Michigan. I find inequities in the system that arise from the relatively low level of state reimbursement for special education and the dependence of the system on property tax revenues. Special needs students in the property poor areas of the state are disadvantaged in terms of spending per pupil, cross-subsidization, and possibly in their identification as eligible for an IEP. One conclusion shared by all the papers in the series is the observation that the composition of special education students varies across school districts and charter schools, making it difficult to determine the extent to which financial incentives and the composition of students each contribute to the differences in the delivery of special education. Further study using student level data and observing students over time could provide credible estimates of the incentive and compositional effects.

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INTRODUCTION

Special education services are expensive and consume a significant portion of school district budgets (Harr, Parrish, & Chambers, 2008; Chambers, J., Shkolnik, J. & Pérez, M., 2002). In an ideal world, decisions about whether a student requires special education and the nature of the services provided would be made based on the needs and potential benefits to the student, rather than financial considerations. Federal IDEA law includes provisions that protect special education services from shifting levels of financial resources with the goal of providing stable funding and services (Harr, Parrish, & Chambers, 2008). Empirical work suggests, however, that financial and other incentives embedded in state financing systems can play a significant role in the administration of special education services (Dhuey & Lipscomb, 2011; Mahitivanichcha & Parrish, 2005). In an era of close scrutiny of school spending, financial considerations may have growing importance in determining the scope and quality of special education services.

Michigan provides a unique opportunity to study special education in detail, through the state's collection of district level special education cost data used for state reimbursement. This dissertation consists of three papers that explore the special education financing system in Michigan. All three papers utilize a unique panel dataset that consists of annual special education enrollment and financial information from 2004 through 2010, provided by the Michigan Department of Education (MDE), the Michigan Center for Educational Performance and Information (CEPI) and the Michigan Department of Treasury (MDT). The enrollment data includes the number of students with Individual Education Plans (IEPs) and the full time equivalent of special education students (FTEs). Along with enrollment data, the dataset includes complete annual financial data for each school district and ISD, complete special

education expenditures and revenues, and taxable values and special education millage rates. For the third paper, a separate enrollment dataset from MDE covering 2004 – 2010 provided information on student movements and enrollment losses for districts over the period. This paper also utilized supplemental enrollment data from Wayne Regional Educational Service Agency that identifies severely disabled, "center" students and their expenditures. The first two papers examine the Michigan special education funding system as it pertains to traditional public schools, while the third paper expands the analysis to include charter schools in the state.

The first paper in the series is titled "Systemic Inequities in Special Education Financing". This paper examines special education funding in Michigan and the delivery of special education services that occurs as a complicated and coordinated effort between Intermediate School Districts (ISDs) and public school districts. Using taxable value per pupil as a proxy for a school district's wealth, and analyzing per pupil special education expenditures at districts and ISDs, the study finds large inequities in spending that are correlated with a district's wealth. ISD spending exacerbates these inequities. The study also identifies differences in the composition of special education students that varies and changes based on the district's wealth.

The second paper, titled "Cross-subsidization and Equity in Special Education Funding", examines cross-subsidization, which in our context refers to the use of school general fund revenues to pay for special education services, a common feature in state special education financing systems. Using financial data to estimate the cross-subsidization for each school district, the study finds that the composition of students receiving special education services varies with district wealth. This variation could be attributable to either compositional differences of special need students or incentive effects creating differences in the identification or services provided to special need students. An additional finding is that financial burdens

associated with cross-subsidization are highest for the poorest districts in the state, due to their larger fraction of special education enrollments.

The third paper includes charter schools and their provision of special education services in the analysis. Titled "Financing Special Education: Charter Schools, Cross-subsidization and Financial Burdens", this study finds significant differences at charter schools in the enrollments of students with special needs and the nature of their disabilities and services, and finds lower cross-subsidization at charter schools. The study also finds evidence that competition from charter schools increases the fraction of special education students and the amount of cross-subsidization at traditional public schools. The financial burdens for schools experiencing charter competition are considerable and can affect the delivery of general education as well as special education services, contributing to inequities across all students at these schools.

All three papers highlight the inequities in Michigan's special education finance system. Special needs students in the property poor areas of the state are disadvantaged in terms of spending per pupil, cross-subsidization, and possibly in their identification as eligible for an IEP. These inequities arise in the funding system because of the relatively low level of state reimbursement and the dependence of the system on property tax revenues. These inequities could be addressed by policy changes that direct state resources towards districts and areas with the greatest needs.

One conclusion shared by all the papers in the series is the observation that the composition of special education students varies across school districts and charter schools. These compositional differences may obscure inequities in the system and introduce some uncertainty in the results, since it is difficult to determine the extent to which financial incentives and the composition of students each contribute to the differences in the delivery of special

education. Further study using student level data and observing students over time could provide credible estimates of the incentive and compositional effects.

CHAPTER 1: Systemic Inequities in Special Education Financing

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ABSTRACT

Since the implementation of IDEA in 1975, as spending on education has continued to grow, a large portion of that spending has been dedicated to students with special needs. This study uses a panel dataset of local and intermediate school districts to examine the complex special education funding and delivery scheme in the State of Michigan. Using taxable value per pupil as a proxy for a district's wealth, we find large inequities in expenditures per special education student based on a district's wealth and that these inequities are exacerbated by Michigan's Intermediate School District system. We also find the composition of special education students varies significantly based on the district's wealth and this composition is likely to change with changes in a district's wealth.

I. Introduction

The unique educational needs of handicapped children were not addressed by the American public education system until relatively recently. In 1975, Congress passed the Education for All Handicapped Children Act.[1] This law requires that states provide a "free and appropriate" public education in the "least restrictive environment" to all children, including those with disabilities. The law also stipulates that these services are to be provided "regardless of cost." Since the implementation of this law, renamed the Individuals with Disabilities

[1] PL 94-142, 1975.

Education Act (IDEA) in 1990, as spending on education has continued to grow, a large portion of that spending has been dedicated to students with special needs. Rothstein (2010) estimates that special education consumes around 20% of all school spending, while around 13% of children nationwide are identified as having special needs (United States Department of Education, 2013).

Much of the empirical work on special education finance has focused on the financial incentives embedded in state special education financing systems and how school districts respond to these incentives. Mahitivanichcha & Parrish (2005) examine the incentives in a variety of state funding systems, including weighted systems, census-based funding, and full reimbursement systems, finding little evidence that fiscal incentives uniformly affect practice. They conclude that the relationship between incentives and practice is complex, and caution that while state financing policies may impact how districts provide special education services, the impact occurs within an intricate web of factors which include federal legal entitlements, diagnosis and treatment decisions that are often based on professional judgment, and state program oversight and monitoring.

Dhuey & Lipscomb (2011) conducted a more comprehensive study of all nine state census-based funding systems, including special education identification rate data for thirteen years from all fifty states. They found that state adoption of census based funding reforms was associated with an approximately 10% reduction in special education identification rates. They also found other changes associated with fiscal incentives including differing identification rates in earlier and later grades (particularly in the more subjective diagnosis categories), changing placements for disabled students, and differing exit rates. This study, along with the Mahitivanichcha & Parrish study, focused on variations across states. There is also research

looking at variations within a state, allowing for the particular details of the state system to be taken into account.

Kwak (2010) examined the special education funding system in California, finding that when the price increased for special education due to the 1997 policy change to a census-based system, districts responded by classifying fewer students as disabled. Cullen (2003) examined how districts respond to incentives provided in the Texas special education financing system, where there is variation in the state revenue gains districts receive when identifying an additional special education student, depending on the district tax base wealth and other district characteristics. Cullen concluded that financial incentives play an important role in determining the size of special education programs in Texas. Battisti, Friesen and Hickey (2012) similarly found that districts responded to financial incentives. Their study concluded that in British Columbia, when supplemental grants for special education students were eliminated, fewer students were identified as having special needs.

In addition to incentive considerations, researchers have examined equity issues around special education funding. Considering across state variation in expenditures, Harr, Parrish, & Chambers (2008) report that existing state systems tend to produce disparities in funding and expenditures that are unrelated to cost factors associated with the disabled student's needs. Baker and Ramsey (2010) raised equity concerns in their study of special education funding in two states with census-based systems. The authors found that children with disabilities were not uniformly distributed across districts in these states, resulting in dramatic disparities in special education funding per identified special education student.

Employing a unique panel dataset of Michigan school districts, this paper uses across district and within district, across year variation to examine Michigan's special education expenditures and enrollment. Taking into account the complex incentive structure provided by Michigan's special education funding system, this study scrutinizes both the composition of special education students and the resulting spending patterns across districts with different taxable values. Using taxable value per pupil as a proxy for district wealth, we find large differences in special education expenditures across local school districts with wealthier districts spending significantly more per pupil. We also find that this inequity is exacerbated by Michigan's Intermediate School Districts which provide additional special education services and resources for local school districts.[2] Finally, our results indicate that poorer districts not only have larger fractions of students requiring special education services but also that the level of services required by special education students varies with district wealth and the composition of special education students is likely to change with changes in a district's wealth.

II. Special Education in Michigan

Michigan funds special education services through a combination of per-pupil funding and cost reimbursement.[3] Historically, the level of special education funding provided by the state has been low. According to Parrish & Chambers (1996), in 1987-88, Michigan ranked near the bottom on special education state funding, reimbursing only 22% of special education expenditures. Only four states contributed a lower percentage. Seventeen years of litigation between the state of Michigan and local schools resulted in the *Durant* (1997) decision, which

[2] Many states have Regional Education Service Agencies similar to Michigan's Intermediate School District that provide staff development, purchasing and administrative services, along with special education services, to the local school districts.

[3] See Citizen's Research Council (2012) for an overview of Michigan's special education funding structure and Michigan Department of Education (2013) for details of the administrative rules for special education.

mandated that the state pay "28.6138% of total approved costs for special education" and "70.4165% of total approved costs for special education transportation" (Seilke & Russo, 1999). The Michigan education funding terrain changed in 1994 with the passage of Proposal A, centralizing education funding so that approximately 74% of district general education revenues, on average, were now provided by the state (Israeli & Murphy, 2007). The State of Michigan chose to interpret the *Durant* decision to include the general per-pupil funding already allocated for every student as satisfying its legal obligation, thus avoiding any responsibility for the added costs associated with special education (Seilke & Russo, 1999) and maintaining the state's relatively low level of funding.

Michigan currently has 549 local school districts and 280 charter schools. Each local district and charter school belongs to one of fifty-seven (57) Intermediate School Districts (ISDs), countywide or several-county organizations that coordinate services for a group of school districts.[4] ISDs provide a wide range of services that can include professional development for the teachers of member districts, business services, curriculum development, career and technical education, alternative education, and technology services (Garcia, Shimmel, & Wraight , 2011). ISDs in Michigan also coordinate special education services and may provide services that overlap with local district programs. Local school districts may maintain their own programs, or place students in ISD programs. All ISDs have facilities, but they vary in programs and services. Some ISDs provide comprehensive special education services, while others provide minimal services. In addition, local districts may contract for services or receive

[4] Charter schools are assigned membership to ISDs and are eligible to receive special education revenues from federal, state, and local ISD sources. Because the number of special education students at charter schools is minimal, we focus on local school districts and ISDs.

in-kind services from their ISD. Along with these ISD resources and state funding, local districts receive special education funding from the federal government.

Each ISD levies several property taxes, including a special education property tax for its member districts. The ISD develops an allocation plan for local and federal funds, which must be approved by the Michigan Department of Education, but the ISD is not obligated to distribute the funding to member districts. Local districts, on the other hand, may find that special education revenues from state, federal, and local sources do not cover their special education expenditures, requiring additional funds from the district's general fund.[5]

Federal law has established and protected the rights of disabled students and ensured that states and local districts provide adequate special education services. The law makes important stipulations that services are to be provided regardless of cost, and in the least restrictive environment, and empowers parents and students in decisions over provided services. Parents may have the option of choosing whether their child receives services at the ISD or in the local school. While school districts may have a financial incentive to place more severely disabled students at the ISD (when available), federal law provides a competing incentive for placement of the disabled student at their local school whenever possible. Parents of disabled students may also advocate for local placement. In addition, the federal IDEA funding reauthorization law has a "maintenance of effort" requirement (Individuals With Disabilities Education Act, 20 U.S.C. § 1400, Section 34 CFR 300.203) stating that funds "Shall not be used …to reduce the level of expenditures for the education of children with disabilities made by the local education agency from local funds below the level of those expenditures for the preceding fiscal year." Districts must budget "at least the same total per-capita amount" (Federal Register, 1999) in

[5] Conlin & Jalilevand (2015) documents this cross subsidization from the general fund.

order to be eligible for federal IDEA funds in that year. The purpose of the law is to ensure that special education spending levels are maintained, regardless of the levels of federal funding. State departments of education are tasked with oversight of local districts to ensure compliance with federal law.

III. Data and Summary Statistics

The dataset consists of annual enrollment and financial information provided by the Michigan Department of Education (MDE), the Michigan Center for Educational Performance and Information (CEPI) and the Michigan Department of Treasury (MDT). Table 1 contains the summary statistics for local school districts from 2003 through 2011 and for ISDs from 2003 through 2010.[6] The enrollment data, provided by the MDE and CEPI, indicate that the average local school district has 2,776 full-time equivalent (FTE) students and that 388 have Individual Education Plans (IEPs). An IEP outlines planned special education services that will be provided for the student.[7] All disabled students will have an IEP, whether severely or mildly impaired, but many students with IEPs spend a significant portion of their time in regular classrooms. Special Education FTEs measure the number of full time equivalent special education students. The fact that the number of IEPs at the local district is more than three times the number of FTEs suggests that many special education students at the local districts spend significant portions of the day in general education classrooms. The average ISD facility enrolls

[6] Each year denotes a fiscal year for the districts. For example, 2003 corresponds to fiscal year 2003 which goes from July 1, 2002 to June 30, 2003.

[7] Special education services are determined and delivered through the Individualized Education Program (IEP), a contractual arrangement between the student's family and the school district (*Individuals With Disabilities Education Act*, 20 U.S.C. § 1400, 2004). Federal law includes a "stay put" provision requiring any changes in special education services be incorporated into the IEP and approved by the IEP participants (Martin, Martin, & Terman, 1996). This contractual method of delivering special education services results in relative stability in the provision of services. Any unapproved changes in services could be interpreted as a breach of contract, initiating a due process complaint procedure between the school district, disabled students, and the parents, and resulting in arbitration or litigation. The National Center on Dispute Resolution in Special Education (2014) reports over 17,000 such complaints were filed in the United States in 2011-12.

233 special education students, who most often require special education services for the entire day and, therefore, are considered FTEs. While ISD facilities on average have a higher number of special education FTE students than local districts, the large number of local districts results in the number of total special education FTEs being five times greater at local districts than at ISD facilities.

The expenditure information was obtained from the MDE and CEPI with the MDE providing those expenditures not reimbursed by the federal government and CEPI providing special education spending funded with federal dollars.[8] In terms of expenditures, Table 1 indicates that the average expenditure per special education FTE, while significant at the local districts, is much greater at the ISD facilities. The higher expenditure level at the ISDs may reflect the fact that the ISD facilities serve the more severely disabled students, but also may be due to the inclusion of in-kind services provided by ISDs to students enrolled at local districts. There are several ISDs (most notably Oakland, Kent and Wayne) that are outliers in terms of expenditures per FTE because they have very few students at ISD facilities but provide significant special education resources to local districts, explaining why the average expenditure per FTE is over half a million dollars for ISDs.

The MDT provided information on special education millage rates and property taxable values. Only ISDs are allowed to levy a special education millage and this tax revenue provides the majority of the total revenue received by ISDs. This revenue varies significantly across districts and ISDs because of vastly different tax bases. As indicated in Table 1, the average ISD

[8] MDE reports SE 4096 and SE 4094 are intermediate and local district cost reports required as part of Michigan's special education reimbursement framework that summarize district special education costs, excluding federal programs. These reports, available from the MDE, are the basis for state special education revenues received by school districts, but also include costs that are funded by local revenues. Federal guidelines require separate accounting for federally funded programs, so these costs are not represented on SE 4096 and SE 4094.

Table 1. Descriptive Statistics. Annual Observations from 2003 through 2010 or 2011.

	Means (Standard Deviations)
Enrollment:	
General and Special Education FTEs at Local District	2,776 (5,389)
Students with IEPs at Local Districts	388 (870)
Special Education FTEs at Local Districts	120 (410)
Special Education FTEs at ISD Facilities	233 (252)
Expenditures:	
Special Education Expenditures per IEP at Local Districts	8,140 (4,074)
Special Education Expenditures per FTE at Local Districts	39,880 (80,322)
Special Education Expenditures per FTE at ISD Facilities	650,434 (4,011,484)
ISD Special Education Millage Rate	2.52 (1.08)
Taxable Value per Total FTE at Local District Level	347,749 (1,029,834)
Taxable Value per Total FTE at ISD Level	230,796 (80,355)
Local District Observations	4,394
ISD Observations	399

Note: There are 186 observations where the number of special education FTEs is zero and 188 observations where the number of IEPs is zero.

special education millage rate is 2.52 and the average taxable value per FTE is 347,749 at the local district level and 230,796 at the ISD level – both with large standard deviations.

Table 1 indicates that significant resources are being spent on special education services at the local district as well as at ISD facilities. While there are many more special education students who reside at the local districts, the severely disabled are more likely provided services at the ISD facilities. There also appears to be significant differences across districts in terms of special education enrollment and expenditures which will be analyzed in more detail in the next section.

IV. Michigan Special Education Enrollment and Expenditure Variations

This section documents how special education enrollment and expenditures vary across years; how the variation across districts is correlated with a district's tax base; and how special education enrollment and expenditures vary with changes in a district's tax base. Figure 1 depicts how the numbers of IEPs and special education FTEs at the local school districts have decreased across years with more significant decreases occurring in recent years. The 31 percent decrease in special education FTEs and 17 percent decrease in IEPS from 2004 to 2011 are greater than the 11 percent decrease in general education FTEs during this time period. While special education FTEs and IEPs have decreased at the local districts, the number of special education students at ISD locations has increased by 3 percent from 2004 to 2010. The decrease in the number of special education IEPs and FTEs, along with the maintenance of effort requirement associated with IDEA funding and the American Recovery and Reinvestment Act (ARRA) funds (which began in 2009), has contributed to the increase in per pupil expenditures at the local districts. Figure 2 depicts this increase in special education expenditures per FTE and IEP across the years at the local districts. ISDs spend considerably more per FTE on their

Figure 1. Michigan Special Education Enrollment by Year.

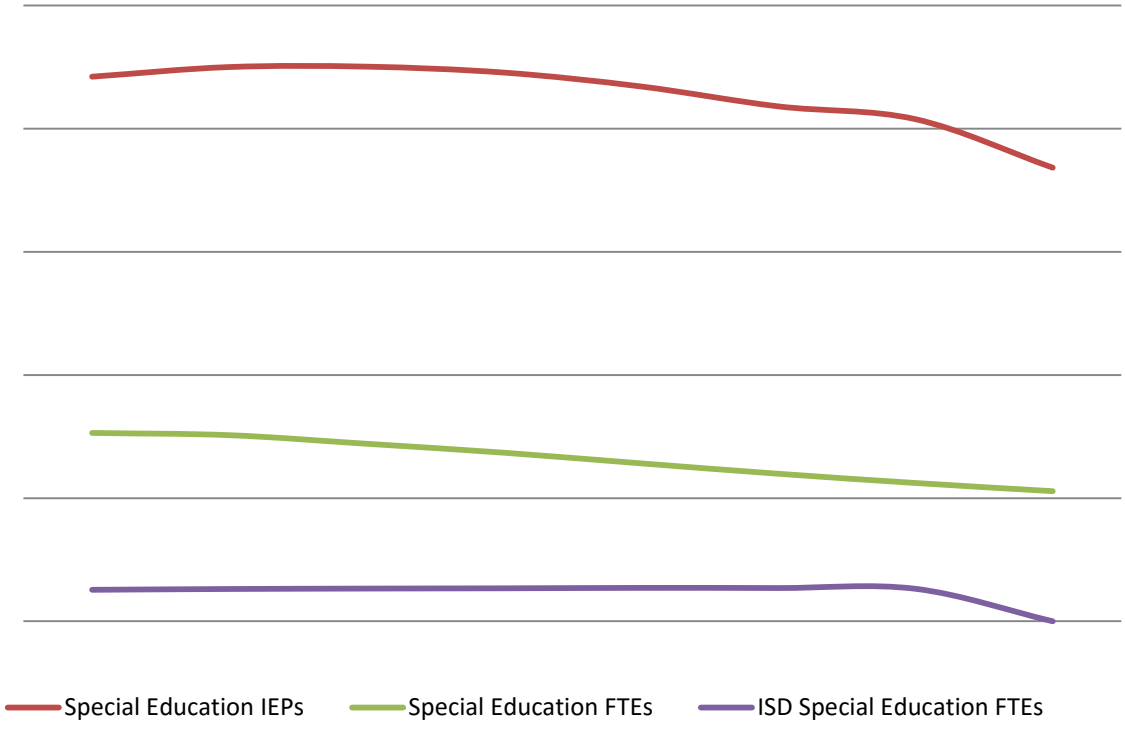
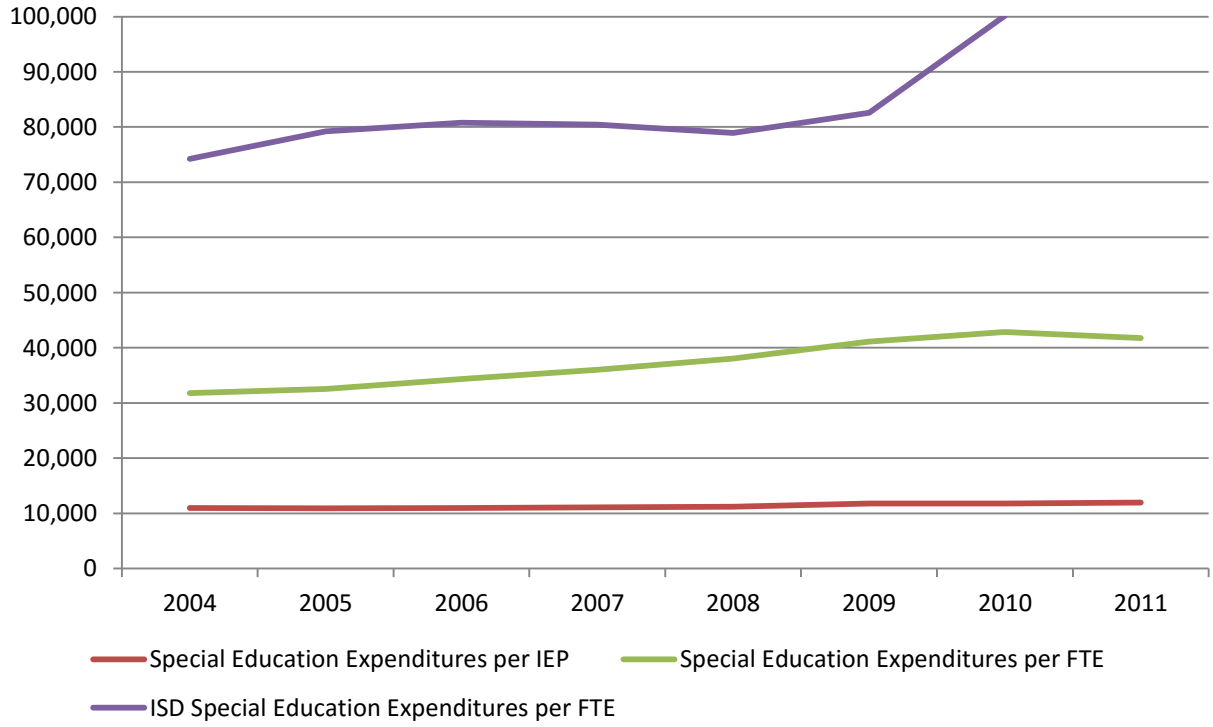


Figure 2. Michigan Per Pupil Average Special Education Spending (in 2012 Dollars).



special education students than local districts and, in recent years, have experienced a significant increase in expenditures per FTE. This reflects a change in the type of students residing at ISD facilities, an increase in revenue, and/or an increase in in-kind transfers to the local districts.

Figures 3 and 4 present annual special education expenditures per IEP and FTE by local districts across different quintiles based on average annual taxable values per total FTE (sum of general and special education FTEs). To ensure that a local school district remains in the same quintile across years, we calculate a district's average annual taxable value per total FTE based on all years. The 20 percent of school districts with the largest average annual taxable values per total FTE are in the wealthiest quintile, the districts from 20 percent to 40 percent are in the wealthier quintile, the districts from 40 percent to 60 percent are in the median quintile, the districts from 60 percent to 80 percent are in the poorer quintile and the 20 percent with the smallest average annual taxable values per total FTE are in the poorest quintile.[9]

Using taxable value per total FTE as a proxy for a district's wealth, Figures 3 and 4 indicate that there are significant differences across districts in special education expenditures per pupil. These expenditure differences could reflect differences in the types of disabilities experienced by children across districts, differences in how districts identify disabilities, and/or differences in how children sort between local districts and ISD facilities. Figures 3 and 4 indicate that districts in the wealthiest quintile spend, on average, between $2,000 and $5,000 more per IEP and between $8,000 and $20,000 more per FTE than districts in the other quintiles. While the wealthiest districts have the greatest per pupil expenditures, these districts have the lowest ratio of special education FTEs to general education FTEs. This ratio is approximately

[9] To ensure that the composition of each quintile does not change across years, observations for Dearborn Heights and Bangor Township school districts are dropped due to at least one year of missing information.

Figure 3. Total Special Education Expenditures Per Student with IEP, in 2012 Dollars.

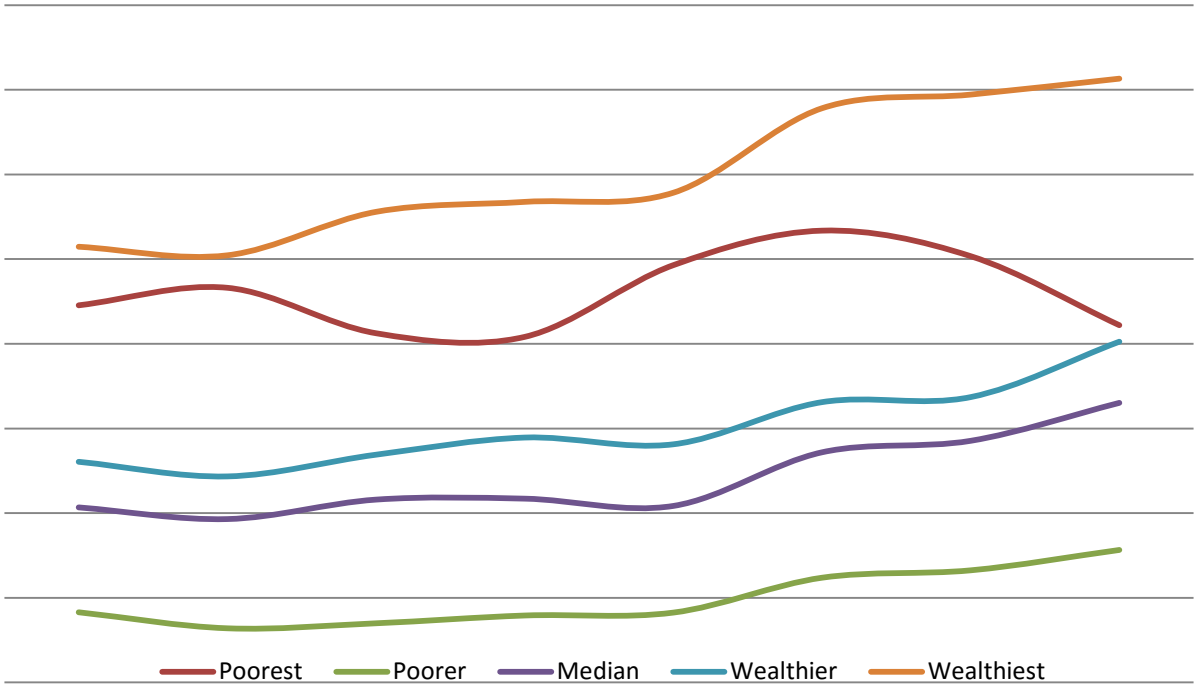
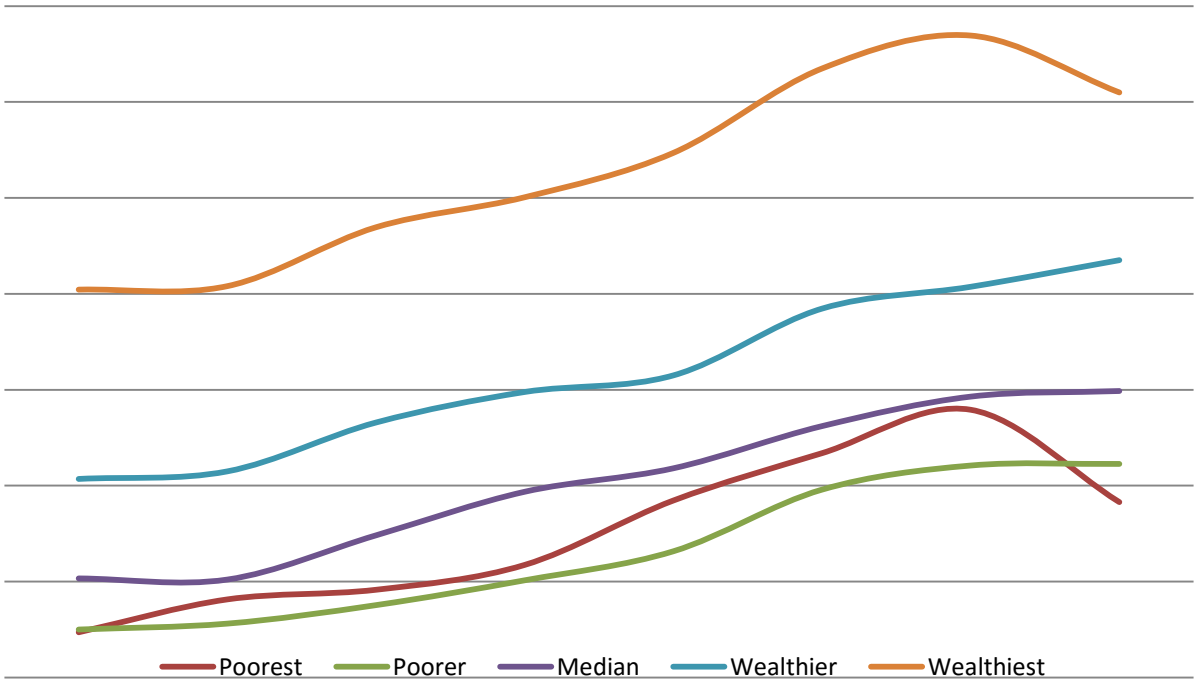


Figure 4. Total Special Education Expenditures Per Special Education FTE, in 2012 Dollars.



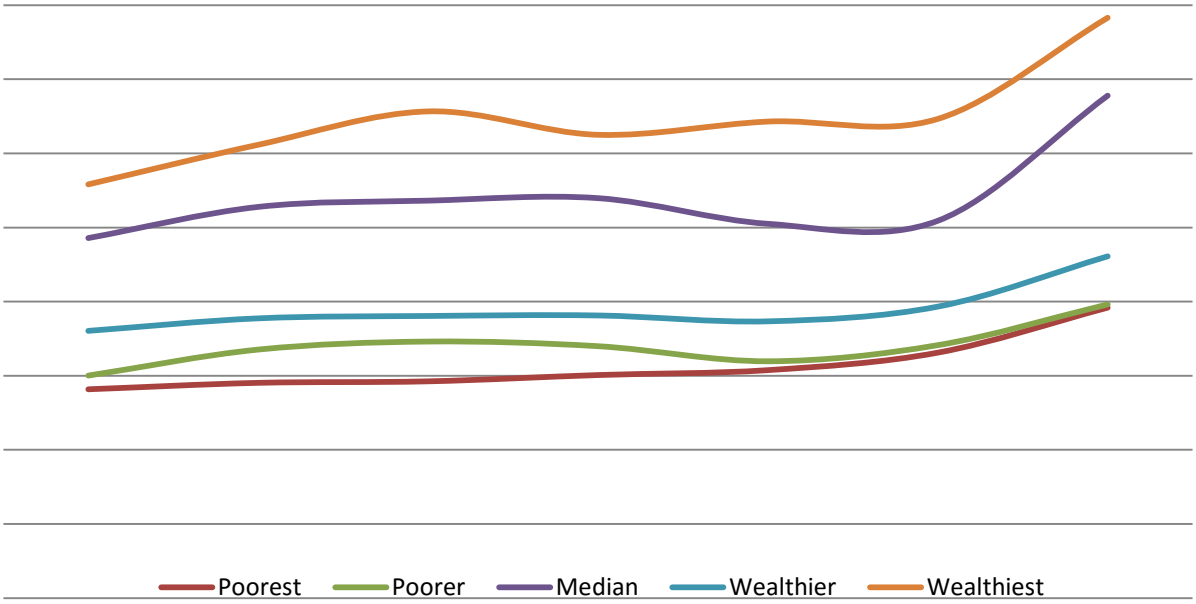
0.036 for the wealthiest and wealthier quintiles, 0.044 for the median and poorer quintiles and over 0.06 for the poorest quintile. This could reflect a large proportion of special need students attending public schools in the poorer districts.[10] Interestingly, while average expenditures per FTE decreases monotonically with wealth quintile, the poorest quintile's average expenditures per IEP is greater than the other quintiles (except the wealthiest quintile). This difference is the result of the ratio of FTEs to IEPs being 0.39 for the poorest quintile and less than 0.30 for all other quintiles. One possible explanation is that students in these poorest districts with relatively moderate disabilities are not being provided with an IEP. Another explanation is that the types of services required by special education students are significantly different in the poorest districts. However, this greater FTE to IEP ratio is not due to special needs students in these poorer districts residing in local districts rather than in ISD facilities. For districts in the two poorest quintiles, over a third of all special education FTEs reside at an ISD facility which is a much larger fraction than in the other quintiles.[11]

While Figures 3 and 4 suggest inequities in special education expenditures based on district property wealth, these figures may underestimate the inequity if wealthier local districts are located in ISDs that provide significant services to special needs students – either at ISD facilities or through in-kind transfers. The fact that ISDs provide expensive special education services could have important equity implications since approximately twenty percent of special education FTEs in Michigan reside at ISD facilities. Figure 5 compares expenditures per FTE at ISD facilities across the different quintiles of ISD wealth. These quintiles are constructed in a similar manner as those for the local districts – based on an ISD's average annual taxable value

[10] Charter schools are more prevalent in poorer areas and, on average, have a smaller proportion of special need students than local public schools.

[11] This difference across the quintiles is driven by several ISDs (specifically Kent, Wayne and Oakland ISDs) with almost all special education students residing at the local districts. The fraction of special education FTEs that reside at an ISD facility is approximately a third for all quintiles if these three outliers are excluded.

Figure 5. Special Education Spending at the ISD (per FTE) in 2012 Dollars.



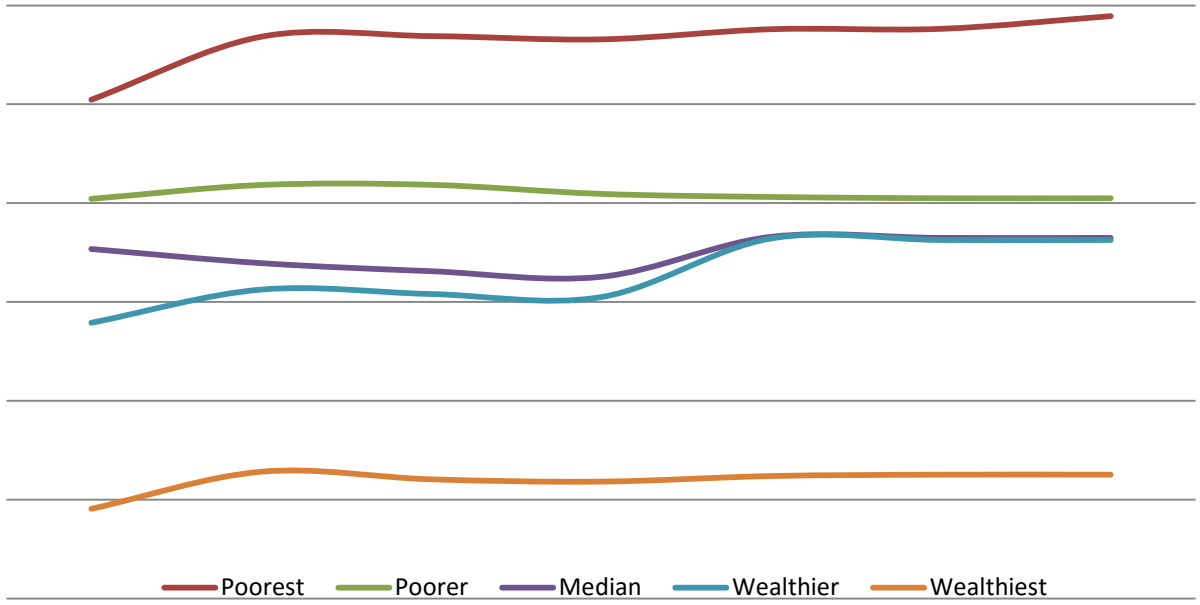
per total FTEs (sum of general education FTEs and special education FTEs at the local district and ISD facilities).[12] Figure 5 indicates that the wealthiest ISD quintile spends significantly more per FTE than ISDs in the other quintiles.[13] This suggests additional advantages for special education students and districts located in areas with high taxable values. Not only do these districts spend more at the local district level, but they may also provide better services for the more severely disabled students at ISD facilities and/or provide more in-kind transfers from the ISDs to the local districts.

The higher average per pupil expenditures at the wealthier ISDs does not imply that these districts are taxing themselves at higher rates to pay for special education services. Figure 6

[12] While local districts in the wealthy quintiles are more likely located in the wealthy ISD quintiles, there are some wealthy districts that are located in ISDs with other local districts that are relatively poor, causing them to be in a relatively poor ISD quintile.

[13] Even excluding the three ISDs (Kent, Wayne and Oakland) with minimal number of students at ISD facilities, the gap between the wealthiest quintile and the other ISDs is between $10,000 and $20,000 per FTE.

Figure 6. Special Education Millage Rates at the ISD.



depicts the special education millage rates at the ISDs, again by property wealth quintile, and indicates that wealthier districts have lower millage rates than their poorer counterparts. While wealthier ISDs have lower millage rates, they generate greater revenue per FTE at ISD facilities due mainly to the size of the tax base.[14]

Figures 3, 4 and 5 suggest that wealthier districts have greater special education expenditures per pupil at the local district level as well as at ISD facilities. We further demonstrate this positive correlation between district wealth and special education expenditures by regressing the natural log of special education expenditures per FTE on the natural log of taxable value per total FTE (along with year indicator variables). The estimates in Columns 1 and 4 of Table 2 indicate

[14] While the state of Michigan does provide some equalization funds to ISDs with smaller tax bases, these funds are not sufficient to compensate for the large tax base differences.

Table 2. Special Education Expenditures Per FTE Regressions.

	Local School Districts			Intermediate School Districts (ISD)		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(Taxable Value Per Pupil)	0.30**	0.17**	0.29**	0.59	0.05	-0.26
	(0.06)	(0.03)	(0.01)	(0.34)	(0.11)	(0.18)
ln(Special Education IEPs)		0.66**				
		(0.07)				
ln(Special Education FTEs)		-0.78**			-0.84**	
		(0.04)			(0.06)	
ln(General Education FTEs)		0.35**			0.81**	
		(0.05)			(0.05)	
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Local or ISD Fixed Effects	No	No	Yes	No	No	Yes
R-squared	0.15	0.57	0.52	0.03	0.92	0.98
Observations	4,205	4,163	4,205	399	399	399

Note: Dependent variables are natural logs of the listed revenue variables. Each specification contains year fixed effects. Robust standard errors, clustered at the local school district or intermediate school district level given in parentheses. ** p<0.01, * p<0.05.

that a ten percent increase in taxable value per total FTE is associated with approximately a 3 percent increase in expenditures per special education FTEs for local school districts and a 5.9 percent increase for ISDs. This specification uses primarily across district variation to identify the relationship between taxable value per total FTE and expenditures per special education FTE but does not account for differences in district size which may be important due to economies of scale issues. To account for potential economies of scale, we estimate the regression equation

$$\ln(y_{st}) = \beta_0 \ln(\text{Taxable Value Per FTE}_{st}) + \mathbf{X}_{st}\,\boldsymbol{\beta} + \boldsymbol{\theta}_{\mathbf{t}} + \varepsilon_{st}.$$

The variable $\ln(y_{st})$ is the natural log of expenditures per special education FTE for school district *s* in year *t;* $\ln(\text{Taxable Value Per FTE}_{st})$ is the natural log of the taxable value per total FTE for school district *s* in year *t*; $\mathbf{X}_{st}$ is a vector of school district characteristics to control for district size that includes special education IEPs (for local districts only), special education FTEs, and general education FTEs; $\boldsymbol{\theta}_{\mathbf{t}}$ is year fixed effects; and ε_{st} is an idiosyncratic error term. Columns 2 and 5 of Table 2 present the coefficient estimates from this specification for local school districts and ISDs, respectively. These estimates indicate that, after controlling for district size, the positive correlation between taxable value per total FTE and expenditures per special education FTE remains but decreases for local districts and ISDs. This positive correlation may be the result of wealthier districts providing better services for special education students, being less likely to provide moderately disabled students with IEPs and/or having students with disabilities that require greater financial resources to address. To provide insight into these alternative explanations, we now estimate several alternative specifications that include district fixed effects.

Columns 3, and 6 of Table 2 provide coefficient estimates when district fixed effects are included as covariates in the initial specification. By including district-level indicator variables, this specification uses within district, across year variation to identify the relationship between changes in taxable value per pupil and changes in special education expenditures per pupil. The coefficient estimates in Columns 3 and 6 indicate that an increase (decrease) in taxable value per total FTE is associated with both an economically and statistically significant increase (decrease) in expenditures per special education FTEs at the local district and an economically significant decrease (increase) for ISD facilities. While these estimates may initially be somewhat

surprising as ISDs receive the majority of their revenue from property taxes and local school district's funding changes little with taxable values, there are several possible explanations for these results. Consistent with Figures 3 and 4, the composition of students may change with wealth where a decrease in taxable value results in an increase in services required for a typical special education student in that district. This would also likely result in a change in the number of special education FTEs. The number of special education FTEs may also be affected if taxable values influence a district's incentives to classify a student as special needs and provide the student with an IEP. Another explanation for the coefficient estimates is that decreases in taxable values result in greater fund transfers and less in-kind transfers from the ISD to the local district or a movement of special education students from local districts to ISD facilities.[15] To provide further insight into these alternative explanations, we estimate similar specifications as those with district fixed effects in Table 2 using expenditures, FTEs and IEPs as dependent variables. The coefficient estimates from these specifications are included in Table 3.

The first column in Table 3 uses the district-level observations and regresses general education FTEs on taxable value to provide insight on the relationship between taxable values and taxable values per pupil. The fact that the coefficient estimate associated with taxable value is close to zero suggests that district changes in taxable value result in minimal changes in general education FTEs and, therefore, corresponding changes in taxable value per pupil.[16] When the dependent variable is total special education expenditures, the estimates in Table 3

[15] While we do not expect ARRA funding designated toward special education to significantly affect the relationship between taxable value per pupil and special education expenditures per pupil at the local districts, it may affect this relationship for Intermediate School Districts. Unfortunately, our data prevents us from identifying the amount of ARRA funding received by the different ISDs for special education programs.

[16] An explanation for this coefficient estimate is that general education students are likely to leave a district prior to an anticipated decrease in taxable values. This is difficult to test based on the limited time span of our dataset. As expected, based on this coefficient estimate on taxable value, the coefficient estimates on taxable value per pupil in

Table 3. Special Education Expenditures, FTE and IEP Regressions.

	Local School Districts				Intermediate School Districts (ISD)	
	Gen Ed FTEs	Spec Ed Expend.	Spec Ed FTEs	Spec Ed IEPs	Spec Ed Expend.	Spec Ed FTEs
PANEL A:						
ln(Taxable Value)	0.01					
	(0.01)					
ln(Taxable Value Per Pupil)		-0.40*	-0.68**	-0.29**	-0.32**	-0.06
		(0.03)	(0.04)	(0.02)	(0.09)	(0.17)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Local or ISD Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.99	0.99	0.98	0.99	0.98	0.98
Observations	4,387	4,287	4,208	4,204	399	399

Note: Dependent variables are natural logs of the listed revenue variables. Robust standard errors are given in parentheses. ** p<0.01, * p<0.05.

suggest that a ten percent increase in taxable value per pupil is associated with approximately a 4 percent decrease in special education expenditures for the local district and ISDs. For local districts, this expenditure decrease is on average less than the decrease in the number of special education FTEs where a ten percent increase in taxable value per pupil is associated with a 6.8 percent decrease. For ISD facilities, the decrease in FTEs associated with an increase in taxable values is minimal and significantly less than the decrease in total expenditures. These results suggest that decreases in taxable values do not result in local school districts moving special education students to ISD facilities. This is likely due to the "least restrictive environment" provision stipulated in the federal IDEA law. However, the increase in special education expenditures at the ISD associated with a decrease in taxable value may be the result of smaller

all Table 3 specifications are similar to the estimates obtained when the taxable value per pupil covariate is replaced by taxable value.

fund transfers from the ISD to the local district. In regards to the local districts, the coefficient estimate from the special education FTE specification does suggest that the composition of students changes with an increase in the number of special needs students for districts that experienced a decrease in taxable values. If services provided to students with specific disabilities at the local district change minimally and the manner by which districts determine special education FTEs do not change differentially, the differences between the coefficient estimate in the total expenditure, FTE and IEP specifications provide further evidence of a compositional change.[17] The fact that a decrease in taxable value per pupil is associated with a larger increase in special education FTEs than in IEPs may be attributable to a compositional change, a change in how local districts determine whether a student warrants an IEP and/or a change in how local districts calculate special education FTEs. In summary, the estimates in Table 3 suggest that the composition of special education students changes with changes in a district's wealth and, while this compositional change may change the amount of resources the ISD transfers to the local district, it does not appear to appreciably change whether the special education student resides at the local district or at an ISD facility.

V. Conclusion

The intricacies of Michigan's special education structure, along with restrictions imposed by federal IDEA legislation, provide a complex environment to analyze the equity of and the financial incentives provided by Michigan's special education funding. Part of the difficulty arises because both local and intermediate school districts provide services directly to special education students; with intermediate school districts often servicing the more severely disabled

[17] The IDEA funding reauthorization law may make it difficult for some districts to reduce services for a student with an IEP due to the "maintenance of effort" requirement.

students. In addition, only the intermediate school districts have the authority to levy property tax millages specifically for special education purposes. This results in most intermediate school districts providing cash, as well as in-kind transfers, to the local school districts.

Using a unique panel dataset on both local and intermediate school districts, this paper focuses on the variation in special education expenditures and composition of special education students across Michigan districts. We find that local school districts with high taxable value per pupil have a smaller fraction of students requiring special education services and significantly higher expenditures per special education pupil than local districts with relatively small tax bases. These per pupil expenditure differences across districts are exacerbated by Michigan's Intermediate School District system. While Intermediate School Districts in areas with high taxable values do not accommodate a larger fraction of special education students in ISD facilities (relative to the local districts), their expenditures per pupil are much greater; indicating that these ISDs are providing more extensive services at their facilities and/or providing more in-kind transfers to their local districts.

Taking advantage of the panel nature of the data, we find that the number of special education students and total special education expenditures increased more for local districts that experienced a decrease in their tax base. Our results also indicate that these changes are likely attributable to a change in student composition and not to a movement of students from ISD facilities to local districts or from local districts to ISD facilities. This type of student movement is impeded by IDEAs stipulation that districts provide a "free and appropriate" public education in the "least restrictive environment" to all children. The fact that the change in total special education expenditures is only slightly less than the change in the number of special education

FTEs may be partially attributable to the "maintenance of effort" requirement in the 1990 IDEA funding reauthorization law.

Our main empirical results have important implications in regards to research measuring the inequities in special education funding and how schools respond to the financial incentives embedded in state financing systems. First, when measuring inequity across districts, it is important to account for not only expenditures at the local district level but also special education expenditures by Regional Education Service Agencies and Intermediate School Districts. Second, when measuring the incentive embedded in state financing systems, it is important to account for composition differences in the population of students requiring special education services as well as changes in this composition. Because controlling for compositional changes is challenging with panel, district-level data, using student-level information and tracking the students over time is likely necessary when estimating these incentive effects.

CHAPTER 2: Equity and Unrestricted Funds in Special Education

ABSTRACT

A state's special education funding structure affects both the level of special education services provided and how equitably these services are distributed across districts. Irrespective of the funding system, districts in almost all states use unrestricted funds to pay for special education services not covered by revenue designated for special education. This study focuses on how district wealth and the provision of special education services are related to this use of unrestricted funds. Using a unique panel dataset that includes detailed annual district level financial and enrollment information for 604 local and intermediate school districts in Michigan, our main findings are that: (i) the financial burden associated with using unrestricted funds for special education expenditures is significantly greater for the poorest districts due to their larger fraction of special need students; and (ii) students receiving special education services vary with district wealth and this variation is likely attributable to both compositional differences of special need students and financial incentives that create differences in the special education identification and services. While unable to quantify the compositional and incentive effects, our results clearly document large inequities in special education funding across Michigan school districts.

I. Introduction

The passage of the Education for all Handicapped Children Act in 1975, later renamed the Individuals with Disabilities Education Act (IDEA), established the rights of students with disabilities to receive a "free and appropriate" education. The law provided some federal funding for special education services but required states, in partnership with local districts, to

develop systems to provide financial support. While each state has its own unique features, researchers often categorize the state special education funding system as per-pupil funding, cost reimbursement, resource based, and census allocation (Verstegen, 2011; Parrish et al, 2003; Harr, Parrish, & Chambers 2008).[1]

A state's funding structure affects both the level of special education services provided and how equitably these services are distributed across districts. Irrespective of the funding system, districts in almost all states use unrestricted funds to pay for special education services not covered by revenue designated for special education. The level of unrestricted funds required, however, and how it relates to a district's wealth will clearly depend on the state's funding system. The level will also depend on a district's composition of special need students and could affect the provision of special education services (Meredith & Underwood, 1995). This paper documents the relationships between unrestricted funds, district wealth, composition of special education students and the provisions of special education services in Michigan. While this paper does not address how unrestricted funds should be allocated across special and general education students, it does document the inequalities generated from having special education funding dependent on property taxes and from having larger proportions of special need students in the poorest districts. These inequities are pertinent for special education students and, through the use of unrestricted funds, general education students.[2]

[1] These different systems distribute state funds for special education to school districts based on the number (and types) of students identified as having special needs (per-pupil funding), the special education costs incurred by the districts (cost reimbursement), the special education resources deemed appropriate by the state (resource based), or based on the student age population residing in the school district (census allocation). See Harr, Parrish, & Chambers (2008), Dempsey & Fuchs (1993), Dhuey & Lipscomb (2011), Kwak (2010), Mahitivanichcha & Parrish (2005), and Baker & Ramsey (2010) for analysis and discussion of the financial incentives provided by the different funding systems.

[2] Conlin & Thompson (2014) consider equity issues in Ohio and Michigan school districts by comparing how total revenue and expenditures vary based on district wealth.

Michigan's special education funding system is an interesting system in which to study equity and composition issues due to the shared responsibilities of local school districts and Intermediate School Districts (ISDs) to provide services and its combination of federal, state and local revenue sources. Michigan organizes local school districts under ISDs that coordinate special education services across local districts and often operate facilities for those students requiring significant special education services.[3] ISDs also levy a special education millage which provides local source revenue to support special education at the ISD and in its member districts. Since there are large tax base differences across ISDs, there is significant variation in these revenues across ISDs. From 2004 through 2010, total annual revenue from federal, state and local sources designated for special education services averaged $1,987 million (M) for the ISDs and $1,706M for the local school districts. Total annual special education expenditures by the over 550 local school districts averaged $2,452M, requiring districts to spend $746 M annually from unrestricted funds on special education services.[4,5] The amount of unrestricted funds used for special education expenditures varies dramatically across districts due to differences in the fraction of students requiring special education services and the amount of local source revenues received from the ISDs.[6] This uneven reliance on unrestricted funds has

[3] See Citizen's Research Council (2012) for an overview of Michigan's special education funding structure and Michigan Department of Education (2013) for details of the administrative rules for special education.
[4] The Michigan House Fiscal Agency estimates that total expenditures for special education in the state exceeds $4 Billion in 2015. At just over 25% of school spending in the state, this represents a significant portion of Michigan's education related expenditures.
[5] ISDs receive full funding for special education services and do not use unrestricted funds for special education.

[6] In terms of special education expenditures, Conlin & Jalilevand (2015) find large inequities in spending across districts based on taxable values at the local district and ISD levels.

been a prominent issue in many of the poorest Michigan school districts including Detroit and Flint.[7]

This study uses a unique panel dataset that includes annual district level financial and enrollment data from Michigan, allowing credible estimates of special education expenditures and revenue, student composition and district wealth. While this analysis is limited by the unobserved individual nature of each special education student's disability, we explore the composition and location of special education students as well as the relationships between unrestricted fund expenditures on special education and district property wealth. We find that: (i) the financial burden associated with using unrestricted funds for special education expenditures is significantly greater for the poorest districts due to their larger fraction of special need students; and (ii) students receiving special education services vary with district wealth and this variation is likely attributable to both compositional differences of special need students and financial incentives that create differences in the special education identification and services.

There are many possible explanations for these findings, including differences in the composition of special need students, differences in whether a mildly impaired student receives any special education services, and variability in services provided to a student with a particular set of special education needs. The fact that changes in a district's wealth are associated with significant changes in the average level of services provided to special education students suggests that our findings are not solely attributable to compositional differences in special need students. While we are unable to quantify the compositional and incentive effects, our results clearly document large inequities in special education funding across Michigan school districts.

[7] In a March 26, 2015 Detroit News article, a memo by William Aldridge (the former chief financial and administrative officer of Detroit Public Schools) is mentioned that states Detroit Public Schools "was required to subsidize special education operations by over $40 million" in the 2013-2014 academic year.

II. **Literature Review**

This study contributes to the research on equity, funding of special education, and provision of special education services. Research into equity issues around special education funding is not abundant, but has uncovered concerns. Harr, Parrish, & Chambers (2008), summarizing research from the Special Education Expenditure Project (SEEP) completed in 2002, determined that existing state systems tend to produce disparities in funding and expenditures that are unrelated to cost factors associated with the disabled student's needs.[8] Conlin & Jalilevand (2015) found large disparities in spending per special education student across Michigan school districts which varied according to the property wealth and income of the district. The inequities were amplified by services provided by the Intermediate School Districts. The study also found large differences in the number of special education students. Baker and Ramsey (2010) raised equity concerns in their study of two states with census-based reimbursement systems, finding dramatic disparities in special education funding per student resulting from the non-uniform distribution of students with special needs. Baker, Green, & Ramsey (2012) discuss inequities related to identification of special education students, noting that funding systems can have incentives embedded in them that promote or discourage identification, but that such incentives can distort the "true need", or underlying distribution of special needs students. These studies illustrate common inequities in special education funding systems, but do not link inequities to the level of unrestricted funds used for special education expenditures.

Competition for resources between special education and general education has been a concern for many years (Meredith & Underwood, 1995), and has contributed to the large number of lawsuits over special education funding systems (Parrish, 2001; Martin, Martin, & Terman,

[8] See Chambers et al, (2002). More recent national data are not available.

1996; Sielke & Russo, 1999). Empirical work examining this competition and the level of unrestricted funds used for special education expenditures (referred to as encroachment in some of the literature), however, has been sparse. Parrish (2001) examined national special education expenditure data and found no evidence of encroachment. Cullen (1997), in her study of special education "crowd-out" in Texas, does conclude that "special education mandates redistribute funds from regular education students to special needs students (p. 49)." Lankford & Wyckoff (1999), in their study of special education funding in New York state, find little evidence that special education expenditures "crowd-out" spending for regular education, but note that changing district composition, including increases in special education students has squeezed district budgets. Murphy and Picus (1996) identified encroachment among districts in California, and noted variation among counties in encroachment amounts. None of the mentioned studies, however, have quantified encroachment in a funding system over time, looked for variations in encroachment related to district characteristics, or considered how encroachment creates financial implications that may differ for poor and wealthy districts.

A significant amount of the literature on special education finance focuses on financial incentives embedded in state funding systems. Mahitivanichcha & Parrish (2005) surveyed several state funding systems, concluding that the relationship between incentives and practice is complex. They identify interactions between financial and compliance incentives which frequently arise in the administration of federal law. Dhuey & Lipscomb (2011), on the other hand, found that school districts respond to financial incentives. They compared the nine state census-based funding systems to systems in other states, and linked census based funding reforms to a 10% reduction in special education identification rates, changing placements for disabled students, and differing exit rates.

State specific research has also uncovered district responses to financial incentives. Kwak (2010) found that in California, districts responded to the 1997 conversion to a census-based system by classifying fewer students as disabled. Cullen (2003) concluded that financial incentives play an important role in determining the size of special education programs in Texas. Battisti, Friesen and Hickey (2012) similarly found that in British Columbia, the elimination of supplemental grants for special education students resulted in fewer students being identified as having special needs.

Overall, empirical work has established that financial and other incentives can play a role in the administration of special education services and the identification of special education students, and that inequities exist in the levels of special education spending across districts. Mininal work has been done on the equity issues associated with encroachment. This paper contributes to our understanding of special education funding by examining encroachment over a seven-year time period, under one state financing system, with a focus on the relationships between encroachment and district wealth. It is the first study to consider how the financial implications associated with using unrestricted funds for special education services may vary for poor and wealthy districts due to compositional differences in the special needs population, and possibly affect the services provided to special needs students. In this manner, our results have implications for inequities in special education services but also for inequities in the distribution of education resources for general education students, due to the use of unrestricted funds. While this paper does provide a detailed analysis of these relationships and inequities, the district level panel data does not allow causal inference in terms of how district wealth affects encroachment and how encroachment affects the composition of special need students and the provision of educational resources for all students.

III. Background on Michigan Special Education Finance

Michigan currently has 549 local school districts and 280 charter schools. Each local district and charter school belongs to one of fifty-seven ISDs, countywide or several-county organizations that coordinate services for a group of school districts.[9] ISDs provide a wide range of services, but have a central responsibility to provide and coordinate special education services. Some ISDs provide comprehensive special education services on site, while others coordinate special education in their member districts and provide minimal services at ISD locations.[10] ISDs may provide services that overlap with local district programs and local school districts may have the option of placing students in their own programs, or in ISD facilities. In addition, local districts may contract for services or receive in-kind services from their ISD. ISDs obtain resources for these activities from a special education property tax levy that provides revenues for ISD operations and for member districts. ISDs also receive state and federal funds, and may distribute funds to their member districts. Along with the ISD resources and state funding, local districts receive special education funding from the federal government.

Federal law has established and protected the rights of disabled students and encourages districts to identify disabled students and provide services, regardless of cost and in the "least restrictive environment". "Maintenance of effort" rules attempt to ensure that local and state special education spending levels are maintained, regardless of the levels of federal funding. Federal law thus provides compliance incentives to local school districts that can compete with financial incentives embedded in the state special education finance system.

[9] Charter schools are assigned membership to ISDs and are eligible to receive special education revenues from federal, state, and local ISD sources. Because the number of special education students at charter schools is minimal, we focus on local school districts and ISDs.

[10] Kent, Oakland, and Wayne ISDs, which cover over one third of Michigan's K-12 enrollment, offer minimal in-house special education services.

IV. Data and Summary Statistics

The dataset consists of annual special education enrollment and financial information at both the local district and ISD level. The enrollment data, provided by the Michigan Department of Education (MDE) and the Michigan Center for Educational Performance and Information (CEPI), includes the number of students with Individualized Education Plans (IEPs) and the number of full time equivalent special education students (FTEs). Along with this enrollment information, the MDE provides complete special education expenditure and state revenue data.[11] CEPI provides annual financial data for each school district and ISD. Finally, the Michigan Department of Treasure (MDT) provided taxable values and special education millage rates while the U.S. Census provided median income and percent of resident students living above the poverty line. The annual data from these different sources were obtained for 547 of the 552 local districts and all 57 ISDs from 2004 through 2010.

Table 4 contains the means and standard deviations of the enrollment and financial variables. Every student that receives special education services is provided with an IEP, outlining planned services, but many students at the local districts with IEPs spend a significant portion of their time in regular classrooms. Special education FTEs, in contrast, measure the equivalent full time number of special education students. Special education FTEs represent less than 5% of general education FTEs. On average, a district has more than three times the number of students with IEPs as FTEs (398 compared to 123), and IEPs are issued to 14% of students. This suggests that the majority of students receiving special education services are in regular classrooms for a

[11] The MDE provides this expenditure and revenue information for both local districts and ISDs on their Michigan State Aid Financial Status Reports. The Financial Information Database (FID) maintained by CEPI contains the financial data.

Table 4. Descriptive Statistics. Annual Observations from 2004 through 2010.

	Means (Standard Deviations)
Students with IEPs at Local Districts	398
	(901)
Special Education FTEs at Local Districts	123
	(426)
General Education FTEs at Local District	2,689
	(5,158)
Special Education FTEs at ISD Facilities	281
	(328)
Special Education Revenue Sources for Local District ($Millions)	
Federal Revenue	0.074
	(0.655)
State Revenue	1.45
	(4.80)
Local Revenue	0.056
	(0.058)
Federal Revenue through ISD	0.344
	(1.40)
Non-Federal Revenue through ISD	1.19
	(4.42)
Unrestricted Funds used for Special Education Expenditures/ Encroachment ($Millions)	1.36
	(4.88)
Total Special Education Revenue for ISD ($Millions)	34.9
	(56.9)
Taxable Value Per Total FTE at Local District ($Millions)	330
	(945)
Median Income ($Thousands)	57.9
	(15.5)
Percent of student age residents above the poverty line	85.4
	(8.0)
Taxable Value of Homesteads in ISD ($Millions)	314
	(302)
Taxable Value of Non-Homesteads in ISD ($ Millions)	201
	(166)
ISD Special Education Millage	2.52
	(1.08)
ISD Taxes Collected for Special Education from Homesteads ($Millions)	12.8
	(24.7)
ISD Taxes Collected for Special Education from Non-Homesteads ($Millions)	5.66
	(10.8)
Annual Local District Observations	3,829
Annual ISD Observations	399

Note: There are 165 observations where the number of special education FTEs is zero and 183 observations where the number of IEPs is zero, excluding charter schools. The averages for the local school district variables are based on the 3,829 local district-year observations and the averages for the ISD variables are based on the 399 ISD-year observations.

significant portion of the day.[12] Many of the more severely disabled students requiring full time services attend ISD facilities and, on average, ISDs enroll 281 special education FTEs at their facilities. Because there are almost ten times as many local districts as ISDs, the majority of special education FTEs receive services at the local district.

There are large differences across districts in the fraction of students receiving special education services and these differences are correlated with district demographics such as wealth. Figure 7 depicts the percent of total FTEs (sum of general and special education FTEs) that are special education, across different property wealth quintiles based on average annual taxable values per total FTE.[13] The figure indicates that, in general, the percentage of special education FTEs decreases across wealth quintiles and that the poorest quintile has a much larger fraction of students with special education FTEs than the other wealth quintiles.[14] In addition, the number of special education FTEs has declined from 2004 to 2010 for all wealth quintiles, with an average decrease of 26.6% across this time span, much greater than the 9.97% decrease in general education FTEs across the state.[15] Interestingly, the poorest quintile has experienced the largest drop in general education FTEs (24.4%) as well as the largest percentage point

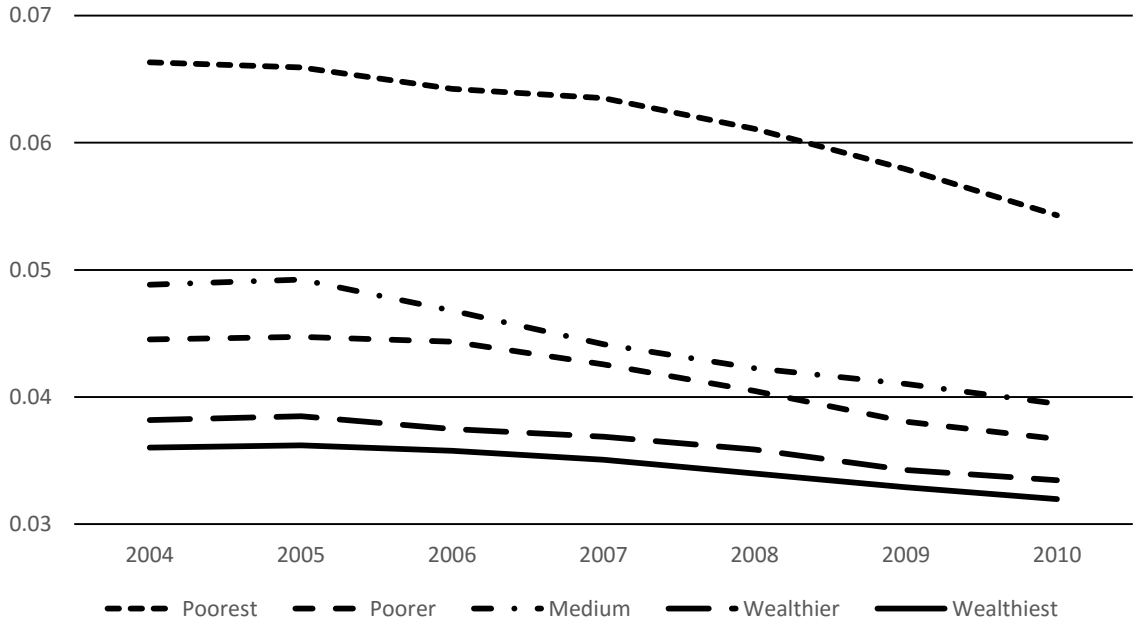
[12] The district does have discretion in terms of how they calculate a special education FTE.

[13] One measure of district wealth is taxable value per total number of FTEs. To obtain the quintiles, we first calculate a district's average annual taxable value per total FTE from 2004 to 2010. This ensures that a local school district remains in the same quintile across years. We then designate the 20 percent of school districts with the largest average annual taxable values per total FTE as the wealthiest quintile, the districts from 20-40 percent as the wealthier quintile and so forth. As indicated in Table 1, the average annual taxable value per total FTE across all districts is $330 million and varies significantly across districts.

[14] The districts in the poorest quintile also have a higher proportion of IEPs but this difference relative to districts in the other quintiles is not as large as the difference in special education FTEs. One obvious explanation is that the distribution of students requiring specific types of special education services varies based on district wealth. It could also be the case that the incentive to provide special education services and provide a student with an IEP depends on the wealth of the district.

[15] One explanation for the changes in FTEs are the changes associated with the reauthorization of IDEA in 2004. This reauthorization, which emphasized the education of students in the Least Restrictive Environment, caused many districts to switch to a co-teaching model of service delivery, placing special education students with a special education teacher in a general education class. Depending on how districts accounted for co-taught classrooms, this could result in a reduction in special education FTEs. Another explanation is that, conditional on special education services, districts have financial incentive to report the minimum number of special education FTEs. The decline could also reflect decreases in services per IEP.

Figure 7. Special Education FTEs as a Percent of Total FTEs, by Wealth Quintile.



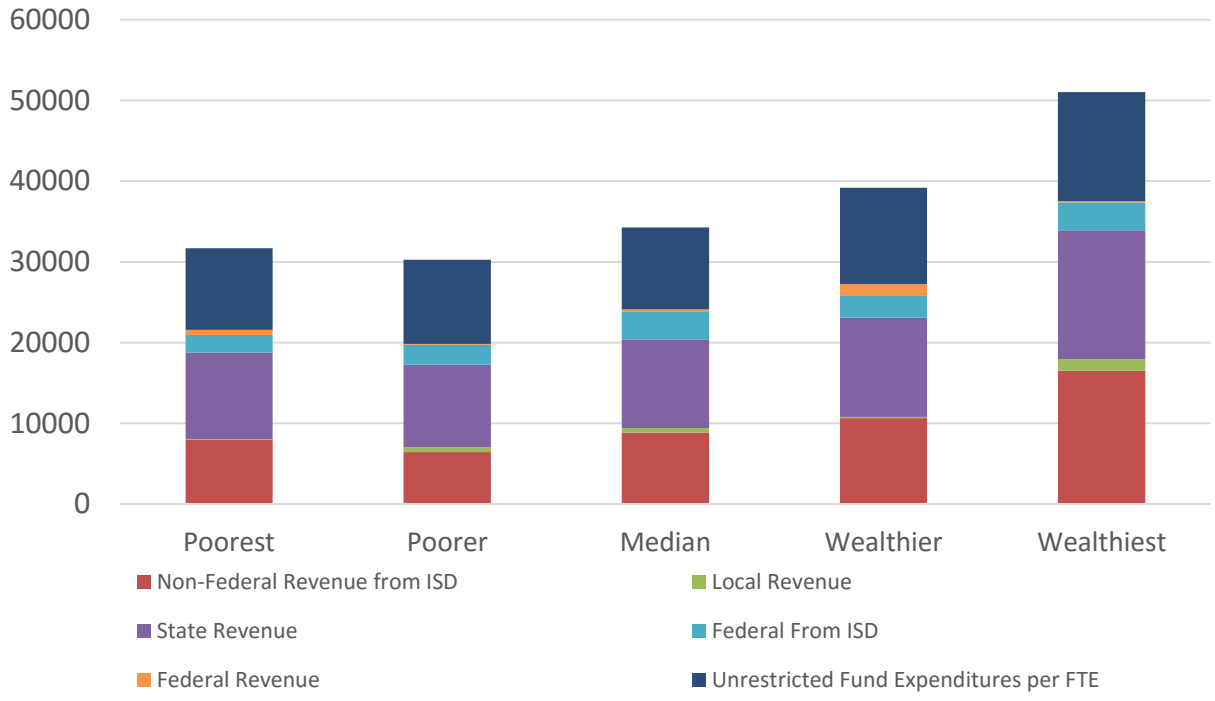
decrease (38.9%) in the number of special education FTEs from 2004 to 2010. While the decline in special education FTEs for all wealth quintiles has been greater than the decline in total FTEs, the overall decline in IEPs is similar to the decline in general education FTEs (7.81% compared to 9.97%).[16] When other wealth proxies are used, such as median income and percent of resident children (ages 5 to 17) above the poverty line, we obtain similar results.

In terms of revenue designated for special education services, Table 4 indicates that the average for a local school district is slightly over $3.1 million. The largest revenue sources are the state (average of $1.45 million) and non-federal revenue transfers from the ISD (average of $1.19 million). Combining revenue and expenditure data, we calculate that the average district will have expenditures in excess of special education designated revenue of $1.36 million. Local

[16] It is interesting to note that the poorest quintile experienced a percent decline in general education FTEs that is significantly larger than the decrease in IEPs (24.4% compared to 16.9%). This results in the percentage of total FTEs with IEPs increasing significantly across years for only the poorest quintile.

districts make up this shortfall using unrestricted funds which pay for 30% of the special education expenditures (i.e., encroachment). Figure 8 demonstrates that while the level of encroachment per special education FTE does increase slightly across wealth quintiles, special education revenues, and thereby expenditures, increases significantly more across wealth quintiles.[17] In addition, the amount local districts receive from their ISD per special education FTE is much greater for the wealthy districts.

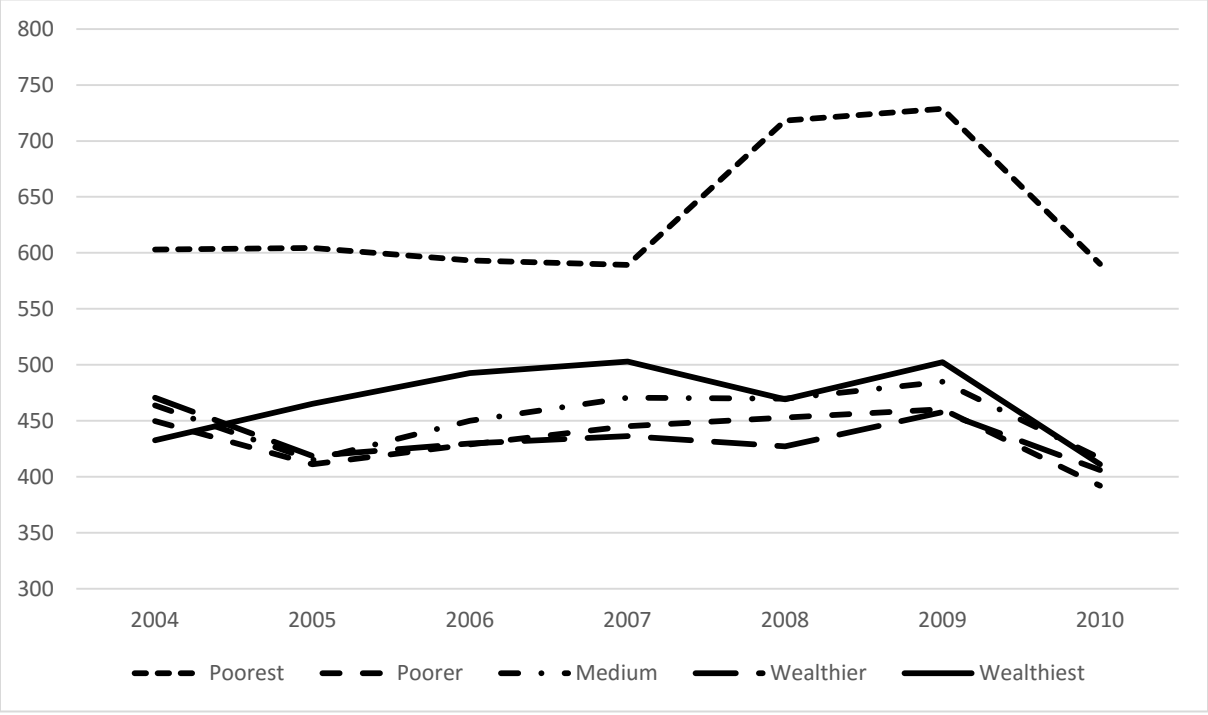
Figure 8. Special Education Funding Per Special Education FTE, by Source and Wealth Quintile.



[17] This difference in special education funding per special education FTE is primarily due to wealthy districts receiving larger transfers from their ISD and obtaining more state revenue for special education services. As Table 1 indicates, there are significant differences in tax bases across ISDs (both homestead and non-homestead properties) and this results in significant differences across ISDs in taxes collected from special education millages. In terms of state revenue, the Michigan funding system is based on cost reimbursement which results in higher spending districts receiving more state funds for special education.

While the encroachment per special education FTE is slightly lower for poorer districts, the amount required from unrestricted funds for special education expenditures is greater for the poorest districts due to the larger number of special education FTEs. This is demonstrated in Figure 9 which indicates that the level of encroachment per total FTEs is significantly greater for districts in the poorest quintile. The poorest quintile also has a much higher level of encroachment per total FTE when median income and percent of resident children above the poverty line are used as proxies for district wealth. One explanation for this greater level of encroachment, partly attributable to the larger proportion of students requiring special education services, is the concentration of charter schools in the poorest areas of Michigan. Along with this concentration, Jalilevand (2016) documents the lower enrollment of students requiring

Figure 9. Unrestricted Funds for Special Education Expenditures Per Total FTE, by Wealth Quintile.



special education services in charter schools relative to the public schools in these poor districts. Other factors associated with poverty (such as lead poisoning, food insecurity, abuse, trauma and inadequate medical care) are also likely to contribute to the larger proportion of special need students in the poorest quintile.

Similar to local school districts, there is significant variation in the amount of special education resources and services provided at facilities operated by the fifty seven ISDs. Table 5 summarizes ISD characteristics by the wealth quintile constructed from the local district taxable values per total FTEs. Notice that the fraction of special education FTEs located at ISD facilities does not vary systematically with wealth. The fraction of special education FTEs at ISD facilities is 0.12 for the poorest quintile, 0.23 for the poorer quintile and ranges between 0.15 and 0.18 for the other three quintiles. As expected, quintiles that service a larger portion of special education FTEs at ISD facilities distribute a smaller percentage of their revenue to local districts. In terms of expenditures per special education FTE at ISD facilities, it increases monotonically with quintile wealth - with some of these expenditures funding in-kind transfers to local districts. The ISDs associated with local districts in the wealthiest and wealthier quintiles receive a large portion, more than half, of their revenue from property taxes, while ISDs in the poorer and poorest quintiles receive around a quarter of their revenue from property taxes. The larger proportion of property tax revenues for wealthier ISDs is attributable to a larger tax base, but not to a higher special education millage rate. In fact, the districts in the wealthiest quintile have the lowest average ISD special education millage rate of 2.54.[18]

[18] There is no encroachment issue associated with ISD expenditures. ISDs obtain enough revenue from the special education millage and state/federal sources to cover all special education services provided at ISD facilities. They distribute revenue, or provide in-kind transfers, to their member districts only after ISD expenses are covered.

Table 5. ISD Characteristics by Local District Quintiles.

	Poorest	Poorer	Medium	Wealthier	Wealthiest
Fraction of Special Education FTEs at ISD Facilities	0.12	0.23	0.18	0.15	0.16
Percent of ISD Revenue Transferred to Local Districts	0.51	0.19	0.35	0.37	0.47
Expenditures at ISDs facilities per Special Education FTE (in $1,000)[A]	134	151	153	191	213
Percent of ISD Revenue Obtained from Property Taxes	0.28	0.25	0.41	0.61	0.76
Homestead Taxes per FTE	6,655	7,199	8,356	8,911	10,319
Non-Homestead Taxes per FTE	4,161	4,413	4,929	5,305	6,332
ISD Special Education Millage	3.07	2.98	3.22	2.89	2.54

Note A: These expenditures also include in-kind transfers from the ISD to the local districts.

V. **Empirical Specification and Estimates**

To further analyze the relationship between unrestricted funds used on special education expenditures, wealth and the provision of special education services, we first estimate the following regression model:

$$\ln(\text{Unrestricted Funds}_{st}) = \beta_1 \text{ WealthProxy}_{st} + \boldsymbol{\theta_t} + \varepsilon_{st}.$$

The variable $\ln(\text{Unrestricted Funds}_{st})$ is the natural log of unrestricted funds spent per special education FTE or total FTE for school district *s* in year *t;* WealthProxy_{st} is the natural log of the taxable value per total FTE, the natural log of median income, or the percent of resident children above the poverty line for school district *s* in year *t*; $\boldsymbol{\theta_t}$ is year fixed effects; and ε_{st} is an idiosyncratic error term. This specification uses cross district variation to identify the relationship between these wealth proxies and encroachment. Panel A of Table 6 contains estimates when the natural log of the taxable value per total FTE is the wealth proxy while Panels B and C contain estimates when the proxies are the natural log of median income and percent of resident children above the poverty line, respectively. The estimates in Column 1 of Table 6 indicate that, irrespective of the proxy, wealthier districts choose special education spending levels that require higher rates of unrestricted funds per special education FTE. In terms of Panel A, the positive estimate of β_1 indicates that a district with a ten percent greater taxable value per total FTEs is expected to have 3.26 percent more in unrestricted fund expenditures per special education FTEs (which is consistent with the Figure 8 bar chart). This is in part attributable to the smaller proportion of special need students in the wealthier districts.

To provide insight on how the financial burden associated with encroachment varies across districts, we estimate the above specification with the natural log of unrestricted funds spent per <u>total</u> FTE as the dependent variable (Column 2 of Table 6). The estimate of β_1 differs

Table 6. Encroachment Regressions.

Panel A: Wealth Proxy - Taxable Value Per Total FTE	Encroachment per SE FTE	Encroachment per Total FTE	Encroachment per SE FTE	Encroachment per Total FTE
ln(Taxable Value Per Total FTE)	0.326**	0.093**	0.871**	0.657**
	(0.033)	(0.029)	(0.156)	(0.143)
Year Fixed Effects	Yes	Yes	Yes	Yes
Local District Fixed Effects	No	No	Yes	Yes
R-squared	0.05	0.01	0.74	0.75
Observations	3,500	3,500	3,500	3,500
Panel B: Wealth Proxy - Median Income	Encroachment per SE FTE	Encroachment per Total FTE	Encroachment per SE FTE	Encroachment per Total FTE
ln(Median Income)	0.116*	-0.340**	-0.721**	-0.519**
	(0.060)	(0.053)	(0.339)	(0.284)
Year Fixed Effects	Yes	Yes	Yes	Yes
Local District Fixed Effects	No	No	Yes	Yes
R-squared	0.01	0.01	0.74	0.75
Observations	3,449	3,459	3,449	3,459
Panel B: Wealth Proxy – Percent above Poverty Line	Encroachment per SE FTE	Encroachment per Total FTE	Encroachment per SE FTE	Encroachment per Total FTE
Percent of Resident Children above Poverty Line	0.269	-1.582**	-1.024	-0.481
	(0.195)	(0.172)	(0.558)	(0.483)
Year Fixed Effects	Yes	Yes	Yes	Yes
Local District Fixed Effects	No	No	Yes	Yes
R-squared	0.01	0.03	0.69	0.75
Observations	3,449	3,459	3,449	3,459

Note: Dependent variables are natural logs of the listed revenue variables. Robust standard errors, clustered at the local school district are given in parentheses. ** p<0.01, * p<0.05.

significantly across wealth proxies. Based on Figure 9, it is not surprising that this estimate is positive for taxable value per total FTE. While encroachment per total FTE is much greater for districts in the poorest quintile than districts in the other quintiles, districts in the wealthiest quintile (with much larger tax bases) average slightly greater encroachment than districts in the other three quintiles. The non-monotonic relationship between the natural log of taxable value per total FTE and encroachment per total FTE is not captured by this specification which restricts the relationship to be linear. As for median income and percent above the poverty line, their relationship to encroachment per total FTE is more monotonic.[36] The large negative estimates of β_1 suggests that the financial burden associated with encroachment is much greater for districts with a low median income and a high proportion of children below the poverty line.

To provide further insight on compositional issues, we include district-level fixed effects in the above specifications. By adding district-level indicator variables, we use within-district, across-year variation to identify the relationship between changes in wealth proxies and changes in unrestricted fund expenditures per FTEs. The estimates in Columns 3 and 4 of Panel A indicate that a decrease in a district's taxable value per total FTE is associated with a relatively large decrease in unrestricted fund expenditures per special education FTE and total FTE. The fact that the positive estimates of β_1 significantly increase with district fixed effects may be attributable to districts increasing the services provided to their special need students as their ISD's tax revenue from the special education millage increases. It may also be attributable to compositional changes in the districts' special education students that could arise from student movements or changes in identification of special needs students. Compositional changes may also explain why, when district-level fixed effects are included and median income and percent

[36] Unlike taxable value per total FTEs, if you replicate figure 3 using these other wealth proxies, the level of encroachment decreases almost monotonically across wealth quintiles.

of resident children above the poverty line are used as wealth proxies, the estimates of β_1 suggest a strong negative correlation between changes in these wealth proxies and changes in both the encroachment per special education FTE as well per total FTE.

To further examine the compositional differences of special education students across districts, we estimate specifications that consider the relationship of the ratio of IEPs to FTEs to taxable value and encroachment (see Columns 1 and 2 in Table 7). To control for potential economies of scale, this specification also includes the natural log of total FTEs as a covariate. In addition, to provide insight on incentive issues, the natural log of unrestricted fund expenditures (i.e. encroachment) per special education FTEs is included as a covariate. The estimates in Column 1, which do not include district fixed effects, provide some evidence that wealthier districts have slightly greater IEP to FTE ratios. Again, this could be due to a different population of special need students, differences in whether a mildly impaired student receives an IEP or differences in services provided to a student with an IEP. The coefficient estimate (6.003) associated with taxable value per total FTE when district fixed effects are included in the specification (Column 2) suggests that increases in a district's taxable value per total FTE is associated with significant changes in the ratio of IEPs to special education FTEs. It would be surprising if such large changes in this ratio are attributable solely to compositional changes in the population of special need students. The positive coefficient estimates associated with encroachment provide no evidence that a district's decision to provide an IEP to a student with marginal special education needs is negatively influenced by the amount of unrestricted funds the district spends on special education services. That said, it could be the case that those districts with large encroachments are attracting more students who require an IEP but have minimal special education needs.

Table 7. Composition and Location Regressions.

	Local Districts		ISDs (Excludes Kent, Oakland, and Wayne)			
	Ratio IEP to SE FTE	Ratio IEP to SE FTE	Ratio Local to ISD	Ratio Local to ISD	Ratio Local to ISD	Ratio Local to ISD
ln(Taxable Value Per Total FTE)	0.454*	6.003**	-0.017	1.057	-0.091	1.054
	(0.224)	(1.881)	(0.259)	(0.960)	(0.252)	(0.962)
ln(Total FTEs)	-1.033**	3.287	0.646**	1.362	0.668**	1.357
	(0.193)	(3.926)	(0.114)	(1.466)	(0.117)	(1.518)
ln(Unrestricted Fund Expenditures Per SE FTEs)	1.941*	3.173*			0.771**	-0.026
	(0.743)	(1.789)			(0.134)	(0.084)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Local District or ISD Fixed Effects	No	Yes	No	Yes	No	Yes
R-squared	0.08	0.36	0.12	0.94	0.17	0.94
Observations	3,500	3,500	377	377	377	377

Note: Dependent variables are the listed ratio variables. Robust standard errors, clustered at the local school district or intermediate school district level given in parentheses. ** p<0.01, * p<0.05.

The prior estimates do not address the possible inequity associated with differences in ISD facilities and the incentives associated with placing a special education student at an ISD facility versus at a local school district. To provide insight into this location issue, we aggregate the annual data to the ISD level and construct the ratio of special education FTEs at the local school districts to FTEs at ISD facilities. Columns 3 through 6 in Table 7 contain estimates when this ratio is regressed on the natural log of taxable value per total FTE and the natural log of total FTEs (in ISD facilities as well as the local districts).[1] First, note that this ratio of special education FTEs at the local district to the ISD facilities does not vary with taxable value per total FTE. The positive coefficient when ISD fixed effects are included suggests that the wealth of a district increasing is associated with a slight increase in the proportion of special education FTEs located at the local districts. When unrestricted fund expenditures per special education FTEs is added as a covariate, the coefficient estimates suggest that while the ratio of special education FTEs at the local school districts and ISD facilities is positively correlated with local district encroachment, this ratio does not change when a district's wealth changes across years. In summary, the estimates in Panel B provide no evidence that the decision of whether a student is placed at an ISD facility is influenced by changes in district wealth or local district financial incentives.[2]

VI. Conclusion

Local school districts in Michigan have experienced significant declines in both general education and special education enrollment in the past 15 years. Over the time period we

[1] Kent, Oakland, and Wayne ISDs are outliers in terms of the ratio of special education FTEs at the local districts and at ISD facilities because they have very minimal ISD facilities and offer almost zero in-house special education services. Therefore, we drop these ISD observations when estimating the specifications in Panel B of Table 3.
[2] We obtain similar results when median income and percent of resident children above the poverty line are used as wealth proxies.

analyze (2004 through 2010), general education FTEs declined 9.97%, special education FTEs declined 26.6% and students with IEPs declined 7.81%. Along with declining enrollment, the state has reduced K-12 education funding (in real terms) which has caused many districts to experience budgetary challenges. This paper documents one reason why poorer districts often experienced more severe budgetary challenges. Having special education funding dependent on property taxes and not directly accounting for the large proportion of special need students in the poorest districts results in financial hardship for these districts and generates inequities across districts. These inequities are not only relevant for special need students but also general education students because the burden of the $746M spent annually from unrestricted funds on special education expenditures is borne disproportionately by the poorest districts.

This paper also finds that changes in a district's wealth is associated with significant changes in the average level of services provided to students identified as special needs and that the composition of students receiving special education services vary with district wealth. This variation based on district wealth, and the changes in the variation across years, is likely attributable to both compositional differences of special need students and perhaps differences in identification and services. Faced with declining enrollment and revenues, districts may reduce special education expenditures by decreasing identification (i.e., IEPs), decreasing services to students with IEPs, and/or encouraging students to receive services at ISD facilities. The incentive to take these actions is magnified by the significant amount of unrestricted funds spent on special education services that exists in Michigan school districts. This incentive may be stronger for the poorest districts because their financial burden associated with this encroachment issue is greater due to their larger fraction of special need students.[3]

[3] The ability of school districts to take these actions is restricted by federal laws that encourage districts to identify disabled students and provide services, regardless of cost and in the "least restrictive environment". Along with the

Using district-level panel data, we are unable to determine whether our empirical results are mainly attributable to compositional or incentive differences. Observing individual students over time is likely necessary if one is to credibly estimate these compositional and incentive effects. That said, district-level panel data does allow us to credibly quantify not only the amount of unrestricted funds used for special education expenditures but also the inequities that exist in special education services that affect both special and general education students in Michigan school districts.

"Maintenance of effort" rule, these federal laws may impede local school districts from decreasing services and dissuading special need students from attending the district.

CHAPTER 3: Financing Special Education: Charter Schools, Encroachment and Financial Burdens

ABSTRACT

Empirical research consistently suggests that charter schools enroll fewer special education students than traditional public schools (TPSs). While there has been debate among charter school advocates and opponents over why these enrollment differences appear, there may also be important financial implications that arise because of encroachment, defined as the use of school unrestricted funds to pay for special education services. Using a unique panel dataset incorporating the extensive special education cost data available in Michigan, I find evidence that charter schools in Michigan enroll proportionally fewer special education students, that special education students at charter schools may require and receive a different complement of services per IEP, and that charter schools experience lower per pupil encroachment than their TPS counterparts. I find encroachment at TPSs increases more with the movements of students to charter schools than for other types of enrollment losses. These results are consistent with the premise that charter school competition increases the proportion of special needs students and thereby substantially increases financial burdens for special education at TPSs.

I. Introduction

The Education for All Handicapped Children Act[1] in 1975, later renamed the Individuals with Disabilities Education Act (IDEA), was designed to encourage states and local districts to provide a "free and appropriate education" for students with special needs, without regard for

[1] PL 94-142, 1975.

costs (Harr, Parrish, & Chambers, 2008). The law included provisions such as "maintenance of effort" to protect special education services from shifting levels of financial resources and resulted in a stable system that identifies students with special needs and provides services in every district and state in the country. When the education landscape changed with the introduction of charter schools, the IDEA law[2] clarified the responsibility of charter schools to serve children with disabilities "in the same manner" as other students and reiterated the rights of special needs students to receive a "free and appropriate education" at charter schools as well as traditional public schools (TPSs).

In spite of the clarification in IDEA law, charter schools have long been accused of avoiding special education students. Henig, for example, (2008, p. 99) reports that "overall, charter schools appear less likely than traditional public schools to accommodate students with disabilities…" Empirical research consistently suggests that charter schools enroll fewer special education students (US Department of Education, 2000; Lacireno-Pacquet et al, 2002; Miron & Nelson, 2002; GAO, 2012; Baker, Libby, & Wiley, 2012; Winters, 2015). While there has been debate among charter school advocates and opponents over why these enrollment differences appear, there may also be important financial implications associated with these differences. These financial implications arise because of encroachment, defined as a shortfall in the revenues designated for special education which requires the commitment of unrestricted funds to cover special education services.

Encroachment is a common feature of most state special education funding systems[3]. In a funding environment with significant encroachment, schools that enroll higher numbers of

[2] 20 U.S.C. §1413(a)(5)

[3] Wyoming is the only state that fully reimburses special education expenditures.

special education students are likely to experience higher cost burdens associated with these students. Michigan, with its low level of state support for special education and restricted local funding, has substantial encroachment in most school districts. In 2013, for example, schools in Michigan spent over $2.8 Billion providing special education services, with over $700 Million of that amount accounted for by unrestricted funds. Conlin & Jalilevand (2016) found that the financial burdens associated with encroachment in the state are correlated with district wealth and are significantly greater for the poorest districts due to their larger fraction of special needs students[4].

Using a unique panel dataset incorporating the extensive special education cost data available in Michigan, this paper uses across district within ISD variation to compare special education enrollments and financial burdens for TPSs and charter schools. I find evidence that charter schools enroll proportionally fewer special education students, that special education students at charter schools may require and receive a different complement of services per IEP, and that charter schools experience lower per pupil encroachment than their TPS counterparts.

This paper further considers whether there is a relationship between special education enrollments, encroachment and competition from charter schools. Growth of charter schools often coincides with enrollment losses for TPSs. Such losses would not cause significant burdens on unrestricted funds at TPSs if the losses are evenly spread over general education and the different types of special education students. If high cost special education students, however, are less likely to depart the TPS (Arsen, Plank, & Sykes,1999), it may result in higher special education enrollments at these schools. Higher enrollments of students requiring

[4] Conlin & Jalilevand (2016) does not consider charter schools.

expensive special education services would then result in higher financial burdens associated with these services.

Most Michigan school districts have experienced enrollment losses over the past seven years, due to demographic changes and economic pressures, as well as state choice policies that promote charter schools and Michigan's intradistrict choice program, Schools of Choice (SOC). SOC allows for students to move from their resident district to a neighboring TPS, offering students an opportunity to move to a better school district. While some districts experience large enrollment losses due to SOC, statewide there are no net losses or gains from the program. Both charter schools and SOC threaten district enrollments, and create competitive pressures on districts, providing the opportunity to analyze and compare the effects of enrollment losses on special education from these two programs. I find that special education enrollments are positively and significantly correlated with enrollment losses to charter schools, while correlations with SOC losses are negative and much weaker. This suggests that charter school competition may increase the proportion of special education students at TPSs, while SOC does not appreciably change proportions. Similarly, I find encroachment at TPSs increases more with the movements of students to charter schools than for other types of enrollment losses. These results are consistent with the premise that charter school competition increases the proportion of special needs students and thereby substantially increases financial burdens for special education at TPSs.

II. Literature Review

This study builds on previous research in the areas of charter school student enrollment characteristics, the financial effects of charter school competition, and unrestricted expenditures

on special education services (i.e. encroachment). Many studies have compared the enrollment statistics of charter and TPSs to understand how student characteristics might differ. Lacireno-Pacquet et al (2002) found mixed results, with "market-oriented" charter schools enrolling much lower percentages of special needs students. Buckley & Schneider (2007) found that Washington D.C. area charter schools enrolled larger proportions of minorities and disadvantaged students, but lower proportions of special education students. The US Department of Education (2000) found that while some charter schools "counsel out" students with disabilities, other charter schools target this population. Baker, Libby, & Wiley, (2012) found that charter schools enrolled significantly fewer students with special needs and fewer English language learners in their study of New York, Ohio, and Texas. Miron & Nelson (2002) studied enrollments in Michigan, and found much smaller enrollment rates for students with disabilities in charter schools across all disability categories. Finally, the GAO (2012) found that charter schools nationwide enrolled a smaller percentage of students with disabilities than traditional public schools, but drew no conclusions as to why the differences exist. This finding was significant because charter schools are subject to federal laws governing students with disabilities. The report emphasized the responsibilities of states to educate charter school operators on federal law with regard to students with disabilities.

While these reports compared enrollments of special needs students at charter schools and TPSs, there is limited research on the nature and causes of these differences. Garcy (2011) found that students with more severe and more expensive disabilities were less likely to attend an Arizona charter school, and that charter schools tended to enroll less expensive disabled students. Winters (2015) examined differences in the enrollment of special education students at charter schools in Denver, CO, and found that the enrollment "gaps" are due to fewer special needs

students applying to charter schools, fewer special needs students identified at charter schools and movements of non-special education students into charters.

In summary, multiple studies have concluded that enrollment differences exist in the numbers and types of special education students enrolled at charter schools. Only a few empirical studies consider the source of these enrollment "gaps", one citing financial considerations, the other focusing on student movements. None of the studies look at the variation across districts (TPSs) in the financial burden associated with special education enrollments.

Finally, while little is known about the financial effects of charter school competition on TPSs, Arsen & Ni (2012) found some evidence that such competition produces financial stress. Moody's Investor Services, a provider of credit ratings, research, and risk analysis (2012, 2013), also warned of increasing credit pressure on school districts that face competition from charter schools and highlighted the struggles districts face to align costs and revenues as enrollments and thus revenues decline. This study contributes to the literature by examining the effects of charter school competition on special education enrollment differences and special education cost burdens for TPSs, uncovering one possible mechanism through which financial stress could occur.

Encroachment or "crowd-out", has been characterized as a competition for resources between special education and general education (Meredith & Underwood, 1995), and has been cited as a possible factor in the large number of lawsuits over special education funding systems (Parrish, 2001; Martin, Martin, & Terman, 1996; Sielke & Russo, 1999). Encroachment has not been widely studied, but previous research has not identified it as a problem for districts (Murphy and

Picus, 1996; Cullen, 1997; Lankford & Wyckoff, 1999; Parrish, 2001). Under the more recent conditions of reduced education funding (Leachman et al, 2016), however, high levels or large variations of encroachment amounts could create financial burdens for TPSs since encroachment involves the commitment of scarce unrestricted funds.

Using a panel dataset containing special education enrollment and expenditure information for both local districts and intermediate school districts (ISDs) in Michigan, Conlin & Jalilevand (2015) estimated encroachment for every district in the state over a seven year period, and found that the poorest districts face a much greater financial burden associated with encroachment due to their larger fraction of special need students. The paper also finds that changes in a district's wealth is associated with significant changes in the average level of services provided to students identified as special needs and that the composition of students receiving special education services vary with district wealth. Since the poorest districts in the state are often those facing intense charter school competition, these findings raise questions about the effect of charter school competition on the size of the encroachment burdens faced by poor districts with large special education populations.

III. Background

Michigan had 549 local school districts and 280 charter schools in 2010[5]. Each local district and charter school belongs to one of fifty-seven ISDs, countywide or several-county organizations that monitor compliance with federal laws and provide a variety of services for members, including coordination of special education services. ISDs sometimes provide comprehensive special education services on site and can also provide in-kind special education

[5] In this paper, each year refers to the school year ending in June, so 2010 refers to the school year ending in June, 2010.

services or alternatively merely coordinate services among their member districts.[6] A special education property tax, levied by the ISD provides local revenues for special education services. This revenue can be distributed by the ISD[7], along with federal funds, to member districts, and in addition local districts, including charter schools, receive funds for special education from the state. Michigan provides state funding for special education using a combination per-pupil and cost reimbursement scheme that provides districts with funding for approximately 30% of their special education expenditures.[8]

The state of Michigan has enacted robust school choice policies such that students in Michigan can choose to enroll in their local TPS, a charter school, or can elect to attend a neighboring district through participation in Schools of Choice (SOC), an intradistrict choice program.

In 2010, over 112,000 students (7.4%) in Michigan were enrolled in charter schools. Students who choose to attend charter schools must complete an application process, and when charter schools are over-subscribed, students are chosen by lottery. Charter schools may reserve spots for siblings, children of employees, and certain grades, but may not select students based on academic or athletic ability. Each student is responsible for their own transportation to the charter school. While state statute expressly forbids discrimination based on disability for students enrolling in charter schools[9], fewer disabled students choose to attend charter schools.

[6] Kent, Oakland, and Wayne ISDs, which cover over one third of Michigan's K-12 enrollment, offer minimal special education services at ISD facilities.

[7] ISDs retain local tax revenues and federal funds for ISD sponsored services, and distribute surplus funds to districts according to their state-approved ISD plan.

[8] See Citizen's Research Council (2012) for an overview of Michigan's special education funding structure and Michigan Department of Education (2013) for details of the administrative rules for special education.

[9] Michigan Act 451 of 1976 Section 380.504

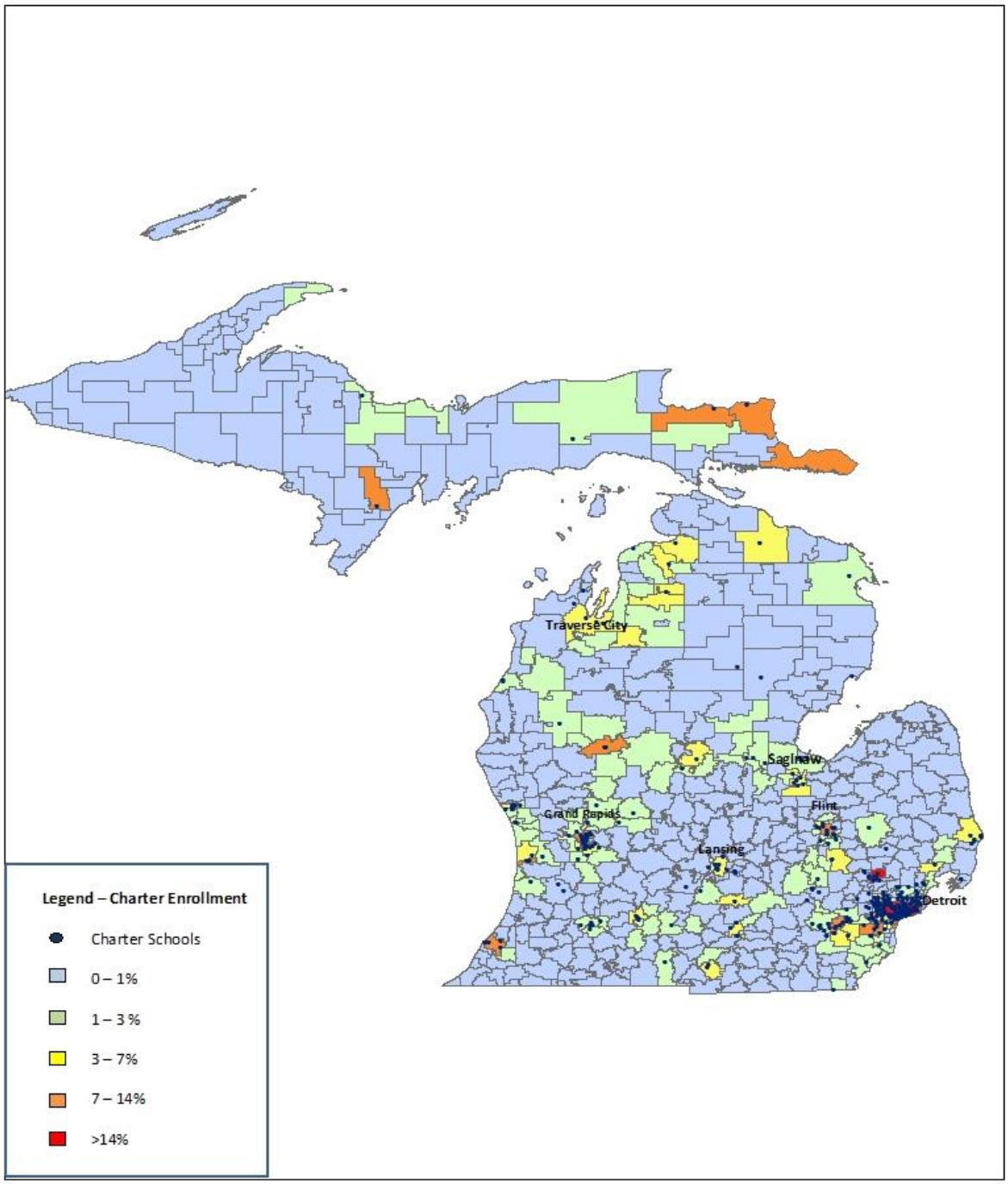
This could be in part because certain, highly disabled students in Michigan attend "center" programs[10], administered by the ISD, and are not eligible to attend charter schools.

Not all districts in the state of Michigan experience charter school competition. Figure 10 shows the locations of all charter schools in Michigan, and is shaded according to the level of charter school competition, as measured by the percent of resident students attending charter schools in 2010. The locations of charter schools on the map demonstrate the uneven nature of charter competition in the state, and illustrate that while many urban areas such as Detroit, Flint, Saginaw, and Grand Rapids experience high levels of charter school competition, some rural areas also experience significant competition.

In 2010, around 92,000 students (6.1%) were enrolled in SOC, out of approximately 1,500,000 total students in Michigan. Around 80% of Michigan districts participate in SOC, and each district determines the parameters of the program, including the number of students it is willing to take, schools and grade levels available, as well as the application rules and timeline. When SOC programs are over-subscribed, students are chosen by lottery, and enrolled students are responsible for their own transportation. While districts may exclude non-resident students from some academic programs and can exclude students with disciplinary problems, Michigan law states that schools participating in SOC "may not grant or refuse enrollment to an applicant based on…the pupil's mental or physical disabilities (MDE Pupil Accounting Manual, p. 5-I-3)."

[10] From Sec. 6. (1) of the State School Aid Act, " 'Center program' means a program operated by a district or intermediate district for special education pupils from several districts in programs for pupils with autism spectrum disorder, pupils with severe cognitive impairment, pupils with moderate cognitive impairment, pupils with severe multiple impairments, pupils with hearing impairment, pupils with visual impairment, and pupils with physical impairment or other health impairment. Programs for pupils with emotional impairment housed in buildings that do not serve regular education pupils also qualify. Unless otherwise approved by the department, a center program either shall serve all constituent districts within an intermediate district or shall serve several districts with less than 50% of the pupils residing in the operating district."

Figure 10. Michigan School District Boundaries, Locations of Charter Schools, and Percent of Resident Students Attending Charters.



The SOC program does not affect overall statewide enrollment, but individual school districts can experience net gains and losses in enrollment due to SOC.

IV. Data and Summary Statistics

The dataset consists of annual special education enrollment and financial information from 2004 through 2013, provided by the Michigan Department of Education (MDE), the Michigan Center for Educational Performance and Information (CEPI) and the Michigan Department of Treasury (MDT). The enrollment data includes the number of students with Individual Education Plans (IEPs) and the full time equivalent of special education students (FTEs). Along with this enrollment data, the dataset includes special education revenues from multiple sources, as well as expenditures for special education. Enrollment loss data was provided by CEPI for years 2004 through 2010 (the last year available).

Table 8 provides descriptive statistics for special education enrollment, funding, and expenditures for charter schools and traditional public school districts in Michigan. The table indicates that the average district in Michigan has around 377 students with IEPs and the equivalent of 113 full time special education students, a ratio of more than 3 IEPs per FTE. On average, Michigan school districts spend more than 4 million dollars annually on special education services, with more than one third of that amount coming from the district general fund as encroachment. Districts on average spend $330 per student on encroachment.[11] This is the average amount per student from unrestricted funds needed to provide special education services, and links special education expenditures with general education. Charter schools in contrast have on average 30 IEPs, but only 4 FTEs, a much higher ratio of more than 7 IEPs per

[11] For details on encroachment by property wealth quintile, see Conlin & Jalilevand (2015).

Table 8. Descriptive Statistics. Annual Observations from 2004 through 2013.

	Means (Standard Deviations)
Traditional Public Schools:	
Students with IEPs at Local Districts	377
	(822)
Special Education FTEs at Local Districts	113
	(380)
General Education FTEs at Local District	2,605
	(4,735)
Special Education Expenditures ($Millions)	4.26
	(13.7)
Special Education Revenue Sources for Local District ($Millions)	
Federal Revenue	0.071
	(0.617)
State Revenue	1.31
	(4.10)
Local Revenue	1.13
	(4.08)
Federal Revenue through ISD	0.351
	(1.32)
Encroachment from General Fund ($Millions)	1.34
	(4.60)
Encroachment per Total FTE	393
	(299)
Charter Schools:	
Students with IEPs at Local Districts	30
	(33)
Special Education FTEs at Local Districts	4.2
	(10.6)
General Education FTEs at Local District	345
	(370)
Special Education Expenditures ($Millions)	0.165
	(0.212)
Special Education Revenue Sources for Local District ($Millions)	
Federal Revenue	0.013
	(0.044)
State Revenue	0.049
	(0.087)
Local Revenue	0.010
	(0.039)

Table 8 (cont'd)

	Means (Standard Deviations)
Federal Revenue through ISD	0.020
	(0.049)
Encroachment from General Fund ($Millions)	0.073
	(0.125)
Encroachment per Total FTE	177
	(466)

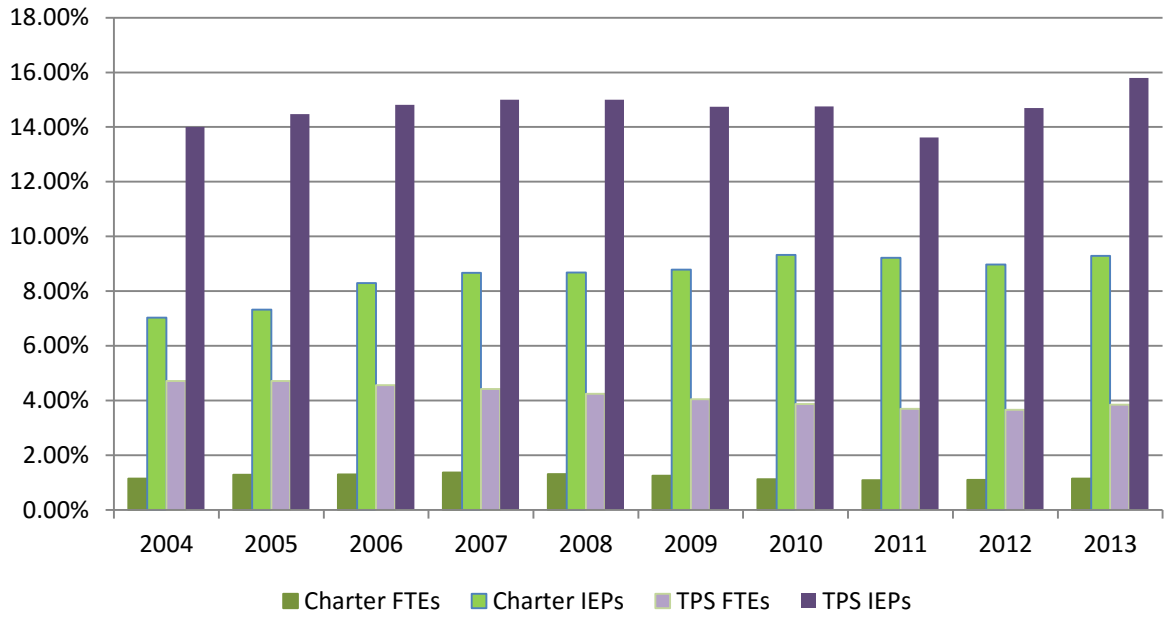
FTE, indicating fewer hours of services per IEP. Charter schools spend on average between $100,000 and $200,000 annually for special education with a large portion coming from unrestricted funds, but spend only $177 per student on encroachment, substantially less than TPSs.

Special education enrollments at charter schools in Michigan, as measured by percent of students with Individualized Education Plans (IEPs) [12] and percent of special education Full Time Equivalents (FTEs) [13] have long trailed those at TPSs. As Figure 11 indicates, TPSs enroll 5% more students with IEPs than charter schools, on average, and have 3% more special education FTEs.

[12] Special education services are determined and delivered through the Individualized Education Program (IEP), a contractual arrangement between the student's family and the school district (*Individuals With Disabilities Education Act*, 20 U.S.C. § 1400, 2004).

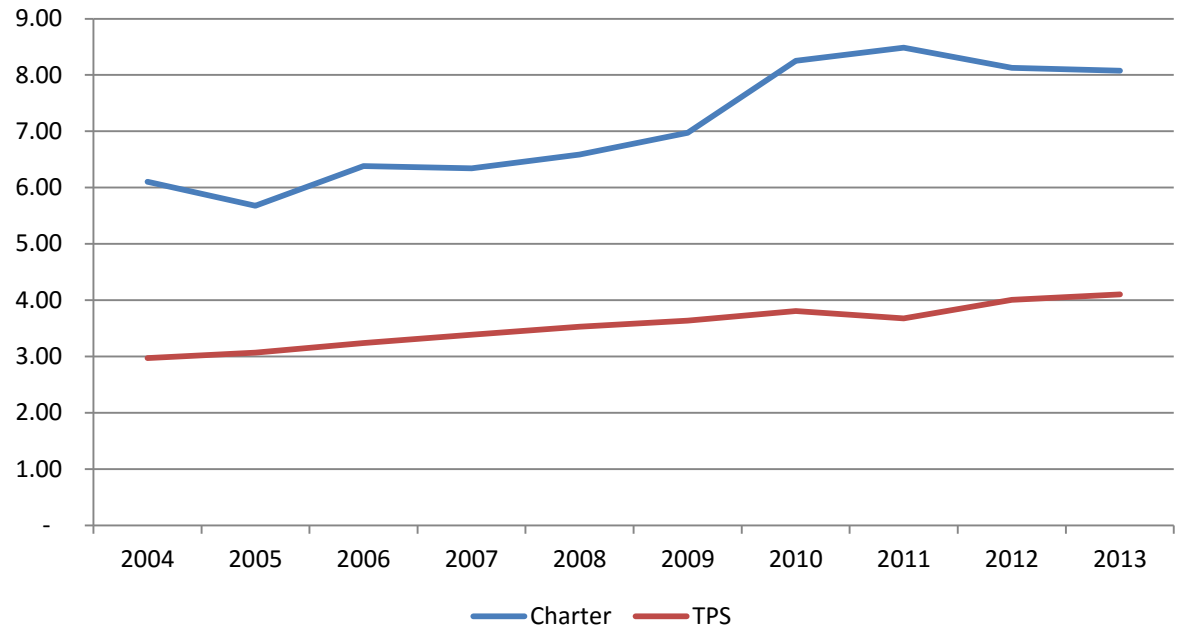
[13] Full Time Equivalent (FTE) combines the hours of special education services required by all IEPs each week, and divides by the number of instructional hours in a week to find the equivalent number of full time special education students. Reauthorization of IDEA in 2004 encouraged movement to a co-teaching model, a change that has enabled districts across the state to reduce their number of FTEs, resulting in declines.

Figure 11. Percent of Students with an IEP and Percent Special Education FTEs at Charter and Traditional Public Schools.



While fewer special education students attend charter schools, it is also possible that special education students that are enrolled in charter schools may differ from special educations at TPSs in important ways, complicating any comparisons. The ratio of students with IEPs to Special Education FTEs gives a rough estimate of the intensity of services associated with each IEP, with a lower number indicating a higher number of hours of service, and corresponding to more severely disabled students (see Figure 12). It is clear that special education students who attend charter schools have much higher IEP/FTE ratios, meaning these students are receiving fewer services per IEP. This provides some evidence that the nature of the disabilities of special needs students at charter schools are different than those for special needs students at TPSs. Alternative explanations include that special needs students at charter schools are not receiving the services they are entitled to, charter schools provide services more efficiently, or special needs students at TPSs are receiving too many services.

Figure 12. Ratio of Special Education IEPs to FTES, by School Type.

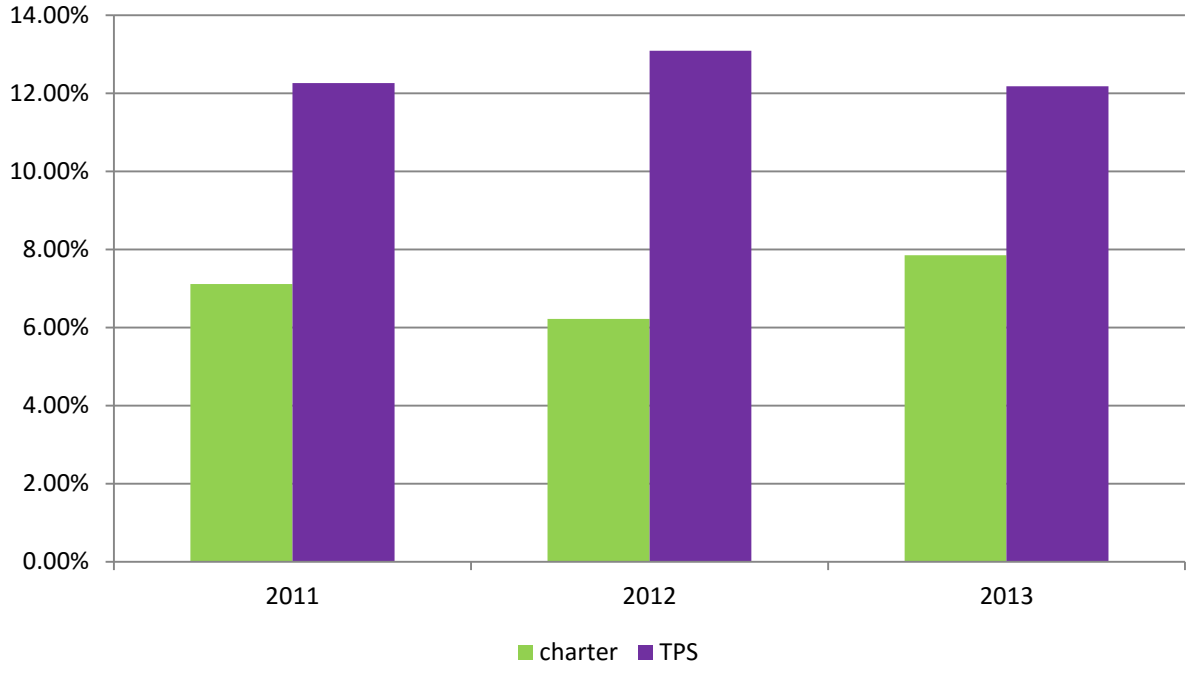


"Center" students account for some of the variation in the population of special education students at charter schools in terms of disability eligibility categories and hours of special education services. "Center" students and their expenditures are not easily distinguishable in the data, but after incorporating data on "center" students from Wayne County, differences in enrollments and in the IEP/FTE ratio at charter schools still persist (See Figure 13). This suggests that charter schools, even after adjusting for severely disabled "center" students, are enrolling fewer special education students. Because "center" students attend specialized programs coordinated by the ISD, they are also unlikely to participate in SOC.

V. Empirical Specifications and Estimates

This study proceeds in two parts. First, differences between charter schools and TPSs in terms of special education enrollments, ratios, and encroachment burdens are analyzed. Second, an analysis of enrollment losses and their effects on special education enrollments and financial

Figure 13. Percent of Students in Wayne County with an IEP after "Center" Students are Removed.



burdens at TPSs is completed, highlighting the differential effect of enrollment losses to charter schools. Both parts of the study focus attention on the financial implications of special education enrollment differences through analysis of the changes in encroachment burdens.

Differences in Special Education Enrollments and Encroachment for Charter Schools

Using special education enrollment data and estimates of Michigan district special education encroachment for 2004 – 2013, this study starts by exploring whether charter schools experience different special education enrollments and encroachment burdens than TPSs. To test this, I estimate the following specification:

$$Y_{st} = \beta_0 C_{st} + \theta_{ISDt} + \varepsilon_{st}$$

where Y_{st} is alternately the percent of students with an IEP, the percent of special education FTEs, the ratio of IEPs to FTEs, or the encroachment per total FTE for school district *s* in year *t*; C_{st} is a charter school dummy variable that indicates if a district is a charter school (C = 1) or not (C = 0); θ_{ISDt} is ISD-year fixed effects to compare variations between charter schools and TPSs in the same ISD; and ε_{st} is an idiosyncratic error term.

Regression results appear in Table 9. The estimates in columns 1 and 2 confirm that enrollment differences between charters and TPSs are statistically significant, with charter schools enrolling approximately 3.6 percent fewer students with IEPs and approximately 1.7 percent fewer special education FTEs. Column 3 strongly suggests a correlation between higher IEP to FTE ratios at charter schools. This is consistent with the premise that special education students at charter schools differ in terms of their disabilities and services from special education students at TPSs.

Table 9. Regression Results, Dependent Variable as Indicated.

	Percent IEP 1	Percent SE FTEs 2	Ratio IEPs to FTEs 3	Cross-sub per Total FTE 4
Charter*	-0.036**	-0.017**	8.67**	-278.9**
	(.002)	(.002)	(.653)	(13.64)
ISD-Year Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.17	0.10	0.09	0.20
Observations	7,726	7,726	7,726	7,726

* Charter = 1 if district is a charter school, 0 otherwise
Note: Dependent variables are natural logs of the listed revenue variables. Robust standard errors are given in parentheses. ** p<0.01, * p<0.05.

Column 4 estimates differences in the encroachment per total enrollment at charter schools and TPSs. The coefficient is negative and statistically significant, suggesting an approximate decrease of $279 per student in encroachment for a charter school, compared to a TPS in the same ISD. This implies that charter schools experience a substantially lower financial burden associated with providing special education services.

These estimates support the following conclusions: proportionally fewer special education students are enrolled at charter schools, special education students at charter schools receive fewer and different services, and charter schools experience substantially lower financial burdens associated with special education compared to TPSs.

Analysis of Enrollment Losses and Effects on TPSs

The strong negative correlation between encroachment and charter schools could arise from differences in the services and needs of the charter school special education students, but there is the possibility of a more complex relationship stemming from competition from charter schools. The theory is that special education students are less likely to depart for charter schools and will choose to remain at the TPS in the presence of competition from charter schools. This will result in higher concentrations of special education students at the TPS, and consequently higher financial burdens from encroachment. Regression results from Table 9 are consistent with this theory.

Michigan districts experience enrollment losses of at least three different types: losses to charter schools, losses to SOC, and losses due to demographic or economic reasons. Table 10 shows the average enrollment changes for a district due to charter schools and SOC over the period 2004 – 2010. Losses due to demographics averaged around 10% statewide, during this

Table 10. Average Percent TPS Enrollment Losses/Gains.

	Mean	Std Deviation
percentcharterloss (1)	2.2%	4.2%
percentSOCloss(2)	11.4%	14.2%
PercentSOCgain(3)	13.6%	40.9%

(1) Defined as the percent of resident students who attend charter schools
(2) Defined as the percent of resident students who left for SOC
(3) Defined as the percent of resident students who came for SOC

period. Since many areas in Michigan do not have charter schools, the average enrollment loss to charter schools is a relatively small 2.2%, although many urban areas experience much higher rates of charter competition. Detroit Public Schools, for example, lost around 31% of resident students to charters in 2010. While total numbers attending charter schools and SOC are similar, losses and gains due to SOC are experienced by a larger number of districts, with the average district losing around 11%, while gaining around 13%. In fact, in 2010, 51 districts lost more than 30% of their resident pupils to SOC, while only 3 districts lost more than 30% to charter schools in that year.

To examine whether enrollment losses of different types affect special education differently, the following regression model was estimated:

$$Y_{st} = \beta_0(\text{percentcharterloss}_{st}) + \beta_1(\text{percentSOCloss}_{st}) + \beta_2(\text{percentSOCgain}_{st})$$

$$+ \beta_3 \cdot \ln(\text{residentstudents}_{st}) + \boldsymbol{\theta_t} + \varepsilon_{st}.$$

The variable Y_{st} is alternately the percent of students with an IEP or the encroachment per total FTEs for school district *s* in year *t;* (percentcharterloss) is a variable between 0 and 1 that

measures the proportion of resident students that left for a charter school for school district *s* in year *t*; percentSOCloss is a variable between 0 and 1 that measures the proportion of resident students that left school district *s* in year *t* due to Schools of Choice; percentSOCgain is a variable between 0 and 1 that measures the proportional gain in students for school district *s* in year *t* due to Schools of Choice; ln(residentstudents) is the natural log of the number of resident students in district *s* in year *t* to control for demographic or economic changes in enrollment unrelated to charter or SOC competition; $\boldsymbol{\theta_t}$ is year fixed effects or ISD-year fixed effects; and ε_{st} is an idiosyncratic error term. All of the regressions employ year fixed effects, in order to control for unobserved differences associated with each year. In addition, some of the regressions incorporate district fixed effects and isd-year fixed effects. These regressions were estimated for all TPS districts in the state from 2004 – 2010, the years for which enrollment loss data is available. Charter school data is not included in this regression. Regression results appear in Tables 11 and 12.

Table 11 shows regression results when the dependent variable is the percent of students with an IEP. The results in columns 1 through 4 show the correlation between district enrollment losses due to various sources and changes in the district's percent of students with an IEP, using various fixed effects to control for unobserved heterogeneity that is constant over time among districts and ISDs. The coefficient for enrollment losses to charter schools is significant across all models, and ranges from .089 to .151, suggesting that a 10% enrollment loss to charter schools is associated with around a 1 – 1.5% increase in the number of students with an IEP at the TPS. Enrollment losses and gains due to SOC have a smaller and less consistent effect in the models, and are generally associated with a small decrease in the proportion of special needs students at the TPS. Possible explanations for decreases in this proportion are: enrollment losses

Table 11. Regression Results, Percent Students with an IEP.

	1	2	3	4
Percentcharterloss	0.151**	0.089**	0.148**	0.107**
	(.046)	(.024)	(.023)	(.026)
PercentSOCloss	-0.061**	-0.019*	-0.047**	-0.017
	(.021)	(.011)	(.011)	(.012)
PercentSOCgain	-0.012**	-0.002	-0.010**	.000
	(.004)	(.002)	(.003)	(.002)
Ln(Total Resident Students)	0.006**	-0.003	0.009**	.010
	(.002)	(.006)	(.001)	(.006)
Year Fixed Effects	Yes	Yes	No	No
District Fixed Effects	No	Yes	No	Yes
ISD-Year Fixed Effects	No	No	Yes	Yes
R-squared	0.18	0.81	0.36	0.84
Observations	3,822	3,822	3,822	3,822

Note: Dependent variables are natural logs of the listed revenue variables. Robust standard errors are given in parentheses. ** p<0.01, * p<0.05.

Table 12. Regression Results, Encroachment per Total FTE.

	1	2	3	4
Percentcharterloss	1048**	1059**	658**	1183**
	(253)	(181)	(164)	(194)
PercentSOCloss	78	363**	203**	262**
	(139)	(85)	(84)	(94)
PercentSOCgain	-27	-5	-23*	-14
	(17)	(12)	(12)	(13)
Ln(Total Resident Students)	38**	-70	66.7**	-66
	(12)	(44)	(6)	(47)
Year Fixed Effects	Yes	Yes	No	No
District Fixed Effects	No	Yes	No	Yes
ISD-Year Fixed Effects	No	No	Yes	Yes
R-squared	0.07	0.77	0.36	0.80
Observations	3,813	3,813	3,813	3,813

Note: Dependent variables are natural logs of the listed revenue variables. Robust standard errors are given in parentheses. ** p<0.01, * p<0.05.

due to SOC include a higher proportion of students with IEPs or enrollment gains include a smaller proportion of students with IEPs, but both of these explanations cannot be true; or districts experiencing SOC losses and/or gains are less likely to identify a student as qualifying for an IEP. Taken together, the results suggest that enrollment losses to charter schools tend to increase the proportion of special education students enrolled at TPSs, while losses due to SOC do not appear to consistently affect special education enrollments.

Table 12 shows the regression results when the dependent variable is encroachment per total FTE. Again, losses of enrollment to charter schools have large positive effects on encroachment in all four models. Results in columns 1 through 4 can be interpreted as a 10% enrollment loss to charter schools is correlated with a $66 - $118 increase in the encroachment per total FTE. Correlations between enrollment losses due to SOC are positive, but smaller in magnitude in three models, suggesting that a 10% enrollment loss due to SOC is associated with a $20 - 36 increase in encroachment per FTE. This result, coupled with results in Table 11 is consistent with the notion that special needs students that participate in SOC are comparatively less disabled than those who choose not to participate. Enrollment gains from SOC do not appear to affect encroachment. The results suggest significant financial implications for school districts that experience large losses in enrollment due to charter schools with smaller effects for enrollment losses due to SOC. An alternative explanation is that differences result from the tendency of charter schools to locate in urban, high poverty areas that may have higher proportions of students with special education needs, while SOC participation occurs more broadly across the state, and in areas with fewer students with special needs.

The results support the notion that changes in enrollment due to SOC are not consistently associated with changes in special education enrollments but do suggest small effects on

encroachment for districts experiencing SOC losses. There are several possible explanations. SOC transfers may be correlated with other characteristics of districts that are not observed, but vary across years. SOC transfers may be more likely to include students with special needs, but may be limited to comparatively less disabled special needs students. Capacity barriers that are present in charter schools, are not present with SOC, making SOC transfers possible for more students. An increase in the enrollment of special education students at schools experiencing SOC losses is not observed, suggesting movement of special education and general education students. Since the majority of SOC transfers occur within the same ISD, local special education funding is also likely to follow the student and would not be affected by SOC. Small negative correlations between SOC gains and encroachment would be consistent with encroachment expenses distributed over a larger student base.

The results do suggest that losses to charter schools affect districts differently. These types of losses are associated with an increase in the percent of students in the TPS district with special needs and also an increase in the use of unrestricted funds to support special education. This provides support to the theory that special education students are less likely to depart for charter schools, and may become concentrated at TPSs that experience charter school competition, raising special education enrollments and financial burdens associated with special education services at these schools.

VI. Conclusion

The expansion of charter school options in Michigan and elsewhere in recent years has gone hand in hand with growing enrollment differences for special needs students at charter and traditional public schools. This paper documents differences in the enrollments of students with special needs at charter schools in Michigan and in the nature of their disabilities and services.

The enrollment differences coupled with the presence of encroachment in Michigan's special education financing system are associated with variations in the financial burdens experienced by charter schools and TPSs related to providing special education services.

There is also evidence that competition from charter schools and related enrollment losses increase the percentage of students with special needs and the use of unrestricted funds for special education services at TPSs in a unique way, compared to other types of enrollment losses. The sum of this evidence, while not meeting the threshold for causality, does convincingly argue that charter competition, when combined with encroachment, carries substantial financial implications for TPSs that experience it. While this could be due in part to the tendency of charter schools in Michigan to locate in urban, high poverty areas that may have higher proportions of students with special needs, a feature not present in all charter school markets, the financial burdens for TPSs under these conditions are considerable. In order to definitively determine whether resultant higher concentrations of special education students at some schools are caused by charter competition, or by the underlying distribution of special needs students, additional study of student level data is needed.

The added cost burdens experienced by the often high poverty TPSs experiencing charter competition can affect the delivery of general education as well as special education services and contributes to inequities across all students at these schools. Policy remedies to address these inequities could include efforts to increase charter school enrollments of special education students, and better alignment of state special education funding to support districts with higher numbers of special education students.

APPENDIX

APPENDIX: Permission from Journal of Education Finance

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15 January, 2016

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406 W Florida Ave
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Conlin, M. & Jalilevand, M. (2015). Systemic Inequities: Special Education Financing in Michigan, *Journal of Education Finance*, 41(1), p. 83 - 100.

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