WHEN ACCOUNTABILITY TARGETS WITHIN SCHOOL ACHIEVEMENT GAPS, WHICH SCHOOLS GET TAGGED AND WHICH IMPROVE?

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ABSTRACT

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The No Child Left Behind (NCLB) accountability movement reinforces the need for policymakers to develop plans for improving student performance and narrowing achievement gaps using academic standards. Under the NCLB, states were faced with mandatory achievement requirements, but the federal government allowed flexibility in the requirements since 2012. Michigan received a waiver and has pursued policy programs to close the achievement gaps through its own accountability policies which included designating the 10% of schools with the widest achievement gaps as Focus Schools. These gaps are measured by the difference in the test scores of the top 30% of high-performing and the bottom 30% of low-performing groups of students. This study seeks to identify the characteristics and related attributes of Focus Schools to deal with closing achievement gaps. Specifically, research question 1 is "Which schools are more likely to be tagged as Focus Schools?" Research question 2 is "Which Focus Schools are successfully able to narrow achievement gaps?"

Three dimensions of school characteristic variable sets — school, student, and community — are utilized to answer these research questions. School-level characteristics include charter schools, grade level, Title I status, achievement level, class and enrollment size, and teacher evaluation data. Student characteristics refer to race/ethnicity ratio, English learners, economically disadvantaged student ratios, students with disabilities, and student mobility rates. Community characteristics convey locale, median household income, and Gini-index. I used school-level administrative data and Census data from 2012, the year in which Michigan began

identifying Focus Schools, to 2016, which is the most recent data available, to develop these three dimensions of variables. I used logit analysis, discrete-time hazard analysis, and predicted value analysis for RQ 1, and cumulative logit analysis and a discrete-time survival model for RQ 2. The multiple approaches provided complementary information for analyzing the research questions.

Results indicated that Focus School characteristics are similar to those of high-performing schools, even though non-White student share and Gini-index presented as slightly higher in both 2012 and 2016. In 2016, Focus Schools were likely to be located in suburban and rural areas than urban areas. In addition, Focus School students' achievements dropped significantly from 2012 to 2016. The analysis of RQ 2 showed that school locale significant factors in narrowing achievement gaps among Focus Schools. It also indicated that it is difficult for high schools and schools with high Gini-index or large class size to exit the status, and that high performing schools were negatively related to Focus School recurrence or duration. Based on my findings, this study suggests that Focus School interventions require more resources for unequally distributed communities, long-term plans to maintain achievement levels, and differentiated approaches by grade level and school locale.

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CHAPTER 1: INTRODUCTION

Academic achievement gaps have been raised as a national issue for more than half-a-century. Since James Coleman addressed racial/ethnic differences in academic achievement in 1966 (Coleman et al., 1966), education policy has aimed to close such gaps. Under the *No Child Left Behind* (NCLB) accountability movement, policymakers developed plans for improving student performance and for narrowing achievement gaps using academic standards. Achievement gaps are viewed as socially and culturally coined problems, and their solution is viewed as needing context-based approaches beyond individual remedies. Education policy considers students' individual backgrounds and finds common reasons for low-achievement. Extending the research, achievement gaps need an approach from schools and communities. School policies for improving student achievement are seen as more feasible than intervening individual student background factors (Phillips et al.,1998)

School-based accountability asks schools to take the initiative in developing educational reforms to improve their students' achievement by utilizing resources, sanctions, and recognitions. As one of the strategies to hold schools accountable, recognitions in accountability systems lead high-performing schools to be honored, and low-performing schools to carry stigmas regarding their performance. Recognitions cost less than other strategies while guaranteeing that schools develop their own plans to maintain their reputation or to avoid disgrace.

Because NCLB has long remained without reauthorization, flexibility from certain NCLB requirements was necessary. One aspect of this flexibility is that the federal government allows state governments to apply for waivers. Educational agencies possess autonomous control; they are better equipped to develop plans to deal with certain problems in need of special attention. In

a survey conducted by the Center on Education Policy in 38 states, many revealed that they felt confident in their ability to improve student learning and to accelerate reforms once they received NCLB waivers (Center on Education Policy, 2013). The state of Michigan applied for an NCLB waiver with a differentiated plan under its own accountability policy. Michigan chose to highlight accountability concerns on closing the achievement gap (U.S. Department of Education, 2012a), designated schools with the largest achievement gaps as Focus Schools, and requested schools and districts to adopt specific interventions to close those gaps.

Michigan developed an accountability system to recognize high-performing, low-performing, and wide-achievement-gap schools after receiving waivers from some of the ESEA federal requirements. Based on their categories, schools are designated as Reward, Priority, and Focus Schools, respectively. Many states designate high-performing schools (including high-gains in student academic achievement) as Reward schools and low-performing schools as Priority schools. In addition, though, Michigan identifies Focus Schools, combining the ideas of closing the achievement gap with school-based accountability. States have some flexibility in defining Focus Schools. Michigan defines Focus Schools as those in the top 10% of schools with the largest achievement gaps. Achievement gaps are measured between the top 30% of high-performing, and the bottom 30% of low-performing groups of students within individual schools. Other states differ in how they define Focus Schools. For example, Kentucky utilizes a "super sub-group" and designates focus schools as those with the largest gaps between sub-groups (Bonilla & Dee, 2017). Oklahoma chooses outcomes with graduation rates in high schools in addition to achievement (Oklahoma State Department of Education, 2017).

Michigan has pursued closing its achievement gaps through school-based accountability and has tried to expand the effects to the whole state. Imperative in all of this is an adequate

understanding of which schools are more likely to have wide achievement gaps, why, and how to solve this issue. In School Year (SY) 2011-12, after two years of only identifying Priority Schools, Michigan began recognizing Focus Schools. In SY 2011-2012, there were 358, approximately 10% of all schools. In SY 2012-13, the state identified 349 schools, and in SY 2013-14, 346 schools. Michigan then received a revised ESEA federal flexibility waiver and chose not to designate new Focus School cohorts for SY 2014-15 and SY 2015-16. Instead, Michigan released a list of schools that had retained their status as Focus Schools. In SY 2014-15, the number of Focus Schools decreased to 213, and the following year, the number fell to 123. Michigan decided that, as of Fall 2017, it would adopt a plan to manage focus schools for the long-term: Focus schools stay four years in their status. If they want to exit the status, they must improvement for two years in a row, and so they must remain on the list for at least two years before they are eligible for exit ("MDE Releases", 2017).

This study seeks to examine the characteristics related to being labeled as a Michigan Focus School, and the characteristics of Focus Schools that have successfully eliminated achievement gaps. It also aims to discover the implications of interventions to close achievement gaps. I consider a range of school-, student- and community- characteristics of Focus Schools, and compare them to the characteristics of schools that received the other accountability labels, Priority Schools and Reward Schools, and the average of the total number of Michigan public schools. Two primary research questions are:

i) Which schools are more likely to be tagged as Focus Schools? and

ii) Which Focus Schools are successfully able to narrow achievement gaps?

Unless they eliminate achievement gaps, Focus Schools will remain on the list or be returned to it within a couple of years of their exit. A study of the duration or recurrence of Focus

Schools can identify which of them respond better to the accountability system. To understand the association between school characteristics and Focus School labeling or exit across years, I utilized multiple approaches, including logit analyses and discrete-time hazard analyses. The different analyses subtly consider different conditions and provide relevant factors related to Focus School labeling and recurrences.

New ideas and approaches to closing achievement gaps have recently been introduced. Achievement gaps are measured with different grades, seasons, and outcomes. The use of within-school achievement gaps as a performance target has received limited attention in school accountability research (Harris & Herrington, 2006). However, the recent reauthorization of the national ESEA law, the *Every Student Succeeds Act* (ESSA), places an emphasis on advancing equity for America's disadvantaged and high-need students (U.S. Department of Education, n.d.). ESSA is designed to bring new flexibility to states, so they can establish their own goals and school interventions (Darling-Hammond et al., 2016). The ESSA accountability system asks schools to identify subgroups that are struggling and to devise improvement plans. This study on Focus Schools in Michigan can provide background knowledge regarding differentiated accountability plans to other states.

I examine the hypothesis that wide achievement gaps are related to diverse student populations in schools. Since racial/ethnic achievement gaps continue, and uneven family economic circumstances are increasingly serious, it seems plausible that schools with high diversity would be more likely to be labeled as Focus Schools. I also consider whether schools with adequate resources are better able to eliminate achievement gaps and remove the status. Recent studies in different states have found that Focus School efforts alone do not improve achievement gaps (Dee & Dizon-Ross, 2016; Dougherty & Weiner, 2017). School characteristics

should be considered when designing interventions to assist Focus Schools with chronic achievement gap problems. This study reveals patterns of characteristics found in Focus Schools, so that schools can consider relevant contexts when designing improvement plans. The study can suggest practical guidelines and their implications for other schools working to close achievement gaps.

This dissertation is comprised of five chapters. Chapter 2 depicts prior studies related to accountability policy and achievement gaps. The literature review introduces the Michigan context for implementing Focus Schools. Chapter 3 lays out specific research questions, data sources and research methods as the research design. Chapter 4 presents a descriptive analysis and analytic results for the two research questions. Chapter 5 summarizes the findings presented in this study and discusses limitations and policy implications in closing achievement gaps.

CHAPTER 2: LITERATURE REVIEW

To situate the Focus School study, this literature review will look at five areas: school-based accountability; schools' strategic behaviors in responding to accountability policy; how the goal of narrowing achievement gaps is implemented under an accountability system; Focus School programs, considering within-school achievement gaps in Michigan and other states; and Michigan's context in Focus-School policy implementation.

School-based Accountability

Under the accountability system, educational reforms are designed to be decentralized, and to prepare grants and strategies for school-based management (Borman et al., 2003). Many schools have developed school-level reforms introduced by programs such as the Comprehensive School Reforms (CSR) or Whole-School Reform (WSR) programs. CSR and WSR are used interchangeably. They encompass a diverse set of nationwide and local programs involving the home, school, and community in the intellectual development and personal nurturing of all children (McChesney, 1998). Keltner (1998) defined WSR as all elements of a school's operating environment that are centralized, simultaneous, and unifying in the vision and mission to improve school performance. The author emphasized the advantageous mechanism of WSR over piecemeal reform. The demands of school-based accountability required a reconceptualization of traditional notions of teaching and learning (Cooper, Slavin, & Madden, 1998). Instruction and teaching are still powerful remedies for improving student performance, but successful schooling to close achievement gaps needs more of a broad, simultaneous, and complex framework.

The No Child Left Behind Act of 2001 included the CSR Program, and Congress has supported this program with federal funds (U. S. Department of Education, 2004). After tracking records of success, the U.S. Department of Education expressed the belief that, unlike fragmented approaches to reform, CSR helps schools by encouraging ongoing state and local efforts to connect higher standards and school improvement, thereby strengthening all aspects of a school's operation (U.S. Department of Education, 2004).

WSR uses the school as a unit for improvement reforms. The strategies differ from those found in system-wide policies and those of larger educational institutions like districts and states. School-level interventions are conducted through multiple views and dimensions of a school's operations; the process is not linear and straightforward (Kurki et al., 2006). School changes include decision-making, resource allocation, class organization, curriculum and instruction, parental involvement, and student support (Bifulco et al., 2005). School-level changes are contingent on the principal's instructional leadership, and the usefulness of the developers' assistance (Kurki et al., 2006).

One of the most successful WSR programs in the U.S., Success for All (SFA), was implemented in the late 1990s. SFA has a theoretical framework for understanding educational networks and reconceptualizing organization, curriculum, and delivery of instruction for reform (Cooper et al., 1998). It differs from traditional reform in the implementation of whole-school change, which requires multi-dimensional views and a variety of activities. In implementing reforms, educational networks are comprised of principals and facilitators sharing experiences, encouragement, and opportunity-creation for learning. Those network activities are conducive to meeting the demands of the local context and for negotiating changes within the schools.

Several studies have examined the ultimate impacts of reforms on student achievement, but their results are inconclusive. Since WSR has been a leading strategy for providing federal grants to low-performing schools and school districts, student achievement is the key outcome of the programs. In their meta-analysis of 29 CSR programs and 232 studies of those programs, Borman et al. (2003) found that the overall effects of CSR are positive and statistically significant for student achievement across various reform programs. They explained that the variations in the effects are from unmeasured program-specific and school-specific differences in implementation. In their study, the CSR-required components—including a set of specific curricular changes, pedagogical practices, student performance assessment methods and teacher and staff professional development—do not explain the differences in the outcomes. One attribute that did generate an effect was the active involvement of parents and the local community in school governance. Borman et al. (2003) also found that contextual differences matter in CSR's effects on achievement. Strong effects from CSR occurred after the 5th year of implementation. Interestingly, poverty level and subject area did not create large differences in CSR effects. Understandably, CSR produced effective improvements in achievement when high standards of requirements were met, regardless of varying contexts. This study, therefore, suggested that parents and local involvement, and long-term perspectives in program implementation are critical to achieving positive effects. Another study (Schwartz et al.,2004) presented ways in which WSR produces positive effects. Schwartz et al. (2004) conducted their study in New York City and reported that academic gains by students are more likely to occur when the school size is small or the school increases or changes the resource allocation for instructional expenditures.

Zhang et al. (2006) examined the relationship between CSR programs and student achievement using nationwide survey data. They confirmed that relationships vary by year of implementation, level of implementation and CSR designation model. Their study also found that the largest increases in student achievement were most likely to present between 3 and 5 years after implementation and revealed that the comprehensiveness or the specific components of a program showed as being weakly associated with student achievement. However, the most recent study (Dragoset et al., 2017) on the nationwide School Improvement Grants (SIG) funded model found no evidence of additional practice models and substantially improved student outcomes. It explained that the reason for no significant improvement is that the new practices were not being fully implemented to produce impacts due to barriers to increasing the effectiveness of teachers and principals. In addition, selective practices with operational flexibility were not helpful for CSR schools, because all of the reforms were required by the program components.

Studies conducted in a specific location can utilize rigorous research methods. In the late 1990s in New York City, several different models of WSR were implemented. Schwartz et al. (2004) studied the effects of the New York Network for School Renewal Project on student test performance using difference-in-differences, and they found no evidence of harmful impacts. However, the results were mixed among grades 4 to 6, ranging from no impact to statistically significant positive impacts. Bifulco, Duncombe & Yinger (2005) also described how WSR was implemented, examining the impact of reforms in New York City. In their study, they examined the effects of WSR on student academic achievement using a quasi-experimental design. To control the implementation environment, they distinguished among three models of WSR programs, based on observable school characteristics: i) *School Development Programs*, ii) *More*

Effective Schools, and iii) *Success for All*. Using educational production functions, the study assumed that student test scores were the outcomes of treatment. Their results indicated that the effects of programs were inconsistent. Only *More Effective Schools* showed a positive impact on cumulative and value-added performance. The impacts, however, did not last because the reform programs required considerable spending by school teachers and administrators. Bifulco et al. (2005) placed a high value on extra resources and the characteristics of schools for educational reforms. They reported that successful outcomes from WSR were associated with management, teaching skill, a concentration on students with limited English proficiency, and a high student mobility rate, as well as resources.

Outside of the U.S., Elk & Kok (2016) conducted a study in the Netherlands in primary schools that volunteered to participate. The CSR program planned intensively for instruction improvements and implementation in performance-based work within the school. Elk & Kok (2016) provided important information regarding the program-implementation timeline. In finding that student achievements for the first 4 years after the introduction of the program were negatively presented, they explained that such results may be due to an increase in teacher replacement, which itself could lead to loss of school-specific knowledge and to teachers having feelings of uncertainty in the workplace. It is notable that harmful effects on student achievement largely presented in the left part of the test score distribution, whereas the least detrimental effects showed at the right tail of the test score distribution. The key issue was found to be integrating the program into existing structures and routines, and they asserted that CSR program evaluations need a long-term perspective.

Gross, Booker & Goldhaber (2009) examined CSR effects on student achievement in terms of equity. On top of previous studies (Slavin & Madden, 2001; Bifulco et al., 2005), Gross

et al. (2009) revealed that more CSR funding went to schools serving disproportionately more low-income students, and that reforms have been most successful with low-income students. Across schools, the CSR program showed a positive influence, but benefits only appeared for some students. There were varied effects of federal CSR grants across different student types. In contrast to White students, African American and Hispanic student subgroups showed negative gains, and non-low-income students had positive gains as a result of the reforms, although this contradicts the earlier statement. There is a controversial result from Bali & Alvarez (2003) that found that school factors generally have little differential effects on the achievement scores of students across their racial backgrounds. They also indicated that one racial group receiving positive effects is not at the expense of another group.

CSR impacts are indecisive because of differentiated implementations. Conditions producing improvements in student achievement are hard to generalize but benefits can be examined by student sub-group. Differentiated implementations can be explained as strategic behaviors by schools, as explained below.

Strategic Behaviors by Schools in Response to Accountability Policy

To improve measured performance, school districts and schools may react strategically to federal educational reforms. Many accountability programs aim to increase the number of students testing above the proficient level. In extreme cases, schools have unintended incentives to respond strategically to performance-based accountability with tricks that have manifested in the form of teachers cheating, excluding low-achieving students from the test-taking pool, or classifying additional students in special education or limited-English-proficiency categories (Cullen & Reback, 2006; Figlio & Getzler, 2002; Jacob & Levitt, 2003). Cullen & Reback

(2006) found a marginal increase in the exemption rates of minority students in Texas, and Figlio & Getzler (2002) showed that schools reclassified low-income and low-performing students as students with disabilities in Florida. Jacob & Levitt (2003) revealed that test scores had been inflated by changing student responses on answer sheets, providing correct answers to students, or obtaining copies of the exam prior to test dates.

Aside from schools' responding to accountability with "gaming," the benefits of school reforms are not equitably distributed across any student groups and may potentially cause other achievement gap problems. Several researchers (Ballou & Springer, 2017; Dee & Jacob, 2011; Lauren & Gaddis, 2016; Springer, 2008) noted that accountability programs led schools to focus on low-performing students as an expression of "educational triage." Examining students by classifying them at the upper end and the lower end of the achievement spectrum, Dee & Jacob (2011) revealed that the lower-end students' achievement gains were bigger. Springer's study (2008) focused on the effect of accountability on the distribution of student test score gains using a general linear model with fall and spring student test score gains. Since the lower-end students' improvements occurred without tradeoffs from high-performing students in failing schools, it could lead to greater productivity within failing schools. Springer (2008) reported that the average gains by students enrolled in a failing school were greater than those of the average students enrolled in a non-failing school. Intuitively, this indicated that the concentrated benefits of NCLB accountability programs could show up in low-performing schools, decreasing the achievement gaps in failing schools.

Achievement gaps, however, can be indicated differently, depending on how they are measured. Springer's study (2008) measured gaps between students in two groups: students at or above the proficiency threshold, and students below the threshold. This measure did not say

much about achievement gaps within a school. The achievement of students left behind were dissipated when the scores of all students below the threshold were averaged, as the measure barely captured the performance of the students at the bottom range.

Many research studies have demonstrated that there are "some students" who benefit from reforms (Chakrabarti, 2013; Krieg, 2008). Results showed that not all low-performing students benefitted, though, and that policy interventions brought greater benefits to "marginal students" (Burgess et al., 2005; Chakrabarti, 2013; Krieg, 2008; Reback, 2008). In other words, schools have incentives to improve the scores of students who are on the margins for passing, thus increasing their proficiency ratings but do not have incentives to improve scores for the lowest-performing students (Reback, 2008). In particular, Burgess et al. (2005) reported that accountability policies affected the distribution of student achievement. They examined student gains by student achievement levels using different approaches. Their analysis provided evidence that the lowest students suffered when marginal students improved. Schools had incentives to concentrate on marginal students to improve their performance, and the last beneficiaries were the lowest level students because the incentives for schools were diffused.

While the Burgess et al. study (2005) was based on the U.K. context, Krieg (2008) demonstrated the differentiated impacts of NCLB on student gains by student ability in the U.S. context. Krieg (2008) utilized paired individual student data before and after NCLB enactment and revealed that students in the tail groups of the ability distribution in the failing schools have lesser gains. The design of educational reforms led schools to strategic instruction, and schools redirected resources to marginal students. This was despite the findings of Springer's (2008) study, which reported that that academic growth for students at the lower tail of the ability distribution did not come at the expense of those in the center. Focusing on marginal students to

pass the proficiency level can be an efficient way to reach the goal of improving average achievement, but schools may have more difficulties in meeting their goals in the future because neglected students would be farther behind. Whereas the measure of achievement gaps can decide the success of reforms, it may not address needs and concerns of students outside the threshold.

Achievement Gaps under Accountability

School accountability generally requires that schools regularly test all students and manage the results by student subgroups. As a result, schools generally show positive effects on student performance across student subgroups (Jacob, 2017). Large and persistent inequities across demographic or socioeconomic subgroups have been highlighted in the literature, and different measures of achievement gaps have received consideration. Traditionally, substantial attention has been given to racial gaps, and the trends in racial gaps have shown improvement (Bainbridge & Lasley II, 2002).

The accountability system deals with multiple comparisons of achievement gaps with different measures across diverse student sub-groups. At the school level, accountability defines two types of achievement gaps: the internal achievement gap (the average differences between, e.g., White students and other racial and ethnic groups, or between low-income and non-low-income student groups within a school), and the external achievement gap — aggregate school scores for each student subgroup across the state (Anderson et al., 2007). Since every school has different proportions of racial and ethnic groups, both achievement gaps are necessary to detect achievement gap problems. In addition, different ways of measuring achievement gaps mean that we can also read the trend of narrowed achievement gaps in different ways. In state comparison

studies after NCLB, the number of states showing narrowing achievement gaps was greater when they were measured in percentages of proficient students, rather than being measured in mean test scores (Timar & Maxwell-Jolly, 2012). From 2002 to 2009, 80% of states succeeded in narrowing the gaps between African American and White students when measured in percentage of proficiency in reading and math in grades 4 and 8, but only about 50% did so when measured in mean test scores (Timar & Maxwell-Jolly, 2012).

Harris & Herrington (2006) reviewed extensive research regarding accountability since the early 1990s. They found that the gap decreased during the early standard movement but increased when accountability was implemented. The study described disadvantaged students as not showing better performance when expectations and pressure increased for these students and for the schools they attended. They discussed how the assumption of accountability had changed from increasing content and capacity for low-performing students and schools to focusing on efficiency and bringing pressure on the schools. Their interpretation is that changed assumptions are not effective in terms of educational equity. For the persistent achievement-gap problem, it is time to think about a new policy with different assumptions and approaches. Accordingly, it is important to understand the current situation of wide achievement-gap schools.

The singular definition of achievement gaps between White and African American students is not sufficiently comprehensive to describe within-group differences and comparisons with other minority populations (Carpenter et al., 2006). The demands of divergent streams on achievement gaps need to be taken into account. For example, Hoerander & Lemke (2006) explained the importance of student socio-demographic factors. Achievement gaps between low-income and non-low-income students have become more critical, thus, economic factors are considered in their school-level reforms. In their study deconstructing the average student-pass-

rates among worst-performing and better-performing schools, they found that about 30-50% of the gap is due to uncontrollable school characteristics. Hoerander & Lemke (2006) also revealed that there were more challenges for schools with a large share of minorities in dealing with achievement gaps. Uncontrollable factors, such as the number of students with limited English proficiency, make many gaps difficult to narrow. The complexity of inherent qualities affecting students' outcomes needed to be incorporated and fixed in the educational process (Bainbridge & Lasley II, 2002). For controllable factors such as lowering class size, schools can narrow the pass-rate gap through additional spending or by hiring more teachers. So, the policy to close achievement gaps should consider school characteristics and the importance of long-term and financial support in combatting challenges.

In Timar & Maxwell-Jolly's book (2012), they synthesized diverse perspectives of achievement gaps and addressed multiple contextual sources of those gaps. Sources of achievement gaps overlap and are simultaneously connected across units from individual to society. School-level achievement-gap sources include class size, distribution of teacher quality and training, finances, quality of standards and curriculum, and student segregation. They are pertinent to schools. Based on one analyses in the book, strategies for closing achievement-gaps within schools would require a comprehensive review of organizational approaches (Mitchell et al., 2012). In addition to school policies and practices, community and family characteristics should also link to the solution (Mitchell et al., 2012).

Anderson et al. (2007) addressed the qualities of schools that succeeded in closing achievement gaps. Schools closing the achievement gaps were not always the highest performing schools and were not necessarily making Adequate Yearly Progress (AYP). Nor is the inverse necessarily true: high-performing and schools that were making AYP were not always closing

achievement gaps. Accountability policy emphasizes proficiency and AYP; achievement gaps have not received a similar amount of attention. They are not solved with the same strategy for improving academic performances, and no single solution exists for closing achievement gaps. Efforts must necessarily connect multiple components of students' learning. Targeting schools with substantially wide achievement gaps using a comprehensive approach can be one option for narrowing them. Some states have adopted a Focus School policy to target wide achievement-gap schools.

Focus School Cases

Over the past 50 years, the ESEA has governed using top-down policies with federal resources going to schools. NCLB, the most recent reauthorization of the ESEA, initiated flexibilities for states and school districts as a new accountability system, sought efficiencies in removing some barriers in exisiting mandates. State governments were to design policies that consider achievement gaps across all student subgroups and overcome the limitations of only counting pass or fail in meeting proficiency levels. Toward this effort, several states have designated Focus Schools based on achievement gaps across student sub-groups including measuring gaps between high- and low-performing students. Researchers have conducted several studies on the effects of Focus School designation.

Since 2011, many states have applied for NCLB waivers and developed their own accountability plans. Kentucky, South Carolina, and Indiana are some of the states that have implemented Focus School policies (Department of Education, 2012b). Each state has a differentiated plan to eliminate achievement gaps. South Carolina established a letter-grading system for individual schools to measure each subgroup's performance and Indiana designed a

plan in which a school's subgroup performance is compared to the same subgroups statewide. Studies using econometric methods have examined the consequences of Focus School policies in Kentucky, Louisiana and Michigan.

Kentucky was one of the first states to establish their own plans for improving school-level outcomes under an NCLB waiver. Kentucky's prescriptive plans for Focus Schools emphasized school-improvement plans and professional development for teachers. They identified a "super subgroup" that is made up of traditionally low-performing subgroups. Identifying a "super subgroup" helped smaller rural schools to be accountable for their performance and gave attention to the design being measured within a school (Bonilla & Dee, 2017). Focus School improvement plans in Kentucky inferred the idea that stigma would spur schools to make efforts to narrow achievement gaps. In addition, their school improvement plans provided financial flexibility to spend money on the intervention. As a result, targeted students have shown better performance in math and reading following the Focus School intervention. Bonilla & Dee (2017) conducted a regression discontinuity design to identify the causality of the treatment effect. Since the state designated a fixed number of schools as Focus Schools, whether a school was designated as a Focus School after the first time did not tell the effects of intervention. Students' improved test scores showed the positive effects of the Focus School intervention in Kentucky.

Dee & Dizon-Ross (2017) studied the effects of being designated a Focus School in Louisiana. Focus School reforms in Louisiana were combined with school letter-grades, under the belief that impact of being designated as a Focus School would be greater if they received publicized letter grades. Dee & Dizon-Ross (2017) emphasized the effects on low-performing schools that had received an F grade, and they concluded that the most challenged schools found

it difficult to generate successful improvements in their performance. To design more effective interventions, they suggested explicit intervention programs and resources to support the programs. Different results that have been found by state are associated with the states' different policy designs, quality of implementation and contexts.

In Michigan, when the MDE designates Focus Schools, it uses the composite gap index to indicate achievement gaps in a school across subject, school grade level and school type. Hemelt & Jacob (2017) studied the effects of Focus School intervention on diverse educational outcomes beyond student achievement using a regression-discontinuity design. An advantage of utilizing a regression-discontinuity design is that the consequences of Focus School designation are presented comparatively among schools that are above and below the threshold for identifying Focus Schools. The study examined the effects of the designation on staffing and student composition. In two different Focus School cohorts, teacher mobility showed mixed results: lower teacher mobility by the third year for the first cohort, and higher mobility by the second year for the second cohort. Student composition showed no significant changes in total enrollment, nor in the share of Black or Hispanic students, nor in the share of economically disadvantaged students. This means that student mobility was not greatly affected by Focus School designation. While they did not find evidence of improvements in average student achievement, they did find a decrease in the achievement gaps. However, the analysis showed that the narrowed gaps were driven by declining test scores among the students in the top of the distribution, not increasing performance by students in the lower part of the distribution. Using student-level data, their study revealed the impact of a Focus School designation on the student achievements gaps by differentiated student gains as a short-term impact.

Prior research on Focus Schools has indicated that the impacts of Focus Schools are trivial or not significant. Since many research studies have concluded that the level of implementation is critical for producing effects, my study emphasizes the school and community attributes of Focus Schools that may be associated with aspects of implementation. Also, even though many school characteristics are uncontrollable, prior Focus School studies have not considered school characteristics as much as they should. In this dissertation, I pay attention to the characteristics of schools designated as Focus Schools, and the associations with the duration or total number of times a school is labeled as a Focus School in Michigan. I begin by reviewing the related context in the state of Michigan.

Michigan Context

Michigan is one of the states approved for an ESEA flexibility waiver and has designed their own plans under the waiver's applications. Michigan's new principles seek to combine several plans: three levels of school accountability labels (Focus, Reward and Priority schools); college- and career-ready standard development; high-quality assessment; a higher education network; and student growth (MDE, 2015). Michigan is utilizing new identification metrics, with a "Top-to-Bottom" ranking for school recognition. This ranking is composed of three parts: level achievement, growth in performance, and the within-school gap between the top 30% and bottom 30% of students (Hemelt & Jacob, 2017). Focus, Reward, and Priority Schools are differentiated recognitions for schoolwide program based on their different needs and challenges. Focus and Priority Schools also receive federal aid for Title I Focus Schools and state funds to assist with their needs. The federal government recommendations for Focus School criteria and interventions yield to the state government.

In 2012, Michigan began identifying Focus Schools as the ten percent of Michigan schools with the widest gaps between high-performing and low-performing student achievements. MDE considers this methodology to be an improvement over a solely demographic-based gap methodology (MDE, 2015). Focus Schools are labeled based on the idea that they need special attention and support for their lower-performing students, even though the school may perform well overall (Hemelt & Jacob, 2017; MDE, 2015). Michigan has a goal of having 100 percent of its students at or above the proficiency level. To achieve this, Michigan needs to identify the lowest-achieving students and change the schools' practices to improve their academic achievement (MDE, 2015).

Once designated as a Focus School, a school remains in this cohort for four years, regardless of their designation on each successive year's Focus School list. (MDE, 2015). If a school is not identified as a Focus School after the first year, the accountability requirements are conditionally suspended (MDE, 2015). MDE thinks the primary source of intervention for Focus Schools is their district and that Focus Schools should collaborate with them to develop plans to close achievement gaps. The first theory of action after being identified is careful diagnosis. Schools should conduct a "data dialogue" to identify the desired strategies for educators in teaching and learning practices from the diagnosis. A data dialogue also includes examining resource allocations and learning processes. The next step is customizing School Improvement Plans in cooperation with districts. Districts with Title I Focus Schools are required to meet more obligations. They must employ District Improvement Facilitators trained at Michigan State University who collaborate with schools on their implementation plans. All Focus Schools and school districts revise their School Improvement Plans in locally appropriate ways to improve low-tail student performance in teaching and learning practices (MDE, 2015). At the district

level, they report quarterly to the local boards of education on the progress of their Focus Schools.

Summary

As a school-based intervention, Focus Schools consider whole-school components in their efforts to close achievement gaps. School-based reforms contemplate not only instruction and curricula, but also principals, facilitators, and the local context. Even though previous studies have revealed that the effects of school-based reforms are varied, the key to success is a coherent plan for long-term, comprehensive programs and additional resources for schools in low-income communities.

In addition, differentiated measuring of achievement gaps is desirable for including students who are far behind. The traditional achievement gaps between race and ethnicity are related to gaps from socioeconomic sources or geographical reasons. Research show that schools are successfully challenging the achievement gaps are not always high-performing or high-improving, and vice-versa. To establish solutions for this complex achievement gap problem, it is necessary to figure out the relevant school attributes in an extensive number of dimensions in the schools.

CHAPTER 3: RESEARCH DESIGN

This chapter addresses the specific research questions, research methods and data sources used for this dissertation. To prepare effective interventions to close achievement gaps, it is important to consider factors that previous research has found to be associated with those gaps. The research questions and methods seek attributes related to large achievement gaps. In addition, this study looks at the recurrence or duration of Focus School status to identify related qualities of schools that have had particular difficulties in closing achievement gaps. Such findings have policy implications for guiding interventions in schools that have difficulties solving achievement gap problems.

Research Questions

Two research questions examine the factors associated with Focus School designation and with schools' exiting from this status after achievement gaps have narrowed.

RQ1. Which schools are more likely to be tagged as Focus Schools?

RQ2. Which Focus Schools are successfully able to narrow achievement gaps?

To identify which schools are more likely to be Focus Schools, I classified school characteristics in three dimensions: school-level characteristics, student demographics, and community characteristics. Three different models — logistic regression, a discrete-time hazard model, and predicted value analysis — were utilized to answer the question. Logistic regression investigates the relationship between school characteristics and Focus School designation. Predicted value analysis enables a researcher to find factors that are associated with schools with a wide achievement gap and a Focus School designation among schools that have wider achievement gaps than the predicted value. Both approaches show relevant factors that can

change over time. I compared the first and third Focus School cohorts: SY 2011-12 (hereafter "2012") and SY 2013-14 (hereafter "2014"). The discrete-time hazard model identified the conditional probability that a school would be designated as a Focus School each year, given that the school had not previously been labeled.

One question of interest is whether the students served by Focus Schools are disproportionately diverse. Racial achievement gaps are obvious in the State of Michigan overall and, accordingly, students' demographic and community economic variations can affect achievement gaps. While Focus Schools are clearly defined as those with the widest achievement gaps, few prior studies have examined the diversity of the populations in these schools.

RQ2 asks which schools are more likely to *exit* the Focus School status or to *stay longer* in the Focus School status. Some Focus Schools exit the status after one year, some remain on the list for several years, and some schools return to the status after exit. I aim to identify predictors related to the total number of years a school is identified as a Focus School, including recurrences, as well as factors associated with a school's duration in the Focus School status, once identified.

This research question utilized a cumulative logistic regression to study patterns in the number of years (recurrences) schools were classified as Focus Schools, and survival analysis methods to analyze factors related to duration in the status. Both of these analyses highlight factors that may pose special challenges in closing gaps among schools identified as Focus Schools. Survival analysis, focusing on duration, has the benefit of finding which schools have been successful in narrowing achievement gaps but it has a limitation in that it excludes schools that return to the Focus School status once they exit (recurrence). Thus, these two models provide complementary information related to persistently wide achievement gaps.

Data Sources

I collected multiple sources of school-level administrative datasets from 2012 to SY 2015-2016 (hereafter "2016"); the Focus School program began in 2012, and the most recent available data is from 2016. The dataset included all Michigan public schools, and each year's dataset was combined in a panel data format. Since the study is based on schools in the accountability file, other educational entities, including correctional facilities and non-instructional educational agencies, were dropped. The final dataset consisted of a set of 4502 public schools, but this number included some schools that have closed or have changed their districts and are now coded with a different number. Detroit Public School Community District is a large school district that includes the Detroit Public School District. Information for tracking Detroit Public School District was manually combined with data from the Detroit Public School Community District.

School-level Characteristics (S)

Focus school labeling is obtainable from the accountability designation file, available for each year from the MDE website. MDE releases school accountability reports, which enable the identification of Focus Schools, as well as Reward, Priority, and Beating the Odds schools. Since accountability data are mainly measured with student standardized annual assessment results, the primary reports include Top-to-Bottom school rankings and scorecard ratings. Top-to-Bottom school rankings consist of achievement and improvement information, each accounting for 50% of the score, and school scorecards include color-coded systems comprising student participation, proficiency, graduation rate, educator evaluation and compliance factors. Statewide schools are ranked by their student performance, ranging from 0 to 99, with 0 indicating the

lowest rank, and 99 indicating the highest rank (MDE, 2012). Rankings are generated for all schools that have two years of assessment data for 30 or more Full Academic Year students in two or more tested subjects (MDE, 2012).

The dependent variables taken from this data were Focus School status, total number of years in that status, and duration of Focus School status. Independent variables fell into the three categories identified earlier: school, student, and community-level attributes. All of the variables are summarized in Table 1.

School-level information (S) included charter school status, school grade level, enrollment size, class size, Title I status, staffing, and test results. Charter school status, school grade level, and Title I status are available from general school information data sheets. School grade levels are categorized as elementary-, middle-, high-, and combined-schools. Title I status was coded into three types: Non-Title I, Title I-participate, and Title I-eligible. Title I-participate schools operate schoolwide programs, and Title I-eligible schools provide targeted assistance. Schools which receive Title I funds can only apply the schoolwide model if more than 40% of students are from low-income families. Title I status is used in the descriptive analysis, but it is not included in other logit regression or survival analyses due to high multicollinearity with median household income. Total enrollment was obtained from student count data sheets and was used to examine prior studies for whether reforms positively affect smaller-sized schools, which have been shown to produce more successful outcomes (Schwartz et al., 2004). In analysis, total enrollment is used as a log transformed variable. Class size was calculated as an average value for a school, using total student enrollment divided by the number of teachers. Staff information counted the number of teachers and included teachers' evaluation results as percentages of each category: *highly effective, effective, minimally effective, and ineffective*. In

addition, I used a ratio of highly effective teachers out of total teacher evaluations from the staff information.

School average student test scores were collected from different sources, depending on the year. From 2012 to 2014, MDE used the Michigan Educational Assessment Program (MEAP) for a general assessment of students in grades 3-11, and the Michigan Merit Examination (MME) for students in Grade 11. Michigan's statewide standard assessment changed in 2015. Assessment data for 2015 and 2016 were from the Michigan-Student Test of Educational Progress (M-Step) for students in grades 3-8 and 11. Standardized test scores enable comparisons of each grade and subject score, and I calculated the school-level standardized test scores. Test scores were standardized by identifying state average test scores and standard deviations in each subject and each grade, which were then converted into a score for a school. The equation can be written as:

$$\frac{1}{G}\sum_{g=1}^{n} Standardized\ \ Test\ \ Scores_{igs} = Standardized\ \ Test\ \ Scores_{is} \quad (1)$$

where g is grade, G is the total number of grades and s is the subject for each school i. Finally, I was able to obtain standardized test scores across grades for two subjects (Mathematics and Reading) by school and combined two test scores to compare between different school levels. The percentage of students at or above proficiency levels was calculated across grades to find the average percentage of proficiency by subject and school. As a prior study showed (Timar & Maxwell-Jolly, 2012), percentages of proficiency can be different from mean scores in presenting achievement gaps, but due to multicollinearity, I only used combined mean test scores in the analysis.

Student Characteristics (P)

Student demographics, student enrollment, and student mobility, were collected from the MI School data website (mischool.com). Student demographics included student race/ethnicity, economic status (i.e., economically disadvantaged), English Learners, and students with disabilities; they were exhibited as a share within a school. Each category and its definitions were derived from the U.S. Department of Education guidelines used in MI School Data. Race and ethnicity were categorized as: White, Black or African American, American Indian or Alaska Native, Hispanic or Latino, Asian, and Native Hawaiian or Other Pacific Islander. To simplify the analysis, I used a non-White student ratio variable for racial and ethnicity distinction. I assumed that the non-White student share was positively associated with being a Focus School. Schools serving demographically-diverse populations of students have increased, and the changing demographics of schools needs more consideration as educators pursue ways to close the achievement gap (Fry, 2007).

According to mischool.com, students are considered to be economically disadvantaged if one of these conditions is present: i) eligible for free or reduced-price meals via locally gathered and approved family applications under the National School Lunch program; ii) from a household receiving food or cash assistance; or iii) homeless, migrant, or in foster care. Students with disabilities are defined as students with one or more specific impairments that require special education or related services and who have an Individual Education Plan.

Student mobility is defined as the ratio of students who leave a school, being removed from the total number of students during the academic year, as a share of all-students. Enrollment is measured in the fall and spring semesters of each year, whereas mobility measures

the number of students who are enrolled in school during the Fall count day but are not enrolled in spring, as a percentage of total fall enrollment.

Community Characteristics (C)

Community-level characteristics were comprised of economic indicators and a locale variable. Economic indicators, median household income and a Gini index of household income were obtained from the Education Demographic and Geographic Estimates (EDGE) program (https://nces.ed.gov/programs/edge/), which uses the U.S. Census Bureau's American Community Survey (ACS) from 2012 to 2014. ACS is an annual, nationwide survey designed to provide demographic, social, economic, and housing data. It provides both single-year and multiyear (3- or 5- years) estimates. Multiyear estimates are based on multiple years of ACS data that are updated annually, with the earliest year removed and the latest added. This provides more statistically reliable data than single-year estimates (U.S. Census, 2008). EDGE customizes data for spatial analysis by focusing on education within boundaries for other types of legal and statistical areas such as counties, Congressional Districts, or Census tracts (Guzman, 2017). The most suitable unit of data boundaries with median household income is the school district-level, and the income Gini index is the most suitable unit of data at the county-level.

In this analysis, I used nominal household income for each year, and adjusted the units in hundreds of dollars. Household income data is less biased than family income because a household consists of everyone who resides in a residence regardless of relationship. Thus, household income does not reflect data from families related by birth, marriage, or adoption that are available in family income (Missouri Census Data Center, n.d). Median household income has an advantage over mean household income, since it is defined as the middle value when

dividing the household income distribution into halves; extreme values have less influence on the highest and lowest incomes than they would if mean household income were used.

The Gini coefficient incorporates the dispersion of income across the entire income distribution, and ranges from 0 to 1. If the Gini index equals 0, it indicates perfect equality; every household receives an equal share. A Gini index value of 1 indicates perfect inequality, or one household receives all the income in the county (U.S. Census, 2017). The Gini index unit is adjusted by dividing it by 100 when conducting an analysis, which means the result of the analysis is interpreted followed by 0.01unit changes in the Gini index. A hypothesis around these variables is that schools serving economically diverse communities (e.g., high Gini coefficients for family income), as opposed to those that simply have high rates of poverty, are more prone to being identified as Focus Schools. Because Focus Schools are designated by achievement gaps, unequal distribution of economic factors would be related.

Another community factor, the school locale variable, was coded as three locales, based on school-district-level data on population density and median income: urban, suburban and rural. Since suburban areas contain a variety of income levels, I utilized an interaction term between median income and suburban in the analysis.

Table 3.1. Description of Dependent and Independent Variables.

Variable Mark	Variable Name	Description	Sources
		Dependent Variable	
Status	Focus School Status	A binary outcome variable indicating whether the school is tagged as a Focus School in the current year, where Yes=1, No-0.	MDE, accountability
Duration	Focus School Duration	As a continuous variable, the time that a Focus School remains in Focus School status in consistent time. Since 2011-12, duration for Focus Schools varies 1 to 5.	MDE, accountability
Total	Total Number of Designations	As a continuous variable, the total number of times a Focus School is designated in five years, regardless of continuity.	MDE, accountability
		Independent Variable	
	School-Level		
Charter	Charter School Status	A binary variable, a charter school equals 1, and a traditional public school is 0.	MI School, school information
Level	Grade Level	Based on grades the school serves, this variable indicates the school level. As categorical variables including elementary, middle, and high schools, as well as elementary-middle, elementary-high, and middle-high school combined schools.	MI School, school information
Enrollment	Total Enrollment Size	Total student count is defined as enrollment size.	MI School, student count
Classsize	Class Size	Average class size for each school is calculated as total enrollment divided by the number of full-time equivalency teachers.	MI School, student count
Testscore (m/r)	Standardized Test Scores	Students' test scores in math and reading in annual MEAP and M-Step are standardized across grades for each school. Using a state average score of 0, the standardized score for each school ranges from -4 to +4.	MI School, student assessment
Proficiency (m/r)	% of proficiency	The share of students who are at or above the proficiency level in math and reading	MI School, student assessment
Schoolwide /Targeted	Title I status	This categorical variable is coded as two dummy variables: schoolwide and targeted.	MI School, information

Table 3.1. (*Cont'd)*

Teacher evaluation	Teacher Evaluation	From results of teacher evaluations, I utilize a concise measure: the ratio of highly-effective teachers to the total in evaluation results.	MI School, staff information
History	Previously Labeled	A binary variable is coded by prior Focus School labeling experiences	MDE, accountability
	Student-Level		
Pnwhite	Racial Composition	I calculate non-White student ratio as (1-White students/total students) to simplify the model.	MI School, student count
Ped	Economically-disadvantaged students	Percentage of economically disadvantaged students among total students.	MI School, student count
Pel	English learners	Percentage of English learners among total students.	MI School, student count
Pswd	Students with disabilities	Percentage of Students with disabilities among total students.	MI School, student count
Pmobility	Student mobility	Percentage of mobile students among total students in all student groups.	MI School, student mobility
	Community-Level		
Locale	Locale	A categorial variable coded to consider population density and median income of the county. (urban/suburban/rural)	Census, ACS
Medianinc	Median household income	County-level average of median household income.	Census, ACS
Gini	Gini Index	Summarizing inequality in terms of median household income in the county. It varies from 0 to 1.	Census, ACS

Research Methods

RQ 1: Which schools are more likely to be tagged as Focus Schools?

Three different models to address RQ 1– multiple logistic regression, discrete-time hazards model, and predicted value analysis – provides complementary information regarding Focus School designation.

Multiple Logistic Regression. Logistic regression was used to examine the outcome of interest, the Focus School designation, which is a dichotomous variable. I conducted multiple logistic regressions over two time-points, 2012 and 2014, to compare how associated factors changed. The choice of these two years was deliberate. The first year in which schools were designated as Focus Schools was 2012 and the last year in which schools were newly designated as Focus Schools was 2014. If variables associated with the likelihood of Focus Schools designation changed significantly over the three-year period, the coefficients of logistic regression would also change. I estimated the following model:

$$Y_{it} = \beta_0 + \boldsymbol{S}_{it}\gamma + \mathbf{P}_{it}\delta + \boldsymbol{C}_{it}\theta + \varepsilon_{it} \qquad (2)$$

where Y_{it} is the outcome of interest, a school *i*'s Focus School status in year *t*, and takes the values one and zero.

$$Y_{it} = \begin{cases} 1 & \text{if the school is identified as a Focus School} \\ 0 & \text{Otherwise.} \end{cases}$$

The year t represents school years 2012 and 2014. Models 1, 2, and 3 conducted a logistic regression with vectors of school (***S***), student (***P***), and community (***C***) level characteristics, respectively, and finally, full model 4 utilized all sets of vectors together.

Logistic regression linked this function for binary responses, and the model was written as:

$$\text{logit}\{\Pr(y_{it}=1|x_{it})\} \equiv \ln\{\frac{\Pr(y_{it}=1|x_{it})}{1-\Pr(y_{it}=1|x_{it})}\} = \beta_0 + \boldsymbol{S}_{it}\gamma + \mathbf{P}_{it}\delta + \boldsymbol{C}_{it}\theta \quad (3)$$

A standard way of expressing an exponential function for the odds that $y_{it}=1$ given x_{it}, is with an odds ratio, written as (Rabe-Hesketh & Skrondal, 2008):

$$\text{Odds}(y_{it}=1|x_{it}) = \exp(\beta_0 + \boldsymbol{S}_{it}\gamma + \mathbf{P}_{it}\delta + \boldsymbol{C}_{it}\theta) \quad (4)$$

I estimated Equation 2 for the third cohort, t= 2014, with and without another variable, *history*, as a school characteristic. This was a control for schools previously tagged as Focus Schools in 2012 or 2013. The estimated coefficients of Equation 3 for the two-time periods provided information on the stability of the relationships over time.

Discrete-time Hazard Analysis. The second approach to studying RQ1 was with a survival analysis, also known as an event-history analysis. The survival model provided another way to describe the distribution of Focus School labeling over time. Among various survival models, the discrete-time hazard model was chosen to examine the relative timing of an event, and the association with independent variables on the hazard rate for a school's entry into the cohort of Focus Schools. A school's hazard rate for Focus School identification varied based on factors that influenced if and when the event would occur (Kramer & Berg, 2003). The hazard function shows the conditional probability that individual schools would experience the event, given that the school did not experience it in any earlier time period (Singer & Willett, 2003).

Survival analysis is most often used in medical and human resources studies. Cancer treatment and the event of death, and job training program and the event of employment are

typical examples. In education research, teacher-retention studies have used survival analysis to examine factors associated with the length of time teachers continue to teach. The measure used to assess the risk of event occurrence in each discrete time period is defined as a hazard (Singer & Willett, 2003).

Estimating both a logistic model at two different time points and discrete time hazard models help to explain how factors associated with designation as a Focus School have changed over time. Compared to a logistic model, hazard models have the advantage of being able to consider end-of-period censoring, and non-random attrition associated with the "at risk" designation, and they highlight the determinants of the chance of an event occurring in an at-risk population (Headen, 2003).

For the Focus School designation study, I calculated whether or not a school was designated as a Focus School, and when, in the first three years, the school entered the status. Hazard models require i) definition of an event; ii) time scale; iii) origin of the event; and iv) time to event T, which is a random variable, as methodological features (Kleinbaum & Klein, 2012). The origin of the event is the time the State of Michigan adopted the Focus School program in 2012, which is the same for all schools. Time to event T is measured by the number of years since 2012 before a school was labeled a Focus School, and it is a random variable. The probability function formulated the event in which labeling happened, and time taken to the event.

Equation 5 displays the hazard function for Focus School identification over three years:

$$h(t_{ij}) \ = \Pr[\, T_i = j | T_i \geq \mathrm{j}) \qquad (5)$$

where T represents a discrete random variable whose values T_i indicates the time period j when an individual school i experienced a first identification as a Focus School. This hazard function

shows the conditional probability that an individual school *i* experienced the labeling in time period *j*, given that the school had not experienced it in an earlier time period (Singer & Willett, 1993).

The survivor function provided another way to describe the distribution of Focus School labeling over time. It accumulated the period-by-period risks of event occurrence, Focus School labeling, and revealed associated covariates. Thus, the survival function told us the probability that an individual school *i* would survive past time period *j without* being labeled as a Focus School. The general form of discrete-time survival function is thus:

$$S_t = \prod_{s=1}^{t}(1 - h_s) \qquad (6)$$

The hazard model is given by Equation (7):

$$\text{logit } h(t_{ij}) = \alpha_1 T_{2ij} + \alpha_2 T_{3ij} + +\mathbf{S_{ij}}\beta + \boldsymbol{P}_{ij}\delta + \mathbf{C_{ij}}\gamma + e_{ij} \qquad (7)$$

where the time indicators T identify the time periods when a Focus School was tagged. T_{2ij} and T_{3ij} represent schools identified in 2013 and 2014, respectively. T means the time for schools to be labeled as Focus Schools. **S**, **P**, and **C** are vectors of school-, student-, and community-level characteristics defined above.

A panel data structure was used to estimate the model because several predictors are time-varying. Since the estimation only covers events for the three years that the MDE identified new schools as Focus Schools, the survival time is incomplete. The observation began in 2012 for all schools, which means left truncation arises, since no school could have been identified before that year. Right censoring also occurs since no school could have been identified after the third year (2014). One important assumption in standard survival analysis, *independent*

censoring, exists here; it means that censoring time is independent of survival time, given the covariates in the model (Rabe-Hesketh & Skrondal, 2008).

Predicted Gap vs. Actual Gap Comparison. The third approach to RQ1 seeks to identify factors associated with schools which have larger achievement gaps than predicted. This model used an alternative dependent variable defined as the actual achievement gap compared to the predicted gap, named "Wide Gaps" if the actual achievement gap is bigger than the predicted gap.

This idea is similar to Michigan's Beating the Odds program. MDE identified schools that have strong student performance despite traditional barriers such as high concentrations of racial minorities, English learners or student with low economic status (MDE, 2017a). Michigan recognized Beating the Odds schools as a subset of Reward Schools, and the selection was based on schools attaining better student outcomes than would be predicted based on their student characteristics.

In this study, I found which schools had larger achievement gaps than the predicted achievement gaps, and which factors were related to schools having these unusually large gaps. I obtained the predicted achievement gaps by fitting the following OLS regression:

$$Actual\ \ Achievement\ \ Gap_i^{2011-12} = \beta_0 + \beta_1\ \ Pnwhite_i + \beta_2 Ped_i + \beta_3 Pel_i + \beta_4 Pmobility + \beta_5 Gini_i + \beta_6 Medianincome + \varepsilon_i \quad (8)$$

where *Pnwhite, Ped*, and *Pel* indicate the share of non-White, economically disadvantaged students and English learners. They are included in the equation that MDE identifies as Beating the Odds schools. To these variables, I added measures of *Pmobility* (student mobility), *Gini*

*(*county-level median household income base) and *Medianincome* (school district-level median household income). Estimated coefficients from Equation 8 were used to generate the predicted gap for each school, using the *STATA* program. Following MDE's Beating the Odds selection criteria, I identified schools where the actual achievement gaps exceeded the predicted gaps by at least two standard deviations from the prediction model. This cutoff point for identification corresponded to the upper bound of the 95% confidence interval (Abe, Weinstock, Chan, Meyers, Gerdeman, & Brant, 2015). The schools for which the actual achievement gap was above the upper bound of 95% confidence interval calculated using a standard error of prediction, were identified as being in the Wide Gaps group. Wide Gaps schools were analyzed in the descriptive statistics and the logistic model. The logistic model's predictor variables were the same variables as those in Equation 3's multiple logistic analysis.

In addition, I examined the question: among the Wide Gap schools, which ones are designated as Focus Schools? Given that Wide-Gap schools all have substantially larger than predicted achievement gaps, one might expect that most if not all would have been identified as Focus Schools. However, the Focus School designation does not take underlying differences in school circumstances into account, so I explored this question with another logistic model estimated for all Wide-Gap schools. The predictors were the same as in Equation 3, and the binary dependent variable identified Focus Schools. I estimated this model for 2012 and 2014 to be consistent with the first logistic analysis.

RQ2: Which Focus Schools are successfully able to narrow achievement gaps?

This question focuses on how long it took for schools to exit the Focus School status, and which Focus Schools returned after leaving. The question is answered via two different

approaches: i) examining which Focus schools are tagged often using a cumulative-logistic model; and ii) utilizing the discrete-time hazards model to examine related factors to variations in time to exit. Although these two approaches examined different outcomes, recurrence and duration of Focus Schools, they have a common element: analyzing factors associated with repeated Focus School designation.

Cumulative Logit Regression. An extension of the logistic model, the cumulative logistic model assigned five levels — i.e., one to five, based on the number of times a school was designated as a Focus Schools — as an outcome variable. Briefly providing a descriptive analysis for the five sub-groups in terms of the number of designations among schools that have ever been tagged as Focus Schools over the last five years, I conducted a cumulative logistic model for Focus Schools with five different values.

The cumulative logistic equation is defined as:

$$\text{Logit}\,[\text{P}(\text{Y}\leq \text{j}|\text{x})] = \log\ \frac{P(Y \leq j|x)}{1-P(Y \leq j|x)} \qquad (9)$$

$$= \log\frac{\pi_1(x)+\cdots+\ \pi_j\ (x)}{\pi_{j+1}(x)+\cdots+\ \pi_j\ (x)}, \qquad j = 1, \ldots J-1.$$

where the function of probabilities is written as:

$$\text{P}(Y \leq j|\text{x}) = \pi_1(x) + \cdots +\ \ \pi_j\ (x), \qquad j = 1, \ldots, J. \qquad (10)$$

Cumulative logistic regression is one of the ordered logistic models, and the value of the dependent variable is a cumulative measure. This model was used to estimate the probability of a recurring designation as a Focus School, as well as the odds ratio as a function of the covariates. The five levels have equal intervals, and the information indicates how much more or less of some attribute one case has compared to another. The interpretation of logit (Y) is intuitively

easy in the natural logarithm of the odds of being in a higher category as opposed to being in any of the lower categories (Menard, 2010).

There can be a limitation in that the dependent variable has a skewed distribution among the five categories. This study assumes the *parallel regression assumption*, wherein the coefficient for each respective predictor is the same across the $j-1$ logistic functions (where j means the number of categories in the dependent variable) (Menard,2010). It is possible to check for the parallel regression assumption in this study with a likelihood ratio test.

Discrete-time Survival Model. Since this research question examines not only whether a school exits the status, but also the time taken to exit the status, I utilized the discrete-time survival function. In other words, this analysis provides a description of the Focus School-status pattern. The specific survival model is the same as was used for RQ1. I included potential predictors of time-to-exit the status, with three dimensions of characteristics for each school in the model. Since schools can enter the focus school status at different time points, and exit the status after different durations, this survival model also uses left truncation and right censoring.

This model's hypothesis is that exit occurs for schools that have less diverse populations and students from wealthier families because schools exiting the status would have more advantageous conditions related to resources. Schools with a large population of disadvantaged students would need a longer time to solve the achievement gap problem.

CHAPTER 4: EMPIRICAL RESULTS

This chapter presents empirical results comprised of descriptive analyses and multiple approaches to analyzing each research question. The descriptive analysis compares characteristics of Focus Schools with those of Reward, Priority, and all public schools in Michigan. It also includes an analysis of Focus School recurrences over five years. Analysis results for the research questions follow the flow of the research methods section. For RQ 1, I used logit and discrete-time hazard models, and a predicted gap analysis to show factors related to Focus School designation. The results for RQ 2 utilized a cumulative logit-model analysis for Focus School recurrence, and a discrete-time hazard model for Focus School duration.

Descriptive Analysis

The descriptive analysis of Focus Schools is comprised of two parts. First, I compared schools in the first and fifth Focus School cohorts with Reward, Priority and total Michigan public schools. Second, I analyzed patterns in Focus School designation over each of the five years.

Comparison of Focus Schools with Other Accountability-labeled Schools

Figures 4.1 and 4.2 show the location of Focus Schools, and Figures 4.3 and 4.4 display the geographic distribution of Reward and Priority Schools in Michigan. The left panel of Figure 4.1 displays the location of all schools that were labeled as Focus Schools at least one time over the five years, and the right panel of 4.1 shows the Detroit area, including Wayne, Oakland, and Macomb counties. Figure 4.2 shows Focus Schools labeled more than three of the five years. The difference between overall Focus Schools and the high number of labeled Focus Schools

corresponds closely to Michigan's population density, with Focus Schools concentrated mostly in metropolitan areas. However, recurrently labeled Focus Schools are far more concentrated in the central cities, and much less so in suburban areas of metropolitan areas.

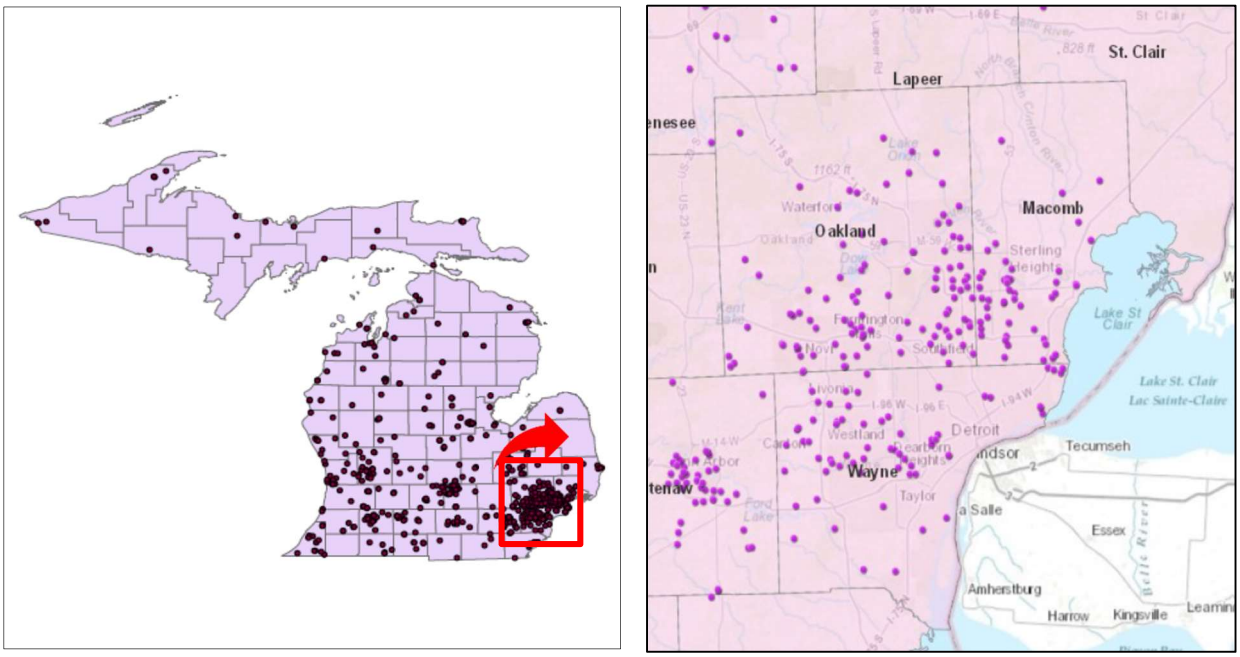

Figure 4.1. *Geographical Distribution of Focus Schools*

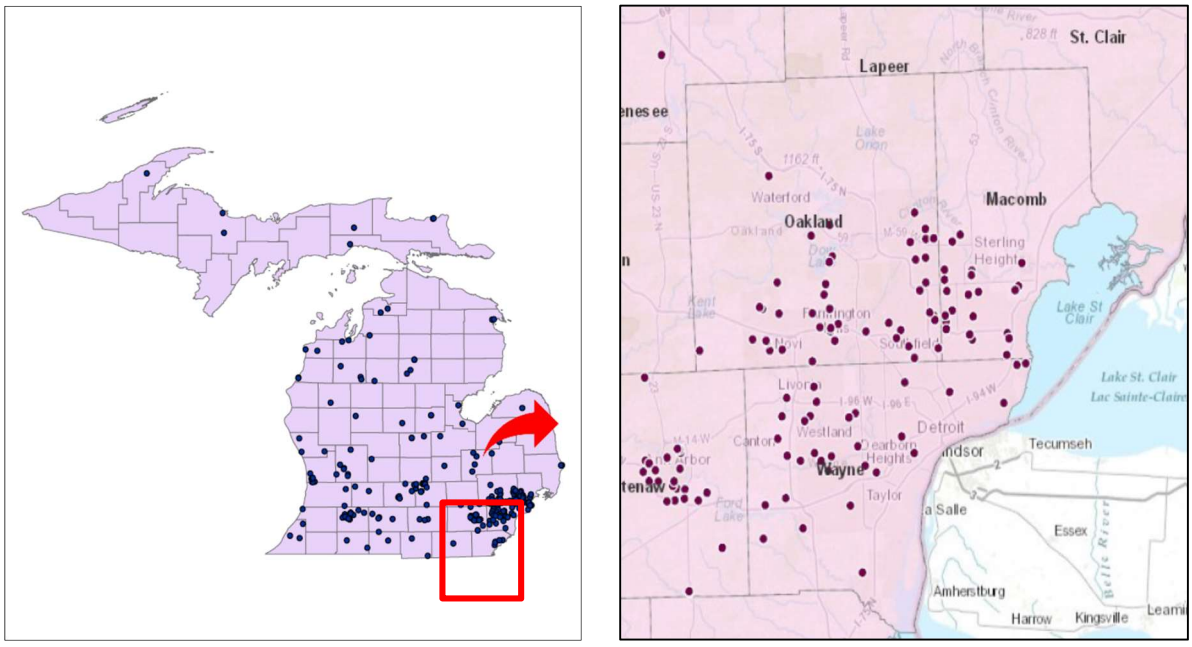

Figure 4.2. *Geographical Distribution of High Number of Focus Schools*

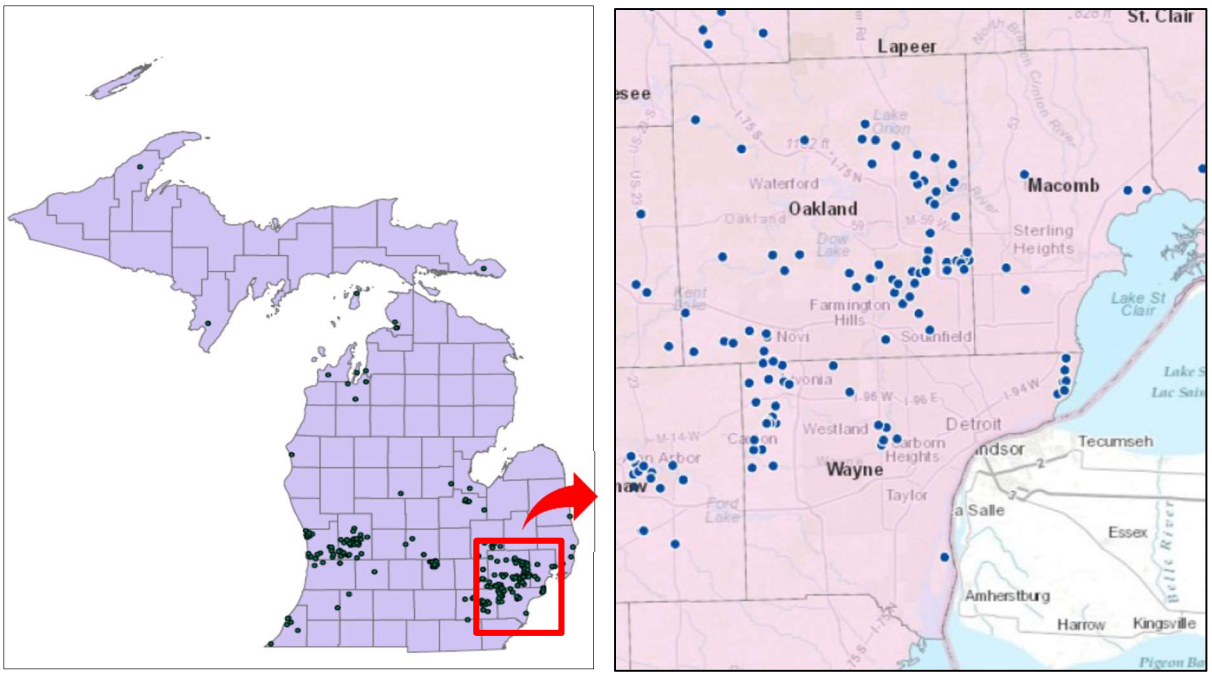

Figure 4.3. *Geographical Distribution of Reward Schools*

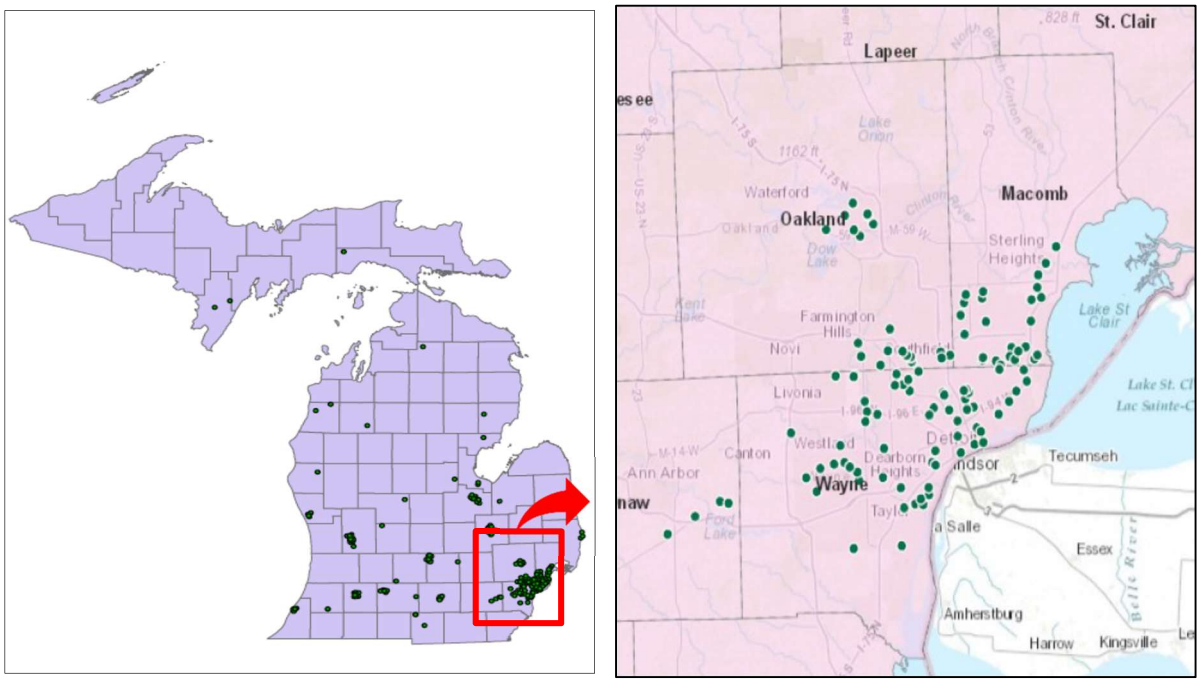

Figure 4.4. *Geographical Distribution of Priority Schools*

Compared to the location of Focus Schools, Reward schools in Figure 4.3 are much more highly concentrated in suburban areas of Detroit and Grand Rapids, while Priority schools in Figure 4.4 are located in the inner city of Detroit and some rural areas.

Accountability-labeled schools and total Michigan public schools show differences in their characteristics. The comparisons in the three dimensions of characteristics in five years are necessary to develop appropriate interventions.

School-level Characteristics. Accountability labeling for academic performance and achievement gaps is conducted at the school level, and school-level characteristics are noticeably different among the three types of labeled schools. Available data includes charter school status, school grade level, enrollment size, class size, average student assessment, percent of students who meet proficiency, Title I status, and staffing information.

Table 4.1. School-Level Characteristics Comparison

Cohort	2012				2016			
Variable	Focus Schools	Priority Schools	Reward Schools	Total Schools	Focus Schools	Priority Schools	Reward Schools	Total Schools
% Charters	6.4	10.9	6.4	8.7	7.4	20.5	6.0	11.5
	(.7)	(1.3)	(.7)		(.6)	(1.8)	(.5)	
Grade Level								
% Elementary	47.8	23.4	50.9	37.4	28.3	19.9	58.5	34.2
	(1.3)	(.6)	(1.4)		(.8)	(.6)	(1.7)	
% Middle	19.8	7.3	7.3	12.1	19.2	7.2	10.5	12.1
	(1.6)	(.6)	(.6)		(1.6)	(.6)	(.9)	
% High	10.6	24.8	17.2	18.1	17.5	20.4	11.0	19.0
	(.6)	(1.4)	(1.0)		(.9)	(1.1)	(.6)	
% Elem-High	2.2	2.2	3.8	5.9	4.2	3.9	1.4	7.0
	(.4)	(.4)	(.6)		(.6)	(.6)	(.2)	
% Elem-Middle	16.0	35.8	16.0	18.1	21.7	41.4	15.1	18.9
	(.9)	(2.0)	(.9)		(1.1)	(2.2)	(.8)	
% Middle-High	2.8	6.6	4.9	7.7	9.2	7.2	3.7	8.8
	(.4)	(0.9)	(.6)		(1.0)	(.8)	(.4)	
Enrollment Size	567	588	488	479	598	455	478	449
	(1.2)	(1.2)	(1.0)		(1.3)	(1.0)	(1.1)	

Table 4.1. (Cont'd)

Class Size	17.0	16.9	17.5	17.8	17.07	15.79	17.58	17.78
	(1.0)	(0.9)	(1.0)		(1.0)	(.9)	(1.0)	
Test Scores								
St. Math	.79	-1.43	.82	0.05	-.16	-1.6	1.15	0.08
% Prof. Math	48.0	9.1	48.4	33.0	29.1	11.32	61.9	38.3
	(1.5)	(.3)	(1.5)		(.8)	(.3)	(1.6)	
St. Read	.60	-1.56	.78	0.05	-.16	-1.62	1.11	0.08
% Prof. Read	70.1	30.1	73.7	60.7	39.4	14.7	66.7	45.9
	(1.2)	(.5)	(1.2)		(.9)	(.3)	(1.5)	
Title I Status								
% Schoolwide	55.6	89.1	45.9	55.7	60.0	90.45	43.4	54.0
	(1.0)	(1.6)	(.8)		(1.1)	(1.7)	(.8)	
% Targeted	22.1	10.1	18.0	23.3	11.7	5.62	13.2	14.0
	(0.9)	(.4)	(.8)		(.8)	(.4)	(.9)	
No Title I	22.4	0.7	36.1	21.0	28.3	3.93	43.4	32.1
	(1.1)	(.0)	(1.7)		(.9)	(.1)	(1.4)	
% Teacher	33.8	33.1	38.4	38.1	40.0	41.8	52.9	48.0
Evaluation	(.9)	(.9)	(1.0)		(.8)	(.9)	(1.1)	
N	358	138	344	3,412	123	186	219	3,454

Note: Figures in parentheses indicate the mean characteristic value in each accountability group divided by the corresponding value for (all) total schools.

Table 4.1 shows school-level characteristics of accountability-labeled schools (Focus, Priority, and Reward Schools) and total public schools in Michigan in 2012 and 2016. The characteristics of Focus Schools were comparable to Reward Schools in 2012; they changed to being similar to total public schools in 2016. Each type of accountability-labeled school showed obvious differences, particularly in grade level and achievement. Focus Schools had a large share of elementary schools and they outperformed in academic achievements in 2012, but the share of elementary schools dropped, and academic performance fell below the average of total public-school scores in 2016. Comparisons between accountability-labeled schools and overall Michigan public schools are presented in parentheses. Figures in parentheses indicate the values of each accountability group divided by those for total Michigan public schools, which produces

a density quotient. Once this portion is larger than 1, it means the shares of the variable in the Focus Schools is larger than their share among schools overall.

Among other characteristics, charter school status was under-represented among the Focus Schools (and Reward schools) in both 2012 and 2016, and strongly over-represented in Priority Schools. In Focus Schools, the share of charter schools was 6.4% in 2012. The share of charter schools increased to 7.4% in 2016, but this does not mean that the ratio of charter schools to total schools had risen. The density quotient of charter schools in Focus Schools was 0.7 in 2012, which meant the share of charter schools compared to their share in total schools was 70%. Even though the share of charter schools in Focus Schools increased by one percentage point, the density quotients remained at the same level. However, charter school shares in Reward Schools has decreased. Contrarily, Priority Schools experienced almost twice the increase. These figures imply that charter schools have had a negative relationship with the top-to-bottom ranking.

Nearly half of Focus Schools were elementary schools, which was higher than the share of total elementary schools in 2012. Compared to overall schools, elementary and middle schools were over-represented among Focus Schools, while high schools and other mixed-grade schools were under-represented. By 2016, however, elementary schools had dropped to 28.3 percent, and they were under-represented compared to total public schools. The shares of high schools and middle-high schools noticeably increased. This may imply either that the problem of achievement gaps is especially challenging in middle schools and high schools or, alternatively, that the challenge is much more readily addressed in elementary schools.

Test scores showed striking decreases among Focus Schools. In 2012, Focus Schools' standardized test scores were a 0.8 standard deviation above the statewide average. Standardized scores were already a relative value to the average of Michigan public schools, so they do not

need a density quotient to compare with total schools. The higher test scores that were similar to those of Reward Schools fell dramatically in 2016, and they were lower than overall Michigan public schools in terms of both average percentage of proficiency and standardized scores.

Focus schools had a roughly similar distribution of Title I status to schools overall in 2012, and the propensity for Title I schools was much lower than for Priority Schools, and slightly higher than Reward Schools. By 2016, however, the distribution had changed in Focus Schools as well as in overall public schools. School-wide Title I schools (Title I participate) increased in share. Although the percentage of no-Title I schools in Focus Schools increased from 22.4% to 28.3%, the density quotient dropped because the overall share of no-Title I schools increased between 2012 and 2016. For this reason, targeted service (Title I eligible) schools among Focus Schools decreased in 2016, but the density quotient stayed at a similar level.

Teacher evaluation results showed no progress in Focus Schools. The evaluation results were defined as the percentage of teachers rated as highly effective; Focus Schools had 33.8 % highly effective teachers, which was slightly below the share in total schools in 2012. Although this share increased to 40.0% by 2016, it fell further below the statewide average because teacher evaluation results showed upward patterns overall.

Student-level Characteristics. Students in Focus Schools tended to have slightly more advantages than the average students statewide in 2012, and they outperformed in statewide tests, almost like those of Reward Schools. But by 2016, students in Focus Schools were similar to the statewide average, and there were higher concentrations of students of color and economically disadvantaged students. Focus schools showed similar racial compositions to

Reward schools at the beginning of this program, 2012, but not in the 2016 cohort. They were becoming more like Priority Schools. In other student-related characteristics — English learner status, and students with disabilities — Focus Schools experienced few changes from 2012 to 2016.

Table 4.2. Student-level Characteristics Comparison

Cohort	2012				2016			
Variables	Focus Schools	Priority Schools	Reward Schools	Total Schools	Focus Schools	Priority Schools	Reward Schools	Total Schools
% Black	12.0	69.8	9.5	15.8	18.1	73.1	6.7	18.5
	(.8)	(4.4)	(.6)		(1.0)	(4.0)	(.4)	
% White	70.9	19.2	78.4	72.2	67.0	14.5	75.4	67.3
	(1.0)	(.3)	(1.1)		(1.0)	(.2)	(1.1)	
% Hispanic	5.5	6.7	5.9	6.3	7.3	8.4	6.3	7.3
	(.9)	(1.1)	(.9)		(1.0)	(1.2)	(.9)	
% Econ. Dis	38.6	80.7	39.6	50.8	57.0	79.8	33.5	51.1
	(.8)	(1.6)	(.8)		(1.1)	(1.6)	(.7)	
% Stu. w/dis	13.1	16.1	13.2	16.2	13.1	15.2	10.0	16.2
	(.8)	(1.0)	(.8)		(.8)	(.9)	(.6)	
% EL	6.4	8.6	6.1	7.3	7.4	8.2	8.8	9.7
	(.9)	(1.2)	(.8)		(.8)	(.8)	(.9)	
% Mobility								
All Stu	6.0	16.4	5.7	10.8	6.2	14.9	4.2	10.0
	(.6)	(1.5)	(.5)		(.6)	(1.5)	(.4)	
White	5.1	19.7	5.1	10.6	5.7	20.5	3.7	10.2
	(.5)	(1.9)	(.5)		(.6)	(2.0)	(.4)	
Black	9.3	17.1	10.8	14.8	9.1	15.3	9.0	13.2
	(.6)	(1.2)	(.7)		(.7)	(1.2)	(.7)	
Els	15.0	18.2	17.8	19.3	15.3	19.7	17.3	19.3
	(.8)	(.9)	(.9)		(.8)	(1.0)	(.9)	
Econ. Dis	8.9	17.0	8.3	12.9	8.2	15.8	7.0	12.2
	(.7)	(1.3)	(.6)		(.7)	(1.3)	(.6)	
N	358	138	344	3,412	123	186	219	3,454

Note: Figures in parentheses indicate the mean characteristic value in each accountability group divided by the corresponding value for (all) total schools.

Table 4.2 shows student racial composition and student-related conditions of the three types of accountability schools as well as the total average students enrolled in Michigan public

schools. Focus School student compositions changed to having a higher share of non-White students and economically disadvantaged students. Focus schools and Reward Schools similarly had a lower share of Black students than total schools in 2012. On average, 12% of Focus School students were Black, which was a higher proportion than Reward Schools, but much lower proportion than Priority Schools, or even the 0.8 density quotient of total schools. Between 2012 and 2016, the proportion of Black students in Focus Schools increased to a larger degree than it did in Reward Schools.

Noticeable differences in Focus School students' composition occurred in the share of economically disadvantaged students. Both Focus Schools and Reward Schools had lower percentages of students in all special-need categories (economically disadvantaged, students with disabilities and English learners) listed in Table 4.2 compared to total schools, while Priority Schools had much higher concentrations of students in each disadvantage group in 2012. By 2016, however, students in Focus Schools were similar to those statewide, and Focus Schools showed even higher concentrations of economically disadvantaged students than total schools. Focus Schools were getting to be more like Priority Schools. Focus Schools and Reward Schools had no significantly higher shares of special-education students and English learners than total schools in either 2012 or 2016. The proportion of special education students did not put a school at a disadvantage in its designation because those students take an alternate assessment, which is then compared against other students in other schools who take the same assessment (MDE, n.d). The assessment for special education students is excluded in calculating standardized test scores in this analysis.

In Focus Schools, student mobility among all students and several sub-groups happened less often compared to schools overall. Only Priority Schools showed a higher rate of mobility

for all student sub-groups compared to total schools, while Focus Schools and Reward Schools maintained lower mobility rates in all student sub-groups, and they had with little change between 2012 and 2016.

Focus Schools had fewer students of color, less special education, fewer economically disadvantaged students, and fewer EL students in 2012. Over five years, however, proportions increased compared to total schools. This needs a careful interpretation because all Focus Schools in 2012 were new entries, whereas all Focus Schools in 2016 had been labeled as Focus Schools for two years or more. Thus, the proportions of adverse-background students became denser in 2016. This implies that Focus Schools which have remained in that status have had higher proportions of students of color, or economically disadvantaged students.

Community-level Characteristics. Focus Schools' community-level attributes changed drastically between 2012 and 2016, as shown in Table 4.3, below. Geographically, the locations of Focus Schools changed from wealthier areas to mid-income suburban, urban and rural areas; therefore, the economic status of Focus Schools dropped. Economic inequalities that are presented in the Gini index of Focus School communities were already higher than overall schools in 2012, and to a much greater degree in 2016. However, Gini index in Michigan was increased overall in 2016, the index for Focus School is similar level of the average of Michigan.

Compared to total school distribution, only a small portion of Focus Schools were located in urban and rural areas in 2012. A high portion of Focus Schools were located in high-income (37.7%) or mid-income (35.7%) suburban areas. However, the trend changed by 2016: the proportion of Focus Schools in high-income suburbs dropped noticeably to 5.0%. Focus Schools

Table 4.3. Community-level Characteristics Comparison

	2012				2016			
	Focus Schools	Priority Schools	Reward Schools	Total Schools	Focus Schools	Priority Schools	Reward Schools	Total Schools
Locale (%)								
Urban	7.4	72.6	6.0	13.6	10.8	68.9	2.3	12.4
	(.5)	(5.3)	(.4)		(.9)	(5.6)	(.2)	
Low-inc	1.4	12.6	2.1	3.3	1.7	7.2	0.9	2.8
Suburb	(.4)	(3.8)	(.6)		(.6)	(2.6)	(.3)	
High-inc	37.7	0	27.6	13.2	5.0	1.2	34.7	13.8
Suburb	(2.9)		(2.1)		(.4)	(.1)	(2.5)	
Mid-inc	35.7	8.9	36.9	40.5	54.2	18.6	40.7	42.9
Suburb	(.9)	(.2)	(.9)		(1.3)	(.4)	(.9)	
Rural	17.9	6.0	27.3	29.5	28.3	4.2	21.3	28.5
	(.6)	(.2)	(.9)		(1.0)	(.1)	(.7)	
Median	58,335	31,183	58,636	50,221	47,376	33,521	64,746	51,991
Income ($)	(1.2)	(.6)	(1.2)		(.9)	(.6)	(1.2)	
Gini Index	.437	.467	.423	.422	.449	.472	.454	.451
	(1.0)	(1.1)	(1.0)		(1.0)	(1.0)	(1.00)	
% of households in each income category								
Less than	7.0	16.9	6.2	7.8	8.2	15.7	5.6	7.6
10,000	(.9)	(2.2)	(.8)		(1.1)	(2.1)	(.7)	
10,000-	4.9	9.1	4.8	5.7	5.7	8.7	3.9	5.4
14,999	(.9)	(1.6)	(.8)		(1.1)	(1.6)	(.7)	
15,000-	10.3	16.0	10.6	11.9	12.2	15.6	9.3	11.5
24,999	(.9)	(1.3)	(.9)		(1.1)	(1.4)	(.8)	
25,000-	10.1	13.2	10.3	11.4	11.7	12.8	9.6	11.3
34,999	(.9)	(1.2)	(.9)		(1.0)	(1.1)	(.8)	
35,000-	13.5	14.8	14.0	15.1	15.5	14.8	13.1	14.7
49,999	(.9)	(1.0)	(.9)		(1.1)	(1.0)	(.9)	
50,000-	18.1	15.1	18.7	19.0	19.3	15.7	18.4	18.9
74,999	(1.0)	(.8)	(1.0)		(1.0)	(.8)	(1.0)	
75,000-	12.4	7.5	12.8	12.0	11.7	8.1	13.1	12.1
99,999	(1.0)	(.6)	(1.1)		(1.0)	(.7)	(1.1)	
100,000-	13.4	5.4	13.1	11.1	10.6	6.0	14.8	11.7
149,999	(1.2)	(.5)	(1.2)		(.9)	(.5)	(1.3)	
150,000-	5.3	1.2	4.9	3.4	3.1	1.6	6.0	3.8
199,999	(1.6)	(.4)	(1.4)		(.8)	(.4)	(1.6)	
More than	5.1	0.7	4.8	2.7	2.2	1.1	6.4	3.2
200,000	(1.9)	(.3)	(1.8)		(.7)	(.3)	(2.0)	

Note: Figures in parentheses indicate the mean characteristic value in each accountability group divided by the corresponding value for (all) total schools.

became concentrated in middle-income suburbs and rural areas, whereas the distribution of Reward Schools across community types remained stable between 2012 and 2016. Understanding why this shift happened is a target of this paper.

When comparing income distribution between 2012 and 2016, I found that Focus School neighborhoods had become less affluent. The average median income dropped about $10,000 over the five years. Considering that median incomes were not adjusted for inflation, these decreases in median household income meant steep declines in the economic status of Focus School communities. While the average income in communities of Focus Schools is similar to Reward Schools in 2012 (both being above average for the state), income distribution differs. In the top two highest ranks and bottom two lowest ranks, Focus School shares are bigger than those of Reward Schools in 2012. In 2016, Focus School shares increased and were a larger share than Reward Schools in the bottom two ranks, and decreased and were a smaller share than Reward Schools in the top two highest ranks.

At a glance, the Gini-index highlighted that Focus School communities had less equal income distribution than Reward School communities, although they had similar levels of median incomes in 2012. The state average Gini-index in 2012 was 0.422, but the Gini-index of communities of Focus Schools was much higher, 0.437. By 2016, the remaining Focus Schools had obviously lower average incomes than the state average and unequal income distribution in their communities. This implies that Focus School students are more likely to come from a wider range of economic backgrounds as time goes on.

In examining the trends within Focus Schools over the five years, monotonic changes are seen between 2012 and 2016. Schools remaining as Focus Schools were more likely to be located in mid-income suburbs or urban areas than in high-income areas. The decreased values

of median incomes, points to the proportion of Focus Schools located in mid-income suburbs in 2016 being higher than in 2012.

Focus Schools over Five Cohorts

Patterns of Focus School recurrence over five years are presented in Table 4.4. The characteristics of Focus Schools in different cohorts are not an apples-to-apples comparison. As table 4.4 shows, the fourth and fifth cohort Focus Schools only include existing Focus Schools that could not exit the status and have adverse conditions for closing achievement gaps.

Table 4.4. Number of Years Focus Schools are on the List

No\Cohorts	2012	2013	2014	2015	2016	Sum
5 Times	-	-	-	-	19	19
4 Times	-	-	-	22	38	60
3 Times	-	-	133	53	63	249
2 Times	-	185	104	138	0	427
Once	358	164	109	0	0	631
Total	358	349	346	213	123	

The first cohort of Focus Schools in 2012 are all new Focus Schools, so all schools are classified “once.” Among these 358 Focus Schools, 185 Focus Schools were tagged again in 2013, while 164 other schools were labeled for the first time. Similarly, in the third cohort, 2014, there are 133 three-times-tagged Focus Schools from the first cohort, 104 two-times-tagged Focus Schools, and 109 newly tagged schools. In 2015 and 2016, no schools are newly labeled as Focus Schools by policy, meaning there are no new one- or two-times-tagged Focus Schools in those years. The seventh column summarizes the total number of Focus Schools designated by recurrence. From a one-time designation to five times shows a decreasing trend from 631 schools to 19 schools, respectively.

Analysis of Characteristics Associated with Focus School Designation

The three models show mixed results in answering the research question "Which schools are more likely to be tagged as Focus Schools?" Some covariates consistently show significant associations, and some factors only show a significant association in a certain model.

Multiple Logistic Regression

Multiple logistic regressions were conducted for the 2012 and 2014 cohorts of Focus Schools. School (S), student (P), and community (C) dimensions correspond to individual models 1, 2, and 3, respectively, and the full model corresponds to model 4. The results are displayed in Tables 4.5 and 4.6. The results are reported with odds ratios; the interpretation of the odds ratio is that the difference between coefficients and 1 is equal to the difference in the likelihood of the Focus School labeling compared to the reference group.

Table 4.5. SY 2011-2012 Focus Schools Logit Model

VARIABLES	(1) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full odds ratio
% Charter	1.159			.927
	(.311)			(.390)
% High School	.410***			.368***
	(0.091)			(.100)
% Elementary	1.199			.895
	(.175)			(.160)
Composite	2.052***			1.582***
Test Scores	(0.669)			(.142)
Class Size	0.905***			.891**
	(0.230)			(.032)
Enrollment	1.001***			1.944***
	(0.000)			(.375)
% Teacher	1.002			1.001
Evaluation	(.003)			(.003)
% Non-White		1.020***		1.023***
		(.003)		(.005)

Table 4. 5. (Cont' d)

% Econ. Dis		.968***		.994
		(.003)		(.008)
% Eng. Learners		1.008		1.029**
		(.006)		(.011)
% Stu. w/dis		.994		1.024
		(.006)		(.016)
% Mobility		.961***		1.005
		(.011)		(.018)
Suburban			6.11e-09	5.87e-06
			(.6.07e-08)	(.00007)
Rural			1.493	2.230
			(.713)	(1.291)
Median Income			1.000	1.000
			(.0000)	(.0000)
Sub*Median Inc			6.399*	3.331
			(6.012)	(3.625)
Gini			1.145***	1.068**
			(.019)	(.022)
Constant	.010	.450	.0002***	.0004
	(.009)	(.060)	(.0002)	(.0008)
Observation	2640	2977	2349	1921
LR Chi2	(7)	(5)	(5)	(17)
	257.58	180.20	142.58	244.02
Prob>Chi2	0.000	0.000	.000	.000
Pseudo R2	.133	.0855	.0855	.169
Log Likelihood	-842.28	-963.303	-762.57	-601.523

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

In Table 4.5, the logistic model presents which characteristics are more likely to be associated with a designation of Focus Schools in the first cohort. While most variables show significant associations with Focus School designation, specific school-level and community-level characteristics such as achievement, class size, interaction term between suburban and median income and Gini tell of a sizable likelihood of being tagged as a Focus School.

Model 1 shows that among school characteristics, grade level, combined test scores, and class size have significant associations with Focus School designation. High schools are 0.4

times less likely to be tagged as Focus Schools than other school grade levels. Combined standardized test scores show significant correlations. The interpretation of a continuous variable like standardized scores, for example, is that one point of combined test score increase is associated with a 2.05 times higher chance of Focus School labeling.

In model 2, student-level characteristics, most variables show a small size of magnitude in the likelihood of being labeled a Focus School. Non-White student share shows a statistically significant positive correlation with Focus School designation. In contrast, economically disadvantaged student share and mobility present negative correlations with being a Focus School. Practically all of the effect sizes of these coefficients are very small.

Model 3 includes community-level characteristics, and the gini-index for the first cohort shows considerable associations. School locale information itself does not tell much about the chance of Focus School labeling. Once suburban variable shows significant coefficient when it is combined with median income variable. Median household income has no correlation with Focus School designation, but the Gini index for median household income shows a large value in the Odds Ratio. An unequal community that is .01 points higher in the Gini index means that schools in that area have a 1.15 times higher chance of being tagged as a Focus School.

In the full model 4, many variables that were significant in the individual models are no longer significant. Combined test scores, log-enrollment, non-White student population, English learners' share and Gini index show positive correlations with being Focus Schools. High school and class size show negative correlation. In sum, in the first cohort, higher academic performance, large enrollment size and gini-coefficients are correlated positively with Focus Schools. Higher academic performance is advantageous qualities, but large enrollment size and Gini-index are not favorable conditions for schools.

In testing for the model fit, the LR chi square values summarize statistical significance with the degree of freedom in parentheses, and the p-values in all models show less than .001. This indicates that the null hypothesis — i.e., no independent variables have a relationship with the dependent variable — would be rejected.

Table 4.6. SY 2011-2012 Reward Schools Logit Model

VARIABLES	(1) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full Odds ratio
Charter	1.993*			1.355
	(.563)			(.715)
High School	1.928***			2.356***
	(.378)			(.560)
Elementary	1.555**			1.626**
	(.245)			(.304)
Combined	1.961***			2.816***
Test Scores	(0.093)			(.282)
Class Size	0.997			.998
	(0.018)			(.029)
Log Enrollment	.632***			.635*
	(.081)			(.118)
% Teacher	.999			.998
Evaluation	(.002)			(.003)
% Non-White		1.000		.992
		(.003)		(.007)
% Econ. Dis		.982***		1.035***
		(.003)		(.008)
% Eng. Learners		1.013*		.983
		(.006)		(.021)
% Stu. w/dis		.984*		.995
		(.007)		(.020)
% Mobility		.941***		.993
		(.014)		(.019)
Suburban			4.96e-10**	.010
			(3.76e-09)	(.114)
Rural			2.310	.785
			(1.285)	(.602)
Median Income			1.094	1.000
			(.686)	(.0000)
Sub*Median Inc			7.698**	1.460
			(5.516)	(1.519)
Gini			1.023	.978*
			(.018)	(.021)

Table 4. 6. (Cont' d)

Constant	.944	.480	.007	.380
	(.789)	(.003)	(.0480)	(.746)
Observation	2640	2977	2349	1921
LR Chi2	(7)	(5)	(5)	(17)
	275.54	130.95	59.10	227.88
Prob>Chi2	0.000	0.000	.000	.000
Pseudo R2	.148	.0633	.0352	.158
Log Likelihood	-792.81	-969.30	-810.44	-603.73

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

Table 4. 6 displays which schools are more likely to be labeled as Reward Schools. Combined test scores present a large significant association for both Reward Schools and Priority Schools, though in opposite directions because they are designated based on achievement level. Interestingly, charter schools are more likely to be labeled as Reward Schools in model (1), but in the full model (4), the charter school coefficient is no longer significant. High schools and elementary schools show a higher chance of being labeled as a Reward School compared to middle and other combined schools. Enrollment size and Gini-index show negative associations with Reward School designation.

Table 4.7. SY 2011-2012 Priority Schools Logit Model

VARIABLES	(1) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full Odds ratio
% Charter	.178***			1
	(.092)			(omitted)
% High School	1.151			13.728**
	(.401)			(11.903)
% Elementary	1.093			1.660
	(.367)			(1.300)
Combined	.268***			.210***
Test Scores	(0.028)			(.082)
Class Size	0.996			1.021
	(0.018)			(.029)
Log Enrollment	5.683***			3.141*
	(1.444)			(1.818)

Table 4. 7. (Cont' d)

% Teacher Evaluation	.996 (.005)			1.000 (.012)
% Non-White		1.035*** (.005)		1.000 (.018)
% Econ. Dis		1.033*** (.010)		1.035 (.034)
% Eng. Learners		.991 (.009)		1.009 (.022)
% Stu. w/dis		1.004 (.008)		.970 (.057)
% Mobility		1.011 (.008)		.972 (.040)
Suburban			1.45e+29** (3.36e+30)	1.09e+24 (4.22e+25)
Rural			.072*** (.048)	.969 (1.369)
Median Income			1.000 (.000)	1.000 (.0000)
Sub*Median Inc			.002** (.003)	.005 (.018)
Gini			.967 (.056)	.953 (.107)
Constant	1.99e-07 (3.53e-07)	.0005 (.0003)	9.050 (30.71)	8.80e-07 (7.23e-06)
Observation	2640	2977	2349	1860
LR Chi2	(7) 300.40	(5) 217.90	(5) 105.51	(16) 129.44
Prob>Chi2	0.000	0.000	.000	.000
Pseudo R2	.423	.290	.320	.563
Log Likelihood	-204.82	-266.45	-112.20	-50.32

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

The partial model shows a negative association for charter schools being labeled as a Priority School, but it disappeared in the full model. High schools are more likely to be priority schools and enrollment size shows a positive association. Unlike previous studies, Priority schools do not show significance in the median income and locale variables. Compared to the

Table 4.8. SY 2013-2014 Focus Schools Logit Model

VARIABLES	(1) S odds ratio	(1a) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full odds ratio	(4a) Full odds ratio
Charter	0.867	1.162			1	1
	(0.209)	(0.313)			(omitted)	(omitted)
High school	0.839	1.037			0.811	1.124
	(0.156)	(0.226)			(0.197)	(0.308)
Elementary	1.033	0.993			0.966	1.006
	(0.149)	(0.164)			(0.174)	(0.200)
Composite	1.293***	1.036			1.272**	0.955
Test Scores	(0.051)	(0.047)			(0.124)	(0.104)
Class size	0.887***	0.963			0.904***	0.955
	(0.022)	(0.026)			(0.032)	(0.037)
Enrollment	2.128***	1.663***			1.859***	1.498*
	(0.281)	(0.248)			(0.350)	(0.313)
High effec.	1.006**	1.005**			1.005*	1.004
Teacher	(0.002)	(0.003)			(0.003)	(0.003)
history		17.82***				13.43***
		(2.703)				(2.520)
% Non-White			1.005		1.016***	1.005
			(0.003)		(0.005)	(0.006)
% Econ Dis			0.991**		0.999	1.000
			(0.003)		(0.008)	(0.009)
% Eng. Learners			1.008		1.010	1.003
			(0.005)		(0.009)	(0.010)
% Stu w/dis			0.990		1.029	1.008
			(0.010)		(0.024)	(0.025)
% mobility			0.950***		0.972	0.962
			(0.013)		(0.024)	(0.026)
Suburban				10.39*	17.20**	5.277
				(12.26)	(21.38)	(6.897)
Rural				4.993	10.98**	3.591
				(5.246)	(12.42)	(4.141)
Median income				1.000	1.000	1.000
				(.000)	(.000)	(.000)
Sub*median				1.000	1.000	1.000
				(.000)	(.000)	(.000)
Gini index				3.370***	2.487***	1.553*
				(0.575)	(0.540)	(0.391)
Constant	0.006***	0.003***	0.271***	.000***	.000***	.000***
	(0.005)	(0.003)	(0.042)	(0.0001)	(.000)	(0.002)
Observations	2,582	2,582	2,865	2,135	1,746	1,746

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

Focus School analysis, student and community characteristics do not present a great deal of association.

Table 4.8 displays variables related to be a Focus School using the 2014 cohort. The results show some declines of magnitude for coefficients compared to the first cohort, 2012, though test scores and enrollment size are still strong predictors of Focus School designation. An additional variable, Focus School labeling *history* in models 1a and 4a control for schools that had experienced Focus School labeling earlier. The labeled history shows that a school was 13 times more likely to be labeled again in 2014. Controlling for the history of prior Focus School designation produce big changes in the associations for test scores and locales.

In the full model in 2014, the lower possibility of high schools being Focus Schools disappears. Class size and total enrollment size remain statistically significant factors but, interestingly, their directions of magnitude are opposite. If class size is bigger, schools are less likely to be Focus Schools, and if total enrollment size is bigger, schools are more likely to be Focus Schools. The share of teachers rated as highly effective also has a positive, but very small association with likelihood.

Student-level characteristics continue to show consistent patterns with small sizes of magnitude. The non-White student ratio is positively associated with being labeled as a Focus School, and economically disadvantaged student ratio and student mobility rates are negatively associated only in the partial model.

All locale variables became significant associations with the Focus School designation in 2014, unlike 2012. Schools in suburban and rural areas are more likely to be Focus Schools in 2014 than urban area schools. Gini coefficients are still highly positive predictors of Focus Schools. A 0.01 unit increase in the Gini index increases the chance of becoming a Focus School

by 2.5 times. Since the median household income's odds ratio is 1, the interpretation of an increase or decrease in median household income does not indicate any differences in being tagged as a Focus School. Once controlling for Focus School labeling history, the locale variables lose their statistically significant associations and Gini index shows decreased coefficient; instead labeling history shows a very high chance of a school being tagged as a Focus School again (13 times).

Table 4. 9. SY 2013-2014 Reward School Logit Model

VARIABLES	(1) S odds ratio	(1a) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full odds ratio	(4a) Full odds ratio
Charter	2.865***	2.951***				
	(0.788)	(0.824)				
Highschool	1.748***	1.633**			2.104***	1.861**
	(0.362)	(0.351)			(0.538)	(0.493)
Elementary	1.274	1.086			1.558**	1.323
	(0.213)	(0.193)			(0.313)	(0.279)
Composite test	2.753***	2.369***			4.826***	4.402***
	(0.167)	(0.150)			(0.625)	(0.595)
Class size	0.994	0.996			0.997	0.998
	(0.011)	(0.011)			(0.016)	(0.015)
Enrollment	0.446***	0.449***			0.466***	0.488***
	(0.059)	(0.063)			(0.086)	(0.096)
High effec.	0.995**	0.993***			0.997	0.995
Teacher	(0.002)	(0.003)			(0.003)	(0.003)
History		5.800***				4.744***
		(0.895)				(0.874)
% non-white			1.002		0.982**	0.988
			(0.003)		(0.007)	(0.007)
% Econ. Dis			0.977***		1.043***	1.049***
			(0.003)		(0.010)	(0.010)
% Eng.			1.013**		1.016	1.006
Learners			(0.006)		(0.011)	(0.012)
% stu. w/dis			0.913***		0.939**	0.948**
			(0.017)		(0.024)	(0.025)
Mobility			0.950***		0.984	0.990
			(0.016)		(0.022)	(0.023)
Suburban				0.498	0.253	0.573
				(0.463)	(0.665)	(1.863)

Table 4. 9. (Cont' d)

Rural				2.535	1.350	1.855
				(1.937)	(3.415)	(5.871)
Sub*Median				1.000*	1.000	1.000
				(1.52e-05)	(2.07e-05)	(2.18e-05)
Median				1.000	1.000	1.000
Income				(1.44e-05)	(2.10e-05)	(2.22e-05)
Gini				1.983***	0.718	0.707
				(0.345)	(0.179)	(0.183)
Constant	6.213**	4.742*	1.180	0.002***	6.528	1.724
	(5.163)	(4.164)	(0.243)	(0.002)	(20.71)	(6.433)
Observations	2,582	2,582	2,865	2,135	1,746	1,746

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

The composite test score is definitely a strong predictor for being labeled as a Reward School. Charter schools were more likely to be labeled as Reward Schools in both 2012 and 2014. High schools and elementary schools show a positive association with labeling as a Reward School. Enrollment size is negatively associated with Reward Schools. The non-White student ratio and students with disabilities ratio show negative associations and the economically disadvantaged student ratio shows a positive association.

Table 4. 10. SY 2013-2014 Priority School Logit Model

VARIABLES	(1) S odds ratio	(1a) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full odds ratio	(4a) Full odds ratio
Charter	0.450**	0.614				
	(0.145)	(0.215)				
High School	1.217	1.072			4.915**	1.863
	(0.439)	(0.421)			(3.676)	(1.688)
Elementary	3.071***	3.745***			2.247	1.951
	(0.815)	(1.127)			(1.279)	(1.246)
Composite	0.271***	0.344***			0.244***	0.276***
Test Scores	(0.024)	(0.033)			(0.073)	(0.087)
Class size	0.987	0.998			1.004	1.008
	(0.010)	(0.009)			(0.014)	(0.007)
Enrollment	2.332***	1.640**			2.125	2.488
	(0.487)	(0.373)			(1.134)	(1.580)

Table 4. 10. (Cont' d)

High effect.	1.003	1.006			1.003	1.014
teacher	(0.004)	(0.004)			(0.010)	(0.012)
History		11.29***				35.63***
		(3.119)				(25.68)
% Non-White			1.030***		1.011	0.995
			(0.004)		(0.015)	(0.018)
% Econ Dis.			1.041***		1.079**	1.091**
			(0.008)		(0.034)	(0.041)
% Eng.			0.976***		0.922**	0.924
Learners			(0.008)		(0.036)	(0.048)
% Students			1.026***		0.949	0.949
w/dis.			(0.008)		(0.058)	(0.066)
% Mobility			0.988		0.925*	0.936
			(0.009)		(0.043)	(0.054)
Suburban				2.204	8.234	1.107
				(4.180)	(18.77)	(2.927)
Rural				0.091***	2.006	1.400
				(0.073)	(2.892)	(2.313)
Sub* median				1.000	1.000	1.000
				(5.41e-05)	(6.63e-05)	(7.40e-05)
Median				1.000**	1.000	1.000
Income				(4.66e-05)	(6.33e-05)	(7.28e-05)
Gini				0.256**	0.364	0.316
				(0.167)	(0.358)	(0.340)
Constant	3.8e-05***	0.0002***	0.0006***	3,144**	2.89e-06*	5.95e-07*
	(5.39e-05)	(0.000)	(0.000)	(11,77)	(2.17e-05)	(5.13e-06)
Observations	2,582	2,582	2,865	2,135	1,746	1,746

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

The composite test scores of Priority Schools in 2014 present a negative association; high schools present a large likelihood of being labeled a Priority School. Interestingly, elementary schools show a strong positive relationship in the partial model of school characteristics, but this disappears in the full model. A composition of economic disadvantages, English learners, and the student mobility rate present a relatively small likelihood without previous Priority School history. Since previous Priority School labeling is a very strong predictor in the full model, many variables lose significance in model 4a. Only the economically disadvantaged student ratio

maintains a statistically significant positive association in the full model with the history variable.

Table 4.11. Factor Comparison between 2012 and 2014

	Positive		Negative	
	2012	2014	2012	2014
School	Composite Score Total Enrollment	Composite Score Total Enrollment Teacher eval.	Class size High School	Class Size
Student	Non-White (%)		Econ. Dis (%) Mobility	Econ. Dis (%) Mobility
Community	Gini Index Sub*Income	Gini Index Suburban		
Full	Composite Score Total Enrollment Non-White (%) Gini Index Eng. Learners (%)	Composite Score Total Enrollment Non-White (%) Gini Index Teacher Eval. Suburban Rural	Class size High School Econ. Dis (%)	Class Size

In sum, Table 4.11 displays attributes that are consistently associated with Focus Schools in two cohorts. The sizable relevant factors for both cohorts are composite test scores, enrollment size and Gini index. Non-White student percentages do not show critical magnitudes of the coefficients. Class size shows negative association in both cohorts. Income level does not show any association with Focus School labeling. Only interaction term between suburban dummy and median income appears to be a significant positive factor in 2012, but suburban area is a significant positive factor in 2014. From these findings, I can say that Focus Schools are more likely to be from communities with unequal income distribution and above average income levels, rather than just lower income areas. In other noticeable changes, grade level, and

economically disadvantaged student ratio show as being more likely to be labeled as Focus Schools in the first cohort but lose the significance in the third cohort.

Discrete-time Hazard Analysis

The second model used a discrete-time hazard model to analyze which factors are associated with whether and when schools are labeled as Focus Schools. The discrete-time hazard model presents the probability of being newly tagged as Focus Schools during the last three years of data, and it shows a decreasing pattern each year. Some Focus Schools are labeled recurrently; the discrete-time hazard model displays schools that are designated as Focus Schools each year, but which had not previously been designated.

Table 4.12. Life table describing Initial Focus School designation for MI public schools

		Number			Proportion	
Year	Time interval	Total number of schools	Newly Labeled in the year	Censored events	Focus school	Schools not labeled
2011-12	[0,1]	3,412	358	-	0.105	0.895
2012-13	[1,2]	3,054	164	16	0.054	0.841
2013-14	[2,3]	2,874	109	9	0.038	0.803

Table 4.12, a life table, summarizes the estimated hazard of Focus School labeling in three school years. This life table tracks the first time that schools were labeled as Focus Schools, based on Michigan's annual Focus School list. Schools newly labeled in each year are counted in the column *Newly labeled in the year*, the *Focus School* column is the hazard entry function and the *Schools not labeled* shows the survivor function. The hazard rate shows that in the first year, 10% of schools were labeled as Focus Schools, and that in the following years, a lower share of

schools are newly labeled as Focus Schools. *Censored events* refer to the number of schools closed in 2013 that were open in 2012.

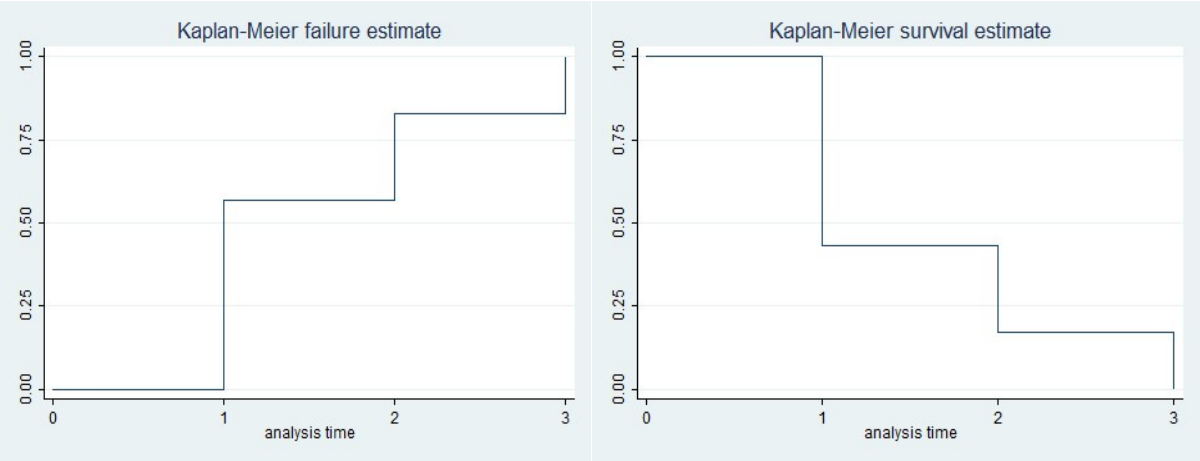

Figure 4.5. *Kaplan-Meier Hazard and Survival Curves of Focus School Entry*

Figures 4.5 describe Focus School entry by time as a step function, showing the cumulative probability of being labeled among Focus Schools in the three years. The event is defined as Focus School entry; the shape of the hazard function displays the identification of risky time-periods. Since the number of Focus Schools is fixed as 10% of total Michigan public schools and they can be labeled repeatedly, the rate of hazard entry is decreasing over time.

Table 4.13. Discrete-time Hazard Analysis

	(1)	(2)	(3)	(4)
VARIABLES	odds ratio	odds ratio	odds ratio	odds ratio
13.year	0.999	1.099	0.784***	1.007
	(0.077)	(0.074)	(0.0603)	(0.099)
14.year	1.016	0.914	59.83***	11.19***
	(0.075)	(0.061)	(22.17)	(5.437)
Charter	0.798*			0.746
	(0.099)			(0.204)
High school	0.623***			0.591***
	(0.068)			(0.079)

Table 4. 13. (Cont' d)

Elementary	1.061			0.933
	(0.071)			(0.079)
Composite	1.424***			1.558***
Test Scores	(0.028)			(0.072)
Class Size	0.887***			0.905***
	(0.010)			(0.015)
Enrollment	1.836***			1.755***
	(0.123)			(0.164)
High Effect.	1.005***			1.004***
Teacher	(0.001)			(0.001)
% Non-White		1.006***		1.017***
		(0.001)		(0.002)
% Econ. Dis.		0.987***		1.000
		(0.001)		(0.004)
% Eng. Learners		1.006***		1.023***
		(0.002)		(0.005)
% Stud. w/dis		0.991***		1.023***
		(0.002)		(0.008)
% Mobility		0.949***		0.997
		(0.005)		(0.009)
Suburban			5.204***	5.695***
			(2.383)	(3.204)
Rural			7.176***	5.764***
			(2.691)	(2.704)
Median Income			1.000	1.000
			(7.02e-06)	(9.00e-06)
Sub*Median			1.000**	1.000
			(7.38e-06)	(8.89e-06)
Gini-index			1.114***	1.066***
			(0.011)	(0.013)
Constant	0.033***	0.651***	0.0003***	0.0004***
	(0.013)	(0.048)	(0.0002)	(0.0004)
Observations	7,173	9,189	6,864	4,785

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

Table 4.13 reports the maximum likelihood estimates for the logistic discrete-time hazards model for Focus School designation. The discrete-time hazards model shows consistent results from the logistic analyses that are reported previously, and the magnitudes of likelihood are also similar when controls are added for time. In Focus School designation, the results indicate that charter schools are 0.8 and high schools are 0.6 times less likely to be labeled in a

partial model. Given that many school-level characteristics show a significant likelihood of being labeled as a Focus School, standardized test score is a greater indicator of probability of Focus School labeling. Total enrollment is positively and class size is negatively associated with Focus School designation. Teacher evaluation shows small associations.

Regardless of the size of the coefficients, all covariates in student dimension characteristics show significance on the odds of designation. All odds ratios are between 0.9 and 1.1, and a one percent increase in student composition or student mobility presented little difference in labeling. Student demographic variables imply that student populations are diverse and disadvantaged, but the directions of associations are mixed. Non-White and English learner ratios measure diversity and show positive association, and the economically disadvantaged student ratio means disadvantageous conditions and shows a negative association. Students with disabilities and student mobility rates are also negatively associated. This tells us that simply having students with economic difficulties is *not* greatly related to being designated as a Focus School, but diversity is *more* related to being designated as one.

The most striking quality in community characteristics associated with the Focus School designation is locale. In the community-level dimension analysis, model 3, suburban and rural area schools are more likely to be Focus Schools than urban schools. Median household income has a 1.0 coefficient of odds ratio, which means there are no differences caused by changes in median household income. However, the Gini index shows a positive association with the odds of a Focus School designation. It reinforces the idea that economic unequal distribution can be more associated with the odds of becoming a Focus School than schools whose students have economic difficulties. Within the time variable, the second year is significantly presented as a

less-risky time for becoming a Focus School. This means that many Focus Schools were labeled repeatedly, so fewer schools were labeled for the first time in the second year.

For the full model 4, most of the student-level covariates with small coefficients in the individual models lose significance. Composite standardized test scores and total enrollment still show significant positive associations, and high school and class size are still a small value when looking at the odds of a school being labeled as a Focus School. Although some coefficients decrease the magnitude size, locale variables display distinctive associations. In sum, schools that are consistently outperforming in academic achievement scores, are located in suburbs or rural, and have a higher Gini index are more likely to be Focus Schools, whereas if schools are high schools, located in urban areas and have large class sizes, they are less likely to be labeled.

Predicted Gap Analysis

The predicted gap analysis identifies which schools are prone to large achievement gaps based on predicted achievement gap values with selected school characteristics. I grouped Wide Gaps, which are defined as schools with actual achievement gaps above the upper bound of a 95% confidence interval of predicted achievement gaps. In addition, I employed another logistic analysis to examine which schools were tagged as a Focus School among Wide Gap schools.

Table 4.14. Logistic Regression for the Wide Gaps group

VARIABLES	SY 2012 odds ratio	SY 2014 odds ratio
Charter	1.312	1
	(0.531)	(omitted)
High School	0.799	1.136
	(0.153)	(0.215)
Elementary	1.126	0.940
	(0.171)	(0.146)

Table 4. 14. (Cont' d)

Composite Test Scores	3.236***	3.122***
	(0.288)	(0.300)
Class Size	1.038	1.022**
	(0.020)	(0.009)
Log Enrollment	0.235***	0.191***
	(0.039)	(0.023)
High. Effe. Teacher	0.999	0.998
	(0.002)	(0.002)
% Non-White	0.993	0.984**
	(0.006)	(0.006)
% Econ. Dis	0.984**	0.987*
	(0.006)	(0.007)
% Eng. Learners	0.983	0.995
	(0.019)	(0.012)
% Stud. w/ dis	1.001	1.017
	(0.013)	(0.014)
% Mobility	1.202***	1.182***
	(0.020)	(0.021)
Suburban	.00003	0.001***
	(.0003)	(0.008)
Rural	1.150	0.028***
	(.905)	(0.020)
Median Income	1.000	1.000
	(.00001)	(.000)
Sub*Median	2.638	1.000*
	(2.284)	(.000)
Gini-Index	0.985	1.174
	(0.018)	(0.241)
Constant	354.43***	18871.92
	(611.4)	(33832.33)
Observations	1,963	1,764

Table 4.14 shows which factors are associated with there being a wider achievement gap than the predicted value. Unlike the prior analysis of maximum likelihood for Focus School designation, grade levels are not telling the likelihood to have wide achievement gaps. In the both cohorts, student achievement results show positive association with Wide Gap schools. Similar to Focus School designation, predictors for schools that have wider achievement gaps

than predicted values point to outperformance. Total enrollment size, however, tells a negative association to produce wide achievement gaps unlike Focus School labeling. Only mobility for all student groups shows an increased coefficient that is positively related with wide achievement gaps. Variables that are related to diverse population, Gini coefficient and non-White student ratio, do not show any association. These results are consistent in two observation time periods. They are the opposite of the logit analysis for Focus School designation, particularly for 2012.

Table 4.15. Logistic Regression for Focus Schools among Wide Gaps

VARIABLES	SY 2012	SY 2014
Charter	3.153	1
	(4.422)	(omitted)
High school	0.016***	2.359
	(0.021)	(2.037)
Elementary	2.068	2.758
	(1.077)	(2.090)
Composite Test Scores	3.164***	1.804
	(0.853)	(0.593)
Class Size	0.950	0.826
	(0.095)	(0.114)
Log Enrollment	11.09***	4.772*
	(7.842)	(3.314)
High Effec. Teacher	0.993	1.007
	(0.008)	(0.010)
% Non-White	1.047**	1.036*
	(0.022)	(0.018)
% Econ. Dis	1.015	1.018
	(0.024)	(0.035)
% Eng. Learners	1.081	1.006
	(0.059)	(0.042)
% Stu. w/dis	1.088*	1.017
	(0.053)	(0.091)
% Mobility	0.988	0.999
	(0.067)	(0.064)
Suburban	5.7e+06	658,333
	(5.2e+09)	(7.7e+08)
Rural	1.3e+06	643,422
	(1.2e+09)	(7.5e+08)

Table 4. 15. (Cont' d)

Median Income	1.000	1.000
	(0.0001)	(9.05e-05)
Sub*median	1.000	1.000
	(9.96e-05)	(8.71e-05)
Gini-Index	1.218***	3.141*
	(0.0803)	(2.184)
Constant	1.52e-19	7.74e-14
	(1.64e-16)	(9.06e-11)
Observations	574	528

Interpretation of the coefficients in Table 4.15, which presents characteristics that are associated with being Focus Schools among Wide Gaps, needs a different explanation than Table 4.14. Table 4.14 shows which qualities are associated with achievement gaps, while Table 4.15 tells which Wide Gap schools are tagged as Focus Schools. The two cohorts show varied results.

In 2012, the association between assessment scores and achievement gaps did not present consistently across subjects. Among grade levels, Wide Gap high schools were less likely to be designated as Focus Schools. Composite test score shows a strongly positive significance with being a Focus School among wide achievement gap schools, however, composite test scores in 2014 show no significance with being a Focus School among wide achievement gap schools.

Economic variables explain not much of the Focus School designation among Wide Gaps. The ratio of economically disadvantaged students and median income do not show any association with likelihood of Focus School designation in both cohorts. Rather than, the Gini index and non-White students present a higher chance of becoming a Focus School among Wide Gap schools both in 2012 and 2014. To sum, academic performances and indicators that present diversity are more positively associated with labeling Focus Schools in both 2012 and 2014.

Focus School Recurrence and Duration Analysis

This section explores which Focus Schools from the 2012 cohort were successfully able to shrink achievement gaps, and which schools were labeled repeatedly. Approximately 10% of schools are designated as Focus Schools every year. In years that followed such a designation, some schools were repeatedly labeled as Focus Schools, and others were removed from the list the next year. To examine which schools showed improvement in closing achievement gaps and exited early, I employed two approaches: a cumulative logit regression and a discrete-time hazard model.

Cumulative Logit Analysis

I sorted Focus Schools by the total number of Focus School designations, displayed in Table 4.16. The number of Focus Schools labeled only once is 204, and 19 were labeled all five times. Table 4.16 describes the characteristics of Focus School sub-groups by the number of recurrences. The patterns of characteristics are not consistent, and most of the variables show the largest differences in the four-times recurrence group.

Generally, variables that measure adverse conditions demonstrate condensed trends. Focus Schools' academic performance steeply decline in both subjects. Focus Schools that are labeled multiple times show a large increase in the non-White student ratio, the economically disadvantaged student ratio and the mobility rate. The locale variable presents the obvious pattern that more recurrences are associated with urban areas. Median household income decreases in the high recurrence groups, but it is hard to describe a pattern for the Gini index. Grade levels in Focus Schools present clear changes: high schools appear in a higher proportion in more recurrence groups and elementary schools show a lower proportion of high recurrence.

The variables that show positive associations with recurrence imply challenges for Focus Schools in eliminating achievement gaps.

Table 4.16. The Characteristics of Focus Schools by Recurrences

Recurrence	Once	Twice	3 Times	4 Times	5 Times
% Charter	3.4	4.5	11.1	0	5.3
% High School	10.8	17.5	11.6	14.6	42.1
% Elementary	52.9	46.9	39.2	24.4	31.6
St. Math	.984	.306	.535	-.091	.295
St. Read	.795	.291	.392	-.065	.081
% Prof. Math	53.8	43.4	44.7	33.8	40.6
% Prof. Read	75.0	68.6	68.5	61.4	63.4
Class Size	17.0	17.3	16.9	16.8	17.3
Total Enrollment	517	566	623	566	844
% Teacher Eval.	35.8	42.3	32.5	40.1	27.0
% Non-White	26.1	20.6	31.9	29.7	35.2
% Econ. Dis	37.1	45.9	45.2	55.8	49.8
% Eng. Learners	6.2	6.4	7.0	5.1	6.5
% Stu. w/dis	14.3	11.8	11.8	14.1	12.3
% Mobility	6.6	6.5	7.0	9.3	6.4
Locale					
Urban	5.0	5.1	6.4	12.2	26.3
High-inc Sub	36.5	14.1	30.9	7.3	10.5
Mid-inc Sub	32.5	45.2	45.7	46.3	52.6
Low-inc Sub	1.5	1.7	0.5	2.4	0
Rural	24.5	33.9	16.5	31.7	10.5
Median Income ($)	59,391	52,529	55,468	45,116	51,0159
Gini	.435	.419	.438	.432	.434
N	204	177	189	41	19

It is hard to describe a consistent pattern for other variables. Overall trends of charter schools do not show a consistent pattern. Charter school status shows high in the three-times-tagged Focus School sub-group and zero in the four-times sub-group. Highly effective rated teachers appear jagged along the sub-groups. Nor can English learners and students with disabilities be described in a consistent pattern.

Using the total number of Focus Schools labeled, the cumulative logit model provides an association between school characteristics and the recurrence of Focus School designations. Since the recurrences of Focus School labeling ranges from 1 to 5, with consistent distances between each value, four cut-points (thresholds) between the values appear in the results in Table 4.17. Coefficients of the cut-point are interpreted as the estimated cut-point on the latent variable used to differentiate each level of dependent variable when values of the predictor variables are evaluated at zero (UCLA, 2018). For example, the value of cut-point 1 is 1.732, which is shown to differentiate a one-time designation from more-than-one-time designations when all predictor variables are zero.

Table 4.17. Cumulative Logit Regression for Recurrence of Focus School Labeling

VARIABLES	(1) S Odds ratio	(2) P Odds ratio	(3) C Odds ratio	(4) Full Odds ratio
% Charter	.980			.925
	(.325)			(.701)
% High School	1.053			.679
	(.354)			(.412)
% Elementary	.706			.616
	(.131)			(.216)
Composite Test	.626***			.479***
	(.040)			(.081)
Class Size	.934*			.918
	(.033)			(.067)
Total Enrollment	1.906**			1.977
	(.391)			(.818)
% Teacher Eval.	1.006			1.004
	(.003)			(.005)
% Non-White		1.012**		1.017
		(.005)		(.009)
% Econ. Dis		1.024***		.996
		(.006)		(.014)
% Engl. Learners		.990		.994
		(.012)		(.017)
% Stu. w/dis		.970**		1.016
		(.013)		(.036)

Table 4. 17. (Cont'd)

% Mobility		1.003		1.026
		(.029)		(.050)
Suburban			1.864	.202
			(.807)	(.526)
Rural			2.077	.499
			(.822)	(.913)
Median Income ($)			1.000	1.000
			(.000)	(.000)
Sub*Median			1.000	1.000
			(.000)	(.000)
Gini			1.003	1.110**
			(.021)	(.044)
Cut 1	1.732	.458	-1.458	4.341
	(1.228)	(.281)	(1.986)	(4.737)
Cut 2	2.912	1.017	-.290	4.884
	(1.232)	(.286)	(1.985)	(4.741)
Cut 3	4.972	3.127	1.813	7.527
	(1.246)	(.339)	(1.993)	(4.757)
Cut 4	6.203	3.740	3.071	8.368
	(1.264)	(.373)	(2.011)	(4.766)
Observation	510	338	442	249
LR Chi2	(7)	(5)	(5)	(17)
	81.19	28.46	17.27	70.32
Prob>Chi2	.000	.000	.004	.000

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

From Table 4.17, we see that Focus School characteristics explain a number of recurrences. In the school-level characteristics model 1, significant covariates are composite test scores and total enrollment, whereas student-level model 2 show that non-White students, economically disadvantaged students and students with disabilities have significant associations. With a minor magnitude size, the non-white student ratio shows a positive association (1.01 times), economically disadvantaged students show a positive association (1.02 times), and students with disabilities show a negative association (0.97 times). In the community-level characteristics model 3, locale variables do not present any different odds of Focus School recurrence. In the full model 4, only composite test scores and Gini-index are statistically

significant. Specifically, when a school has a one-point increase in composite test scores, they rarely repeat Focus School labeling (.048 times), while having a 0.01 point increase of the Gini-index in the community means it is 1.11 times more likely to have labeling recur. An overall interpretation says that out-performing schools are less likely to repeat Focus School labeling, but schools in an unequally distributed community are more likely to repeat it.

In cumulative logistic regression, there is a required assumption of the proportionality of odds between values in dependent variables. The *Stata* program provides an approximate likelihood-ratio test of the proportionality of odds, and this model shows no evidence of violating the assumption.

Discrete-time Survival Analysis

The second approach, using a discrete-time survival analysis, looked at the continuous Focus School designation and how covariates are associated with the duration. I only examined the patterns of Focus Schools labeled continuously in Table 4.18. Among Focus Schools, with 631 schools in the first year, the estimated hazard for Focus School exit specifies the conditional probability that the exit would happen at time t, given that it had not yet happened.

Table 4.18. Life Table Describing Hazards of Focus Schools

Interval	Total Focus Schools	Cumulated Failure	Std. Error	Hazard	Std. Error
2012-2013	631	0.3914	0.0194	0.3914	0.0249
2013-2014	384	0.7242	0.0178	0.5469	0.0377
2014-2015	174	0.9651	0.0073	0.8736	0.0709
2015-2016	22	1.000	.	1.0000	0.2131

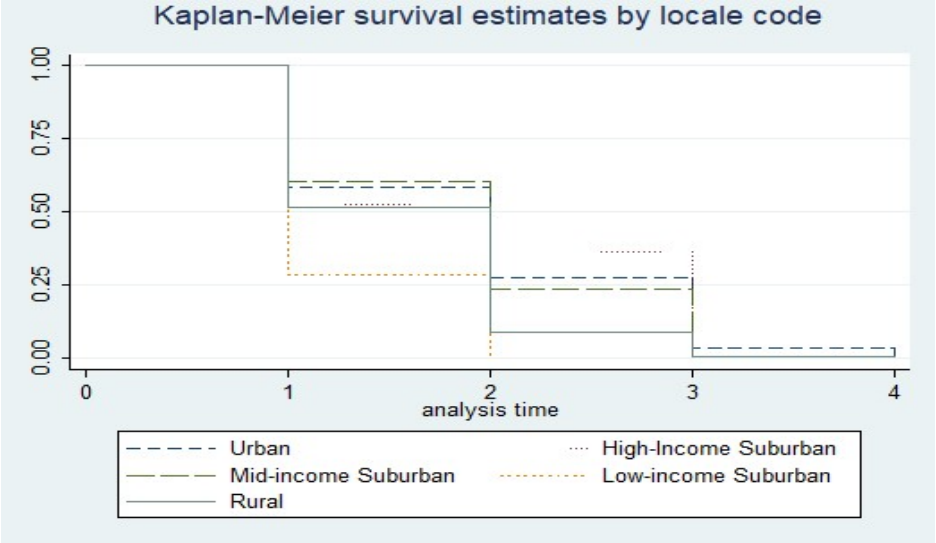

Figure 4.6. Kaplan-Meier Survival Curves for Focus School Exit by Locale

Since locale variables are consistently shown to be relevant factors in Focus School labeling in the earlier analysis, I explored the pattern of Focus School exit by locale code as an example. Figure 4.6 is a Kaplan-Meier survival graph for that, and it shows that Focus Schools in urban areas stay longer and exit Focus School status slower.

Table 4.19. Discrete-Time Survival Model of Focus School Exit

VARIABLES	(1) S odds ratio	(2) P odds ratio	(3) C odds ratio	(4) Full odds ratio
13.year	1	1	0.988	
	(0.191)	(0.339)	(0.220)	
14.year	1	1	0.980	
	(0.191)	(0.339)	(0.219)	
15.year	1	1	0.453***	
	(0.191)	(0.339)	(0.107)	
16.year	1	1	0.453***	
	(0.191)	(0.339)	(0.107)	
Charter	1.104			
	(0.256)			
High School	1.018			0.079***
	(0.205)			(0.053)
Elementary	2.155***			1.456
	(0.309)			(0.780)

Table 4. 19. (Cont'd)

Composite	2.255***			3.896***
Test Scores	(0.130)			(1.114)
Class Size	0.994			0.801**
	(0.025)			(0.074)
Log Enrollment	0.724**			4.148***
	(0.100)			(2.274)
High effect.	0.987***			1.002
Teacher	(0.003)			(0.008)
% Non-White		0.989**		0.992
		(0.005)		(0.013)
% Econ. Dis		0.967***		0.980
		(0.006)		(0.020)
% Eng. Learners		1.024		1.107**
		(0.015)		(0.050)
% Stu. w/dis		1.026*		0.941
		(0.015)		(0.041)
% Mobility		1.052		1.261**
		(0.040)		(0.117)
Suburban			7.27e-07	9.71e-06
			(0.001)	(0.009)
Rural			1.57e-06	5.18e-05
			(0.001)	(0.046)
Median Income			1.000**	1.000
			(1.70e-05)	(6.54e-05)
Sub*median			1.000	1.000
			(1.84e-05)	(6.26e-05)
Gini-index			1.012	0.800***
			(0.019)	(0.038)
Constant	62.72***	47.37***	623,206	4.9e+09
	(53.57)	(17.97)	(4.925e+08)	(4.3e+12)
Observations	2,550	1,690	1,795	796

Note: *** significant at p<0.001; ** significant at p<0.01; * significant at p<0.05

In Table 4.19, the discrete-time survival model shows the hazard rate of each variable in Focus School status exit. As stated in my hypothesis, this indicates that schools in communities with unequal economic distribution communities have difficulty exiting from Focus School status. Not many variables related with economic status present a significant hazard rate for the exit of Focus School status. What is consistently shown is that high schools are more likely to

have difficulties in narrowing achievement gaps and exiting the Focus School status, as are schools with large classroom sizes.

In school-level characteristics, model 1, elementary schools are more likely to exit the status and the association disappears in the full model. Composite test scores show a positive relationship with exit but enrollment size shows a negative relationship. The highly effective teacher rating ratio shows a small negative association with a Focus School exit. In the student characteristics model 2, schools with higher non-White student numbers and economically disadvantaged students are more likely to stay in Focus School status, whereas schools with higher students with disabilities ratios appear to be more likely to exit. In model 3, only median household income shows a negligible hazard-rate size for exiting as a Focus School, but it disappears in the full model. In the full model 4, high school, class size, English learner ratio, student mobility and Gini-index all indicate a statistically significant association. Total enrollment changes the direction of a statistically significant association. Composite test score is the only remaining sizable predictor of exit status. Finally, this approach displays that grade level, student academic performance, enrollment size, mobility rate and Gini index are relevant predictors of Focus School duration, though student composition and locale information are not.

Table 4.20 displays the summary of Focus School recurrence and duration. The two approaches show consistent results, and composite student test scores and Gini-index variables are highly associated with Focus Schools' recurrence or duration in opposite directions.

Table 4.20. Focus School Recurrence and Duration Analyses

	Positive		Negative	
Dimension	Recurrence	Duration	Recurrence	Duration
School	Total Enrollment	Total Enrollment Teacher Eval.	Composite Score Class Size	Composite Score Elementary
Student	% Non-White % Econ. Dis	% Non-White % Econ. Dis	 % Stu. w/dis	 % Stu. w/dis
Community				
Full model	Gini-index	Gini-index High School Class Size	Composite Score	Composite Score Total Enrollment % Eng. Learners % Mobility

Summary

For RQ 1, Focus School labeling, multiple logit models show the characteristics that are associated with Focus School labeling in two different time points. The analyses show that school attributes related to Focus School designations are consistent, although only locale variables turned out to be associated with designation in 2014. Variables which remained positive predictors in both cohorts, high-performing schools and schools located in communities with unequal economic distribution, are more likely to be labeled as Focus Schools as time goes by. In locale variables, suburban and rural communities changed to be positively associated with Focus School designation in the third cohort with controlling median household income level. From the discrete-time hazard model, which controls for time, high performing, large enrollment size, location in suburban or rural and a high Gini-index indicate that schools with these characteristics are more likely to be labeled. High schools are less likely to be labeled as Focus Schools. Compared to the predicted gaps in the third model, high-performing, large size of schools and high Gini-index schools are more often labeled as Focus Schools among Wide Gap

schools. The advantageous qualities of Focus Schools decrease the magnitude of predictors after policy implementations, but non-White student ratio, and Gini-index appear to be consistently associated with Focus School labeling.

For RQ 2, which investigates recurrence or duration of Focus Schools, school locales stay significant predictors. In the cumulative logit analysis, only Gini-index presents a higher likelihood of Focus School labeling recurrence, while out-performing schools show a lower likelihood of labeling recurrence. Non-White student share and economically disadvantaged students show a trivial association size in a partial model. Student test scores shows a negative relationship with Focus School recurrences in a partial model, but it shows bigger coefficient in a full model. In the discrete-time hazard analysis, test scores, grade level, enrollment size and Gini-index, rather than any other economic characteristics, are more associated with Focus School durations. High schools and schools locate in high Gini-index are more likely to experience difficulties in exiting Focus School status. In addition, high test scores, large enrollment size, English learner ratio and high mobility rates are positively associated with exiting the status.

CHAPTER 5: CONCLUSION AND IMPLICATIONS

I have explored how the characteristics of Focus Schools have changed over the last five years. From examining school-, student-, and community-characteristics, I have found that certain characteristics are more likely to be correlated with achievement gaps, leading to a school being designated as a Focus School, and that recurrences are associated with specific attributes.

First, the geographical distribution of Focus Schools shows a clear distinction from the other accountability-labeled schools—Reward and Priority Schools. Focus Schools are distributed widely, whereas Reward Schools are in high-income suburban areas and Priority Schools are in urban areas. Schools with smaller enrollment sizes are more likely to be labeled as Reward Schools and large schools are more likely to be labeled as Focus or Priority Schools. Focus School recurrences are displayed not only in student achievement, but also in community economic distribution. These descriptive analyses support the idea that student achievements are correlated with economic status. The achievement gaps that lead to Focus Schools were more likely to evolve in wealthier schools in 2012, but during the five years covered in this study, the achievement gaps seem to be related with economic distribution rather than wealth itself.

Second, Focus School labeling analyses shows them consistently out-performing academically over the five-year span. Focus School characteristics from 2012 are similar to those of Reward Schools, although Title I share, non-White student share, and Gini index are a little higher than those of Reward Schools. Focus Schools in 2016 are prone to having more economically disadvantaged students and non-White students, and to being located in suburban and rural areas rather than in urban schools. High-performing schools show a smaller likelihood of being tagged as Focus Schools over time. Instead, in the third cohort, locale and Gini index suggest a strong likelihood of a school being labeled as a Focus School. Generally, higher grade-

level schools have a larger size and more diverse student population, and previous studies show that these characteristics pose challenges in closing achievement gaps. In RQ 1, the results show that school characteristics associated with labeling as Focus Schools contain students from diverse socioeconomic backgrounds. Non-White students, school locale and Gini-index are the most significant qualities for being labeled in any of the models.

Third, school academic performance and community economic status are significant attributes of whether schools remain or are repeatedly labeled as Focus Schools. Out-performing schools show a lower likelihood of having labeling recur, while schools with unequal economic distribution areas experience difficulties in closing achievement gaps. In addition, high schools are negatively associated with exiting the status. In my findings, with little variation, common implications are that economic conditions and enrollment size play an important role in challenges to shrinking achievement gaps. Focus Schools that remained on the list for several years are comprised of high schools and high Gini-index. Schools that have higher test scores, large enrollment, a high number of English learners, and high mobility easily exit the status. Unlike finding predictors associated with an initial Focus School labeling, not many attributes show statistically significant associations with the recurrence and duration of Focus School labels. As previous studies show, if Focus Schools use targeted services to concentrate on the marginal students who are just below proficiency levels, then the schools also show increased achievement gaps between the top and bottom students.

My hypothesis in this study—that indicators showing diverse populations and unequal economic distribution matter in both the initial Focus School labeling and the duration or recurrence of status—is partially supported by the findings. The positive associations between non-White student share, Gini-index and Focus School labeling show that mean diverse student

composition is related with achievement gaps. Against the challenge of narrowing achievement gaps, median household income and school locale prove to be less related than student composition. Combining the analyses, schools in unequally distributed economic areas are more likely to be tagged as Focus Schools at the beginning of the policy, and they find it more difficult to eliminate the problem and exit the Focus School status. Over five years, the indicators related with diversity are more related with Focus School status than economically advantageous conditions.

Focus schools should be an answer to NCLB's goal of equalizing educational outcomes with no one lagging far behind. However, closing achievement gaps is difficult, especially trying to do so within a short time. Empirically, prior studies show that NCLB led to improved student achievement, but that the benefit sometimes targeted students who were only marginally below proficiency levels. Measuring achievement gaps within a school is an alternate approach for making accountability reforms better. The designation of Focus Schools and school-based comprehensive reforms were expected to be a solution for eliminating gaps. This study sheds lights on where more efforts should be focused.

Policy Implications

The approach of measuring achievement gaps within a school is not flawless. Since designating a school as a Focus School relies on relative criteria, Focus Schools may pull down high-performing students rather than raise lowest-performing students. To avoid this, policy evaluations need to carefully consider every student, such as using differentiated measures of student performance. Measuring the percentage of students who are at or above proficiency level can leave those students who already are far behind in danger. It may prove easier to have

strategies that focus on the lowest-performing students and increase their achievement in high-performing schools. Low-performing schools have double the burden in eliminating achievement gaps, because they need to improve both groups. Thus, this study suggests three implications for Focus School interventions.

First, Focus School interventions need more resources. Given the finding that Focus Schools in high-income suburban areas more successfully exit the status than other communities, Focus Schools in low-income communities need more support. Schools serving high concentrations of low-income students have the greatest difficulty narrowing achievement gaps. These schools generally confront resource scarcities on many dimensions. Current intervention programs emphasize diagnosis and collaboration with districts. Diagnosis-based strategies change resource allocations and identify teaching and learning priorities. Districts and schools face more administrative work and expertise, so more financial resources are required for their improvement plans as well.

Second, Michigan should consider long-term management of Focus Schools. Michigan has already revised its Focus School plan with multiple years' monitoring. To be eligible to exit Focus School status, Michigan has added the restriction that i) the designation of Focus Schools lasts for four years; and ii) the lowest-performing 30% students' achievement or improvement should be above statewide averages for two years after designation (MDE, 2017b). Michigan does not view closing achievement gaps as a short-term solution. The efforts *can* lead Focus School interventions to not draw down high-performing students and to not end up as a zero-sum game. However, this criterion can be challenging for low-performing schools, and they may put their efforts only on the bottom 30% of students. Any single policy that targets students may not be a silver bullet, so combining multiple policies into a coherent policy are necessary. For

example, by targeting *diverse* student groups — such as the lowest-performing students, the marginally-below-proficiency-level students, or students who have been in a certain sub-group for long-time — achievement gaps may be manageable.

Third, Michigan's Focus School experience suggests that achievement gaps in high schools are more difficult to solve than those in elementary or middle schools, because their problems may have accumulated from lower grade levels. High schools generally have larger and more diverse enrollment than lower-grade schools, and high-school students are subject to many factors that may cause their achievement trajectories to diverge. Given these differences, it may make sense for the state to distinguish high schools from other schools in ranking them by achievement gaps. At the same time, narrowing gaps in elementary and middle schools, as Michigan's Focus School policy has done, may lead to narrower gaps in high schools in the future. Thus, interventions by grade level can help narrow achievement gaps from lower-grade schools. In addition, the trend of achievement gaps and the associations with Focus School labeling present different results by subject (math and reading). Each subject can proffer different levels of difficulty for improving low-performing students' achievement, and therefore may need different intervention plans.

This study helps identify where Focus School programs need more consideration based on which schools are labeled and what factors may lead to their having difficulties in closing achievement gaps. The Focus Schools program will take several years to solve the achievement-gap problem. Still, educators and policymakers are all seeking the solution for closing achievement gaps given prevailing conditions, namely that students' socioeconomic backgrounds strongly affect their achievements, and economic inequalities are becoming polarized. Although socioeconomic redistribution is beyond education policy, Focus Schools aiming to close gaps in

educational opportunities and outcomes can inform and even initiate solutions to social problems.

Limitations and Future Studies

To make this study robust, future work needs to examine how schools deal with decreasing the achievement gaps once schools are labeled as Focus Schools. In particular, examining which students are more targeted by Focus School interventions can be a key to improving all students' achievements and closing achievement gaps. The question of why standardized test scores and percent of proficiency are associated differently with Focus School designations remains. In future studies, since test scores and percent of proficiency have different meanings, separate models can be utilized to analyze Focus School duration and recurrence.

In addition, this study can be expanded to examine details of interventions related to resource allocation and decision-making between schools and districts. Schools need to collaborate with districts to change resource allocations and evaluate human resource requirements. Current Focus School interventions in Michigan have good strategies for utilizing whole-school reforms and for connecting plans with districts. Districts have more flexibility to support school-based reforms and offer a comprehensive view to manage other interventions, so they will align with achievement gap problems.

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