Introduction

Tennessee’s efforts to turn around its lowest-performing schools have garnered widespread attention both from educational authorities across the state and from other states that have shaped their reform efforts around the accomplishments and challenges of school reform in Tennessee (Delaney, 2017; Downey, 2018; Granados, 2017; Riley, 2015). Tennessee’s two school turnaround models, the Achievement School District (ASD) and local Innovation Zones (iZones), have been in continuous operation since 2012-13, a relatively long period of time compared to school reform efforts in other states (Henry & Harbatkin, 2018; Papay & Hannon, 2018; Schueler, Goodman, & Deming, 2017; Sun, Penner, & Loeb, 2017). We further describe the ASD and iZone models below, but note that both models continue to operate schools, and both are currently part of the state’s school reform approach under the Every Student Succeeds Act (ESSA). The relative maturity of these turnaround models and their ongoing roles in Tennessee’s approach to school reform motivate this policy brief as an update on how six years of investment in school turnaround have affected student achievement in Tennessee’s lowest-performing schools.

Supported by Race to the Top Funding, Tennessee’s approach to school turnaround targeted the lowest-performing five percent of schools, called priority schools. In 2012, Tennessee released its first list of priority schools, and drawing from that list, the ASD began operating its first cohort of schools. The ASD, Tennessee’s most radical reform strategy, is a statewide school district that removes schools from local district governance in order to either directly manage them or place them under the management of a charter management organization. In that same year, the Tennessee Department of Education also approved the creation of iZones in two districts: Metropolitan Nashville Public Schools and what was then Memphis City Schools (now Shelby County Schools).\(^1\) Schools placed into a local iZone were given additional funding and increased autonomy as part of an intra-district network focused on turnaround. By 2017-18, local iZones grew to include four districts across the state, with iZones also located in Hamilton County Schools and Knox County Schools. Across the six years of ASD and iZone interventions examined in this brief, five different cohorts of schools have joined the ASD and local iZones from two priority school lists: the original list of 83 schools released in 2012 and an updated list of 85 schools released in 2014.\(^2\) In addition to overall effects, our results below also examine each cohort separately.
RESEARCH QUESTION

WHAT IS THE EFFECT OF ASD AND IZONE INTERVENTIONS ON STUDENT TEST SCORES AFTER SIX YEARS OF TURNAROUND REFORMS?

Averaging across all subjects in all years of intervention, iZone interventions have positive and statistically significant effects in math and science. In reading, the average effect is smaller and borderline in terms of statistical significance.

Moderate to large positive and statistically significant effects for iZone schools in the first two years of turnaround largely drive the overall effects.

Overall, ASD schools perform no better or worse than comparison schools in any subject or any cohort throughout the six year period.

The effects of individual cohorts of ASD and iZone schools vary considerably with positive effects for the first two cohorts of iZone schools, negative results for the fifth cohort, and negative results for the second cohort of ASD schools. Our descriptive evidence suggests that negative effects in the fifth cohort of iZone schools may be driven by decreased effectiveness among incoming teachers.

Data

Data used in this analysis are provided by the Tennessee Department of Education and managed by the Tennessee Education Research Alliance (TERA). The data span 2010-11 to 2017-18, which includes six years of ASD and iZone interventions. Our outcomes of interest are student test scores from end-of-grade exams in grades 3-8 and end-of-course exams in high school subjects. We note that testing complications occurred in the transition to new assessments and methods of testing in the 2015-16 school year, preventing test scores in grades 3-8 from being reported. Therefore, our analysis does not include any scores from the 2015-16 school year. In order to have a common metric across years, we standardize the reading, math, and science scale scores by subject, grade, year, and in the case of EOCs, semester. Standardization results in effect sizes that are measured in standard deviation units. For reference, a 1 standard deviation unit increase would be equivalent to a school moving from the 50th to the 84th percentile, and relatively successful turnaround models in other states report effect sizes of approximately 0.1-0.2 standard deviation unit increases (Gill, Zimmer, Christman, & Blanc, 2007; Papay & Hannon, 2018; Schueler et al., 2017). The effects reported in this brief should be interpreted as average effects across all four local iZones in Tennessee. However, since most of Tennessee’s turnaround efforts over the past six years have been concentrated in Memphis, we also examine our results by restricting our analysis to only schools in the Memphis area. We do not show the results here to conserve space, but examining only Memphis schools does not change our substantive conclusions. Finally, our analysis controls for student characteristics including prior year test scores, gender, race, eligibility for free or reduced-price meals (a measure of economic disadvantage), special education status, and English-language learner status. Including prior year student test scores allows us to interpret our effects as gains in student achievement from the previous year.
**Research Approach**

We use an analytic approach that is commonly referred to as the difference-in-differences (DiD) model, which is consistent with our strategy in past reports (Pham, Henry, Zimmer, & Kho, 2018; Zimmer, Henry, & Kho, 2017; Zimmer, Kho, Henry, & Viano, 2015). The DiD model identifies the before-after turnaround difference in performance in ASD or iZone schools and subtracts the same before-after difference in comparison priority schools that received no turnaround interventions. The logic behind this model is that differences in performance can only be attributed to ASD or iZone reforms if these differences are larger than the differences in comparison schools that received no turnaround interventions in the same time period. In this analysis, our comparison sample includes all low-performing schools on either the 2012 or 2014 priority list that did not receive ASD or iZone turnaround interventions.6,7

**OVERALL RESULTS**

Averaging across all six years and subjects, the iZone interventions have a positive and significant effect on student achievement that amounts to approximately one tenth of a standard deviation. ASD schools perform no better or worse than the comparison schools across all years and subjects. Figure 1 below shows the overall effect estimate for ASD and iZone schools for all subjects and separately for reading, math, and science. The striped bars represent the effect for iZone schools and solid bars represent the effect for ASD schools. The effect of the iZone intervention is equivalent to a school moving from the 50th to the 54th percentile in average student achievement.

When we examine student achievement effects averaged across all six years in reading, math, and science separately, we find that the positive effects for iZone schools are statistically significant in math and science, but the effects on reading are not statistically significant. In all three subjects, we also find that the iZone effects are smaller in this current analysis than our original effect estimates after three years and five years of turnaround (Pham et al., 2018; Zimmer et al., 2017). For example, in math, our overall effect estimate for iZone schools was 0.24 standard deviations after three years, 0.16 standard deviations after five years, and 0.10 standard deviations in this six-year analysis. The ASD intervention was neither more nor less effective in any of the three subjects over the six-year period.

**FIGURE 1: ASD and iZone Effects for All Subjects, Reading, Math, and Science Across All Years**

Note: Only bars marked with asterisks are statistically significant. * p<0.05, ** p<0.01, *** p<0.001
In order to investigate effects over time, Figure 2 below shows the effect of ASD and iZone reforms in each year of turnaround, averaged across all subjects. Figure 2 shows that the effects of ASD interventions are not statistically distinguishable from zero in any year. These estimates provide evidence that ASD interventions have not made improvements to student achievement in any of the six years in which they have been in operation. iZone schools show positive and statistically significant results in the first two years of turnaround, but the effects become statistically insignificant after the second year. Given the sizes of the effects in years five and six, and the smaller sample sizes for those years, it is possible that the lack of statistical significance could be attributable to lack of statistical power (e.g., only cohort 1 schools have six years of data and thus are the only cohort included in the Year 6 effect estimates).

**FIGURE 2: Effect Estimates for Test Scores Across All Subjects for ASD and iZone Schools by Year**

![Graph showing effect estimates for test scores across all subjects for ASD and iZone schools by year.](image)

Note: Only bars marked with asterisks are statistically significant. * p<0.05, ** p<0.01, *** p<0.001

Another way to examine the effects of ASD and iZone reforms across time is to examine each cohort separately, as shown in Figure 3 below. Note that each cohort has been undergoing turnaround for a different number of years. For example, the first cohort of turnaround schools has been operating for six years (between 2012-13 and 2017-18), whereas the second cohort has been in operation for five years (between 2013-14 and 2017-18). Figure 3 provides evidence that iZone schools in the first two cohorts produce positive and statistically significant gains in student achievement, but these gains are not produced by the third, fourth, or fifth cohorts. In fact, the fifth cohort of iZone schools has a negative effect. Looking across the different cohorts of ASD schools, we again find mainly no effects. Effects for each cohort of ASD schools are substantively small and statistically insignificant, except for the second cohort which produced negative effects on student test score gains.

**FIGURE 3: Effect Estimates for Test Scores Across All Subjects for ASD and iZone Schools by Cohort**

![Graph showing effect estimates for test scores across all subjects for ASD and iZone schools by cohort.](image)

Note: Only bars marked with asterisks are statistically significant. * p<0.05, ** p<0.01, *** p<0.001
Beginning in 2012-13, Tennessee’s school turnaround strategy has been in continuous operation for over six years, intervening in five cohorts of priority schools. In past reports, we examined the performance of the interventions both in ASD and iZone schools (Pham et al., 2018; Zimmer et al., 2017). ASD schools have not produced significant gains in student achievement in any academic subject, intervention year, or cohort of schools. Given existing research on school reform suggesting that turnaround interventions can take up to five years before positive effects can take hold, we have continued to evaluate the performance of ASD schools as the model has matured. However, after six years of operation, we find that the ASD turnaround strategy as originally conceived and implemented has not produced positive effects. Researchers have documented structural problems with this original model including alienation of the communities served by these schools (Glazer & Egan, 2018), but the ASD model has evolved since then with changing leadership after the third district leader recently resigned (Bauman, 2019). The transition to a new leader may present an opportunity to revise the ASD strategies. The evidence-based guiding principles for improving Tennessee’s lowest performing schools (Henry, Pham, Guthrie, and Harbatkin, 2018) may be useful in revising the past ASD model that mainly consisted of matching a management organization to a school and providing the management organization with autonomy and financial resources for operating the school. While we did not find that the ASD approach to school reform was effective, it is possible that districts and the iZones would not have been as motivated to make such gains without the pressure of takeover from the ASD.

Our past reports have also evaluated local iZone interventions, generally showing positive and statistically significant effects on student achievement. However, as the iZone models have matured, we find evidence that positive gains in earlier years and cohorts are dwindling across time, suggesting that iZone effects have been uneven in later years.

In previous reports, we showed evidence that part of the reason for success in iZone schools can be attributed to the recruitment of high-performing teachers and school leaders to iZone schools (Henry, Zimmer, Attridge, Kho, & Viano, 2014). In Table 1 on page 6, we again examine teacher effectiveness in order to shed some light on why positive results in iZone schools have not been as strong in recent years. For comparison schools and for each cohort of the ASD and local iZones, Table 1 shows the proportion of teachers who are new to the school as a measure of teacher turnover. For example, across all cohorts in the years after turnaround began, an average of 51% of teachers in ASD schools were not teaching in their respective schools the previous year. Average teacher turnover in ASD schools is higher than in iZone schools and both models experienced higher teacher turnover than priority schools in the comparison group. High levels of teacher turnover may be part of the reason ASD schools have not improved student achievement.

Table 1 also shows the average prior-year value-added scores for incoming teachers who taught tested subjects as measured on the Tennessee Value Added Assessment System (TVAAS). For example, averaging across all cohorts, incoming teachers have an average prior-year TVAAS score of 3.01 out of 5 in iZone schools. Although these statistics are only descriptive, they provide suggestive evidence that both ASD and iZone schools were able to attract more effective teachers in the early cohorts compared to comparison schools. ASD cohorts 3 and 4 and iZone cohorts 3 and 5 hired less effective teachers than other cohorts. This may at least partially explain the negative effects of the fifth cohort of iZone schools. These results suggest that turnaround efforts which rely on restaffing schools with more effective educators may not be sustainable after multiple years, which raises the possibility that there is a limited supply of teachers who are willing to transfer to low-performing schools.

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In 2013, Memphis City Schools and Shelby County Schools merged into one district named Shelby County Schools. Excluding two schools that were split off from existing schools, 50 schools on the 2014 priority list were also on the original 2012 priority list.

Instead of using scale scores as the outcome, we also test our models using proficiency rates. Using proficiency rates does not change our conclusions.

In models where we pool results across all three subjects, we also include subject-level indicators to control for systematic differences across subjects.

When restricting analysis to only Memphis area schools, our effect sizes are usually slightly larger in magnitude.

The iZones also began including high schools in the third year and high schools comprise most of the fifth iZone cohort, corresponding with the time period and cohorts when iZone effects become statistically insignificant or negative. These patterns suggest that the iZone intervention may not be as effective in high schools. When we compare iZone effects in high schools with other school levels, we find evidence that the effect of iZone interventions on student achievement gains are significantly lower in high schools.

As school reform efforts in Tennessee move forward under ESSA, new schools have been identified for improvement in more districts and across all school levels. Given these expansions, we urge future research to identify and address the instabilities in these schools (e.g., teacher and leader turnover and student chronic absenteeism) that constitute barriers to improving the performance of the new priority schools, examine the theory of change for each district’s interventions, and measure the extent to which it was implemented as intended.

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### Table 1: Teacher Turnover and Incoming Teacher Effectiveness for ASD, iZone, and Comparison Schools in the Years After Turnaround Reforms Began

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4. In models where we pool results across all three subjects, we also include subject-level indicators to control for systematic differences across subjects.
5. When restricting analysis to only Memphis area schools, our effect sizes are usually slightly larger in magnitude.
6. Our previous analyses only included priority schools on the 2012 priority list in our comparison group. We check our current estimates by using only the 2012 priority schools as part of the comparison group and find similar results leading to the same substantive conclusions. These results are available upon request.
7. As of the 2017-18 school year, the comparison group consists of 26 priority schools that have not joined the ASD, have not joined a local iZone, and have not closed.
8. Examining effect estimates for each subject by year lead to similar conclusions.
9. Teacher TVAAS scores range from a low score of 1 to a high score of 5.


REFERENCES

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