



January 2018

How has iZone Teacher Recruitment Affected the Performance of Other Schools?

Examining Systemic Effects of Teacher Recruitment for School Turnaround

Adam Kho, Gary T. Henry, Ron Zimmer, Lam Pham

About this Research Brief

This research brief continues the Tennessee Education Research Alliance examination of Tennessee's efforts to turn around its lowest performing schools. The brief reviews the extent to which teacher recruitment of Innovation Zones throughout the state of Tennessee have impacted the schools from which these teachers came. It follows previous work which looked at the impacts of Tennessee's turnaround approaches on student achievement and teacher recruitment.

Funding for this research was provided by the Laura and John Arnold Foundation and the Walton Family Foundation. The content is solely the responsibility of the authors and does not necessarily represent the official views of the foundations.

Introduction

In 2012-13, Tennessee began a series of initiatives to turnaround its lowest-performing schools, known as Priority schools. Among them, local Innovation Zones (iZones) in Memphis, Nashville, and Chattanooga have been acclaimed as some of the most effective initiatives in improving the academic achievement of students (Zimmer, Kho, Henry & Viano, 2015; Gonzales, 2016; Kebede, 2016; Tillery, 2017; Zimmer, Henry & Kho, 2017). A key strategy that contributed to the success of the iZone schools was the recruitment of highly effective teachers.

In a previous policy brief, we found that teachers entering iZone schools averaged higher value-added rating scores than teachers entering other low-performing schools and other Tennessee schools in general (Henry, Zimmer, Kho & Pham, 2017). However, while students in the iZone schools have likely benefitted from the instruction of these high-quality teachers, it is important to examine possible unintended consequences of this teacher recruitment. In this policy brief, we examine the systemic effects of the recruitment of high-quality teachers to iZone schools. In particular, what impact has this recruitment had on student achievement in the schools that lost these teachers (henceforth referred to as sending schools)? This information will help to provide a more complete picture of the overall effect of the iZone initiative.

Data

To examine the systemic effects of the recruitment of teachers into iZone schools, we utilized a database provided by the Tennessee Department of Education and compiled by the Tennessee Education Research Alliance. The database contains data on each teacher in Tennessee including his/her school of employment and the tested grades and courses he/she taught.

The database also includes student-level data, including school and grade enrollment data,

Key Findings

1. Students in schools losing teachers to iZone schools experienced a small negative effect as a result of those teacher losses, particularly in reading and science.
2. This effect of losing teachers was smaller in Priority schools than in non-Priority schools.
3. The small negative effects of losing teachers in the schools that lost these teachers does not appear to offset the positive effects in iZone schools. Overall, considering both, our calculations show a net positive impact on students in Tennessee as a result of the iZone initiative.

demographic characteristics, and state assessment scores. For the analysis, we use reading, math, and science scale scores and convert these to standardized units by subject, grade, year, and, for EOCs, semester to have a common metric across grades and years. Data for this analysis span school years from 2011-12 through 2014-15.

Who Was Affected?

Between the 2012-13 and 2014-15 school years, 652 teachers transferred into one of 26 iZone schools in Memphis, Nashville, or Chattanooga. In this analysis, we follow the 234 teachers who previously taught tested grades and subjects – 181 teachers who entered iZone schools in Memphis, 28 teachers who entered iZone schools in Nashville, and 25 teachers who entered iZone schools in Chattanooga. Most of these teachers, about 92%, were recruited from other schools in the same district as the receiving iZone school they transferred to. About

Why Teacher Turnover May Adversely Affect Students in Sending Schools

Teacher turnover can harm students in a number of ways. Here, we highlight three mechanisms as identified in the previous research literature (Henry & Redding, 2017) – change in the composition of teachers, classroom disruptions, and staff instability.

Change in the Composition of Teachers. Teachers who leave a school must be replaced. If they are replaced with a more effective teacher, students may benefit from the change in composition. However, teacher recruitment in iZone schools specifically targeted highly effective teachers, meaning that sending schools likely lost some of their more effective teachers. As a result, these teachers were likely to have been replaced with less effective teachers, on average. If so, the compositional change will decrease overall teacher quality and may decrease student achievement.

Classroom Disruptions. Teacher turnover can create classroom disruptions, particularly with midyear transitions. Students become accustomed to the routines and procedures of their teachers and must adjust to new routines and procedures when those teachers leave. Further, highly effective teachers are more likely to have a set of routines and procedures for their classrooms (Emmer & Stough, 2001; Oliver & Reschly, 2007). Therefore, losing a highly effective teacher can create greater classroom disruption.

Staff Instability. Teachers have knowledge about the schools where they work and develop relationships with other teachers, faculty members, and students. When teachers leave, these relationships are severed and their institutional knowledge leaves with them. The instability that results can be even greater with the loss of highly effective teachers, as they often have more responsibilities or more often serve in leadership roles.

4% came from nearby or bordering districts, and 3% came from other districts throughout Tennessee.

The three districts primarily placed elementary and middle schools into the iZones, and therefore, most teacher transfers were from elementary and middle schools (see Table 1). Overall, the sending schools had smaller percentages of minority and economically disadvantaged students than iZone schools. Nevertheless, the sending schools, on average, had a larger share of economically disadvantaged students and performed worse on the state's standardized assessments relative to the average Tennessee school. About a quarter of the sending schools were also Priority schools (the state's lowest-performing 5% of schools).

Table 1 provides the average proficiency rates of schools in reading, math, and science prior to iZone initiatives. Both iZone schools and sending schools were significantly lower-performing relative to the

state prior to the recruitment of teachers for the iZones. Schools served by the iZone initiatives performed worse than the sending schools in the year prior to the implementation of the iZones.

Research Approach

For the primary analysis, we use a methodology that allows us to compare student test score gains in grades that lost a teacher(s) to the iZone to other grades in the same school in the same year that did not lose a teacher(s) to the iZone, known as a school-by-year fixed effect approach. This approach allows us to control for other school-level, year-specific changes that may have affected student achievement gains. We also account for the effect of other teacher turnover in which the teachers did not leave to iZone schools to avoid misattributing the effect of turnover into the iZone schools to turnover that occurred for other reasons.

Table 1. Characteristics of iZone Schools, Sending Schools, and Tennessee Schools Prior to iZone Interventions

Characteristics	Sending Schools	iZone Schools	Tennessee ⁺
Total Schools	140	26	1,614
Elementary	36%	46%	56%
Middle	44%	39%	25%
High	20%	15%	19%
Percent Minority	83%	97%	33%
Percent Economically Disadvantaged	79%	91%	61%
Priority Schools (Lowest-Performing)	26%	100%	5%
Reading Average Proficiency Rates	26%	14%	49%
Math Average Proficiency Rates	30%	18%	48%
Science Average Proficiency Rates	30%	19%	60%

⁺ Excludes alternative schools

We present overall impact estimates of teacher turnover to iZone schools separately for reading, math, and science. Note that the effects displayed are for 100% turnover of the particular grade in the sending school.

Results

Overall Effects on Sending Schools

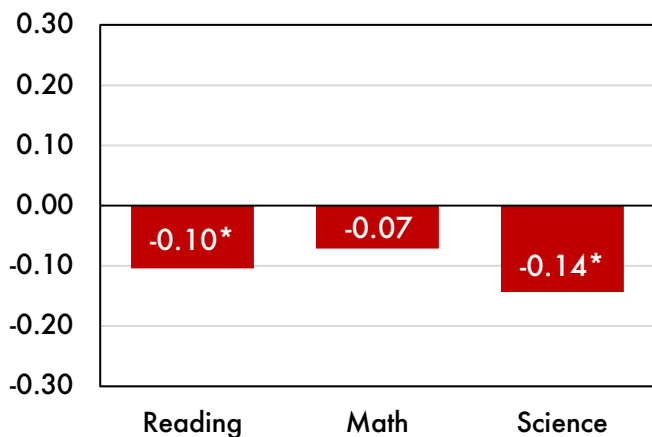
We find negative effects of teacher turnover to iZone schools in all three subjects (see Figure 1). In reading, students entering grades in which teachers left for iZone schools experienced a decrease in standardized test scores of about a tenth of a standard deviation on average. In science, students entering grades in which the teachers left for iZone schools experienced a decrease in standardized test scores of about 0.14 standard deviations on average. The results in both subjects are statistically significant. In math, the negative effect is smaller at 0.07 and not statistically significant. To give context and help interpret this metric, the average difference between the cutoffs for basic and proficient

achievement levels on the 2013-14 state assessment was 1.28 standardized units in reading, 1.19 in math, and 1.24 in science. Given this context, the results can be generally viewed as relatively small adverse effects for sending schools, especially considering these estimates represent the effect of all teachers leaving for the iZone schools in the grade and school where the turnover occurred. On average, in the grades of sending schools in which turnover occurred, 46% of the grade-level reading teachers left for iZone schools. In math and science, the iZone-bound turnover averaged 54% and 58%, respectively. Therefore, the average effect on students in grades within schools that sent a teacher to the iZone was about half of the effect described above or approximately 0.05 standard deviation units for reading or 0.08 standard deviation units for science, spread across all the students within the grade.

Effects on Sending Schools by Priority School Status

On average, sending schools were higher-performing than iZone schools. However, about a

Figure 1. Estimates of the Effects of Teacher Turnover on Student Achievement in the Schools Sending Teachers to iZone Schools



Note: An asterisk (*) indicates statistical significance of estimates at the 0.05 level

quarter of sending schools were also Priority schools (see Table 1), meaning the teachers who left these schools left a low-performing environment to transfer to another low-performing environment. Prior research shows that teacher turnover is more harmful for lower-achieving schools (Ronfeldt, Loeb & Wyckoff, 2013; Hanushek, Rivkin & Schiman, 2016). Therefore, for these schools, the unintended consequence of the iZone teacher recruitment could be even more harmful to the students in the sending schools.

To assess this concern, we disaggregated our analysis on sending schools into Priority schools and non-Priority schools. We found that the effects in Priority schools appear to be less than other schools and are not statistically significant.

Assessing Overall iZone Effects

Given the positive effects found in iZone schools and the resulting negative effect in sending schools, it is reasonable to ask what the net impact of the iZone intervention might be. However, for a number of reasons, it is difficult to directly compare the results from this analysis with the results from our previous policy brief highlighting the effect of iZone schools. First, the number of students

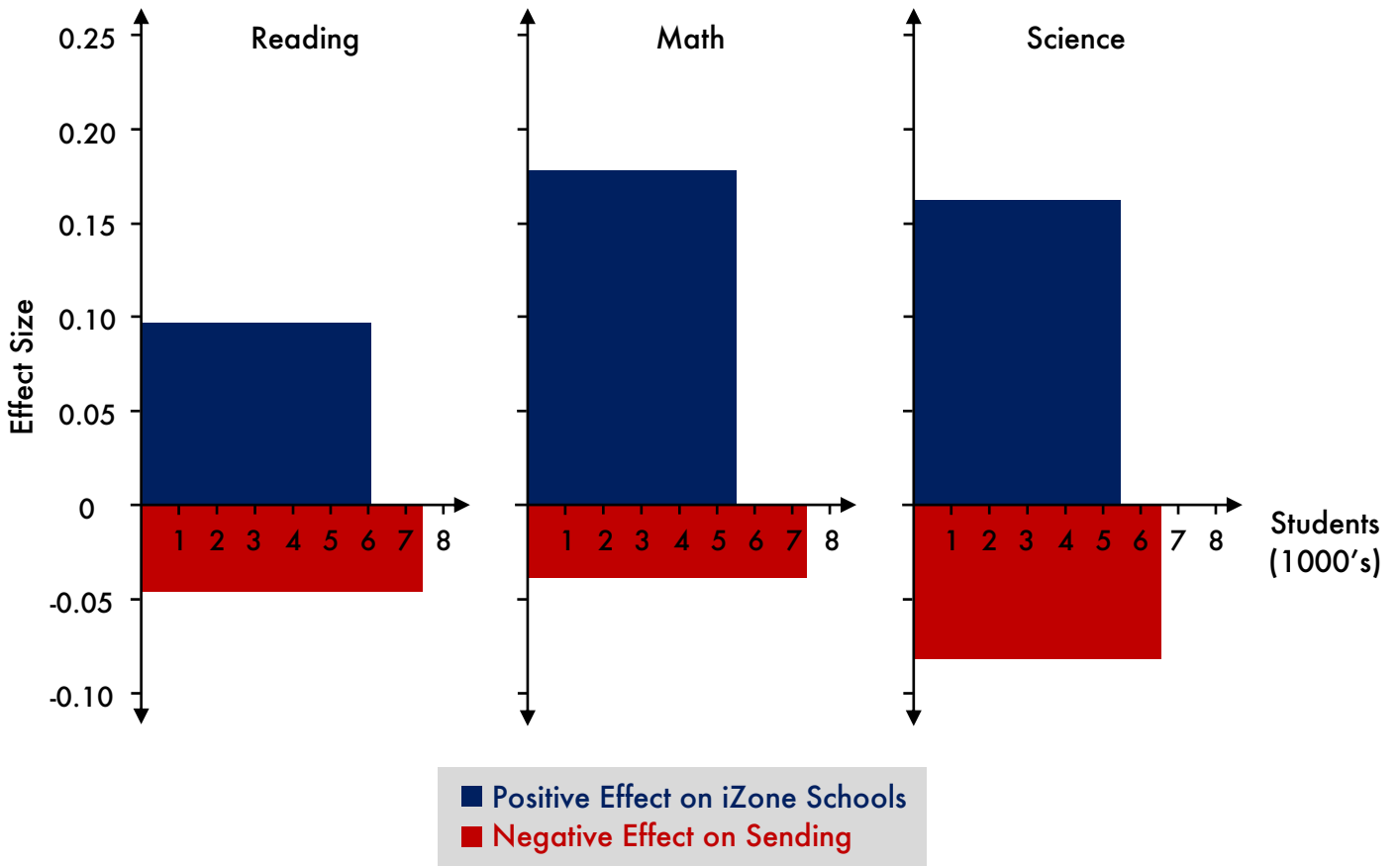
impacted by the iZone school initiatives is not the same as the number of students impacted by the loss of a teacher to an iZone school. Second, the types of students affected are different. As shown in Table 1, iZone schools have a greater proportion of minority and economically disadvantaged students, and many of these students have been served by one of the state's lowest-performing schools for multiple years. Third, the effects evaluated in this policy brief are short-term effects assessed in the year after teachers leave. The effects evaluated in the previous brief spanned one to three years of the intervention. Lastly, this analysis only considers the effects of teachers at the sending schools. The positive effects of the iZone may only be partially attributable to the teachers hired. iZone schools also employed a number of other interventions, including changes in leadership, instructional coaching, and extending the school day, all of which may have contributed to the positive effects we found.

Given these concerns, it is difficult to precisely calculate the net impact of iZone schools as a whole. Nonetheless, we take into account a number of these concerns and make several assumptions here to conduct a less formal, back-of-the-envelope calculation of the net impact of iZone schools. In particular, we have not made a value judgment based on students' backgrounds. In other words, the gain (or loss) in one student's test score is not weighted any differently from the gain (or loss) of any other student's test score. We also assume that recruiting effective teachers accounts for 80% of the positive impact in iZone schools. In our previous policy brief, we identified separate effects for each of three cohorts of iZone schools in their first year. In each of our calculations below, we assume the smallest of the three. We also account for the number of students impacted in our estimate below.

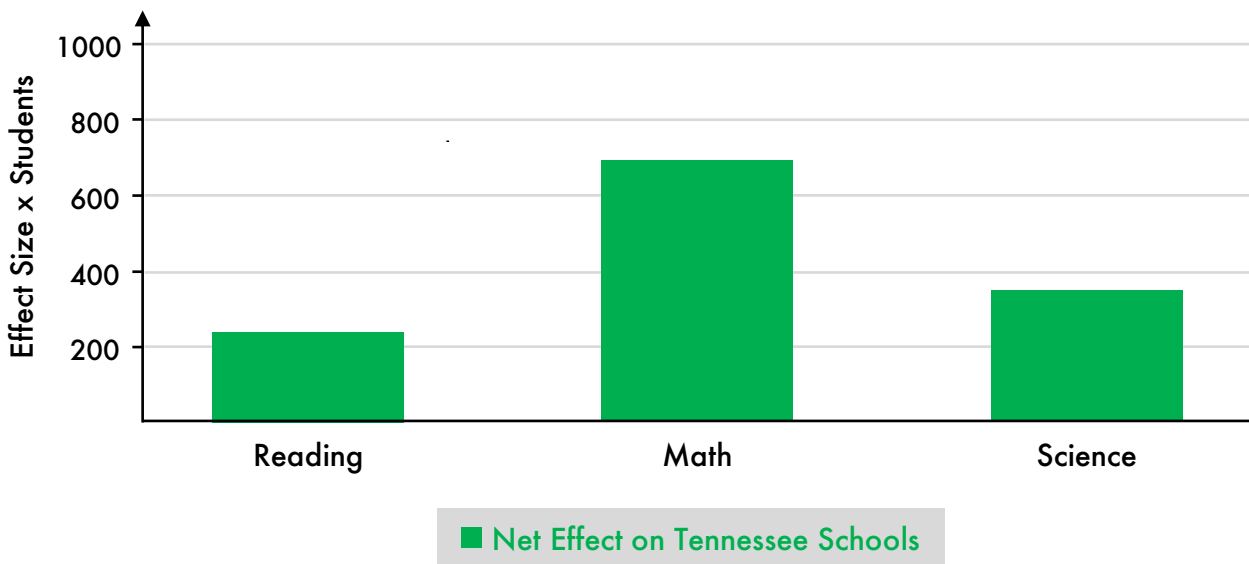
Figure 2 depicts the overall effect of iZone schools on reading, math, and science student achievement taking into account the effect on both iZone schools

Figure 2. Estimation of the Net Effects of iZone Schools

(a)



(b)



and sending schools¹ and the number of students impacted in each. In Figure 2a, the positive effects at iZone schools are displayed in blue, and the negative effects at sending schools are displayed in red. In Figure 2b, we multiplied the size of the effect by the number of students affected and found the difference between these positive and negative effects to identify the net impact of the iZone schools, displayed in green. This figure shows a large positive net impact of the iZone schools in all subjects with the greatest net impact in math. Note that we used the effect estimates without regard to statistical significance.

The largest assumption we make in this comparison is that 80% of the positive impact of iZone schools is attributable to the high-quality teachers that were recruited. However, even if we assume that these teachers only explained half of the positive impact of iZone schools, the net impact would still be positive in all three subjects, though almost negligible in reading and science. For the negative effects on students in sending schools to completely cancel out the positive effects on students in iZone schools, only 49% of the positive science effect in iZone schools could be attributable to recruiting effective teachers from other schools in Tennessee. In reading, this percentage would be 47%; in math, 23%.

Conclusion

In 2012-13, Tennessee began a series of interventions to improve the academic performance of low-performing schools throughout the state. Prior research shows that district-led iZones were effective in increasing students' achievement gains. A key strategy that contributed to the success of the iZones was the recruitment of highly effective teachers – the iZone schools hired 652 teachers

from throughout the state to help turnaround these schools.

In this research brief, we examine possible negative side effects of recruiting highly effective teachers into the iZone schools – did students in sending schools have to lose in order for students in iZone schools to gain? Our analysis shows that the students in the sending schools did experience a small loss in terms of gains on achievement tests. In grades that lost a teacher to an iZone school, students averaged losses in test score gains between 0.04 to 0.08 standard deviations, depending on the subject, due to this teacher transition.

However, this decrease in student performance at sending schools appears to be small relative to the positive effect of iZone schools. A direct comparison and therefore net effect estimation cannot be made using our previous findings of the impact of iZones on student achievement and the impact of teacher turnover on sending schools to iZone schools in this analysis. We can, however, make an informal calculation of an overall net effect of these two analyses. This informal calculation indicates a positive net impact of the iZone schools on students' overall achievement gains.

Our findings suggest that the iZones' strategy for recruiting highly effective teachers to turnaround their schools has been successful in improving the achievement of students in persistently low-performing schools with a relatively small negative side effect on the sending schools, at least in the short run. However, if sending schools recover from this initial dip in the longer run, this small negative consequence may be minimized, while the iZone schools posted consistent gains two and three years after the intervention began. This is a question we hope to investigate in a future report.

¹ Note that the effects displayed in Figure 1 represent the effect as a function of full grade-level turnover. The effect sizes depicted in Figure 2 represent the full effect displayed in

Figure 1 multiplied by the average proportion of grade-level teachers that left. Therefore, the effects in Figure 2 represent the negative effect for the average grade that lost teachers.

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