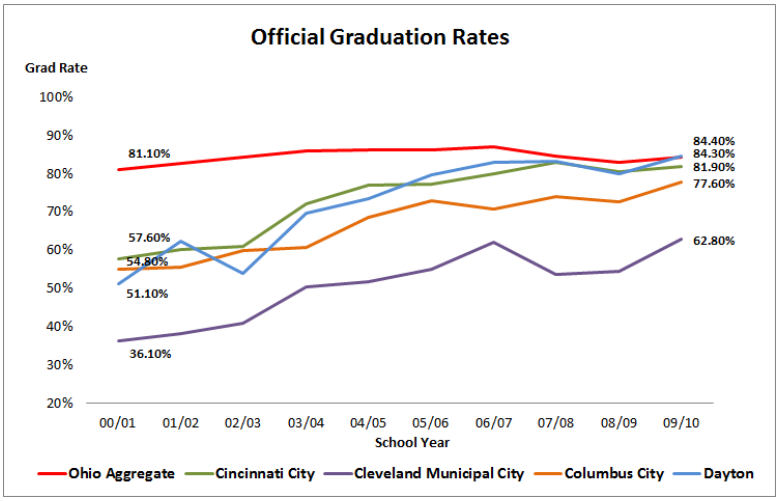
Estimating the Impact of Dropout Recovery Charters on Graduation Rates

Background

According to the Ohio Department of Education (ODE), graduation rates for several of Ohio's urban public school districts have markedly improved during the past decade. Figure 1 shows this increase in graduation rates for four districts, Cincinnati, Cleveland, Columbus, and Dayton. The rate of increase for these cities far outpaces the statewide graduation rate, which is also provided.

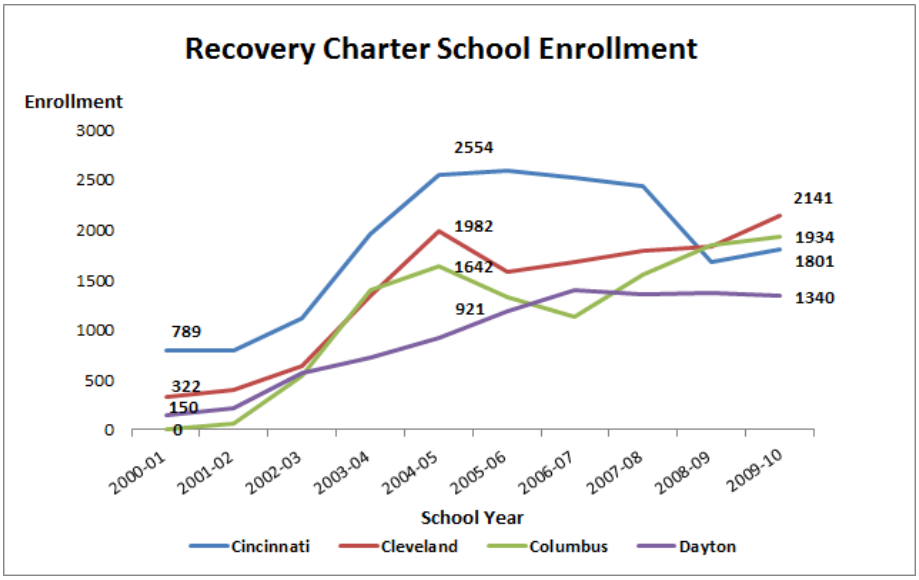
Figure 1: Graduation Rate, Statewide and by Select District (2000-01 to 2009-10)



Source: Ohio Department of Education

During this time, a simultaneous development occurred—the growth of dropout recovery charter schools. Under state law (ORC 3314.36), Ohio can approve charter schools that serve a majority of dropped-out or at-risk-of-dropout students (one or more grade levels behind) and waives the schools' normal accountability standards. From 2000 to 2010, enrollment in recovery charters has proliferated in several of Ohio's urban areas (figure 2). The rise in dropout recovery student enrollment was especially sharp from 2002 to 2005 but has since flattened (and even dropped in Cincinnati).

Figure 2: Enrollment in Approved Recovery Charter Schools by Geographic Location



Source: Ohio Department of Education and author's calculations

Graduation Rate Formula

Ohio has traditionally calculated its districts' graduation rate via the "leaver" method.[1] The calculation is relatively straightforward and can be expressed as:

$$\frac{Graduates\ (year\ x)}{\begin{array}{c}Graduates\ (year\ x) + Dropouts\ (12th\ grade, year\ x) + Dropouts\ (11th\ grade, year\ x-1) + \\ Dropouts\ (10th\ grade, year\ x-2) + Dropouts\ (9th\ grade, year\ x-3)\end{array}}$$

The numerator is the number of graduates in any particular year. The denominator sums a class' dropouts in the graduation year plus the number of dropouts in the prior three years in the appropriate grade level. The cumulative number of dropouts are added to the size of a school's graduation class. Dropouts, therefore, directly count against a district's graduation rate.

Method

To estimate what the graduation rate would have been without recovery charter schools from 2000 to 2010, I use data from four Ohio cities: Cincinnati, Cleveland, Columbus, and Dayton. These cities are appropriate test cases because they all experienced significant enrollment into recovery charter schools

[1] Although it seems simple, how to calculate the graduation rate is debated among statisticians. See discussion in Christine O. Wolfe, *The Great Graduation-Rate Debate* (Washington DC: Thomas B. Fordham Institute, 2009), http://www.edexcellencemedia.net/publications/2009/200907_thegreatgraduationratedebate/200907_GradRateDebate.pdf; James J. Heckman and Paul A. LaFontaine, "The American High School Graduation Rate: Trends and Levels," *Review of Economics and Statistics* 92 (2010): 244-262, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2900934/pdf/nihms-117813.pdf.

during this time (figure 2). Thus, their graduation rates would have likely been impacted the most. I run the simulation under three scenarios:

- *Scenario 1*: 100% of students enrolled in recovery charters would have otherwise dropped out public schools.
- *Scenario 2*: 75% of students enrolled in recovery charters would have otherwise dropped out of public schools.
- *Scenario 3*: 50% of students enrolled in recovery charters would have otherwise dropped out of public schools.

Scenarios 1 and 3 represent the extreme cases (best-case/worst-case) of the risk of dropout among recovery school students, while scenario 2 may represent an average case.

For this report, I did not have access to student-level data, so I make several simplifying assumptions about the process and distribution of the aggregated data sets provided by ODE.

- *Assumption 1:* Recovery charters enroll approximately 90% of its students from the inner-city, public school district in their geographic vicinity. (E.g., 90% of students enrolled in Cincinnati's recovery charters would have otherwise been enrolled in Cincinnati Public Schools.) This estimate is in-line with the reported rates of several recovery charters that we checked.
- *Assumption 2:* Recovery charters draw equally from each graduating class. Without the student-level data, this enables an estimate of the number of students from each class by taking a recovery charter's reported enrollment and dividing by four.
- *Assumption 3*: When a dropout enrolls in a recovery school, their home district recodes them as a "transfer" instead of a "dropout." Home districts would conceivably know when one of their dropouts enrolls in a recovery school, since enrollment in a new school requires a transcript request from the student's previous school.[2]

The steps in the calculation are:

1. Taking the public shools' annual reported graduation count and graduation rate, I calculate the number of dropouts using the graduation rate formula. I rearrange the formula algebraically to solve for the number of dropouts:

   $$\text{Dropouts} = [\text{Graduates} - (\text{Graduation Rate} \times \text{Graduates})] \div \text{Graduation Rate}$$

2. Having located recovery charters, I sum the enrollment of recovery schools by city and by year. I divide by four to estimate the number of students drawn from each grade 9-12.
3. I add the number of recovery students from each class (step 2) and multiply by 1.00, 0.75, and 0.50 to derive the number of students who would have otherwise dropped out under scenarios one to three respectively.

[2] See the Ohio Department of Education, FY2011 EMIS Manual, Chapter 2, pg. 41.

4. I add the number of recovery students who would have otherwise dropped out to the number of actual dropouts (step 1).
5. I recalculate the graduation rate by city and by year under the three scenarios enumerated above.

Results

Table 1 shows the full results of the adjusted graduation rate. We observe how the adjusted graduation rate falls for each city as the dropout rate assumption increases. Cincinnati's adjusted 2009-10 graduation rate, for example, ranges between 67% (worst case) and 74% (best case), with an average caes of 71%.

Figure 3 compares the adjusted to the officially-reported graduation rate for Cincinnati, Cleveland, Columbus, and Dayton Public School Districts. The official graduation rate is in red and the 75% adjusted scenario is in blue. The best case (50% scenario) and worst case (100% scenario) are shown in the dashed lines. From the graphs, we observe:

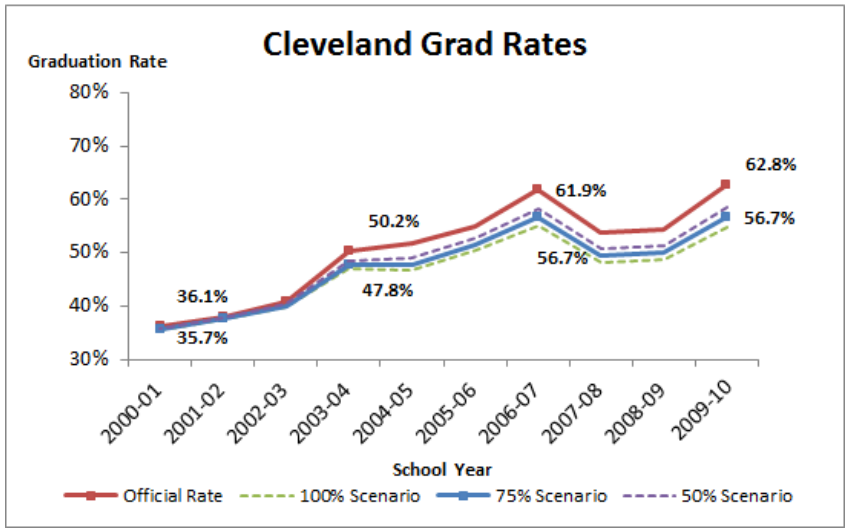
- The downward adjustment from the official graduation rate ranges from 5 to 20 percentage points.
- The gap widens in three of the four cities over time due to the increased enrollment in recovery charters.
- The gap between reported and adjusted rates is higher in Dayton and Cincinnati compared to Cleveland and Columbus. The relatively larger proportion of students enrolled in recovery charters in Dayton and Cincinnati explains these differences.

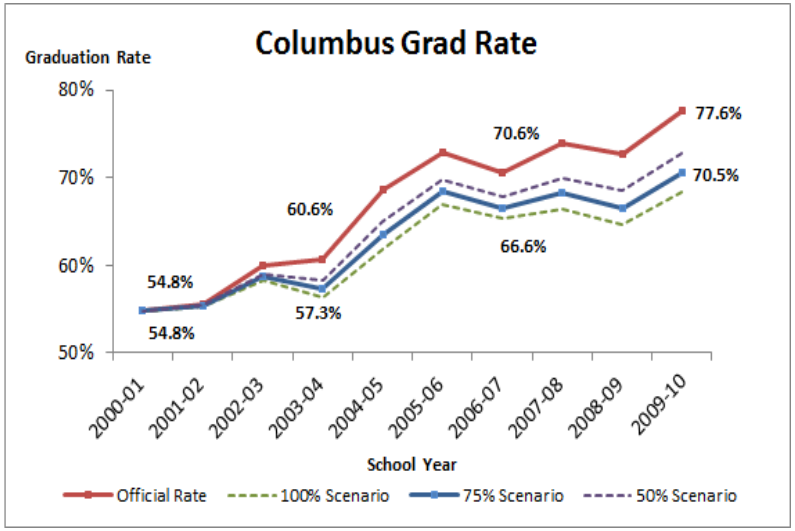
Conclusion

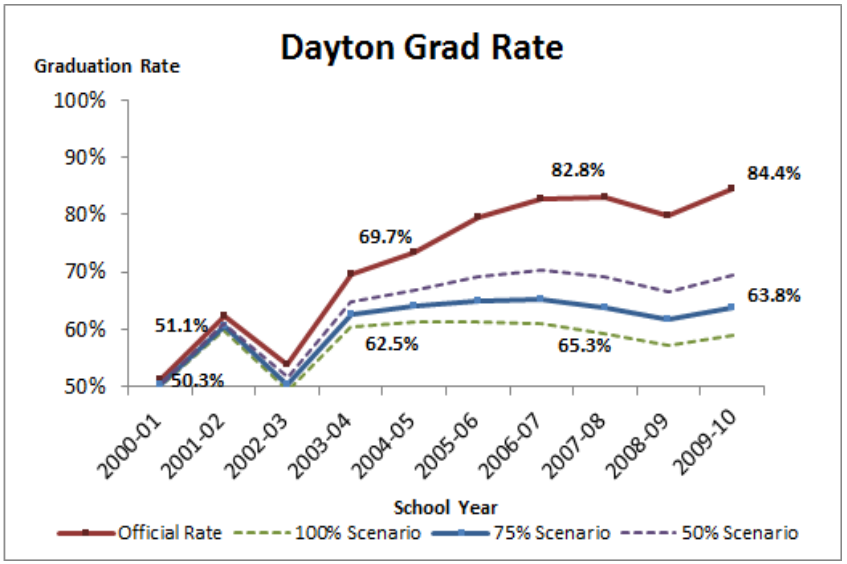
The increase of dropout recovery charters has likely affected the graduation rates of their geographically-proximate public school districts. Under a couple simplfying assumptions, I estimate a downward effect of between 5 and 20 percentage points for four public school during school years 2000-01 to 2009-10. The effect size depends on the relative enrollment of students in recovery charters vis-à-vis the size of their counterpart public school as well as the estimate of how many students who attend recovery charters would have otherwise dropped out of the public school system.

The results put into question just how much emphasis reported graduation rates should have when assessing a public school district's performance, especially when a district feeds a relatively large number of dropout recovery charter schools.

Figure 3: Graduation Rates of Selected Ohio Public School Districts, Official and Simulated Rates (School Year 2000-01 to 2009-10)







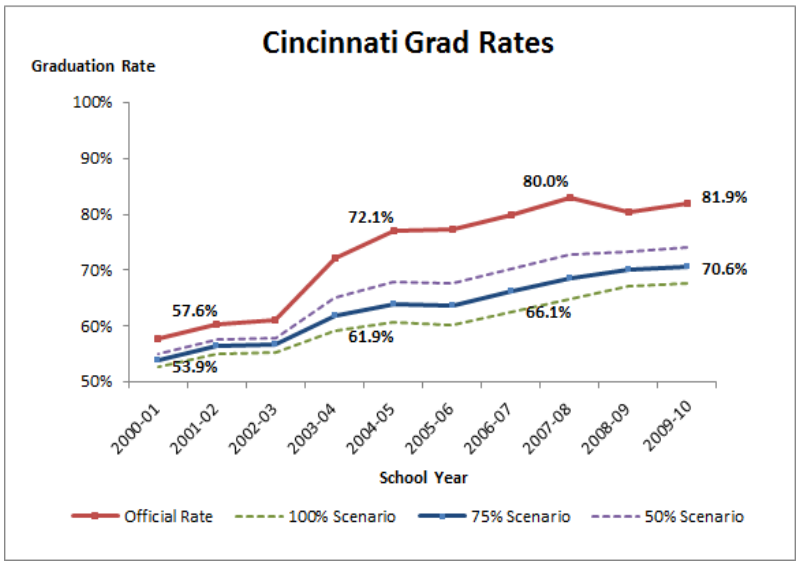


Table 1: Simulated Graduation Rates for Selected Ohio Public School Districts (School Year 2000-01 to 2009-10)

District	2009-2010	2008-2009	2007-2008	2006-2007	2005-2006	2004-2005	2003-2004	2002-2003	2001-2002	2000-2001
Estimated Graduation Rate, Assuming **100%** of Recovery Students Would Have Otherwise Dropped										
Cincinnati	67%	67%	64%	62%	60%	61%	59%	55%	53%	51%
Cleveland	51%	47%	46%	52%	50%	44%	46%	39%	36%	33%
Columbus	67%	64%	65%	65%	66%	61%	56%	57%	55%	54%
Dayton	59%	58%	59%	61%	61%	62%	60%	50%	60%	50%
Estimated Graduation Rate, Assuming **75%** of Recovery Students Would Have Otherwise Dropped										
Cincinnati	70%	70%	68%	66%	64%	64%	62%	57%	54%	52%
Cleveland	53%	48%	47%	53%	51%	45%	46%	39%	36%	34%
Columbus	69%	66%	67%	66%	67%	63%	57%	58%	55%	54%
Dayton	64%	62%	64%	65%	65%	64%	63%	51%	61%	51%
Estimated Graduation Rate, Assuming **50%** of Recovery Students Would Have Otherwise Dropped										
Cincinnati	74%	73%	72%	70%	67%	68%	65%	58%	55%	53%
Cleveland	55%	49%	48%	55%	52%	46%	47%	40%	37%	34%
Columbus	71%	68%	69%	67%	69%	64%	58%	58%	55%	54%
Dayton	70%	67%	69%	70%	69%	67%	65%	52%	61%	51%