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Abstract

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Disciplines

Education | Educational Administration and Supervision | Educational Assessment, Evaluation, and Research

AMBIENT POSITIONAL INSTABILITY AMONG ILLINOIS TEACHERS, AY2007-2012: A Briefing

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ABSTRACT

This briefing concerns two measures of Ambient Positional Instability (API) among teachers in the state of Illinois: cohort retention and churn. The teacher population includes full time public school teachers in the base year of AY2007-2008 and who were followed longitudinally through AY2011-2012. The state, district, and school level cohort retention for elementary, middle and high school teachers over the five years are provided here, as are the cohort retention rates in the five largest school districts in Illinois. Population churn rates, which include both leavers and newcomers to the Illinois system, are reported within the state over the years covered. A rationale for the work is that high instability and regional differences in the instability rates can have serious implications for designing school level interventions, especially for those designed to be implemented over the course of multiple years, and for controlled trials on such interventions. Challenges and techniques used to mitigate problems encountered using publicly available datasets are also discussed.

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Introduction

High-magnitude instability of teachers undercuts the possible effectiveness of multi-year interventions that depend on high teacher stability. In controlled trials where effective interventions are otherwise well designed, this instability can reduce the size of the intervention's apparent effect and the chance that the effects will be discerned. That is, teacher instability can mask or degrade what otherwise might be a promising practice if teachers' assignments were more stable.

In this briefing, we provide deeper and broader understanding of system instability that may influence program evaluation using publicly available data. We use the term Ambient Positional Instability (API) to characterize the various ways that teachers may shift their positons from one school to another, one grade level to another, one subject to another, and so on. For a detailed description of different measures of API, see Ye, Frisone, Hooks and Boruch (2016). This paper focuses only on two measures of API in particular, cohort retention and churn.

This briefing also demonstrates how publicly available administrative records can be used to assess teacher instabilities at various levels. The work described here is part of a larger collaborative effort to investigate different indices of API in different states across the nation. Similar efforts have been carried out for Missouri (Bowdon and Boruch, 2014), Ohio (Baker and Boruch, 2015), New Jersey (Ye et al, 2016), and Arkansas (Frisone et al, 2016). Although there are variations resulting from the different structures of data across states, methods used to calculate the API measures have been made to be as consistent as possible with the other reports.

Illustrative Previous Studies on Chicago and Illinois Teachers

In their examination of second year effects of the Teacher Advancement Program (TAP) on teacher retention in Chicago Public Schools, in which Glazerman and Seifullah (2013) found no evidence of effects of TAP on teacher retention, the authors cautioned that lack of evidence should not be considered a proof of no impact. They pointed out that 3 of the 16 schools in the study were dropped from retention analyses for reasons such as consolidation or program drop out. This illustrates how unexpected loss of schools or teachers from the study can introduce uncertainty in evaluation of programs.

In a report that included personnel records of about 35,000 teachers in 538 elementary schools and 118 high schools in Chicago Public Schools (CPS), Allensworth, Poniscik, and Mazzeo (2009) found that about 100 Chicago schools undergo chronically serious teacher turnover. A quarter or more of their teaching staffs were lost every year and roughly half of teachers teaching in 2002 left their schools by 2006. One caveat of the study, which the authors pointed out, was that they were unable to track teachers who left the Chicago Public School system because they did not have data on the neighboring districts. This made it impossible to distinguish teachers who left the Chicago Public School system but had transferred to neighboring school districts within the state.

King, Kan, and Aldeman (2016) investigated teacher supply and demand trends as well as staff retention across the state from 2002-2012. However, they focused on new hires, finding that approximately two-thirds of new hires are still working in Illinois five years after date of

hire. They also determine that new hire retention rate varied by district, with Chicago low compared to other large districts, and that rate was lowest in high poverty districts.

This briefing employs the use of the data of a cohort of teachers teaching in Illinois so teachers who move within the state can still be tracked over the years. In examining the cohort retention, we examine the cohort retention at difference institutional levels. That is, the indicators are reported on retention within the state, cohort retention within the original school and cohort retention within the original school district.

The Illinois Population Records

We use Teacher Service Records (TSR) to calculate cohort retention of the entire population of teachers in Illinois. The records are publicly available through Illinois State Board of Education (ISBE) at their website, http://www.isbe.net/research/htmls/educator-employment.htm. In 2015, ISBE completely transitioned the TSR into a new system on their website, Employment Information System (EIS) where several improvements, such as introduction of identification number, were introduced. The changes under the new EIS system were applied beginning AY 2012-13. This study covers the five years (AY 2007-08-AY 2011-12) during which ISBE was still using the TSR system.

The initial dataset from the baseline teachers in AY 2007-08 included records of 164,325 employees, of which 158,999 were full-time. We restricted our dataset to employees who were employed more than 75% of the time and more than 9 months during the given academic year and who were teaching in either elementary, middle or high school during the years covered. This is a conservative approach in that we only considered the teacher to be retained if they

maintained their "full-time" status, remained employed for more than 9 months in a given year and were employed more than 75% of the time in either elementary, middle, or high school.

We further constrained the population of interest to teachers for whom we could create a unique identifier based on identifiable characteristics, e.g. teacher's surname, first name, middle initial, and baccalaureate institution. This approach has some caveats. For instance, changes in names of people in the files, on account of marriage for instance, were not accounted for, as there was not enough information to sort these out without great difficulty.

The record editing and population delimiting procedures left us with the baseline of 111,659 teachers for the 2007-2008 baseline year, who were teaching in 4,145 schools. Less than one percent of teachers from the baseline year encountered duplication problem so when found, they were simply deleted. The final numbers of teachers included in the analysis from the other years were: 112,001 (AY2008-09), 112,686 (AY2009-10), 105,018 (AY2010-11), and 103,315(AY2011-12). The demographic characteristics of the teachers from the base year AY 2007-08 for the cohort retention are provided in Table 1.

Exact grade level of the teacher was not identifiable in TSR with enough precision to include this variable in statistical summaries. Consequently, we depended only on the general categorization of Elementary, Junior High/Middle School and High School designations, even though teacher movement across different grades is considered one important aspect of API.

Results

The first analysis calculates multi-year retention of the cohort of all teachers from AY 2007-2008 to AY 2011-2012 at the state, school district, and school levels. Figure 1 portrays different levels of cohort retention rates in the population of full-time teachers in Illinois who

were teaching in either elementary, middle, high school during the base AY 2007-08. Only about 54.8% of the full-time teachers in Illinois from AY07-08 stayed in the same school throughout these years until AY2011-2012. About 63% remained in the same school district and about 65% were retained in the state of Illinois through the five year period.

The 54.8% cohort retention rate for the same school over five years may surprise readers who expect higher stability. However, a subset of the movement occurred within the same school district and another subset occurred within the state of Illinois. Figure 2, for instance, portrays the cohort retention in the same school broken down by elementary, middle and high school. This picture reveals that the although one-year retention is similar among elementary, middle and high school teachers at about 80%.   The cohort retention rates vary considerably across years however. The highest cohort retention in same school was among the middle school teachers (58.8%) and lowest in elementary schools (51.5%). It is unclear from the information at hand why elementary school teachers are less likely to be retained in the same school over multiple years.

Figure 3 gives empirical evidence on the cohort retention rates of all teachers in the five largest school districts in Illinois. Chicago School District (SD)'s one-year cohort retention in the same school is only about 60%, suggesting that only about six out of ten teachers teaching in a school in Chicago school district will remain in the same school the following year. Fewer than four out of ten teachers teaching in AY2007-08 remained in the same school by AY2011-12. The low cohort retention in the Chicago school district is in stark contrast with other large school districts in Illinois, where the cohort retention was generally higher than that of the Chicago school district.

Figure 4 compares churn within the state from AY2008-09 to AY2011-12. Unlike cohort retention, which follows teachers from the base year, AY 2007-08, churn within state gives us a snapshot of instability in a given year by simply dividing the sum of the number of leavers and the number of newcomers in a given year by the number of total teachers in Illinois in the previous year. Notice that we do not have an estimate for AY2007-08 because denominator is obtained from the number of teachers in previous year. Figure 4 illustrates that the churn within the state of Illinois has not changed drastically in the last four years; about 20 percent of the teachers in the system in a given year either left or entered the system afresh in a given year.

Discussion

This report illustrates that public administrative records on the entire population of public school teachers in Illinois can be transformed into forms that useful for simple statistical analyses. The analyses here provide empirical rates of retention and churn among teachers that are population rather than sample based, at the state, school district/city, and school level.

The technical challenges to transformation include having to depend on using teachers' names and baccalaureate institutions as identifiers for longitudinal tracking each teacher over time inasmuch as the public records in the files at hand included no unique identifier. Future challenges lie in the fact that new public record systems that include unique numerical identifiers are being developed by the state and new Illinois data system vendor and processes may be used to construct the records in a revised data system.

Analyses, thus far, have been confined to simple population based rates of teacher retention and churn at different levels. These rates alone can be useful in designing education interventions that are deployed over several years, and consequently must take into account the

ambient positional instability of teachers in the system. Further, the rates can be used as design parameters in mounting randomized controlled trials or quasi-experiments on the interventions. Knowing that the churn rate from year to year is above 20%, for instance, is important in these contexts. Knowing that the retention rate over five years is only about 50% is equally important for longer term studies and for selecting sites in which to do trials on interventions.

There are implications for further work, of course. Simple forecasts of retention and churn based on short term time series of the sort examined here are an obvious option. Building explanatory or predictive statistical models of retention or churn based on auxiliary variables such as teacher age or experience or subject area specialization is another. And one can capitalize on the population records to understand how to generalize results from a small set of impact evaluations to a larger sample.

Beyond this, understanding how rates of ambient positional instability vary or do not across jurisdictions seems important. If, for instance, churn rate among public school teachers in the US is discovered about 20% in most States over 5-10 year periods, this then becomes like a good scientific constant. The rate may not be as "constant" (roughly speaking) as the acceleration rate of gravity on earth, but it is a pretty dependable parameter.

We plan to explore the challenges of accessing public administrative records and their transformation and implications in each case for Illinois and other states. Results will be posted on the University of Pennsylvania's Scholarly Commons web site, published in peer reviewed academic journals, and reported in professional forms.

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Table 1

Summary of Illinois teachers' characteristics (cohort AY 2007-2008)

	M	SD
Salary	60,794.13	20214.67
District experience	10.56	8.86
State experience	12.05	9.32
Out of state experience	0.33	1.69
Highest degree: Baccalaureates	0.47	
Highest degree: Masters	0.52	
Female	0.75	
Asian	0.01	
Hispanic	0.05	
Elementary	0.48	
Middle/Junior High	0.21	
High school	0.31	

Note. M and *SD* represent mean and standard deviation, respectively.
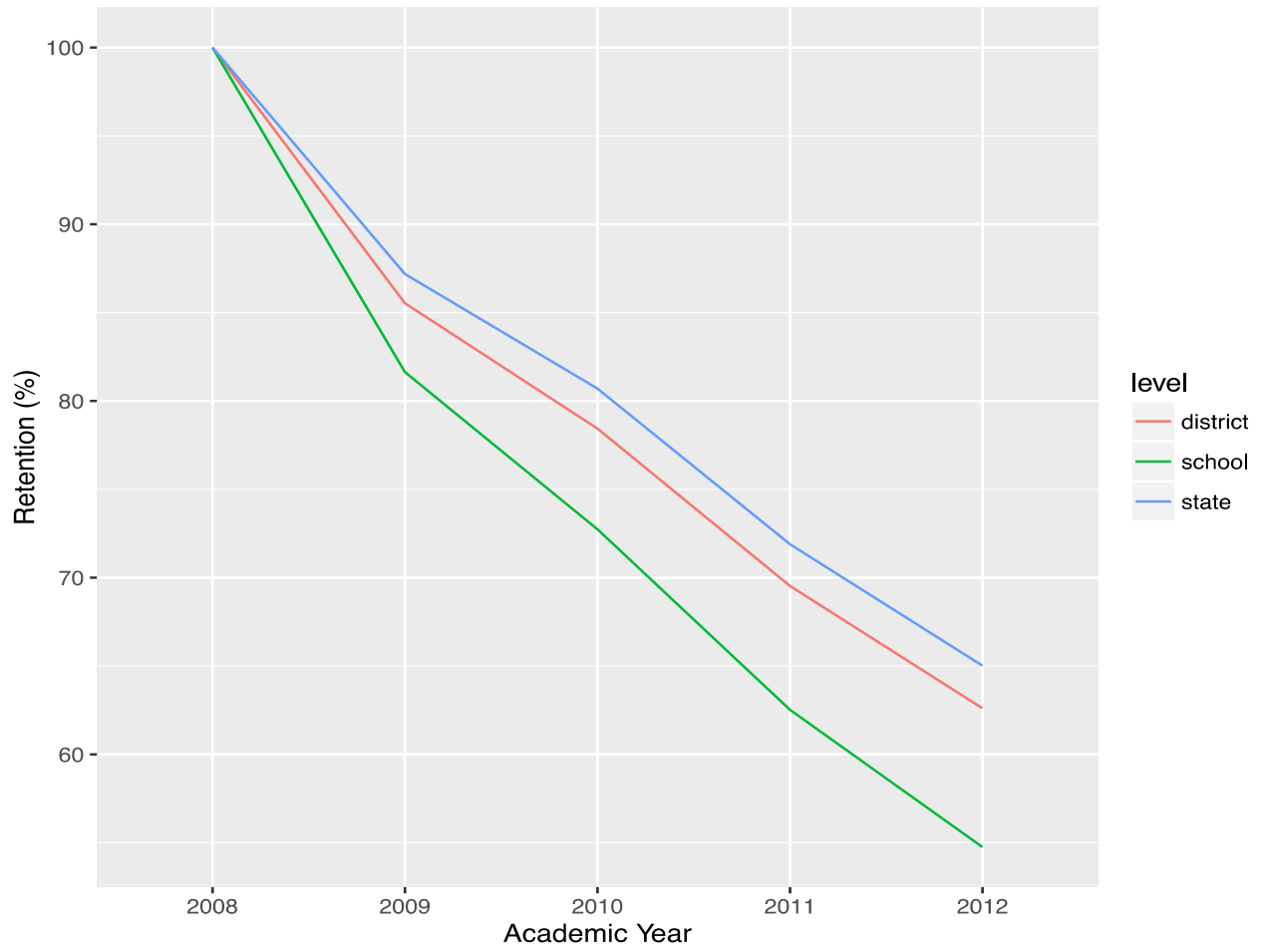
Figure 1.Cohort Retention in Illinois teachers

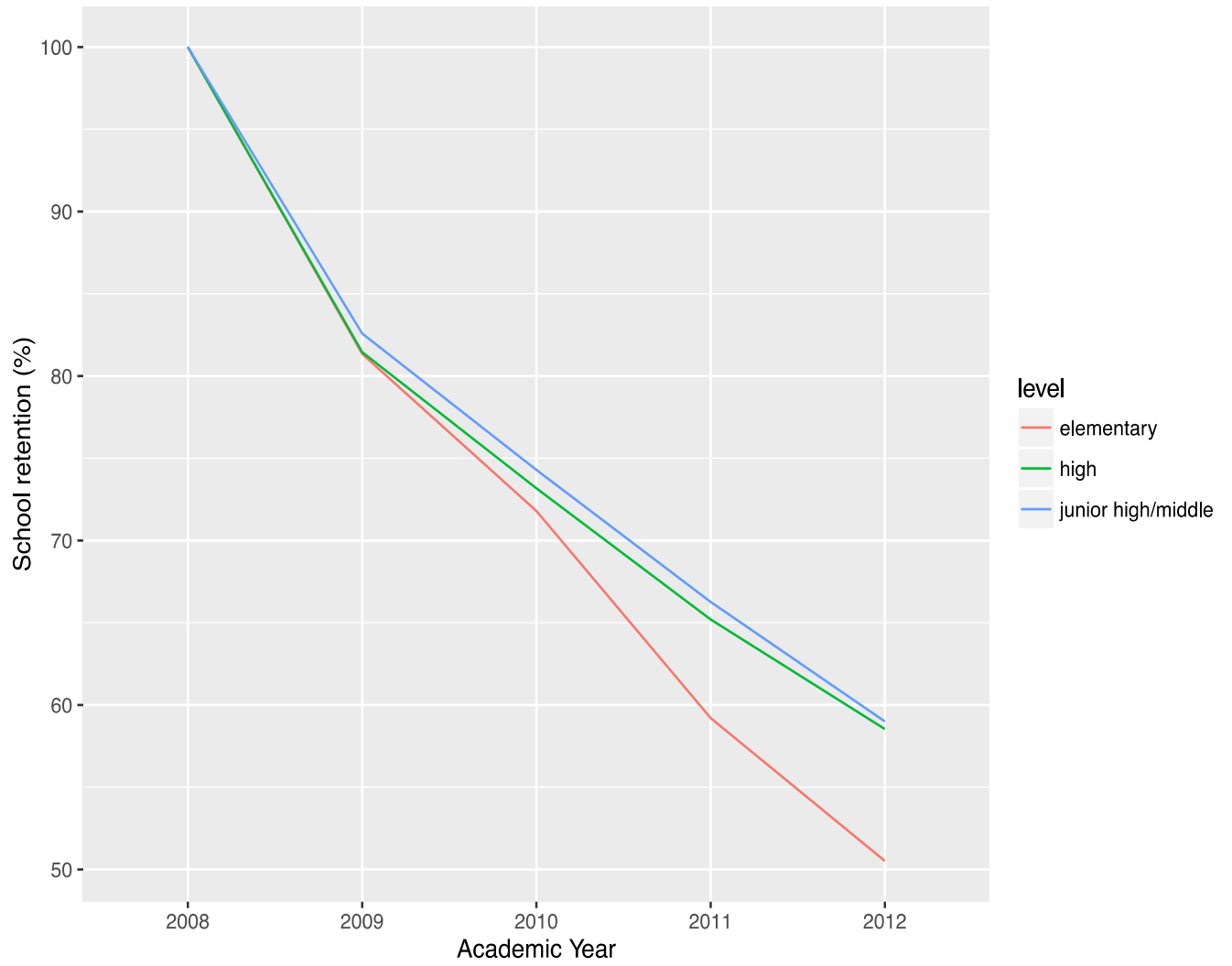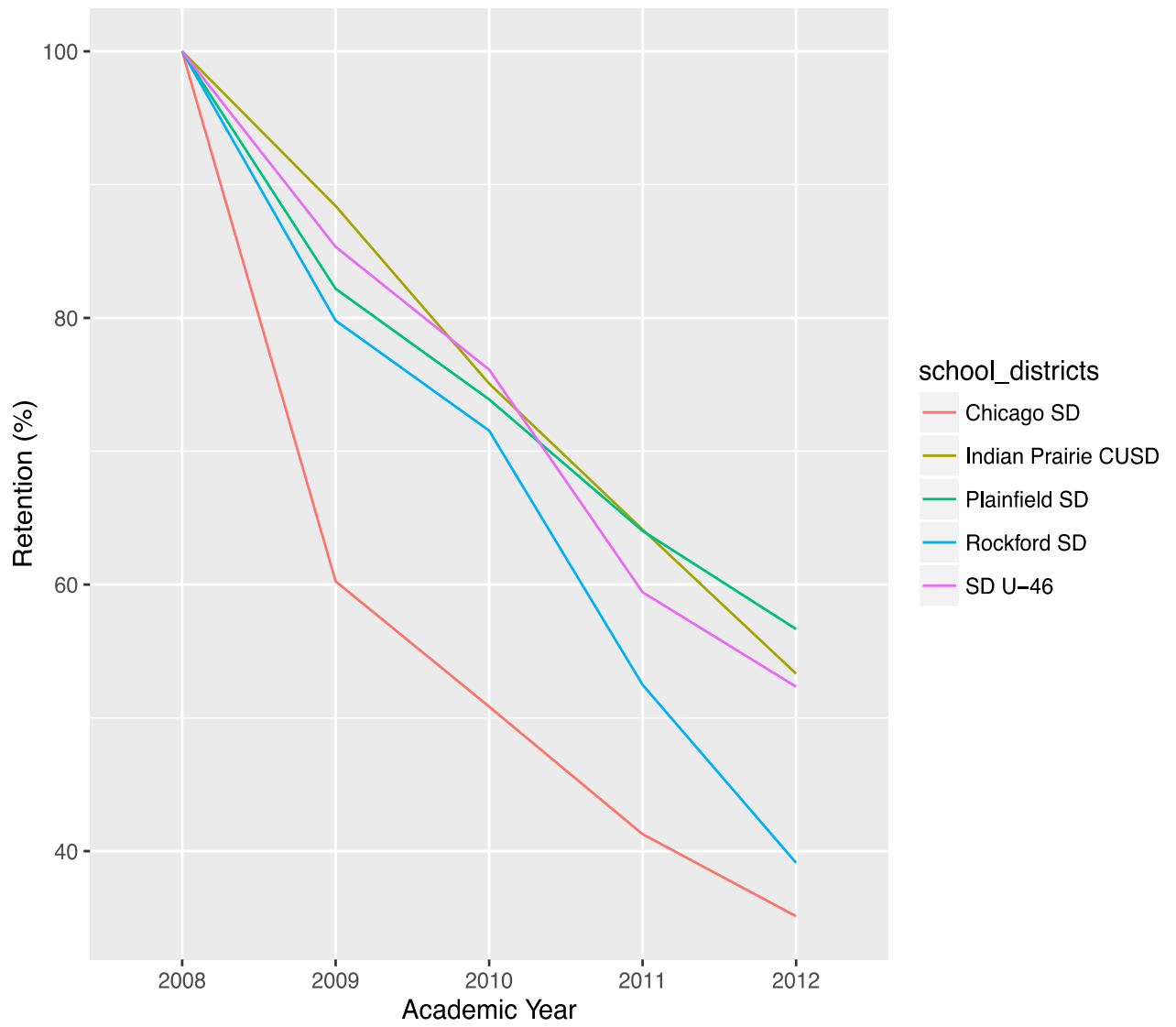Figure 2.Cohort retention in same school by school level

Figure 3.Cohort retention in same school in biggest school districts

Figure 4. Churn within state in Illinois teachers