Educator Supply and Demand Reports: Lessons for States

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Note: This slide deck has been adapted from a project in partnership with Advance Illinois. We thank them, and the Joyce Foundation, for their support in making these lessons public. All opinions and any errors are our own.

We set out to see what states are tracking on educator supply and demand, and how they report the data.

We had three main goals for the project:

1. See how states are tracking educator supply and demand
2. Surface good examples to learn from
3. Stoke creativity about what's possible

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Methodology

- A Google search and scan of state websites yielded 18 examples of educator supply and demand reports (from 15 states)
  - Note: Most of these come from some arm of the state's government, but others appear to be commissioned or entirely independent from the state.

- Our goal was to find interesting data points or unique ways of displaying educator supply and demand data, **not** to systematically uncover all such reports.

- See the Appendix for sources and links to the full reports

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Examples of ways to display educator supply data

Supply starts with retaining existing educators. Here's how New York City shows retention rates by cohort over time.

Table 3.16
Turnover Rates of Newly Hired Teachers, New York City Public Schools, 2000-2001 Through 2013-2014
All rates as of October 31 of each year

New Teachers in:	Number of Teachers	Percentage That Left Their Teaching Jobs at First School Assignment After												
		1 yr	2 yrs	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs
2000-2001	8,872	32%	46%	58%	65%	70%	74%	77%	78%	79%	80%	81%	82%	84%
2001-2002	9,437	30%	49%	58%	64%	69%	72%	74%	76%	77%	79%	80%	82%	
2002-2003	8,375	31%	47%	58%	65%	70%	73%	75%	77%	79%	80%	82%		
2003-2004	8,552	27%	44%	56%	63%	68%	71%	74%	76%	78%	80%			
2004-2005	7,763	25%	41%	53%	59%	63%	67%	70%	72%	75%				
2005-2006	7,769	24%	41%	51%	58%	63%	68%	72%	74%					
2006-2007	7,305	23%	40%	50%	57%	63%	67%	71%						
2007-2008	7,497	21%	37%	48%	56%	62%	67%							
2008-2009	6,013	24%	39%	50%	58%	64%								
2009-2010	2,595	19%	37%	48%	57%									
2010-2011	3,031	20%	35%	45%										
2011-2012	4,025	20%	34%											
2012-2013	5,299	20%												

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Similarly, Georgia breaks down attrition data by teacher demographics and grade level.

Table 5b. Attrition* Patterns for Newly Hired Teachers (by Demographic Groups)

Demographic Group	Hired in 2012	Left After 1 Year	Left After 2 Years	Left After 3 Years
White Females	4533	1479 32.6%	1012 22.3%	1321 29.1%
Minority Females	2021	301 14.9%	474 23.5%	603 29.8%
White Males	1185	164 13.8%	275 23.2%	348 29.4%
Minority Males	630	118 18.7%	187 29.7%	233 37.0%

** Attrition counts include only those teachers no longer in the workforce in any certified role.*

Table 5c. Attrition* Patterns for Newly Hired Teachers (by Teaching Categories)

Teaching Subgroup	Hired in 2012	Left After 1 Year	Left After 2 Years	Left After 3 Years
Kindergarten	892	76 8.5%	132 14.8%	178 20.0%
Elementary	2281	257 11.3%	432 18.9%	580 25.4%
Middle School	1417	190 13.4%	322 22.7%	385 27.2%
High School	2074	328 15.8%	525 25.3%	687 33.1%
Special Education	1420	152 10.7%	279 19.6%	329 23.2%
ESOL	103	15 15.5%	26 25.2%	32 31.1%

** Attrition counts include only those teachers no longer in the workforce in any certified role..*

Within-state mobility is another source of supply. Here's how Georgia tracks it by district.

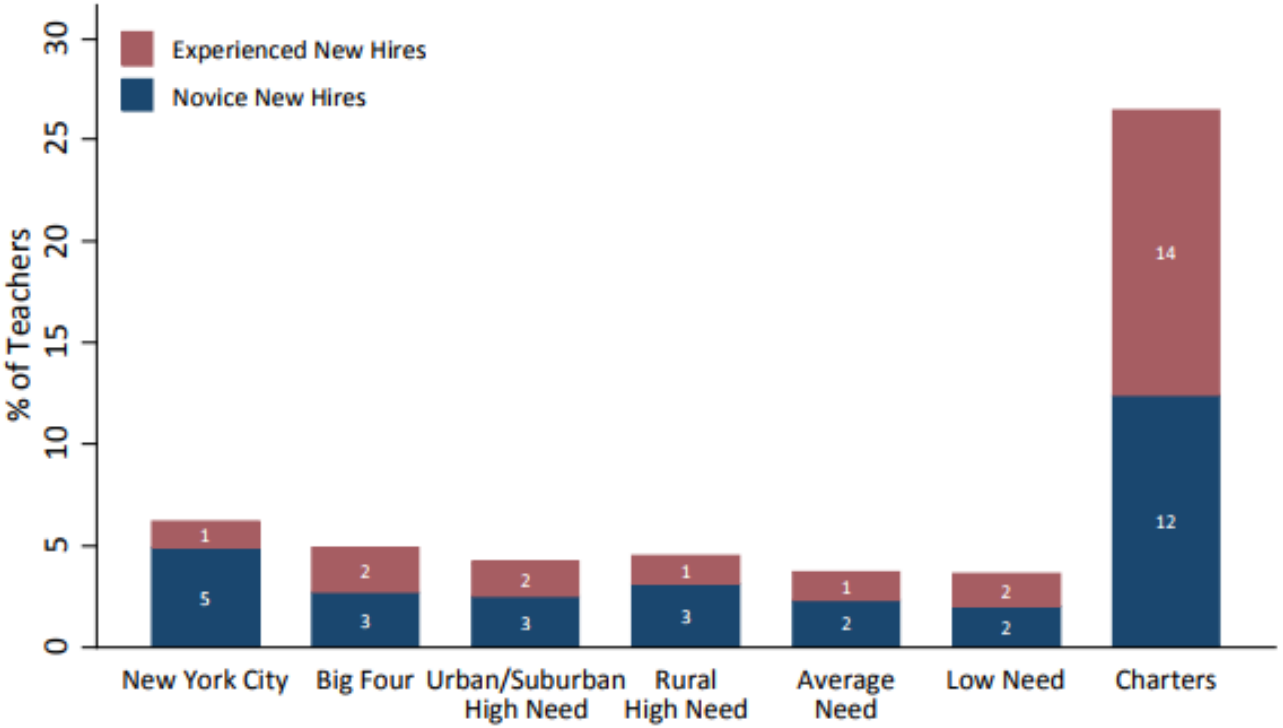
Table 2.16. Inter-System Mobility of Retained Teachers Between FY02 and FY03

System	Moved Out of System after FY02	Total in FY02	Moved into System in FY03	Net Gain/Loss	% Gain/Loss Over FY02
Appling	9	227	9	0	0
Atkinson	4	99	2	-2	-2.02
Atlanta City	193	3,471	99	-94	-2.71
Bacon	4	131	6	2	1.53
Baker	2	35	0	-2	-5.71
Baldwin	35	402	20	-15	-3.73
Banks	16	145	14	-2	-1.38
Barrow	51	617	25	-26	-4.21
Bartow	43	887	25	-18	-2.03
Ben Hill	8	221	4	-4	-1.81
Berrien	3	188	10	7	3.72
Bibb	69	1,365	57	-12	-0.88
Bleckley	4	151	11	7	4.64
Brantley	11	201	5	-6	-2.99
Bremen City	2	93	8	6	6.45
Brooks	14	166	7	-7	-4.22

New York also looks at hiring by source and district type.

The impact of experience in hiring practices varied by district type

Newly Hired Teachers
by School Need Index



Sample includes teachers with teacher job codes in New York State public and charter schools in the 2007-08 to 2010-11 school years, with 869,428 teacher years and 260,281 unique teachers. Novice teachers were in their first teaching year in NYS public and charter schools and reported having zero experience. Data source: New York State Education Department records.

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To understand retention, states also need to look at teacher age. Colorado shows it as a distribution.

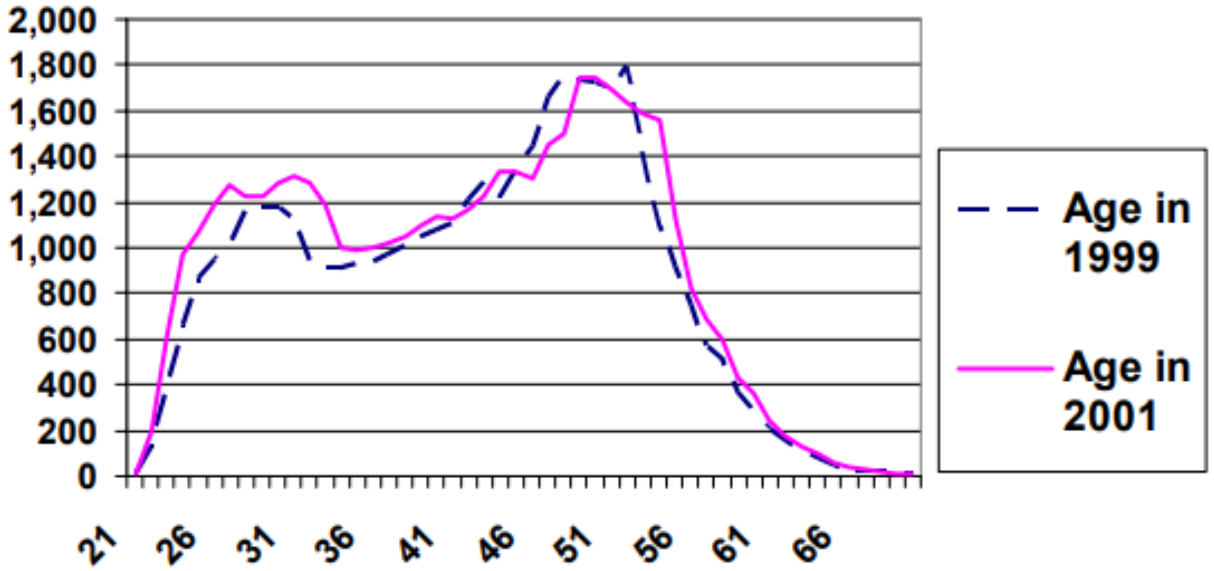

Figure 2: Colorado teacher age distribution

Note: This would be even more informative over a longer period of time. See, for example: https://www.teacherpensions.org/blog/gif-watch-illinois-baby-boom-teachers-age-out-workforce

When looking at potential supply, several states show where new hires have come from in the past. Here's how Maryland does it.

Actual New Hires by Certification Area
Maryland Public Schools: 2014-2015
Date run: 8/19/2016

Certification Area		Total New Hires	Beginning New Hires Total	Beginning New Hires- Maryland Prepared	Beginning New Hires - Out of State	Experienced New Hires Total	Experienced New Hires - Maryland	Experienced New Hires - Outside Maryland
Total New Hires		~~3,948~~	~~3,597~~	~~1,049~~	~~2,548~~	~~2,451~~	~~1,302~~	~~1,149~~
The Arts Total		**405**	**265**	**79**	**186**	**140**	**68**	**72**
The Arts	Art (PreK-12)	175	123	42	81	52	25	27
	Dance (PreK-12)	17	12	7	5	5	2	3
	Music (PreK-12)	204	126	29	97	78	37	41
	Theatre (7-12)	9	4	1	3	5	4	1
Career/Technology Education (7-12) Total		**188**	**109**	**8**	**101**	**79**	**42**	**37**
Career/Technology Education (7-12)	Agriculture	7	4	0	4	3	2	1
	Agriculture/Agribusiness	1	1	0	1	0	0	0
	Business Education	33	14	2	12	19	9	10
	Family and Consumer Sciences	27	11	2	9	16	9	7
	Health Occupations	2	0	0	0	2	2	0
	Technology Education	54	33	4	29	21	10	11
	Trades & Industry	64	46	0	46	18	10	8
Computer Science (7-12) Total		**19**	**12**	**1**	**11**	**7**	**3**	**4**
Computer Science (7-12)	Computer Science (7-12)	19	12	1	11	7	3	4

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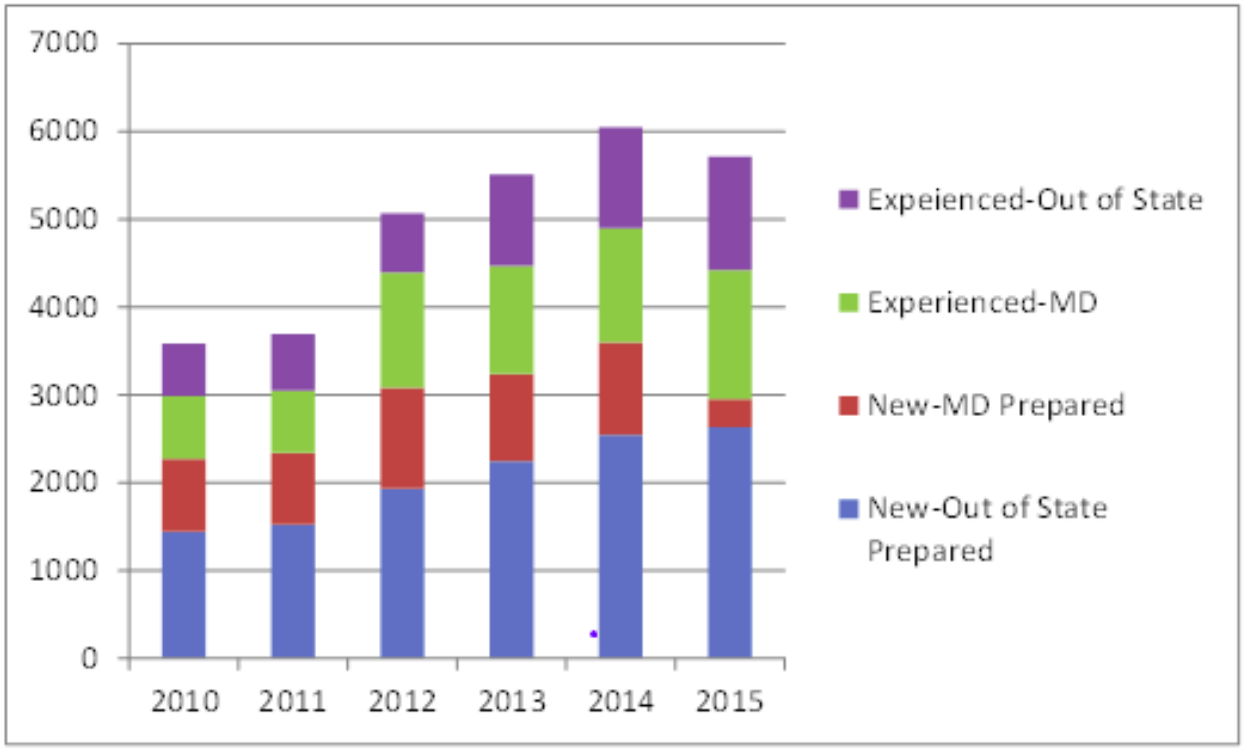
Another Maryland report disaggregates new hires based on their route into that position.

Figure 8: Makeup of Maryland Public School Hires, 2010 to 2015



Source: Maryland State Department of Education, P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports

Alaska does something similar.

Figure 6. Teacher Hires By Type
Average, 2008-2012

	Total	Urban	Rural
Total Teacher Hires	985	552	433
Returning Alaska Teachers*	241	150	91
New Alaska-prepared Teachers	118	88	30
Teachers from out of State	626	314	312

*Returning Alaska Teachers are those who had taught in the state previously but not in the previous year.

Georgia also shows how the mix can change over time.

Table 14. Four Sources of Annual Teacher Supply

Hiring Year (Fall)	Total New Teachers Hired	(1) Georgia Teachers Returning after a Break in Service	(2) Rookies from Georgia Programs	(3) GaTAPP Non-Traditional Teachers	(4) Other Sources *
2010	6763	30.6%	49.6%	6.6%	13.2%
2011	6941	30.7%	48.5%	5.9%	14.9%
2012	8369	27.6%	40.3%	6.4%	25.7%
2013	8132	26.9%	38.5%	6.5%	28.1%
2014	10806	28.7%	27.5%	5.9%	37.9%

** Other Sources: For this chart, it is assumed that the remainder after accounting for Returnees, Rookies and GaTAPP teachers must be mostly teachers from other states (or countries) or imports from non-public schools. Thus 100% - 30.6% - 49.6% - 6.6% yields 13.2%.*

From a supply perspective, it's also worth tracking whether in-state completers are finding jobs (as a measure of supply capture). This is from Georgia.

Table 16. First Year Teacher Yield from Traditional Preparation Programs, 2006-2013

Completer Year	Completer Counts	Completers Who Received Georgia Certification	Completers Employed Next Year after Program Completion	Percentage of Completers Employed the Next Year after Program Completion	Percentage of "Certified" Completers Employed the Next Year after Program Completion
2006	5030	4920	3955	78.6%	80.4%
2007	5294	5134	4399	83.1%	85.7%
2008	5337	5147	4108	77.0%	79.8%
2009	6222	5962	3357	54.0%	56.3%
2010	6551	6179	3368	51.4%	54.5%
2011	6873	6471	3373	49.1%	52.1%
2012	6340	5933	3127	49.3%	52.7%
2013	5421	5051	2977	54.9%	58.9%

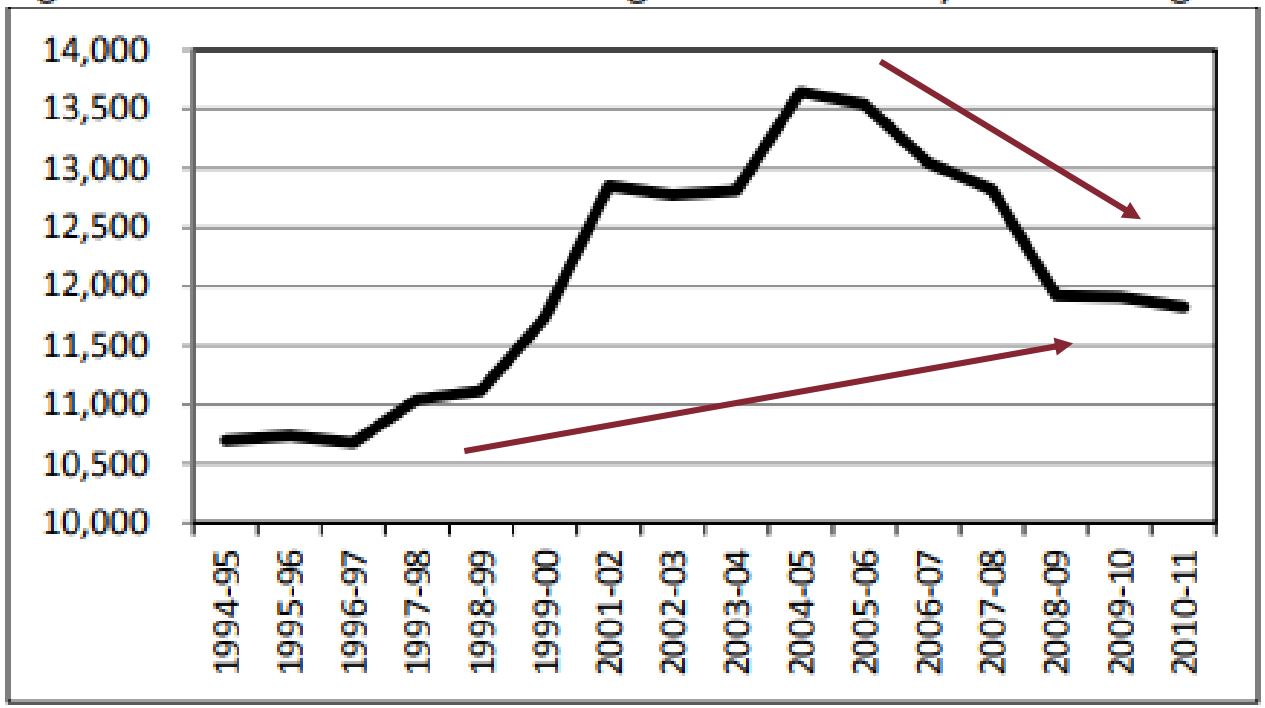
Those issues may be particularly acute in some fields. Ohio tracks licensure rates by major.

Table 7-7: License by Type of Major

Major	CIP	Degrees	% Not Licensed	% Licensed
College Student Counseling and Personnel Services	131102	79	92%	8%
Health Teacher Education	131307	91	77%	23%
Social and Philosophical Foundations of Education	130901	21	76%	24%
Higher Education/Higher Education Administration	130406	99	76%	24%
Teaching English as a 2nd Language	131401	27	74%	26%
Speech or Language Impairment Teaching	131012	22	73%	27%
Technical Teacher Education	131319	58	64%	36%
Adult and Continuing Education and Teaching	131201	54	63%	37%
Education, Other	139999	143	61%	39%
Physical Education Teaching and Coaching	131314	276	51%	49%
School Counseling and Guidance Services	131101	268	40%	60%
Hearing Impairments / Deafness Teachers	131003	19	37%	63%
Education, General	130101	807	31%	69%
Technology-Industrial Arts Teacher	131309	10	30%	70%

Many states also track statewide totals of degree production over time, including Ohio. Longer-term data is useful to see both short- and long-term trends.

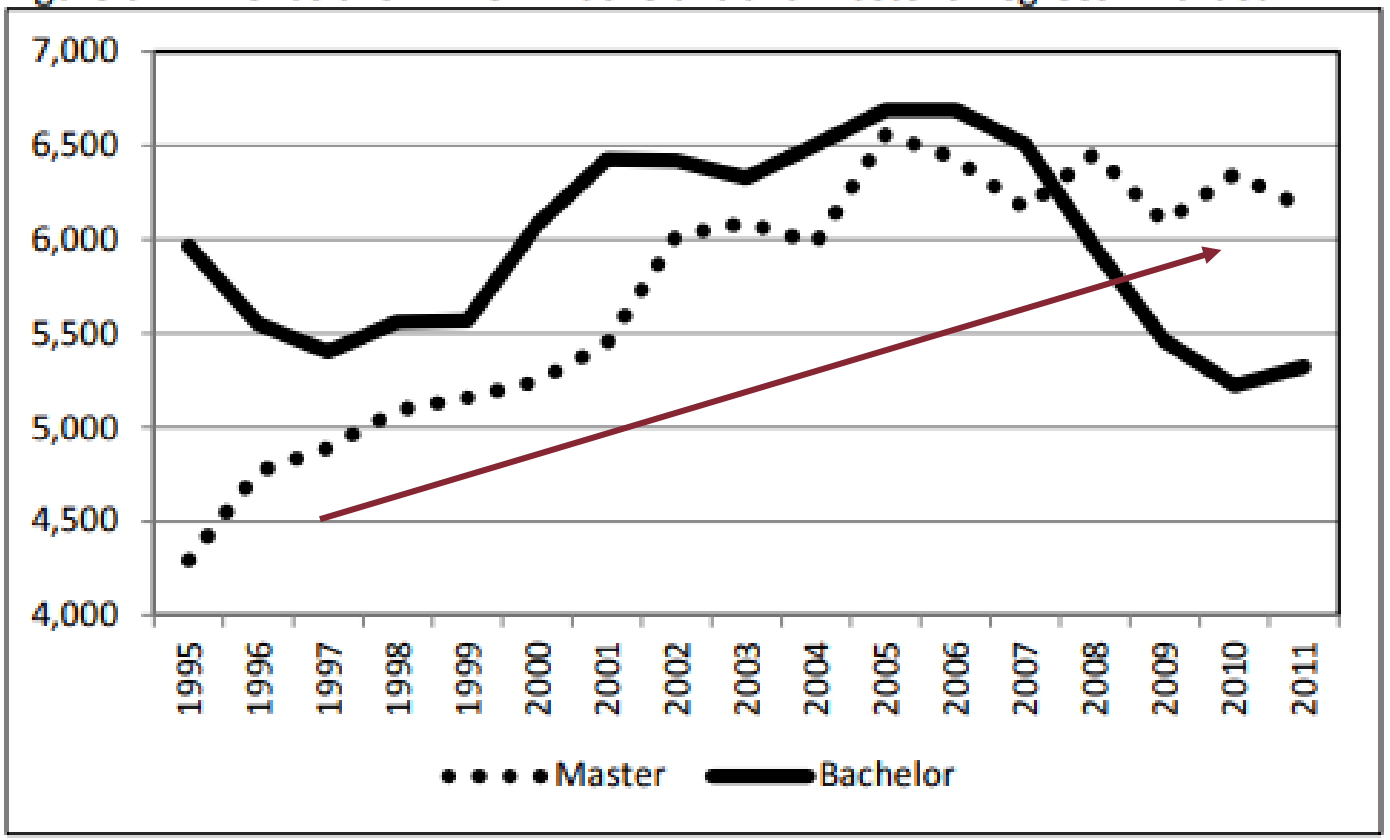
Figure 6-1: Number of Education Degrees Conferred by Ohio's Colleges and Universities



Note: Data are from the U.S. Department of Education IPEDS system and show first major.

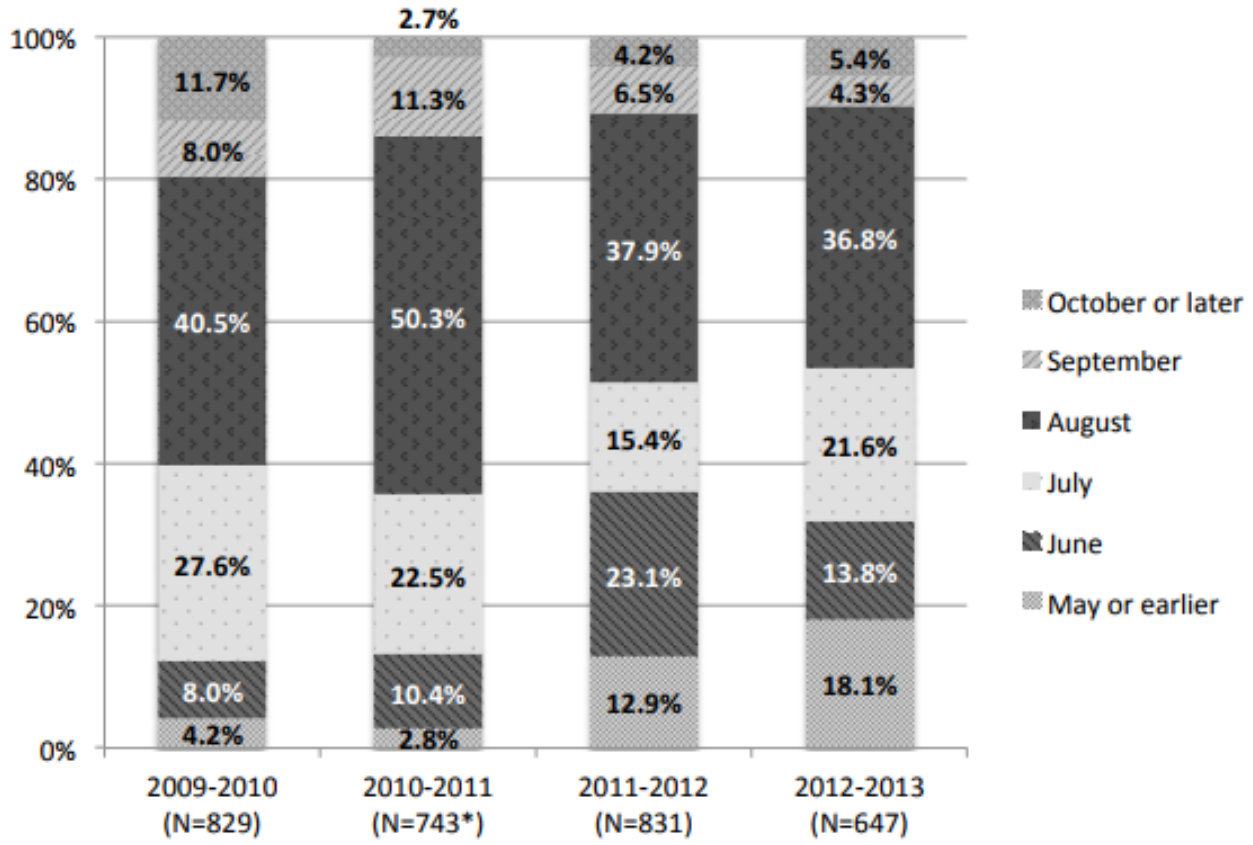
As more teachers enter the workforce with master's degrees, Ohio shows the value of disaggregating by degree level.

Figure 6-4: Trends over Time in Bachelor's and Master's Degrees Awarded



Supply data can also be used to analyze district hiring practices. Delaware uses a teacher's hire date to zoom out to see broader hiring trends.

Figure 5. Month that Teacher Contract was Agreed Upon: Four-Year School District Comparison



*two districts did not report months

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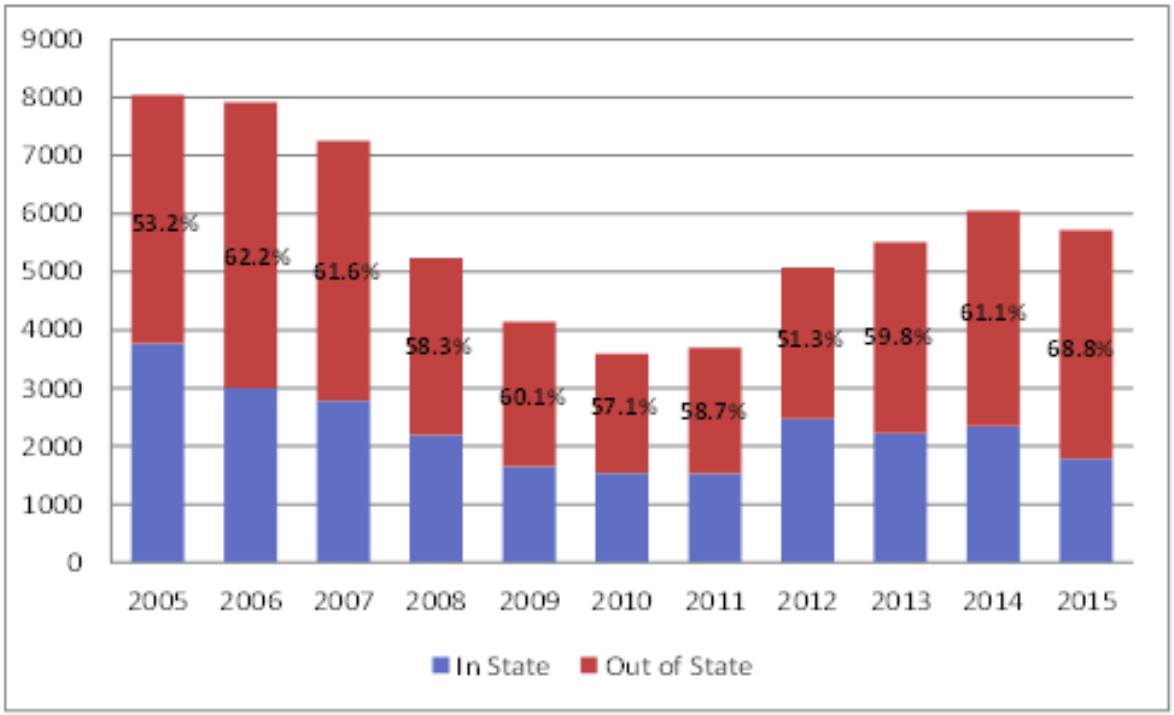
Examples of ways to display educator demand data

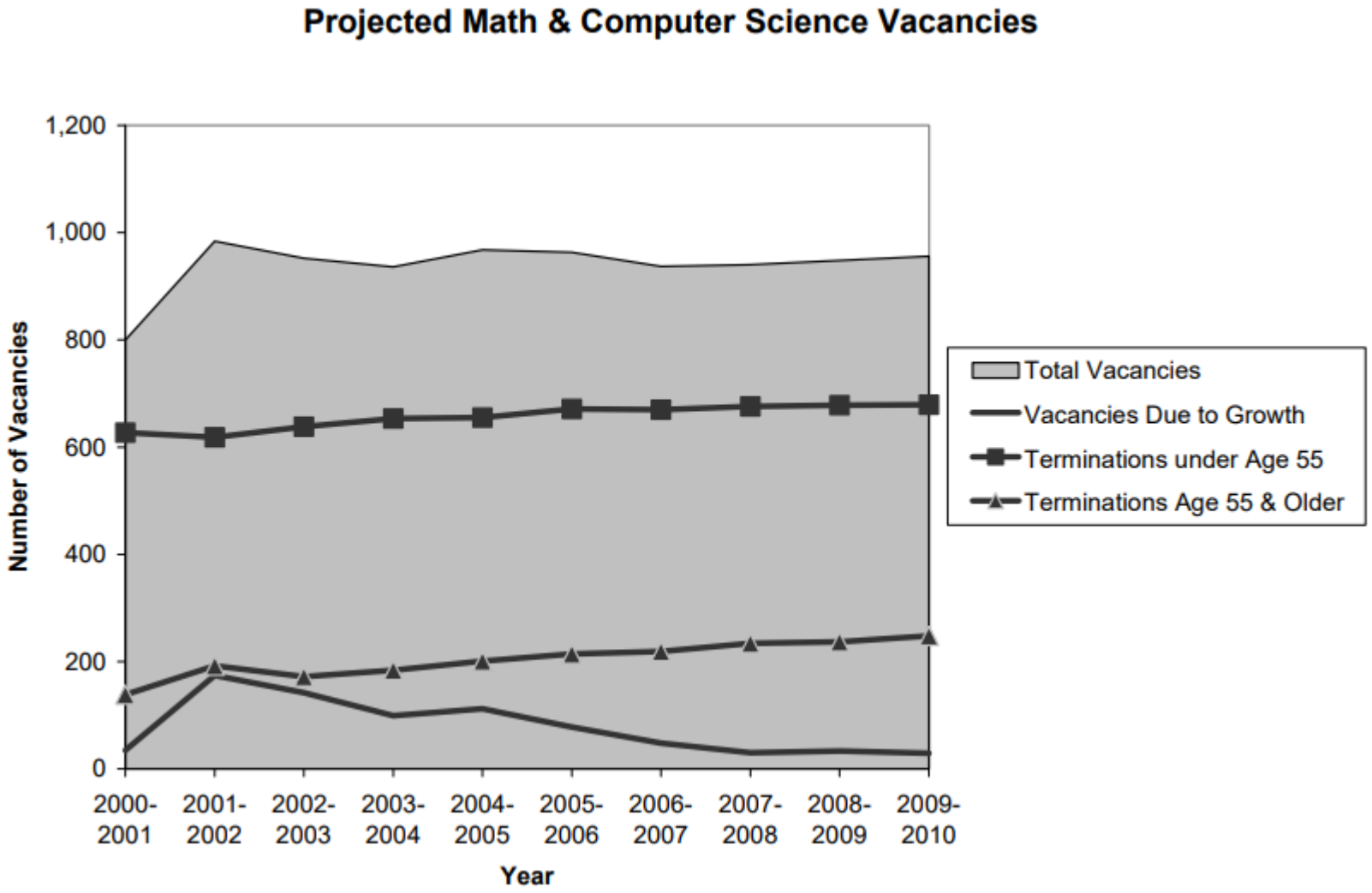
As a reverse of the supply data, Maryland disaggregates hiring by source to also show statewide demand over time.

Figure 6: Maryland Hiring Trends (In vs Out of State), 2005 to 2015



Source: Maryland State Department of Education, P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports

Florida breaks down demand data overall and by subject area. This is for math and computer science.

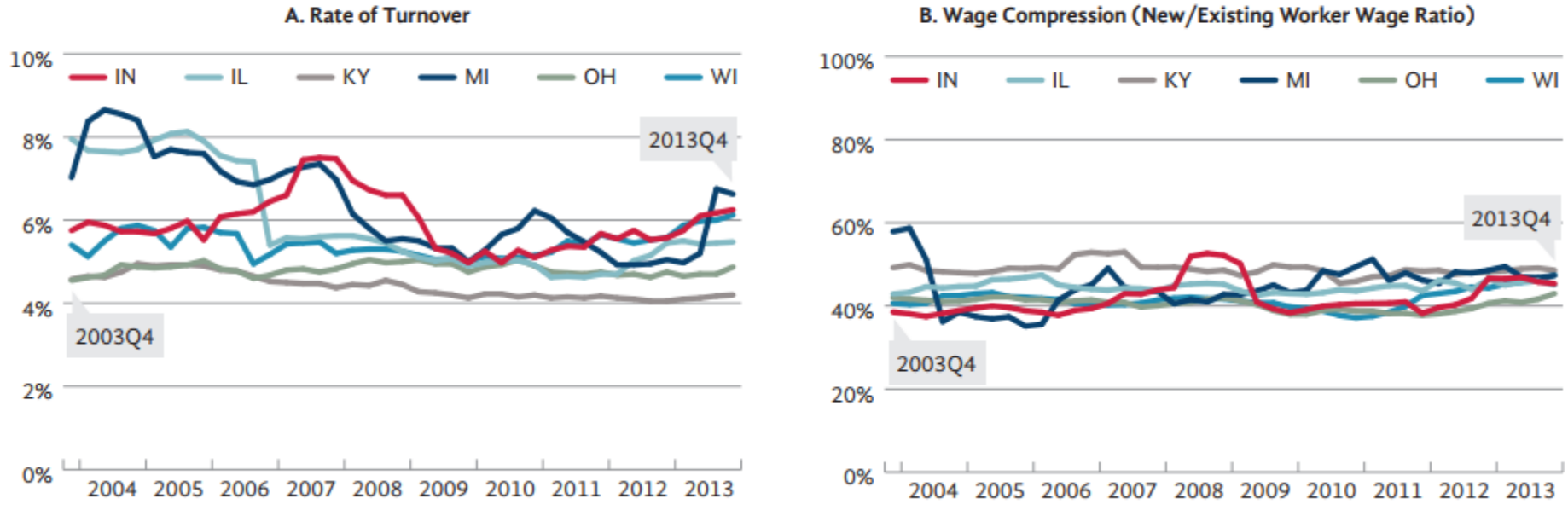


To provide additional context, Indiana used Census data to compare its turnover rates to its neighbors.

Figure 3. K-12 School Employee Turnover and Wage Compression in Nearby States, 2003-2013

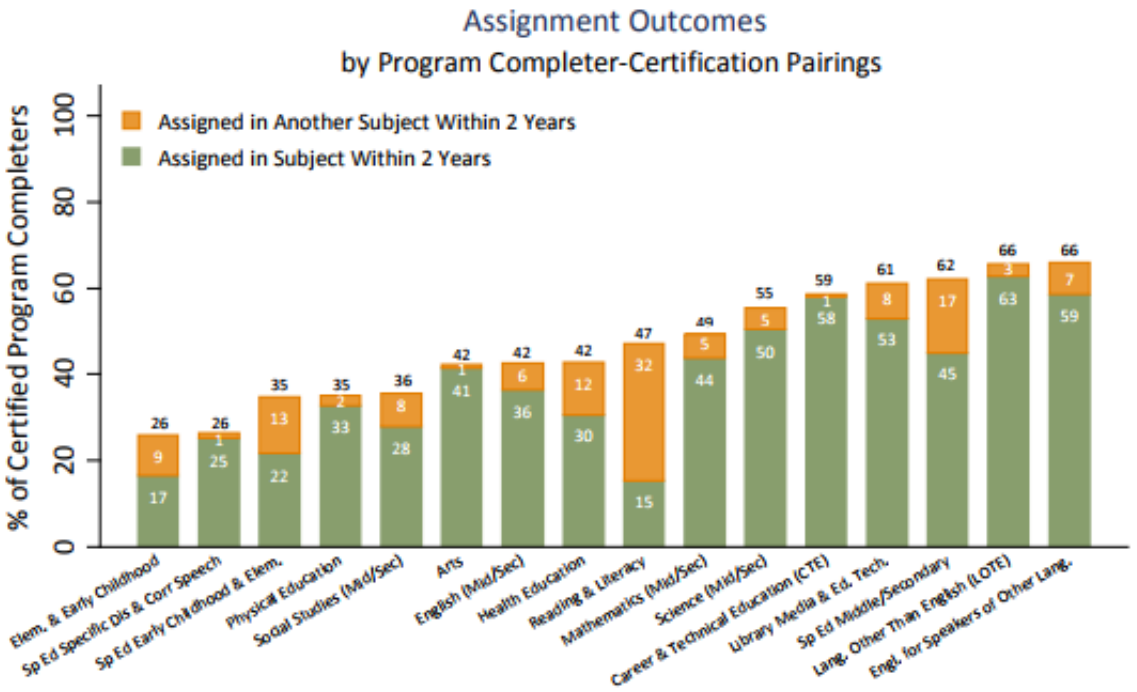
Source: US Census, Longitudinal Employer, Household Database

Note: Using four-quarter moving averages in Panel A and four-quarter moving averages at annual rates in Panel B.



Several states, including New York, track employment rates by subject area.

The likelihood of attaining employment varied dramatically by certification subject



Each subject category sample includes certificate-holding new teacher candidates who completed NYS teacher preparation programs in the subject in 2006-07 through 2009-10 and were not employed as NYS public or charter school teachers prior to program completion. Full sample includes 67,199 program completer-subject pairings. Program completers who received Transitional B or Transitional C certificates are excluded from the analysis. Data source: New York State Education Department records.

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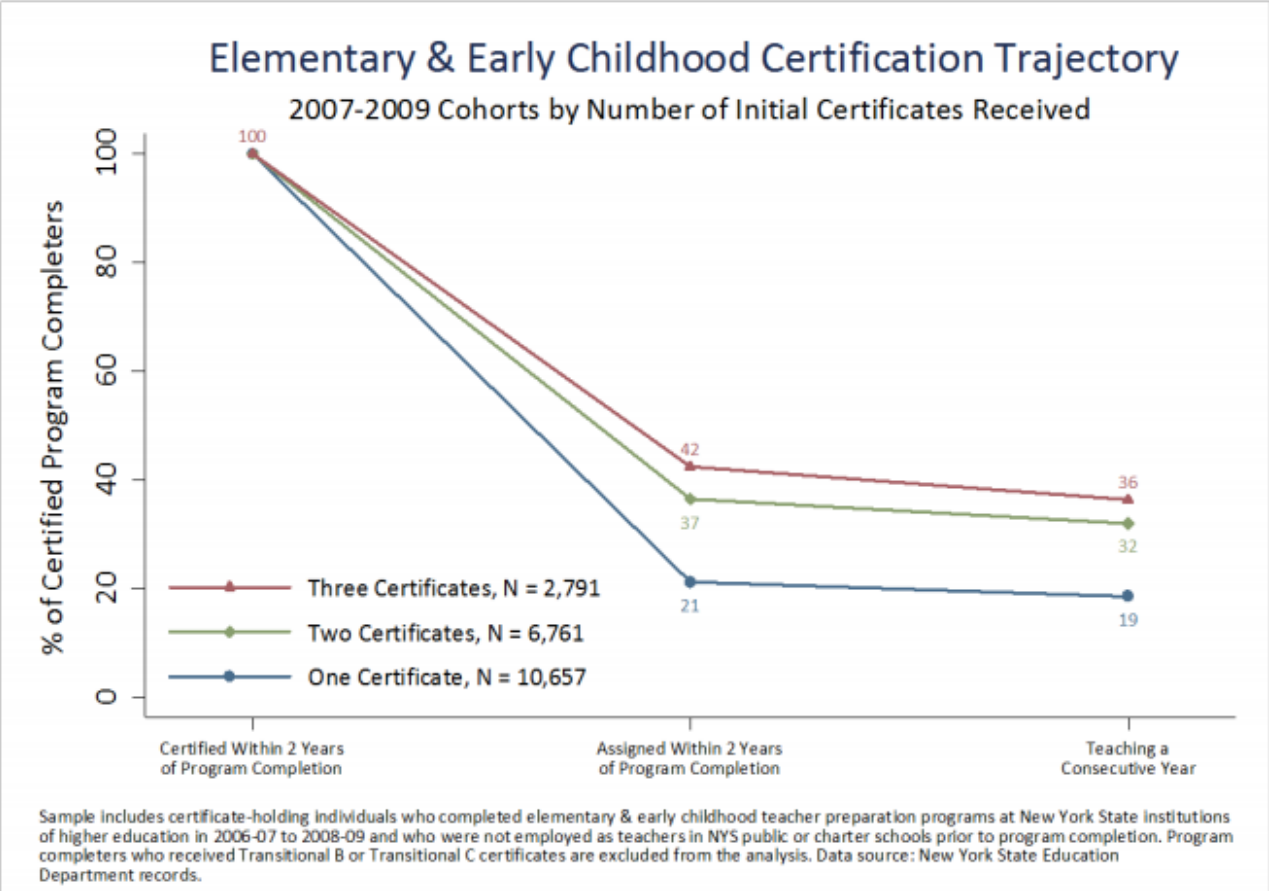
New York also shows that teachers are more likely to be hired and retained as teachers if they have multiple certificates.

Elementary education graduates with multiple certificates are substantially more likely to find jobs



Sample includes certificate-holding individuals who completed elementary & early childhood teacher preparation programs at New York State institutions of higher education in 2006-07 to 2008-09 and who were not employed as teachers in NYS public or charter schools prior to program completion. Program completers who received Transitional B or Transitional C certificates are excluded from the analysis. Data source: New York State Education Department records.

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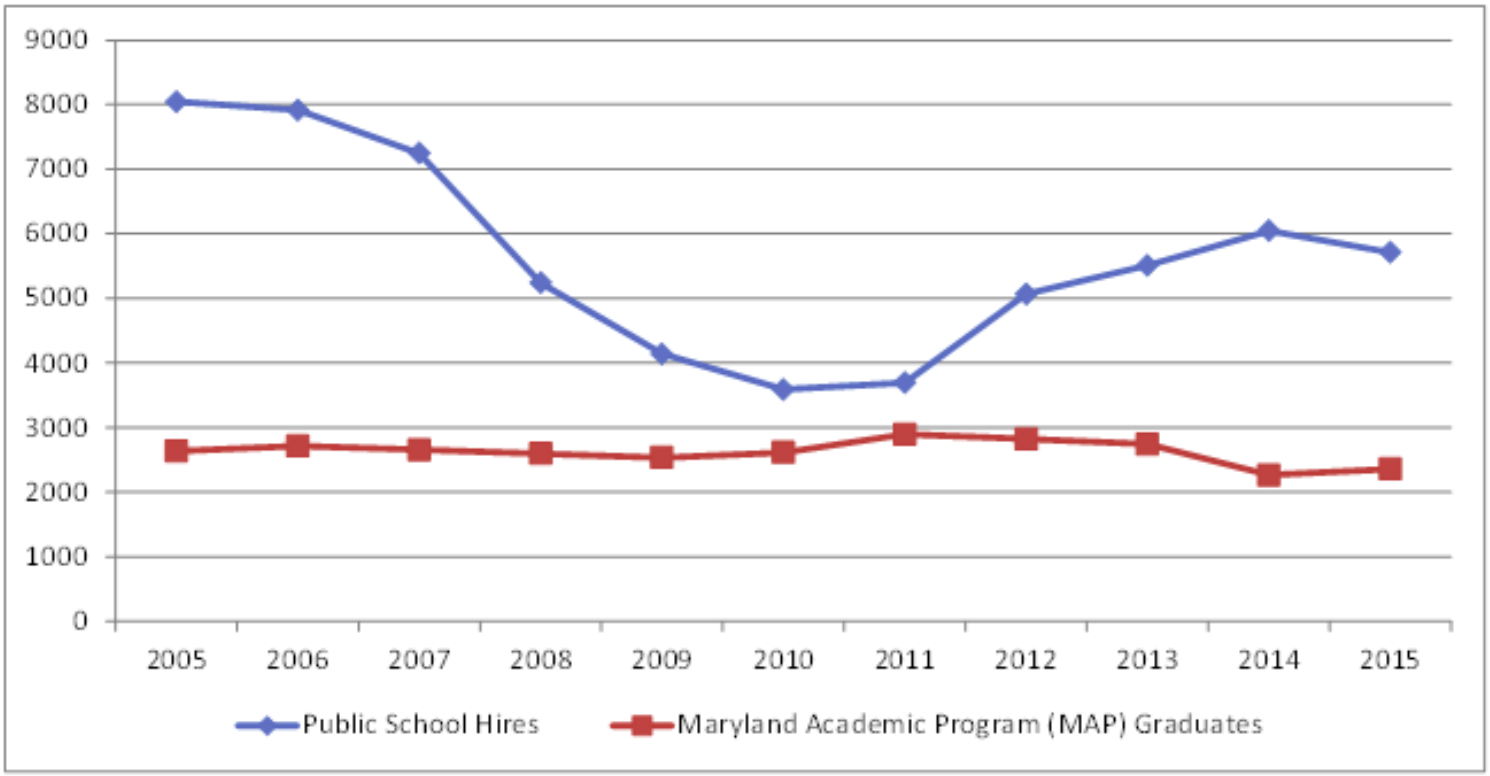
Examples of ways to display supply *versus* demand

Most state reports, including Maryland's, have some high-level snapshot comparing supply versus demand.

Figure 5: Maryland Public School Hiring and MAP Graduates Trends, 2005 to 2015



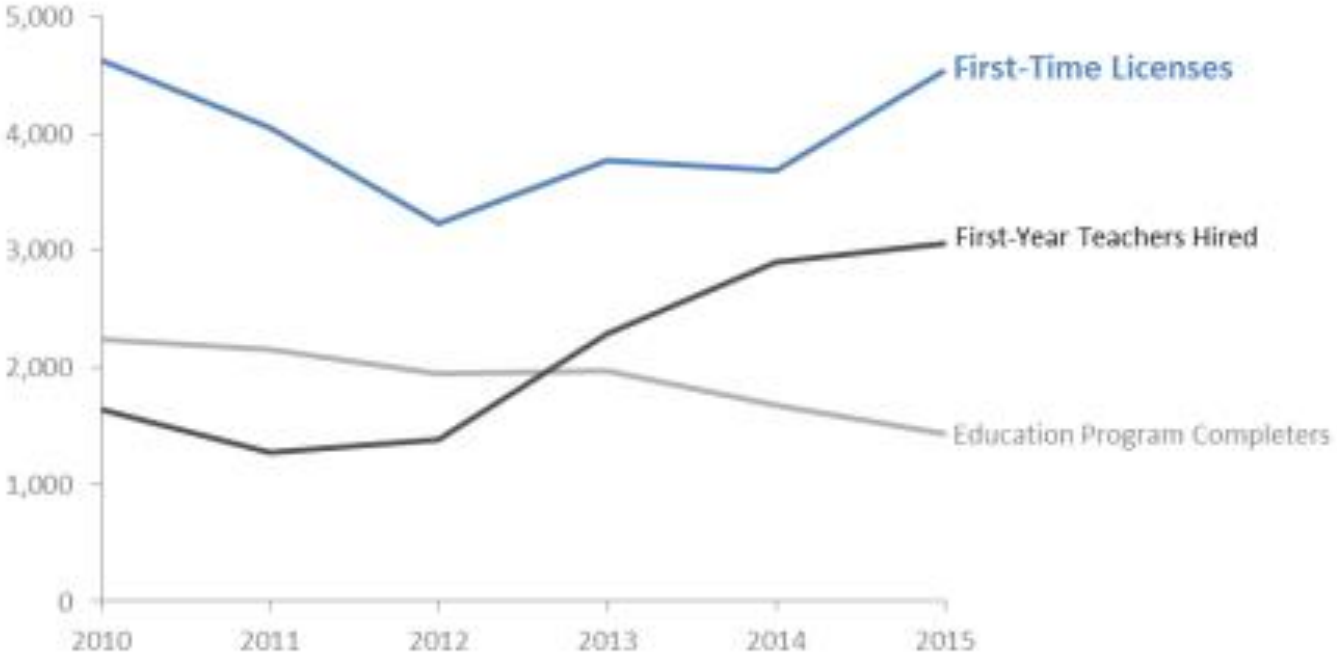
Source: Maryland State Department of Education, P-12 Longitudinal Data System Dashboards & Maryland Teacher Staffing Reports

Oregon compares the number of first-time hires, all first-time licenses, and in-state program completers.

Figure 1:

First-year teacher supply and demand

New licensees outpace district demand, 2010-2015



Sources: TSPC Licensure, Title II reporting, Oregon Department of Education

A few states have sophisticated ways to define “shortage” areas. Maryland has a multistep process.

Formula Process for Determining Shortage Areas

1. Add hiring data by certification area for as many years as available. Add IHE production data by certification area for as many years as data are available for hiring. The sum of the hiring data becomes the numerator; the sum of the production data becomes the denominator. Divide the fraction/ratio by number of years available.
2. Subtract the resulting denominator from the projected current need. Extract the % of shortage.

Equation

Percentage of Shortage = Current year need – supply quotient of the

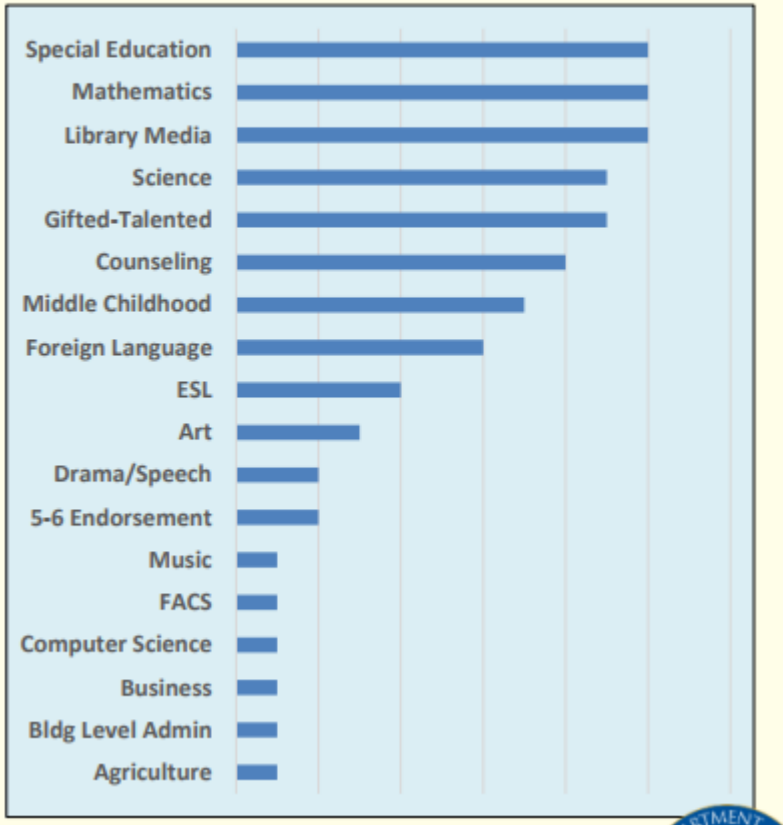
$$\frac{\text{sum of available years of hiring data}}{\text{sum of equal \# of available years of supply data}} \setminus \frac{\text{\# of years of hiring data}}{\text{\# of years of supply data}} \setminus \text{current year need}$$

	Statewide Critical Shortage	Statewide Shortage	Statewide Balance	Statewide Oversupply	Total
Criteria	**4 points**	**3 points**	**2 points**	**1 point**	
1. State projection formula	70 % – 100% shortage:	30% - 70% shortage:	0% to 30% shortage:	Supply is greater than 100% that of projected need.	
2. Projected Need	Need is 10 or more in number:	Need is 10 or fewer in number:	Need is 10 or fewer in number:	No need is reported.	

Arkansas shows that, while some areas are frequently identified as shortages, others are rarely identified.

Frequency (*f*) of License Areas as Shortage Areas

License Area	*f* '07-08 thru '16-17
Special Education	10
Mathematics	10
Library Media	10
Science	9
Gifted-Talented	9
Counseling	8
Middle Childhood	7
Foreign Language	6
ESL	4
Art	3
Drama/Speech	2
5-6 Endorsement	2
Music	1
FACS	1
Computer Science	1
Business	1
Bldg. Level Admin.	1
Agriculture	1



Here's another way Arkansas shows the same trend.

License Areas as Shortage Areas by School Year

Area	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17
Library Media	X	X	X	X	X	X	X	X	X	X
Mathematics	X	X	X	X	X	X	X	X	X	X
Special Education	X	X	X	X	X	X	X	X	X	X
Gifted-Talented	X	X	X	X	X	X	X	X	X	
Science	X	X	X	X	X	X	X	X		Phys, Chem
Counseling	X	X	X	X	X	X	X	X		
Middle Childhood	X	X	X	X	X	X		X		
Foreign Language	X	X	X		X				X	Fr, Sp
ESL				X	X	X	X			
Art	X								X	X
5-6 Endorsement				X	X					
Drama/Speech		X							X	
Agriculture										X
Bldg Level Admin					X					
Business								X		
FACS										X
Music								X		
Computer Science										X

New York does something similar to Arkansas.

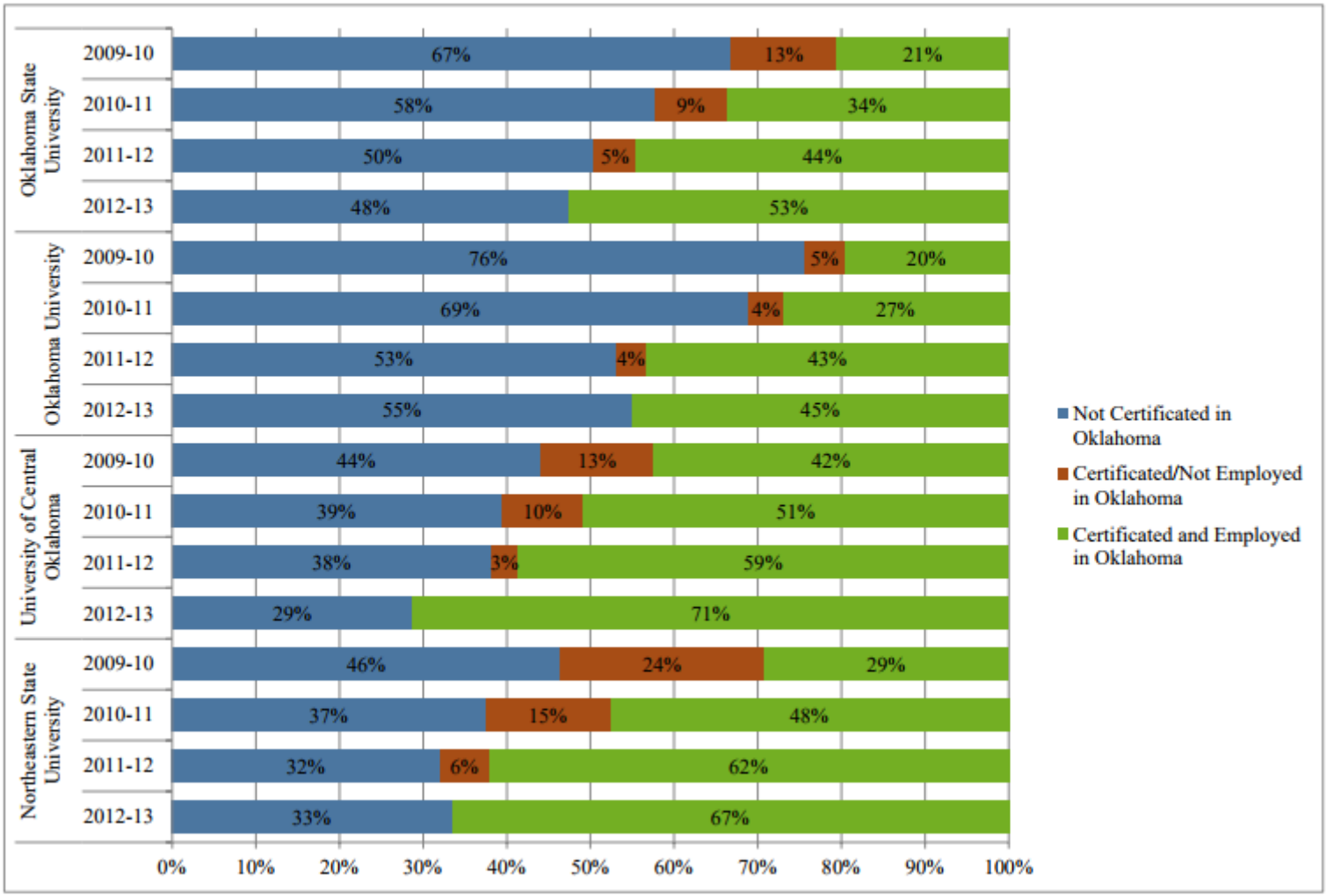
New York State: Teacher Shortage Areas

	2010-2011	2011-2012	2012-2013	2013-2014
Bilingual Education	X	X	X	X
Chemistry (Grades 7-12)	X	X		
CTE	X	X	X	X
Earth Science (Grades 5-9 and 7-12)	X	X	X	X
ESOL	X	X		
Languages other than English	X	X	X	X
Library and School Media Specialist	X			
Physics (Grades 7-12)	X	X	X	X
Special Education (Grades 5-9 and 7-12)	X	X	X	
Special Education – Bilingual	X	X	X	X
Students with Disabilities – Science Certification (Grades 5-9 and 7-12)				X
Technology Education Classroom Teacher				X

U.S. Department of Education, Office of Postsecondary Education (2013, March). Teacher Shortage Area Nationwide Listing 1990-1991 through 2013-2014.

Several states track in-state placement rates by institution. Here's an example from Oklahoma.

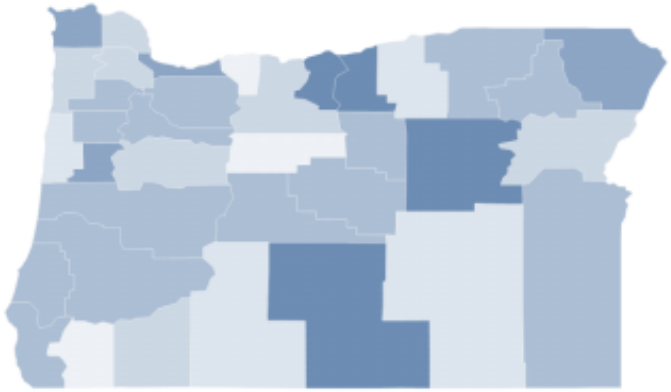
Exhibit 15. Share of Program-Completer Certification and PK–12 Public Education Employment Status Outcomes for the Top Four IHEs From 2009–10 to 2012–13



To show geographic shortage area, Oregon produces teacher shortage “heat maps” like these.

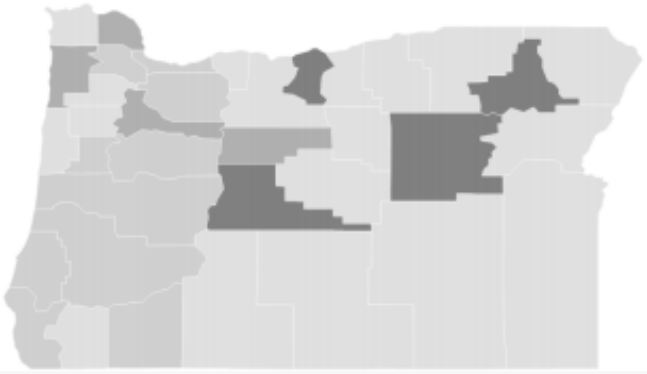
Figure 7:

Highly Qualified teacher shortages, 2014 – 2015

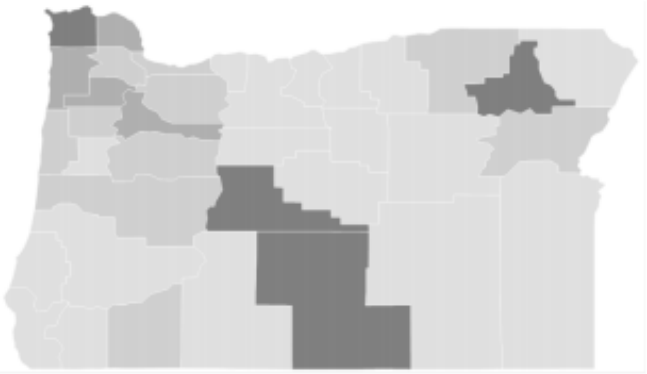


Darker colors indicate **greater shortage** of Highly Qualified teachers

All courses, primary and secondary



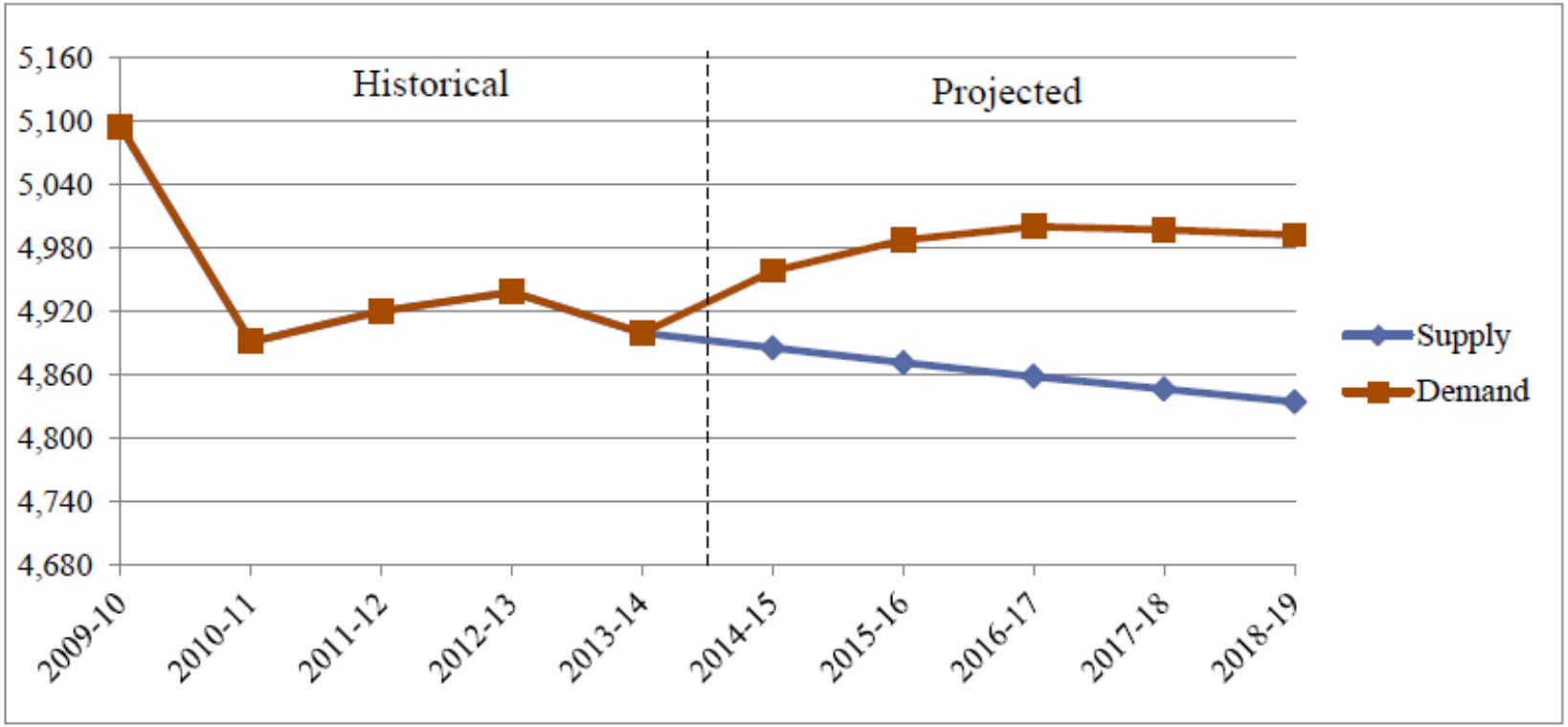
Secondary English



Secondary Math

Oklahoma has supply and demand projections by state region.

Exhibit 43. Trends in Historic and Projected Teacher Supply and Demand in the Southeast Region



Montana looks at over- and under-supply by program and region, and includes education alongside other fields.

FIGURE 4.4 (CONTINUED)

REGIONAL SUPPLY AND DEMAND ANALYSIS BY PROGRAM

Program Category	Program	North West 1	South West 2	North Central 3	South Central 4	Eastern 5
Education	Education, General	Over	Over	Over	Over	
	Curriculum and Instruction	Over	Over		Over	
	Education Administration	Over	Over		Over	
	Special Education	Under			Over	Under
	School Counselor	Meets		Over	Over	
	Elementary Education	Under	Over	Over	Over	Under
	Early Childhood Education	Under	Over		Under	Over
	Secondary Education	Under	Over	Under	Meets	Under
Engineering	Mechanical Engineering		Over			
	Engineering, General		Over			Under
	Chemical Engineering		Over			
	Civil Engineering		Over			
	Electrical and Electronics Engineering		Over			
	Environmental Engineering		Over			
	Petroleum Engineering		Over			
	Industrial Engineering		Over			
	Geological/Geophysical/Mining Engineering		Over			

Appendix: Sources

Appendix: Links to Selected Educator Supply and Demand Reports

- Alaska: Alaska Teacher Turnover, Supply, and Demand, 2013
- Arkansas: Academic Shortage Areas for 2016-2017
- Colorado: Teacher Supply and Demand in the State of Colorado, 2003
- Delaware: Delaware Teacher and Administrator Supply and Demand Survey Analysis Report, June 2013
- Georgia: The 2015 Georgia Public P-12 Teacher Workforce and the 2003 Georgia Educator Workforce report
- Florida: Florida Supply and Demand Report, 2000
- Indiana: Indiana's Demand & Supply Issues for K-12 Educators, October 2015
- New York: Teacher Supply and Demand Reports, November 2013
- New York: New York City Public School Indicators: Demographics, Resources, Outcomes, October 2015
- Maryland: Maryland Teacher Staffing Report, 2016-18
- Maryland: Is There a Teacher Shortage in Maryland? Examining Trends in Supply and Demand, May 2017
- Massachusetts: Massachusetts Study of Teacher Supply and Demand: Trends and Projections, December 2015
- Minnesota: Teacher Supply and Demand in Minnesota's Public Schools, Fiscal Year 2017
- Montana: Meeting State Worker Demand: A Report on the Labor Market Outcomes for Montana Colleges, 2017
- Ohio: Teacher Supply and Demand in Ohio, October 2013
- Oklahoma: Oklahoma Study of Educator Supply and Demand, September 2015
- Oregon: Understanding and Identifying Teacher Shortage Areas in Oregon, 2015
- South Carolina: Annual Supply and Demand Reports
- Wisconsin: Supply and Demand for Public School Teachers in Wisconsin, January 2018