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## Executive Summary

Year-over-Year (YoY) growth rates by district and cohort

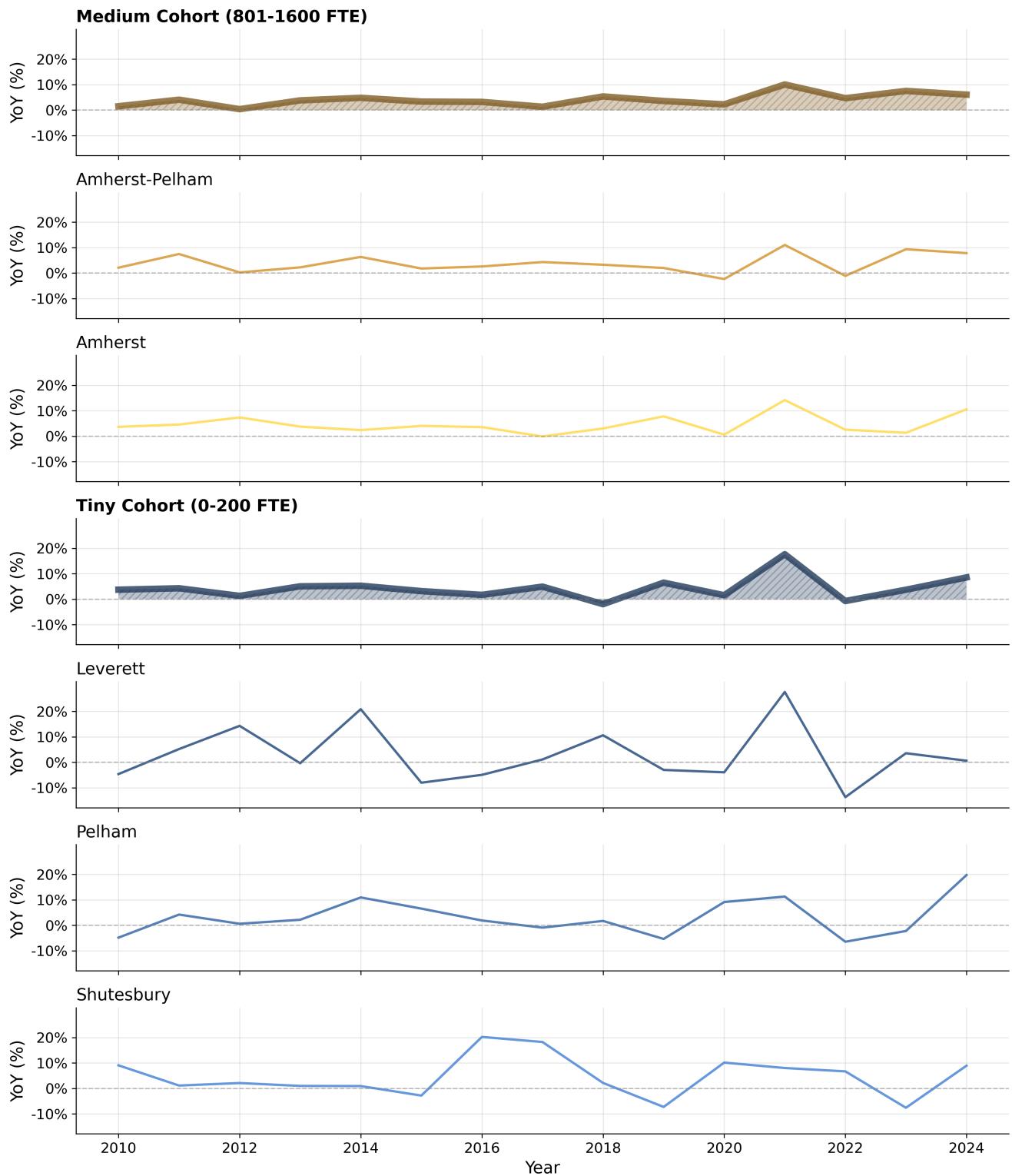


Figure 1

These plots show year-over-year (YoY) growth rates in per-pupil expenditure (PPE) for districts of interest and their enrollment cohorts. The districts are organized into enrollment cohorts based on student population size. The thicker lines represent cohort aggregates, while thinner lines show individual districts within each cohort. The determination of these cohorts is explained in detail in Appendix A. While patterns can be observed in these plots, it is difficult to discern a clear, consistent signal across all districts and cohorts over the 2009-2024 period.

## Executive Summary (continued)

### 5-year CAGR by district and cohort

The Compound Annual Growth Rate (CAGR) provides a clearer picture of growth trends by smoothing out year-to-year volatility. By comparing 5-year periods (2009-2014, 2014-2019, 2019-2024), we can observe how growth rates have evolved over time. The visualization below uses color shading to group districts by their enrollment cohorts, with diagonal white lines marking cohort aggregates for easy identification. For a longer-term perspective, we can also examine the 15-year CAGR from 2009 to 2024, shown in the second chart, which captures the overall growth trajectory across the entire period.

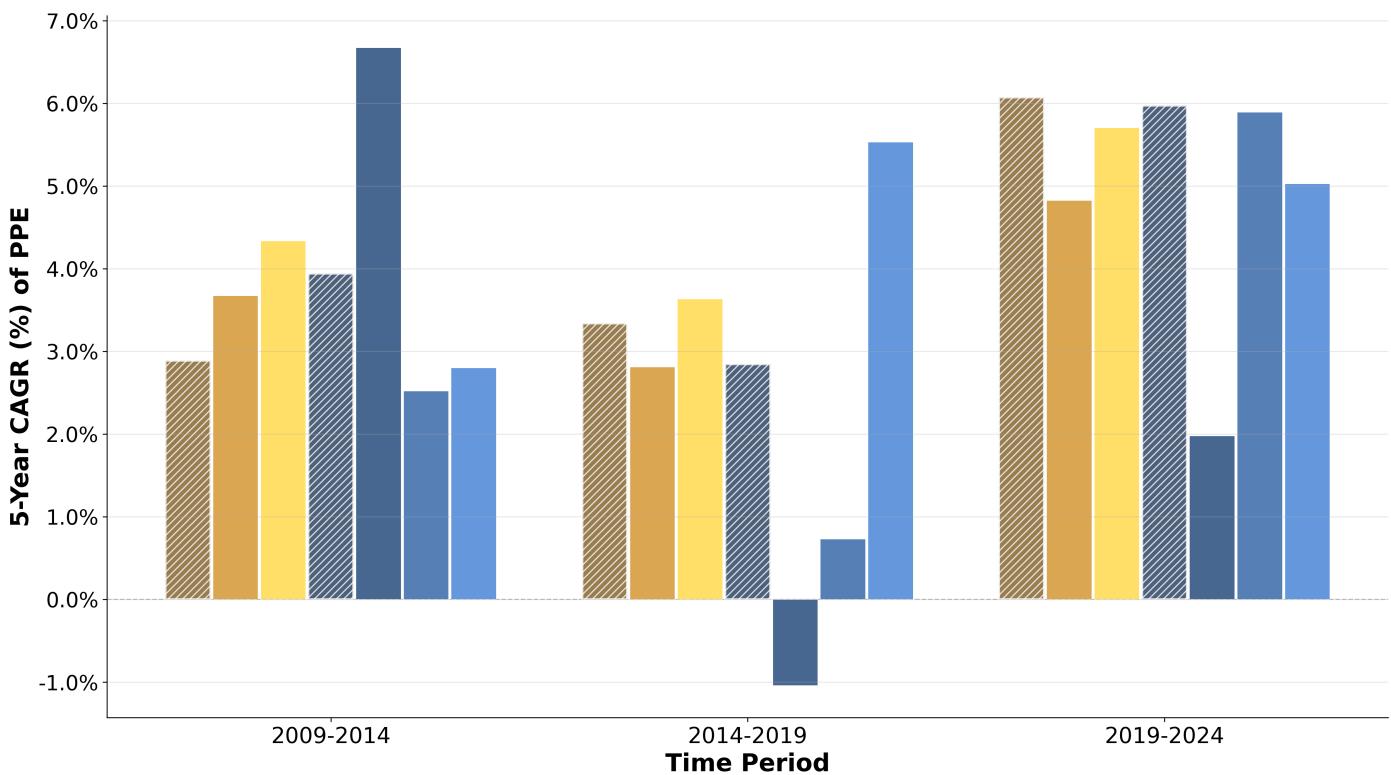


Figure 2

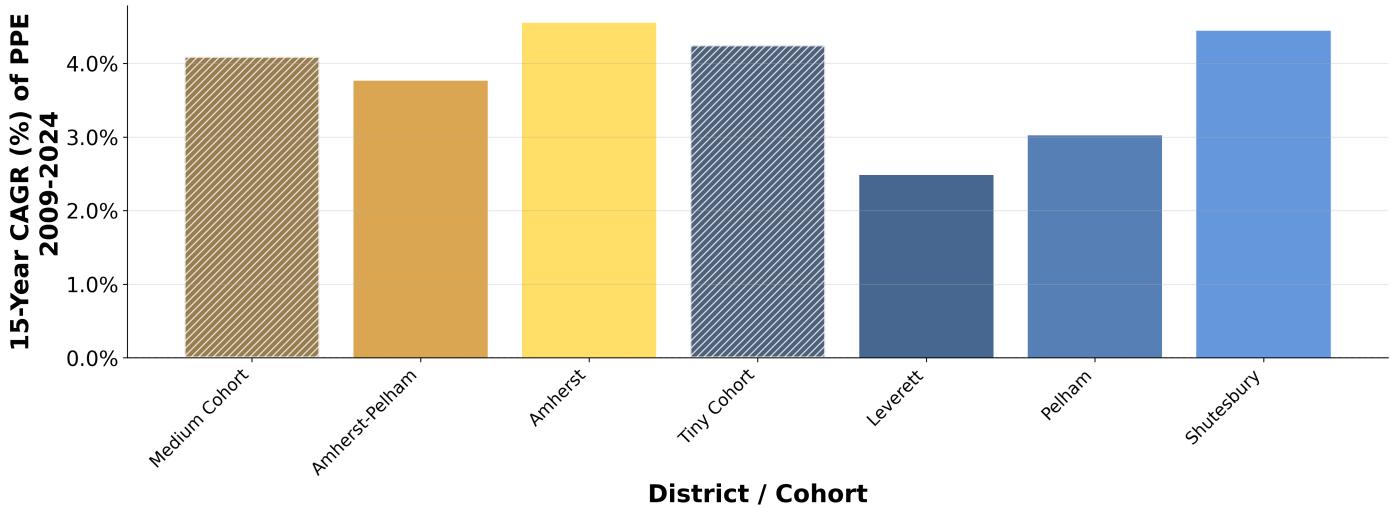


Figure 3

## Executive Summary (continued)

Cohort comparison: Western Massachusetts enrollment groups

Cohort/District	2009 \$/pupil	Shading vs baseline: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta CAGR  \geq 1.0\text{pp}$			Above baseline	Below baseline
		CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil	
Western MA (all, excl. Springfield)	\$12,234	+4.0%	+4.6%	+6.0%	\$22,065	
Western MA Tiny (0-200 FTE)	\$14,738	+4.2%	+4.4%	+6.0%	\$27,504	
Western MA Small (201-800 FTE)	\$12,523	+4.6%	+5.1%	+6.7%	\$24,622	
Western MA Medium (801-1600 FTE)	\$13,032	+4.1%	+4.7%	+6.1%	\$23,785	
Western MA Large (1601-4000 FTE)	\$10,942	+3.9%	+4.3%	+4.7%	\$19,439	
Western MA X-Large (4001-10K FTE)	\$12,498	+3.9%	+4.7%	+6.9%	\$22,040	
Outliers (Springfield)	\$14,608	+4.1%	+5.7%	+9.4%	\$26,615	

This table compares per-pupil expenditure growth across enrollment-based cohorts in Western Massachusetts. All cohorts are shaded relative to the overall Western MA average (excluding Springfield).

District comparison: Medium enrollment cohort (801-1600 FTE)

Cohort/District	2009 \$/pupil	Table 2			
		CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Western MA Medium (801-1600 FTE)	\$13,032	+4.1%	+4.7%	+6.1%	\$23,785
Amherst-Pelham Regional	\$16,211	+3.8%	+3.8%	+4.8%	\$28,233
Amherst	\$16,029	+4.6%	+4.7%	+5.7%	\$31,267

This table compares Amherst-Pelham Regional and Amherst to the Western MA Medium cohort average. Districts are shaded relative to the cohort average.

District comparison: Tiny enrollment cohort (0-200 FTE)

Cohort/District	2009 \$/pupil	Table 3			
		CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Western MA Tiny (0-200 FTE)	\$14,738	+4.2%	+4.4%	+6.0%	\$27,504
Leverett	\$15,156	+2.5%	+0.5%	+2.0%	\$21,910
Pelham	\$14,733	+3.0%	+3.3%	+5.9%	\$23,040
Shutesbury	\$14,011	+4.4%	+5.3%	+5.0%	\$26,908

This table compares Leverett, Pelham, and Shutesbury to the Western MA Tiny cohort average. Districts are shaded relative to the cohort average.

**Calculation methodology:** All figures represent enrollment-weighted per-pupil expenditures. For cohort aggregates, we calculate weighted averages where each district's contribution is proportional to its enrollment. CAGR (Compound Annual Growth Rate) is computed as  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$ . Shading indicates deviations from baseline: blue for below, orange for above. Intensity increases with deviation magnitude.

## All Western MA Traditional Districts

Per-pupil expenditure overview: 2019 PPE (lighter) to 2024 PPE (darker segment)

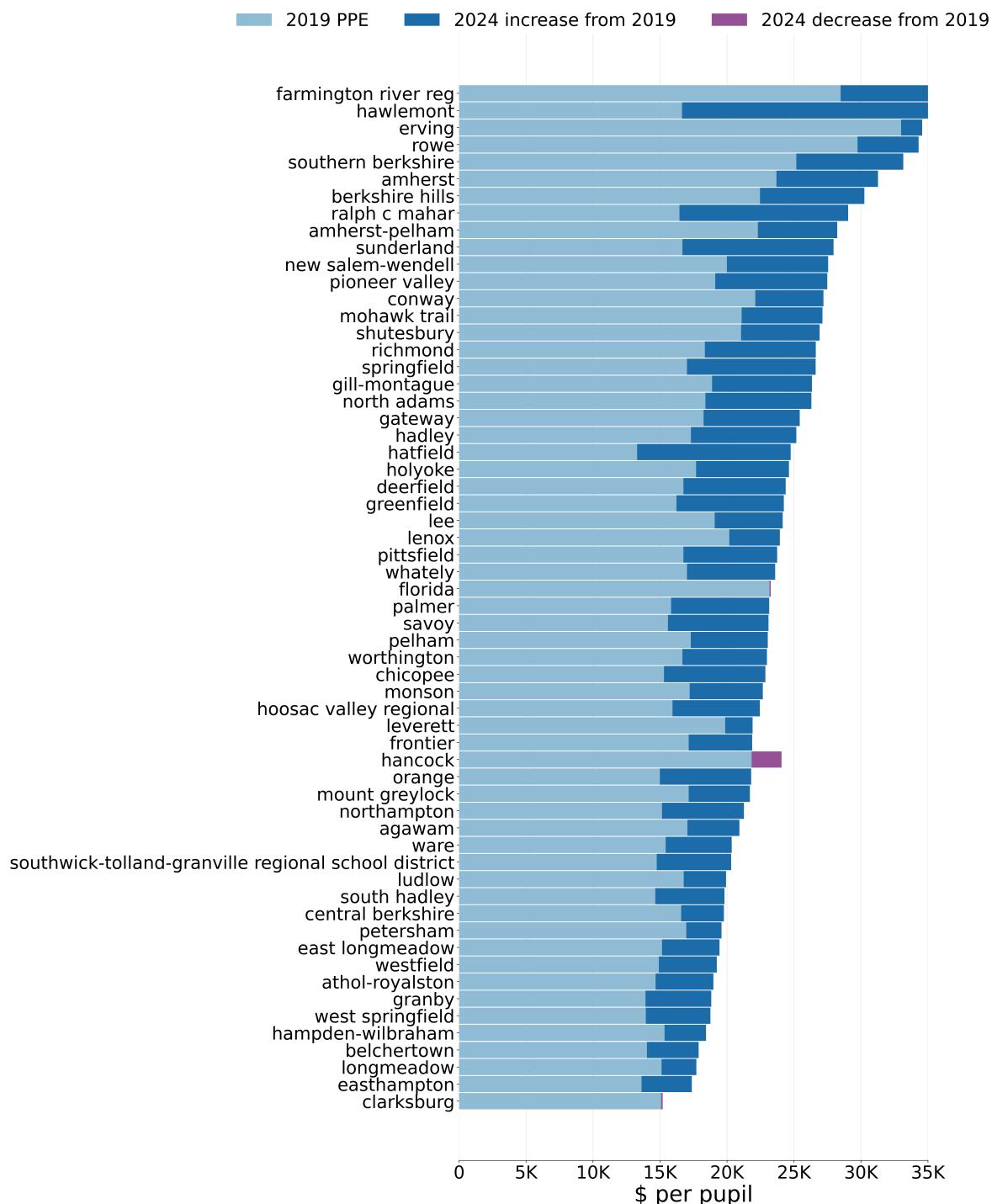


Figure 4

Each bar represents one district's per-pupil expenditures (PPE). Districts are sorted by 2024 PPE (lowest to highest).

Note: The following districts are omitted from this analysis: Chesterfield-Goshen (missing expenditure data), Hampshire (missing expenditure data), Southampton (missing expenditure data), Warwick (no enrollment data), Westhampton (missing expenditure data), Williamsburg (missing expenditure data).

# All Western MA Traditional Districts

Enrollment distribution and proposed cohort grouping

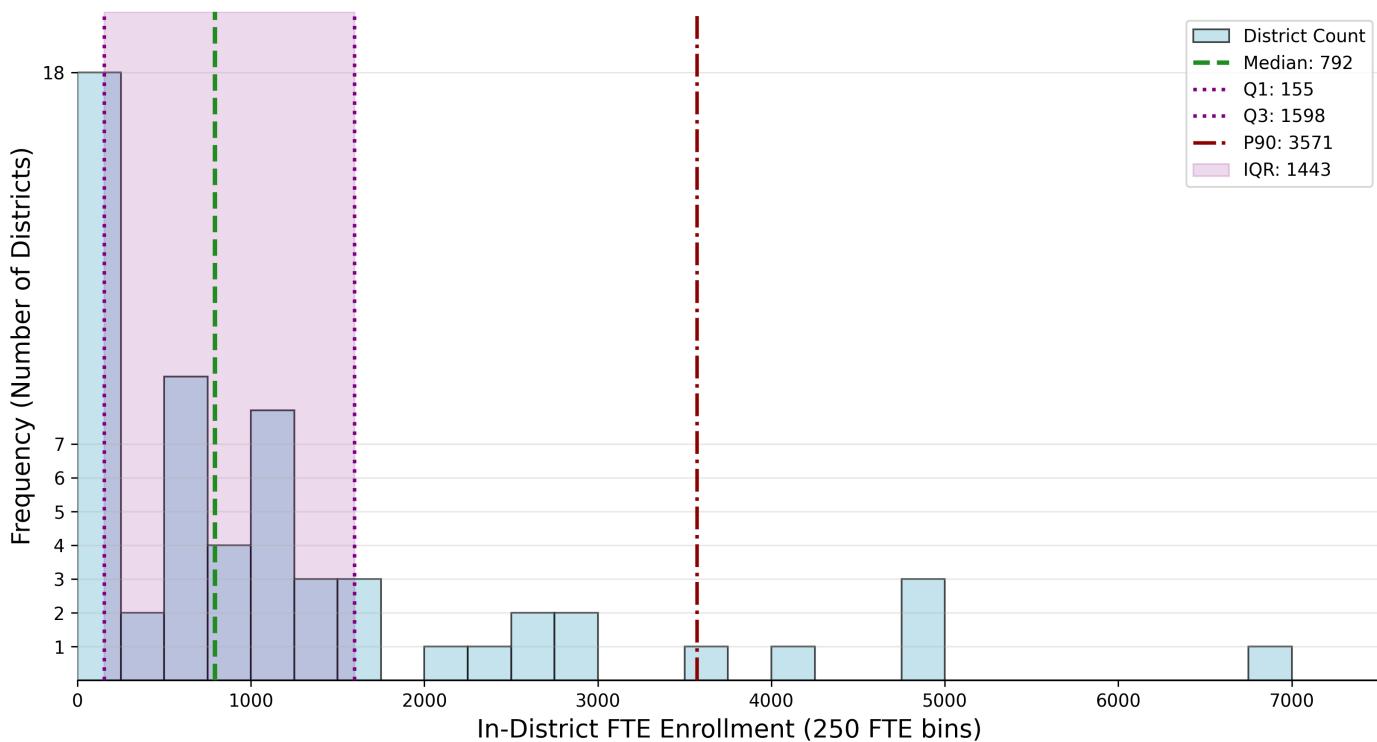


Figure 5

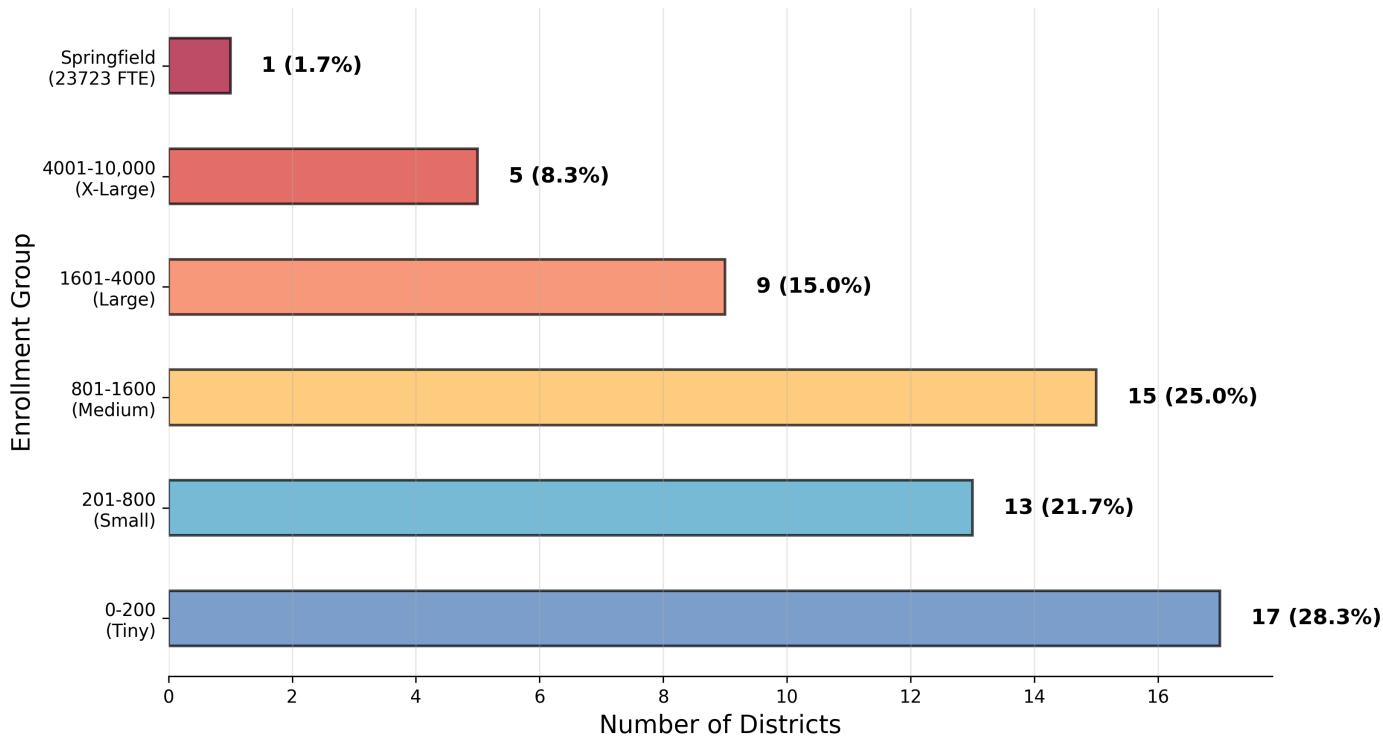


Figure 6

The histogram (top) shows right-skewed enrollment distribution using 250 FTE bins, with a long right tail and sparse districts at higher enrollments. Based on IQR analysis, districts are grouped into five enrollment-based cohorts (bottom): Tiny (0-200 FTE), Small (201-800 FTE), Medium (801-1600 FTE), Large (1601-4000 FTE), X-Large (4001-10K FTE), and Springfield (>10,000 FTE, statistical outlier). These cohorts enable meaningful cost comparisons between districts facing similar scale-related challenges in administration, staffing, facilities, and programming. This method supports scale-based grouping across a large set of districts, not claims of sameness or normalized expectations of cost and performance. Districts of similar size can differ significantly in economy, demographics, geography, facilities, and governance, which shape both costs and outcomes. Per-pupil figures can mask these differences and should be interpreted with caution. This report reflects that caution by examining each district's PPE through detailed revenue and expenditure subcategories over time.

## All Western MA Traditional Districts

Scatterplot of enrollment vs. per-pupil expenditure with quartile boundaries (2024)

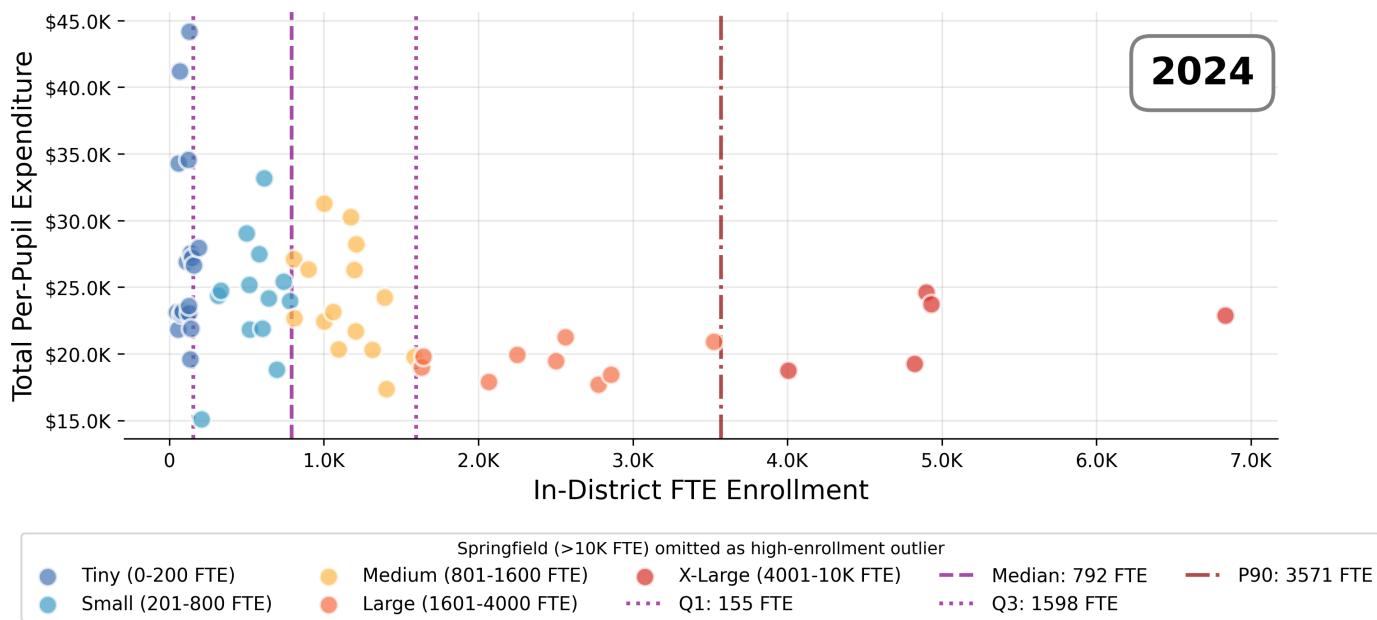


Figure 7

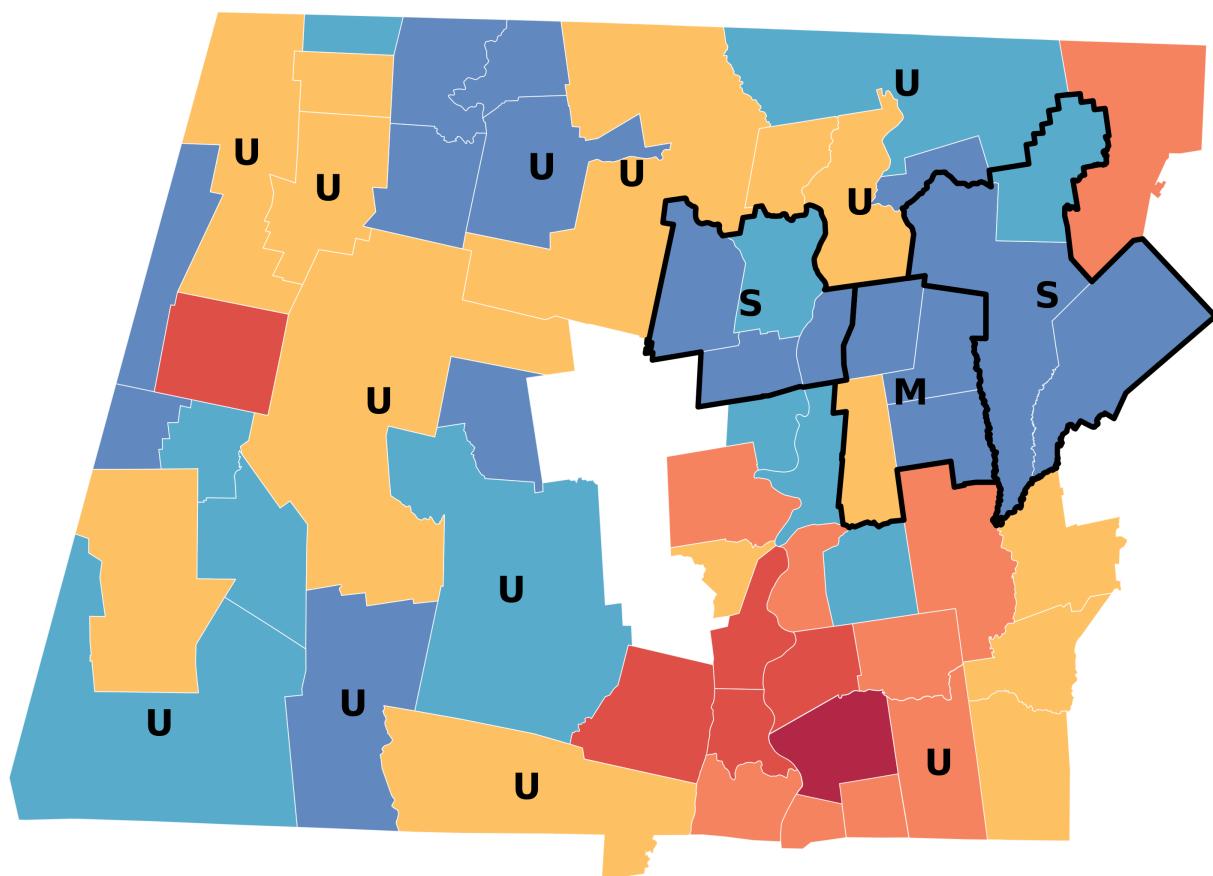
Table 4

District	2024 FTE	2024 PPE ▼
Hawlemont	108	\$41,189
Rowe	86	\$34,297
New Salem-Wendell	148	\$27,553
Conway	155	\$27,200
Shutesbury	129	\$26,908
Whately	136	\$23,593
Florida	94	\$23,175
Savoy	62	\$23,099
Pelham	136	\$23,040
Worthington	140	\$22,985
Leverett	145	\$21,910
Hancock	106	\$21,836
Petersham	141	\$19,591
Farmington River Reg	254	\$44,178
Erving	208	\$34,566
Southern Berkshire	758	\$33,162
Ralph C Maher	622	\$29,040
Sunderland	209	\$27,953
Pioneer Valley	664	\$27,490
Richmond	210	\$26,631
Hadley	624	\$25,173
Hatfield	412	\$24,752
Deerfield	355	\$24,382
Lee	746	\$24,155
Frontier	656	\$21,881
Orange	593	\$21,809
Granby	781	\$18,824
Clarksburg	262	\$15,078
Amherst	1,135	\$31,267
Berkshire Hills	1,291	\$30,257

District	2024 FTE	2024 PPE ▼
Amherst-Pelham	1,356	\$28,233
Mohawk Trail	951	\$27,124
Gill-Montague	1,127	\$26,345
North Adams	1,447	\$26,300
Gateway	847	\$25,430
Lenox	814	\$23,944
Palmer	1,234	\$23,154
Monson	910	\$22,675
Hoosac Valley Regional	1,240	\$22,450
Mount Greylock	1,269	\$21,705
Ware	1,310	\$20,348
Southwick-Tolland-Granville Regional School District	1,432	\$20,311
Greenfield	1,869	\$24,237
Northampton	2,846	\$21,267
Agawam	3,691	\$20,920
Ludlow	2,377	\$19,928
South Hadley	1,950	\$19,810
Central Berkshire	1,787	\$19,773
East Longmeadow	2,600	\$19,444
Athol-Royalston	1,887	\$18,981
Hampden-Wilbraham	2,950	\$18,436
Belchertown	2,265	\$17,887
Longmeadow	2,826	\$17,710
Easthampton	1,712	\$17,371
Holyoke	6,165	\$24,619
Pittsfield	5,806	\$23,739
Chicopee	7,530	\$22,866
Westfield	5,162	\$19,236
West Springfield	4,245	\$18,760
Springfield	29,468	\$26,615

## All Western MA Traditional Districts

Geographic map showing district locations and enrollment cohorts (2024)



### Enrollment Cohorts - 2024

Tiny (0-200 FTE): 17 district(s)	Outliers (Springfield >10K FTE): 1 district(s)
Small (201-800 FTE): 13 district(s)	
Medium (801-1600 FTE): 15 district(s)	Secondary regional (black border)
Large (1601-4000 FTE): 9 district(s)	Cohort: T, S, M, L, XL
X-Large (4001-10K FTE): 5 district(s)	U = Unified regional district (PK-12)

Figure 8

This map situates the districts within their geographic context in Western Massachusetts.

Districts are shaded according to the enrollment cohort system: Tiny (blue), Small (light blue), Medium (yellow), Large (orange), X-Large (red).

Elementary and PK-12 unified districts appear as solid filled areas. Unified regional districts (marked with 'U') serve all grades PK-12 across multiple towns. Secondary regional districts are bounded by a thick black border with a cohort letter indicator (T = Tiny, S = Small, M = Medium, L = Large, XL = X-Large) showing the enrollment cohort of the secondary regional district.

# All Western MA Traditional Districts

Scatterplot of enrollment vs. per-pupil expenditure with quartile boundaries (2019)

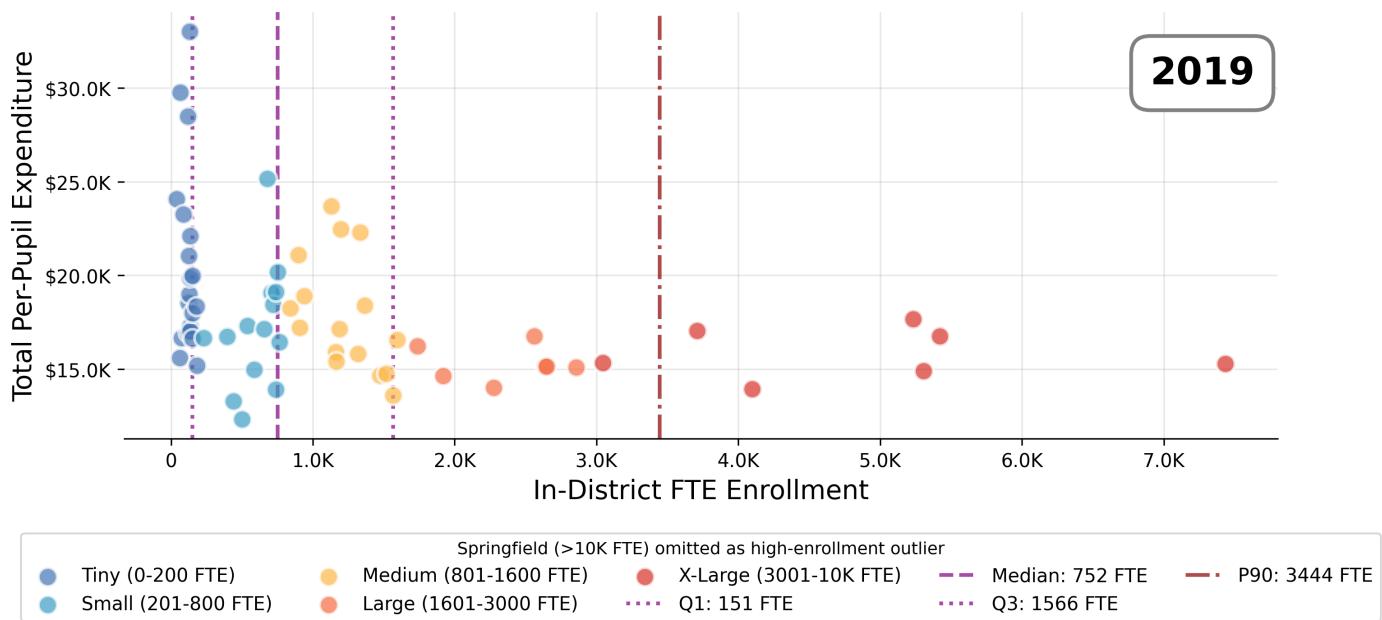


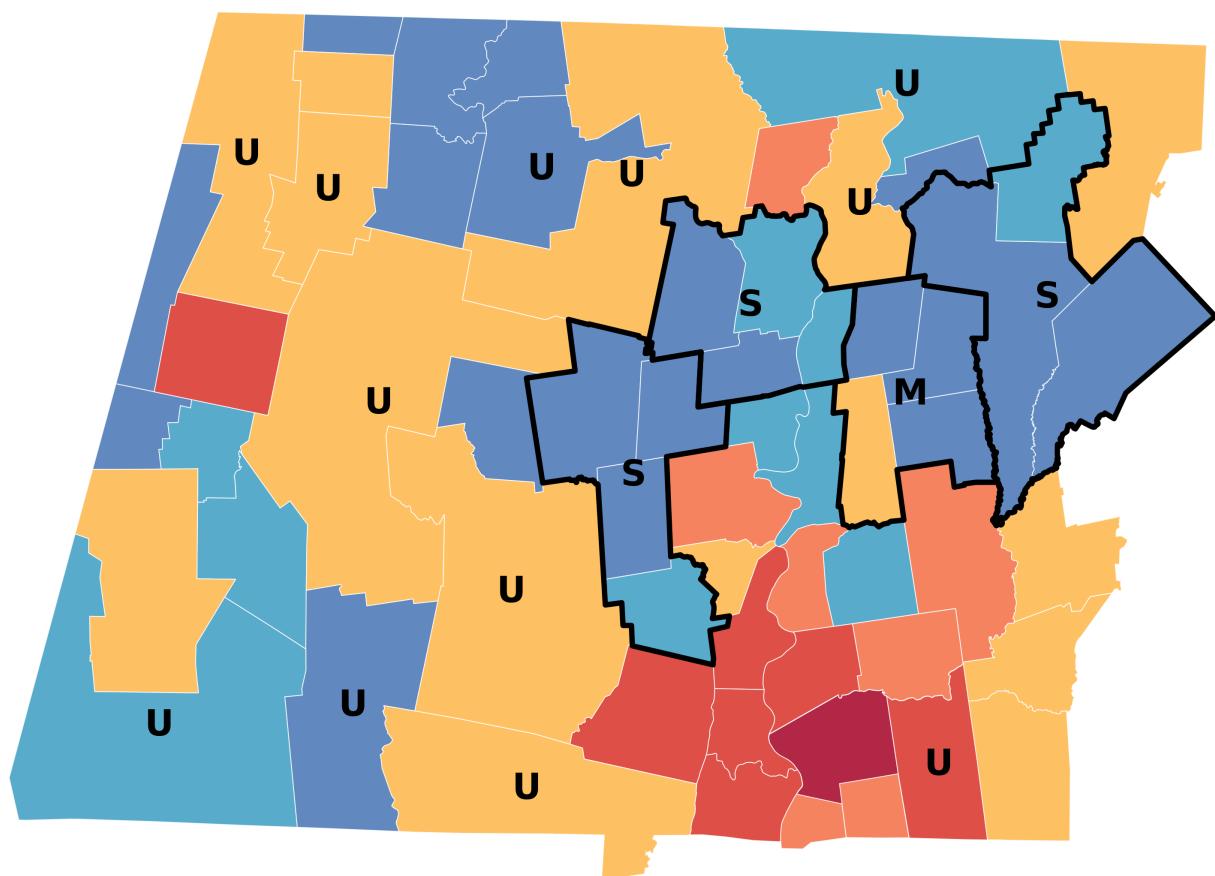
Figure 9

Table 5

District	2019 FTE	2019 PPE ▼	District	2019 FTE	2019 PPE ▼
Rowe	94	\$29,747	Lee	819	\$19,082
Hancock	85	\$24,069	Gill-Montague	1,275	\$18,893
Florida	103	\$23,270	North Adams	1,587	\$18,395
Conway	145	\$22,109	Gateway	944	\$18,257
Shutesbury	145	\$21,056	Monson	1,013	\$17,212
New Salem-Wendell	161	\$19,986	Mount Greylock	1,251	\$17,137
Leverett	145	\$19,866	Ralph C Maher	866	\$16,447
Pelham	145	\$17,303	Hoosac Valley Regional	1,396	\$15,929
Whately	150	\$17,017	Palmer	1,460	\$15,822
Petersham	135	\$16,960	Ware	1,379	\$15,423
Worthington	144	\$16,672	Granby	834	\$13,919
Hawlemont	178	\$16,644	Agawam	3,869	\$17,043
Savoy	93	\$15,595	Ludlow	2,680	\$16,772
Erving	225	\$33,003	Central Berkshire	1,826	\$16,577
Farmington River Reg	259	\$28,487	Greenfield	2,163	\$16,226
Southern Berkshire	794	\$25,172	Hampden-Wilbraham	3,119	\$15,337
Lenox	792	\$20,176	East Longmeadow	2,728	\$15,150
Richmond	217	\$18,349	Northampton	2,943	\$15,148
Hadley	687	\$17,306	Longmeadow	2,920	\$15,112
Frontier	752	\$17,142	Southwick-Tolland-Granville Regional School District	1,620	\$14,758
Deerfield	432	\$16,748	Athol-Royalston	1,853	\$14,674
Sunderland	251	\$16,669	South Hadley	2,171	\$14,653
Clarksburg	243	\$15,201	Belchertown	2,468	\$14,018
Orange	679	\$14,988	Easthampton	1,900	\$13,620
Hatfield	508	\$13,296	Holyoke	6,590	\$17,688
Amherst	1,255	\$23,694	Pittsfield	6,202	\$16,751
Berkshire Hills	1,320	\$22,463	Chicopee	7,957	\$15,298
Amherst-Pelham	1,493	\$22,304	Westfield	5,606	\$14,918
Mohawk Trail	1,105	\$21,096	West Springfield	4,282	\$13,937
Pioneer Valley	837	\$19,125	Springfield	30,444	\$17,009

## All Western MA Traditional Districts

Geographic map showing district locations and enrollment cohorts (2019)



### Enrollment Cohorts - 2019

Tiny (0-200 FTE): 20 district(s)	Outliers (Springfield >10K FTE): 1 district(s)
Small (201-800 FTE): 14 district(s)	
Medium (801-1600 FTE): 16 district(s)	
Large (1601-4000 FTE): 7 district(s)	
X-Large (4001-10K FTE): 7 district(s)	
	Secondary regional (black border)
	Cohort: T, S, M, L, XL
	U = Unified regional district (PK-12)

Figure 10

This map situates the districts within their geographic context in Western Massachusetts.

Districts are shaded according to the enrollment cohort system: Tiny (blue), Small (light blue), Medium (yellow), Large (orange), X-Large (red).

Elementary and PK-12 unified districts appear as solid filled areas. Unified regional districts (marked with 'U') serve all grades PK-12 across multiple towns. Secondary regional districts are bounded by a thick black border with a cohort letter indicator (T = Tiny, S = Small, M = Medium, L = Large, XL = X-Large) showing the enrollment cohort of the secondary regional district.

## All Western MA Traditional Districts

Scatterplot of enrollment vs. per-pupil expenditure with quartile boundaries (2014)

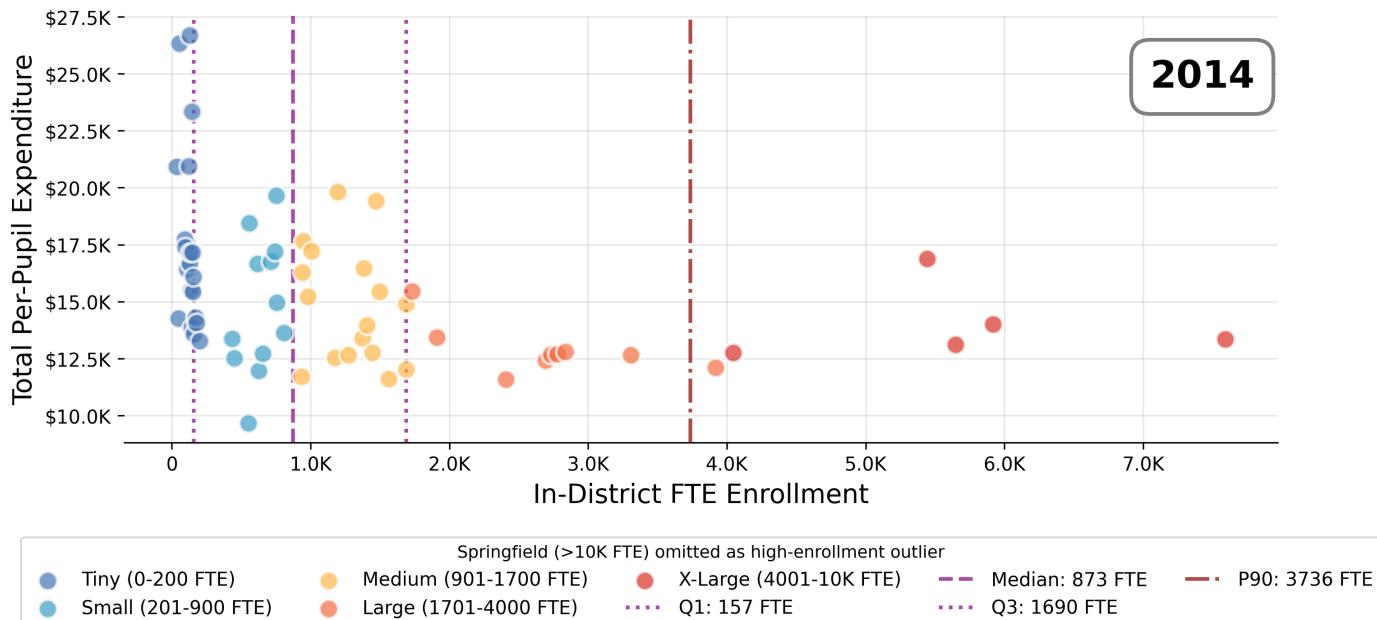


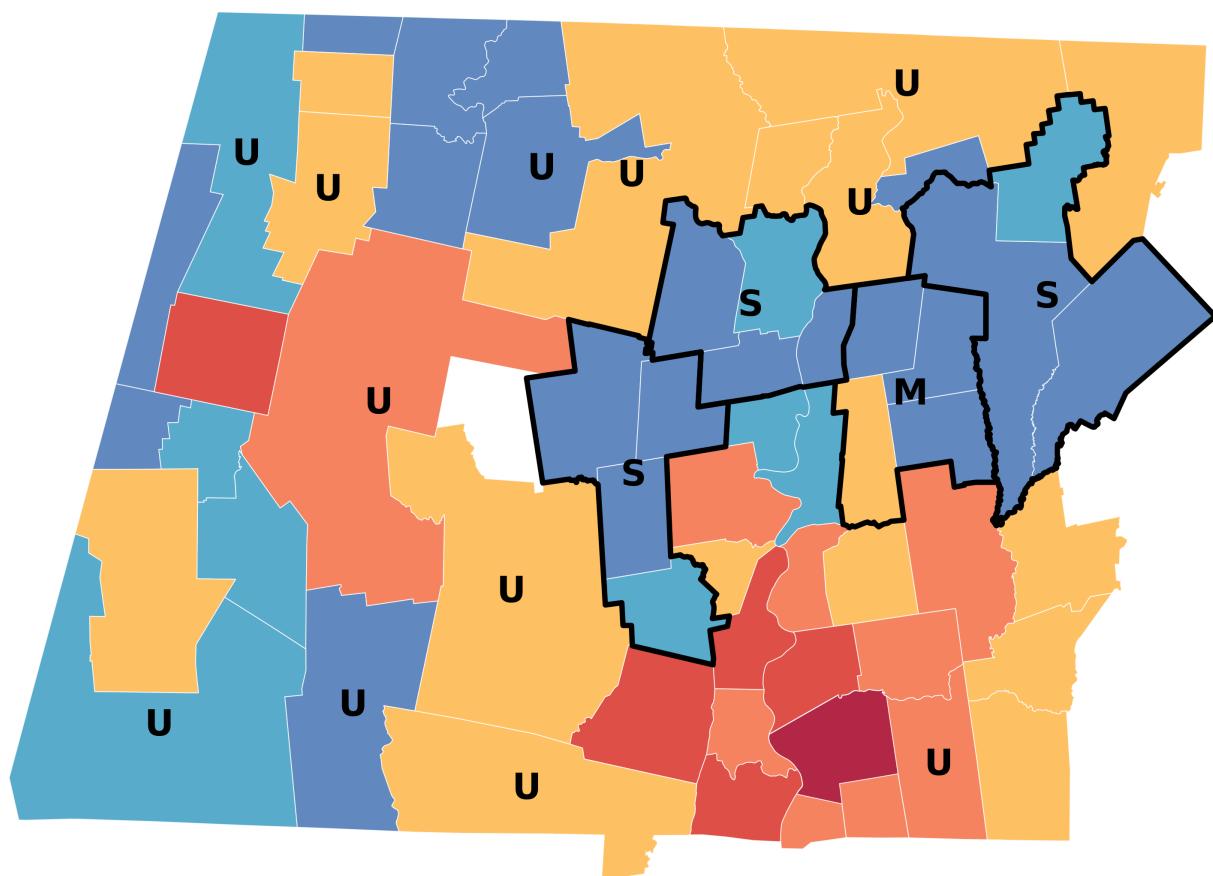
Figure 11

Table 6

District	2014 FTE	2014 PPE ▼	District	2014 FTE	2014 PPE ▼
Rowe	88	\$26,332	Pioneer Valley	993	\$16,285
Leverett	132	\$20,935	Gateway	1,110	\$15,206
Savoy	83	\$20,923	Ralph C Maher	906	\$13,625
Florida	112	\$17,740	Hoosac Valley Regional	1,512	\$13,395
Hawlemont	114	\$17,391	Palmer	1,536	\$12,763
New Salem-Wendell	139	\$17,162	Ware	1,446	\$12,664
Pelham	135	\$16,685	Monson	1,240	\$12,543
Petersham	117	\$16,421	Granby	1,003	\$11,712
Shutesbury	170	\$16,087	Amherst-Pelham	1,619	\$19,416
Whately	155	\$15,521	Central Berkshire	1,887	\$15,459
Conway	181	\$14,305	North Adams	1,694	\$15,434
Hancock	102	\$14,273	Greenfield	2,165	\$14,893
Farmington River Reg	284	\$26,684	Athol-Royalston	1,772	\$13,967
Erving	262	\$23,344	South Hadley	2,120	\$13,440
Mount Greylock	598	\$18,447	Longmeadow	2,898	\$12,797
Richmond	230	\$17,160	Ludlow	2,870	\$12,702
Frontier	705	\$16,660	Northampton	3,040	\$12,674
Clarksburg	223	\$14,075	Hampden-Wilbraham	3,367	\$12,650
Deerfield	455	\$13,372	East Longmeadow	2,776	\$12,413
Sunderland	223	\$13,283	Southwick-Tolland-Granville Regional School District	1,803	\$12,018
Orange	706	\$12,711	Easthampton	1,874	\$11,607
Hatfield	517	\$12,517	Belchertown	2,558	\$11,596
Hadley	758	\$11,961	Holyoke	6,590	\$16,881
Amherst	1,287	\$19,820	Pittsfield	6,497	\$14,013
Southern Berkshire	909	\$19,660	Chicopee	7,921	\$13,361
Mohawk Trail	1,084	\$17,652	Westfield	5,811	\$13,112
Gill-Montague	1,271	\$17,221	Agawam	4,176	\$12,750
Lenox	806	\$17,194	West Springfield	4,051	\$12,106
Lee	818	\$16,765	Springfield	28,862	\$15,315
Berkshire Hills	1,492	\$16,458			

## All Western MA Traditional Districts

Geographic map showing district locations and enrollment cohorts (2014)



### Enrollment Cohorts - 2014

■	Tiny (0-200 FTE): 20 district(s)	■	Outliers (Springfield >10K FTE): 1 district(s)
■	Small (201-800 FTE): 12 district(s)	■	Secondary regional (black border)
■	Medium (801-1600 FTE): 17 district(s)	■	Cohort: T, S, M, L, XL
■	Large (1601-4000 FTE): 9 district(s)	■	U = Unified regional district (PK-12)
■	X-Large (4001-10K FTE): 5 district(s)		

Figure 12

This map situates the districts within their geographic context in Western Massachusetts.

Districts are shaded according to the enrollment cohort system: Tiny (blue), Small (light blue), Medium (yellow), Large (orange), X-Large (red).

Elementary and PK-12 unified districts appear as solid filled areas. Unified regional districts (marked with 'U') serve all grades PK-12 across multiple towns. Secondary regional districts are bounded by a thick black border with a cohort letter indicator (T = Tiny, S = Small, M = Medium, L = Large, XL = X-Large) showing the enrollment cohort of the secondary regional district.

## All Western MA Traditional Districts

Scatterplot of enrollment vs. per-pupil expenditure with quartile boundaries (2009)

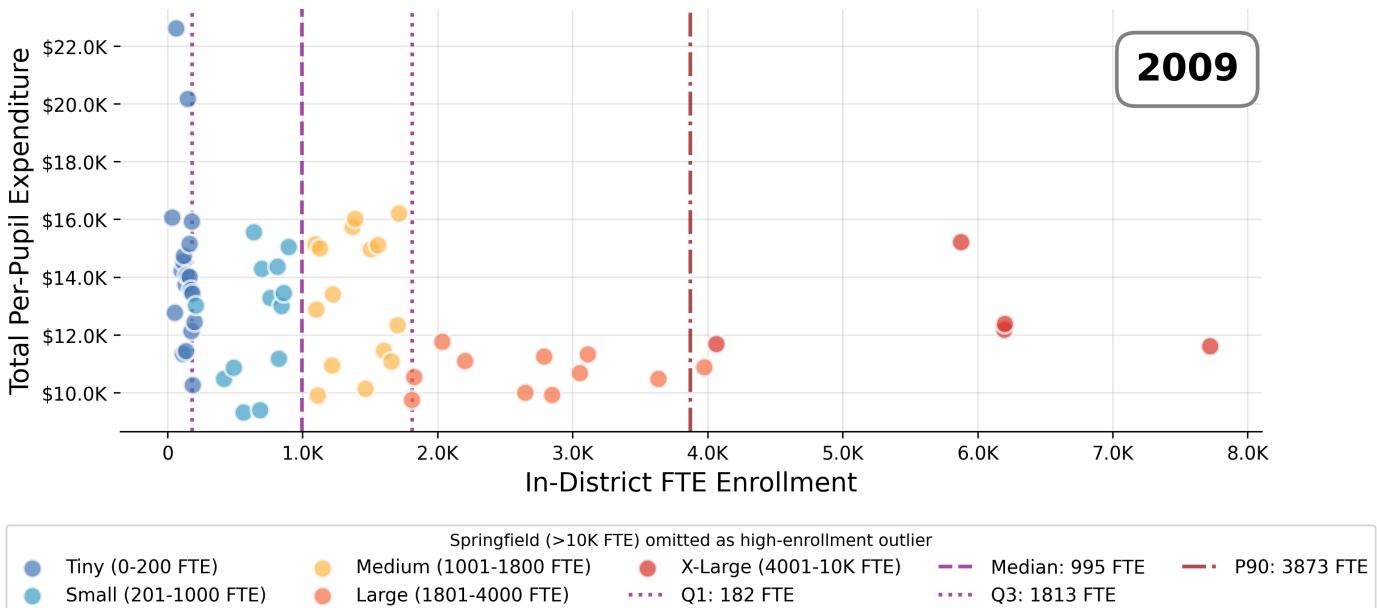


Figure 13

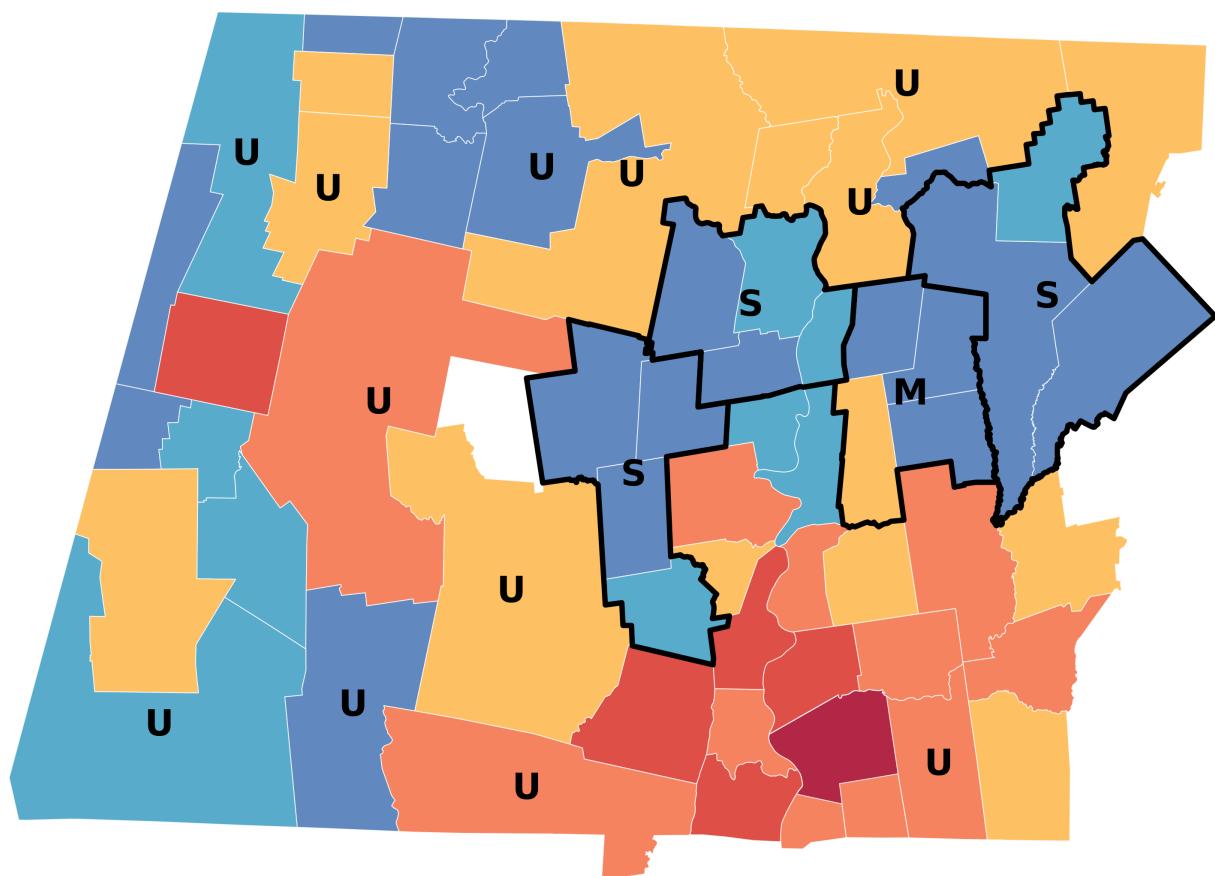
Table 7

District	2009 FTE	2009 PPE ▼
Rowe	83	\$22,616
Hancock	108	\$16,069
Leverett	168	\$15,156
Pelham	120	\$14,733
Hawlemont	130	\$14,531
Petersham	120	\$14,224
New Salem-Wendell	150	\$14,079
Shutesbury	169	\$14,011
Whately	153	\$13,740
Conway	185	\$13,557
Savoy	116	\$12,772
Florida	134	\$11,349
Farmington River Reg	301	\$20,165
Erving	297	\$15,928
Mount Greylock	665	\$15,564
Frontier	776	\$14,288
Richmond	269	\$13,435
Sunderland	234	\$13,023
Clarksburg	268	\$12,448
Deerfield	506	\$10,864
Hatfield	504	\$10,476
Hadley	749	\$9,388
Amherst	1,452	\$16,029
Berkshire Hills	1,500	\$15,739
Gill-Montague	1,313	\$15,141
Southern Berkshire	1,052	\$15,050
Mohawk Trail	1,249	\$14,995
Lenox	862	\$14,359
Lee	934	\$13,448
Gateway	1,326	\$13,413

District	2009 FTE	2009 PPE ▼
Ralph C Maher	910	\$13,278
Pioneer Valley	1,148	\$12,885
Orange	847	\$11,176
Ware	1,403	\$10,944
Monson	1,498	\$10,139
Granby	1,169	\$9,905
Amherst-Pelham	1,824	\$16,211
North Adams	1,754	\$15,116
Greenfield	1,970	\$14,970
Athol-Royalston	2,014	\$12,338
Central Berkshire	2,229	\$11,760
Hoosac Valley Regional	1,704	\$11,448
Longmeadow	3,164	\$11,336
Northampton	3,056	\$11,254
South Hadley	2,348	\$11,094
Easthampton	1,967	\$11,081
Ludlow	3,140	\$10,688
Palmer	1,906	\$10,544
Hampden-Wilbraham	3,732	\$10,485
Belchertown	2,759	\$9,996
East Longmeadow	2,949	\$9,924
Southwick-Tolland-Granville Regional School District	1,880	\$9,754
Holyoke	6,736	\$15,217
Pittsfield	6,623	\$12,390
Westfield	6,320	\$12,177
Agawam	4,217	\$11,690
Chicopee	7,884	\$11,605
West Springfield	4,082	\$10,883
Springfield	28,708	\$14,608

## All Western MA Traditional Districts

Geographic map showing district locations and enrollment cohorts (2009)



### Enrollment Cohorts - 2009

■	Tiny (0-200 FTE): 19 district(s)	■	Outliers (Springfield >10K FTE): 1 district(s)
■	Small (201-800 FTE): 13 district(s)	■	Secondary regional (black border)
■	Medium (801-1600 FTE): 15 district(s)	■	Cohort: T, S, M, L, XL
■	Large (1601-4000 FTE): 11 district(s)	■	U = Unified regional district (PK-12)
■	X-Large (4001-10K FTE): 5 district(s)		

Figure 14

This map situates the districts within their geographic context in Western Massachusetts.

Districts are shaded according to the enrollment cohort system: Tiny (blue), Small (light blue), Medium (yellow), Large (orange), X-Large (red).

Elementary and PK-12 unified districts appear as solid filled areas. Unified regional districts (marked with 'U') serve all grades PK-12 across multiple towns. Secondary regional districts are bounded by a thick black border with a cohort letter indicator (T = Tiny, S = Small, M = Medium, L = Large, XL = X-Large) showing the enrollment cohort of the secondary regional district.

## All Western MA Traditional Districts: Tiny (0-200 FTE)

PPE vs Enrollment — Weighted average per district. Expense category table shaded by comparison to weighted average of all Western MA (excluding Springfield)

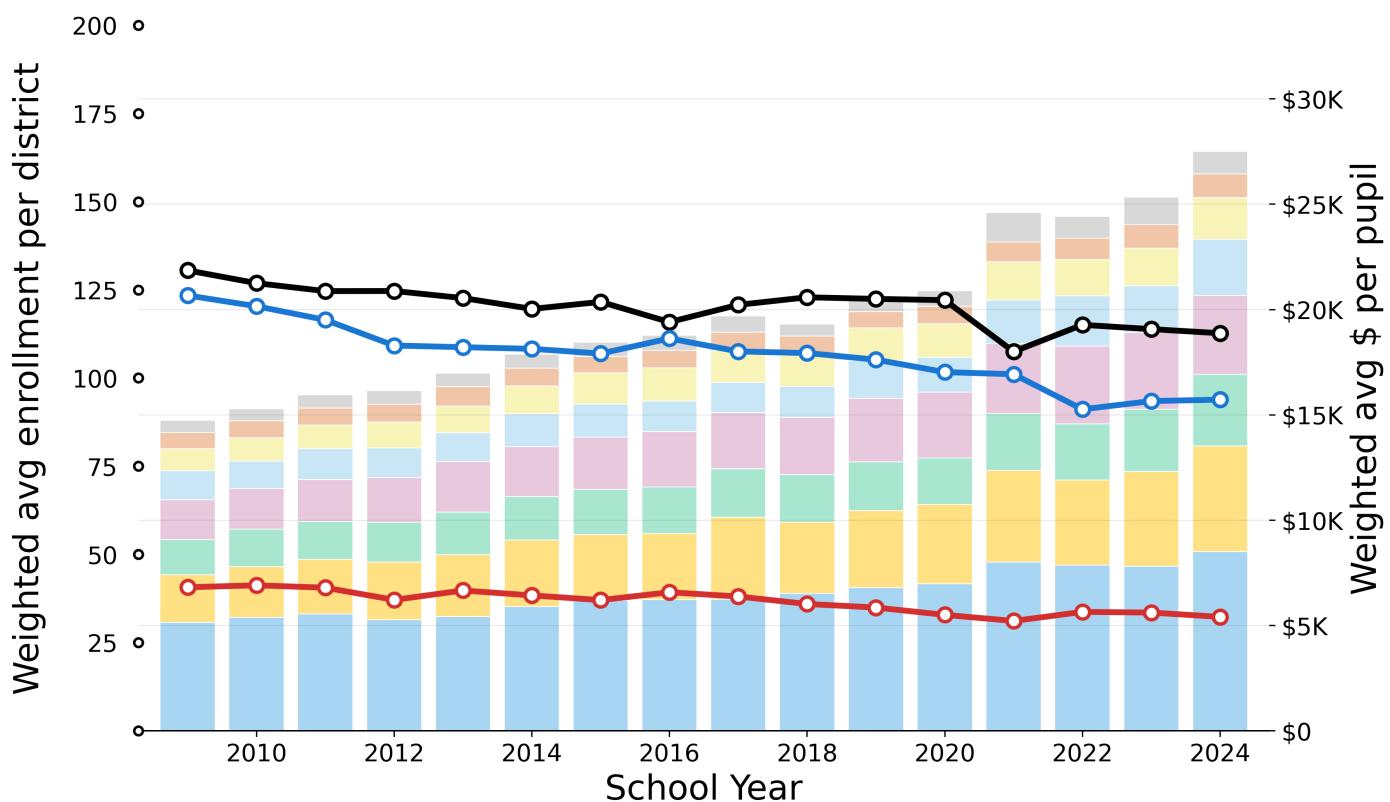


Figure 15

Table 8

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$577	+4.1%	+4.7%	+9.4%	\$1,057
Administration	\$770	+2.6%	+2.8%	+7.9%	\$1,126
Instructional Leadership	\$1,042	+4.4%	+4.2%	+5.2%	\$1,991
Operations and Maintenance	\$1,374	+4.5%	+5.5%	+7.9%	\$2,652
Other Teaching Services	\$1,899	+4.7%	+4.7%	+4.6%	\$3,757
Pupil Services	\$1,669	+4.9%	+5.2%	+8.0%	\$3,406
Insurance, Retirement and Other	\$2,258	+5.5%	+4.8%	+6.5%	\$5,009
Teachers	\$5,148	+3.4%	+3.7%	+4.6%	\$8,507
Total	\$14,738	+4.2%	+4.4%	+6.0%	\$27,504

Table 9

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	131	-1.0%	-0.6%	-1.6%	113
Foundation Enrollment	123	-1.8%	-1.4%	-2.3%	94
Out-of-District FTE Pupils	41	-1.5%	-1.7%	-1.6%	32

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$  Above Western MA (excl. Springfield)

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Tiny (0-200 FTE)

Chapter 70 Aid and Net School Spending (NSS). Weighted avg funding per district: State aid (Ch70), Required local contribution, and Actual spending above requirement. Funding component table shaded by comparison to weighted average of all Western MA (excluding Springfield)

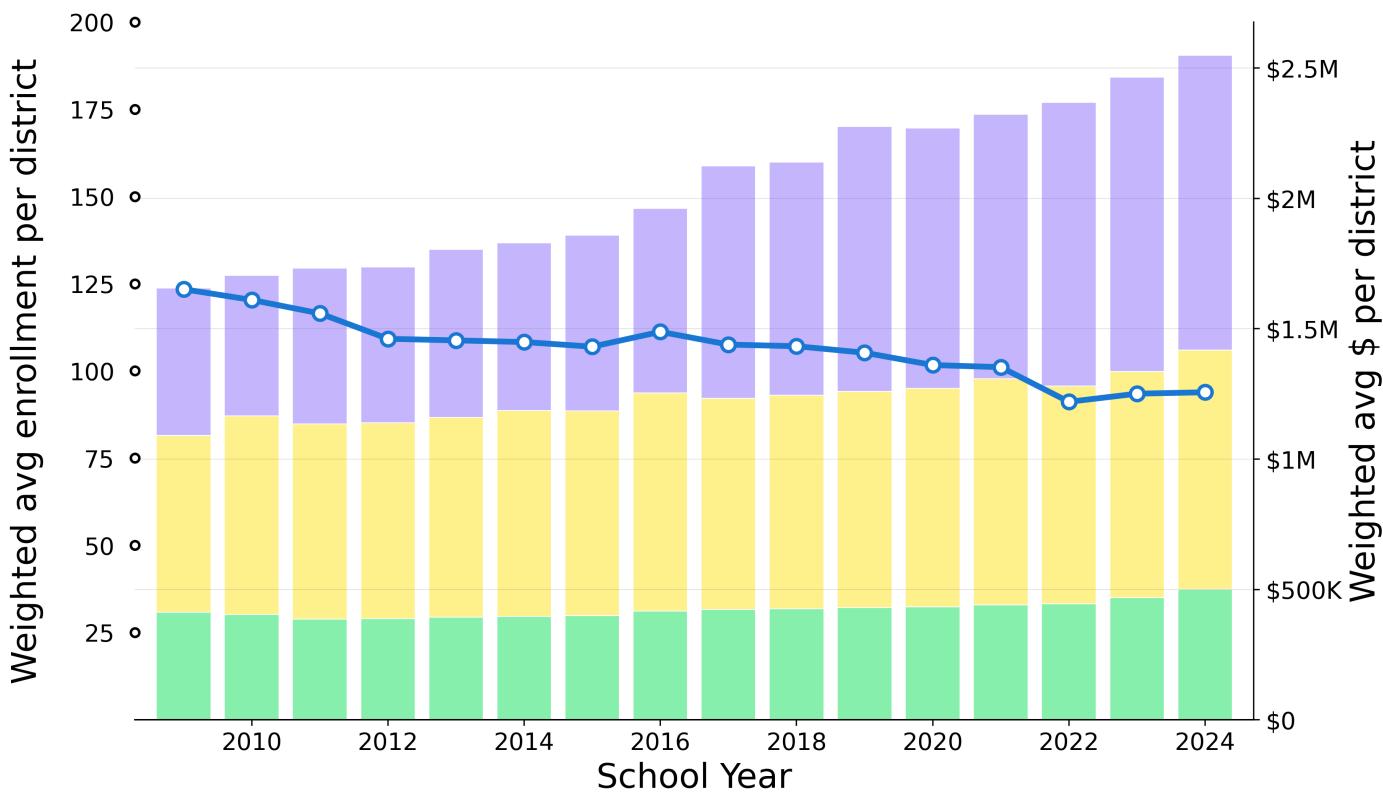


Figure 16

Table 10

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$565,230	4.74%	5.83%	2.20%	\$1,131,796
Req NSS (minus Ch70)	\$679,670	2.02%	1.51%	2.02%	\$917,491
Ch70 Aid	\$412,033	1.30%	2.34%	3.07%	\$500,393
Total (Actual NSS)	\$1,656,933	2.92%	3.38%	2.30%	\$2,549,680

Table 11

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	123	-1.8%	-1.4%	-2.3%	94
Shading vs Western cohort: $ \Delta \$/\text{pupil}  \geq 5.0\%$ , $ \Delta \text{Enrollment}  \geq 5.0\%$ , $ \Delta \text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Small (201-800 FTE)

PPE vs Enrollment — Weighted average per district. Expense category table shaded by comparison to weighted average of all Western MA (excluding Springfield)

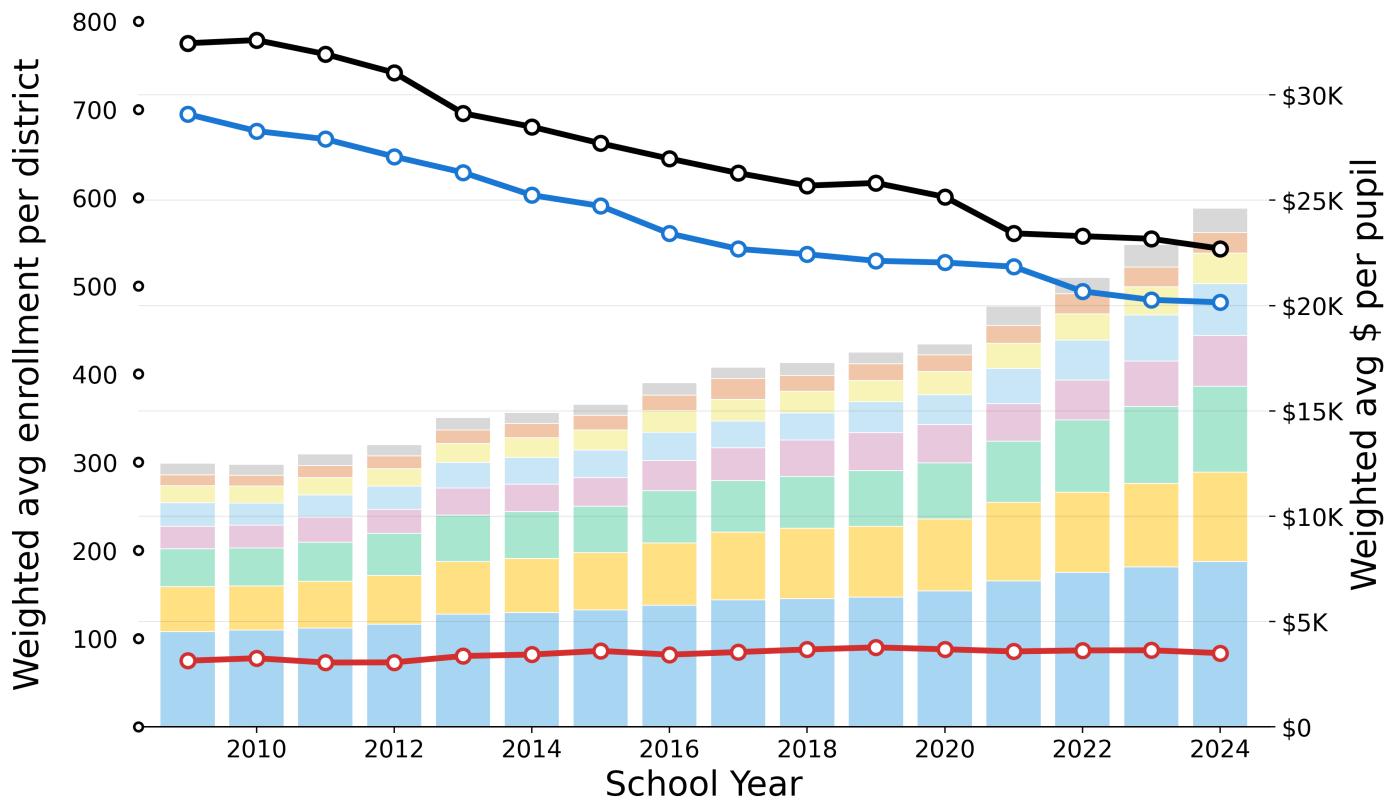


Figure 17

Table 12

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$558	+4.9%	+8.4%	+15.6%	\$1,150
Administration	\$523	+4.3%	+3.9%	+4.4%	\$976
Instructional Leadership	\$811	+4.0%	+4.4%	+7.6%	\$1,463
Operations and Maintenance	\$1,108	+5.4%	+6.9%	+10.8%	\$2,454
Other Teaching Services	\$1,061	+5.6%	+6.2%	+6.0%	\$2,402
Pupil Services	\$1,813	+5.6%	+6.3%	+9.1%	\$4,084
Insurance, Retirement and Other	\$2,128	+4.7%	+5.2%	+4.8%	\$4,254
Teachers	\$4,522	+3.7%	+3.8%	+5.0%	\$7,838
Total	\$12,523	+4.6%	+5.1%	+6.7%	\$24,622

Table 13

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	775	-2.4%	-2.2%	-2.5%	542
Foundation Enrollment	695	-2.4%	-2.2%	-1.8%	481
Out-of-District FTE Pupils	75	+0.7%	+0.2%	-1.5%	84

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Above Western MA (excl. Springfield)

Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Small (201-800 FTE)

Chapter 70 Aid and Net School Spending (NSS). Weighted avg funding per district: State aid (Ch70), Required local contribution, and Actual spending above requirement. Funding component table shaded by comparison to weighted average of all Western MA (excluding Springfield)

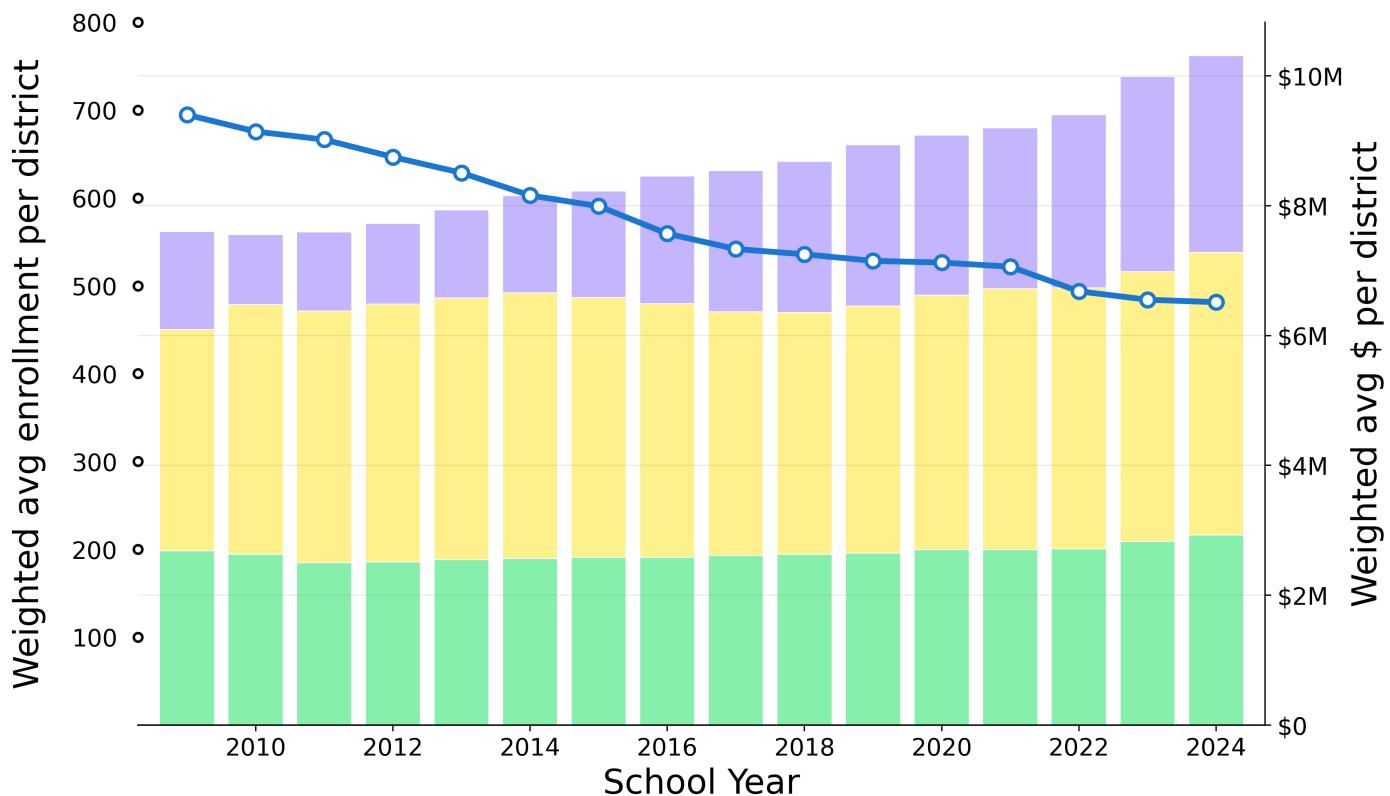


Figure 18

Table 14

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$1,503,377	4.78%	7.28%	4.04%	\$3,027,779
Req NSS (minus Ch70)	\$3,407,993	1.65%	0.63%	2.73%	\$4,357,282
Ch70 Aid	\$2,687,050	0.57%	1.32%	2.03%	\$2,925,814
Total (Actual NSS)	\$7,598,420	2.06%	2.37%	2.90%	\$10,310,875

Table 15

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	695	-2.4%	-2.2%	-1.8%	481
Shading vs Western cohort: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Medium (801-1600 FTE)

PPE vs Enrollment — Weighted average per district. Expense category table shaded by comparison to weighted average of all Western MA (excluding Springfield)

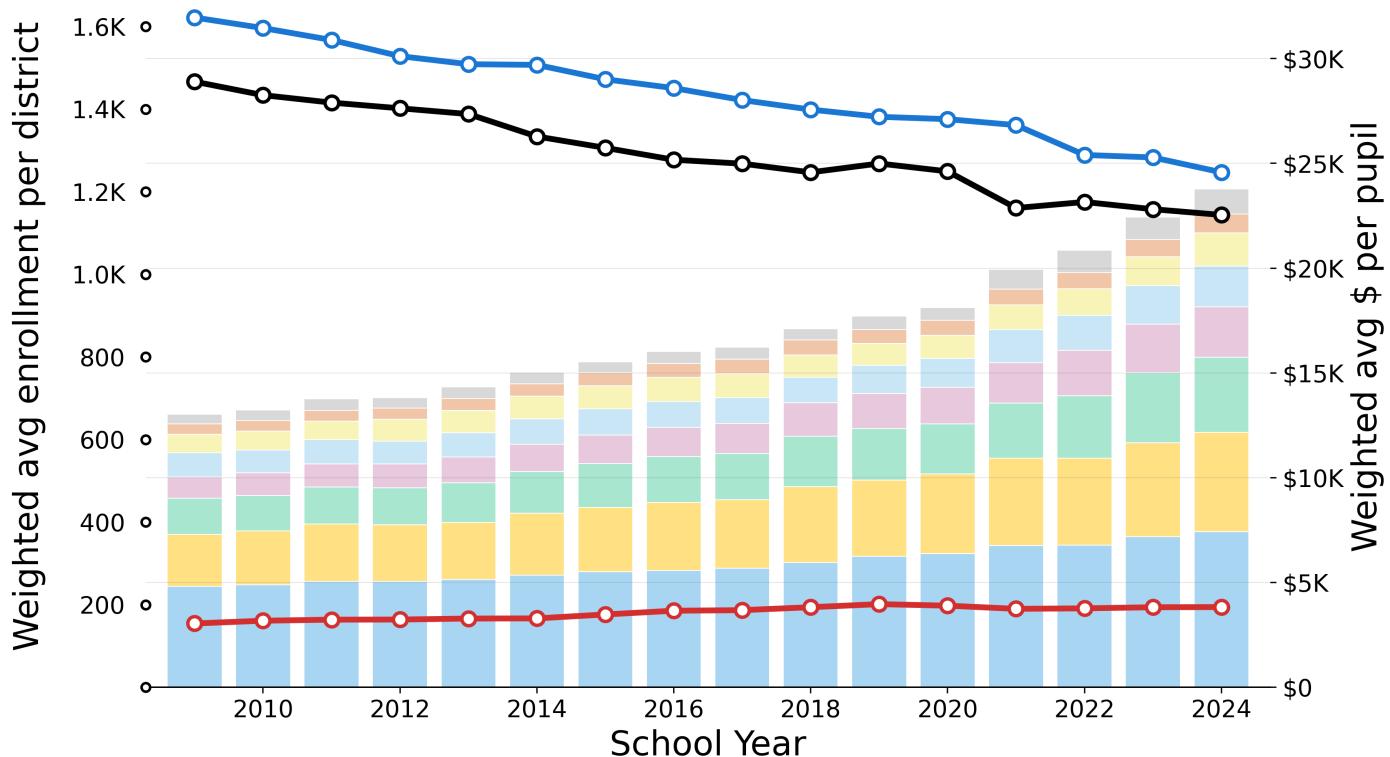


Figure 19

Table 16

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$461	+6.6%	+8.1%	+13.3%	\$1,200
Administration	\$494	+4.2%	+4.7%	+6.9%	\$911
Instructional Leadership	\$893	+3.8%	+3.7%	+8.2%	\$1,573
Operations and Maintenance	\$1,150	+3.6%	+4.9%	+8.0%	\$1,953
Other Teaching Services	\$1,014	+5.9%	+6.2%	+7.3%	\$2,395
Pupil Services	\$1,724	+5.0%	+6.1%	+7.8%	\$3,581
Insurance, Retirement and Other	\$2,483	+4.4%	+4.9%	+5.5%	\$4,740
Teachers	\$4,813	+2.9%	+3.3%	+3.5%	\$7,431
Total	\$13,032	+4.1%	+4.7%	+6.1%	\$23,785

Table 17

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	1,466	-1.6%	-1.5%	-2.0%	1,144
Foundation Enrollment	1,622	-1.7%	-1.9%	-2.0%	1,247
Out-of-District FTE Pupils	154	+1.5%	+1.5%	-0.7%	194
Shading vs Western cohort: $ \Delta \$/\text{pupil}  \geq 5.0\%$ , $ \Delta \text{Enrollment}  \geq 5.0\%$ , $ \Delta \text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Medium (801-1600 FTE)

Chapter 70 Aid and Net School Spending (NSS). Weighted avg funding per district: State aid (Ch70), Required local contribution, and Actual spending above requirement. Funding component table shaded by comparison to weighted average of all Western MA (excluding Springfield)

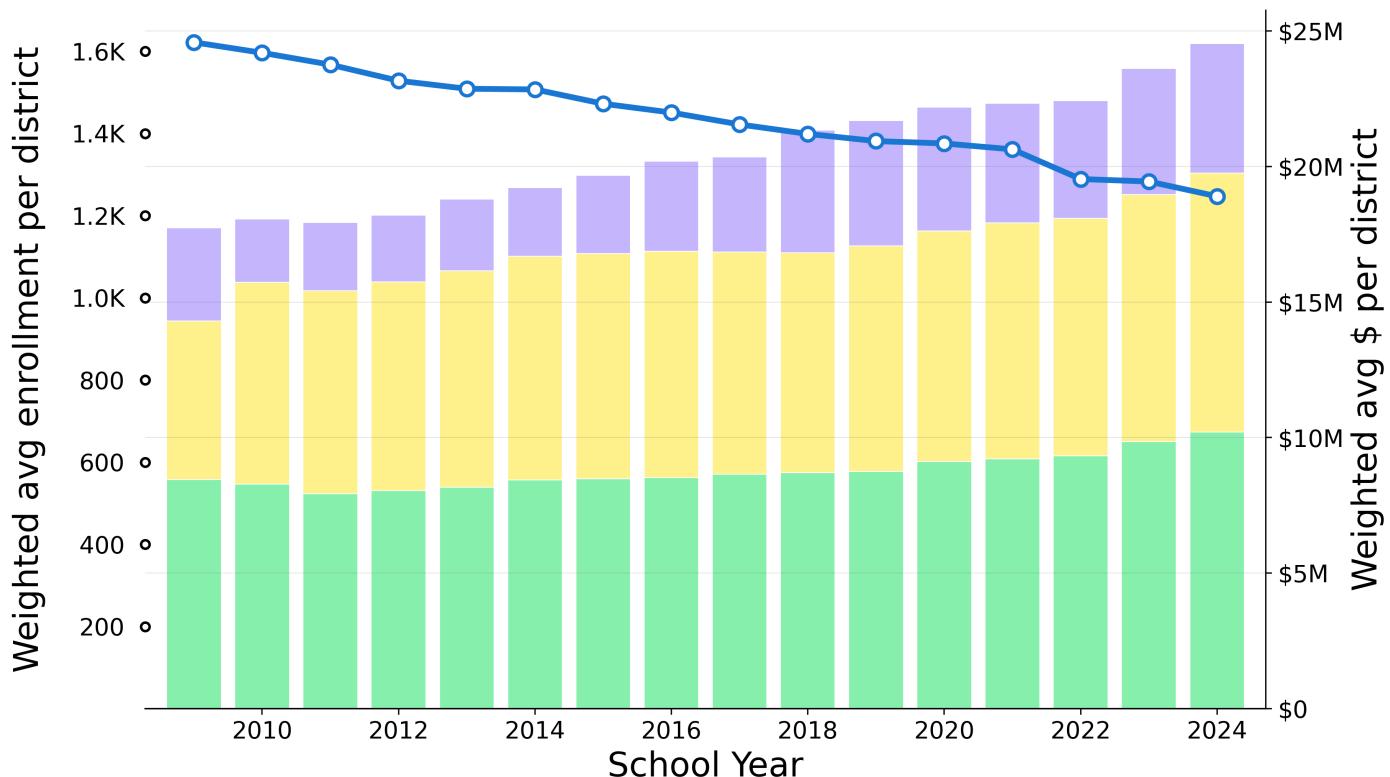


Figure 20

Table 18

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$3,437,076	2.23%	6.62%	0.71%	\$4,785,662
Req NSS (minus Ch70)	\$5,849,475	3.32%	1.45%	2.80%	\$9,543,900
Ch70 Aid	\$8,447,177	1.27%	1.93%	3.12%	\$10,206,872
Total (Actual NSS)	\$17,733,728	2.19%	2.47%	2.50%	\$24,536,434

Table 19

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	1,622	-1.7%	-1.9%	-2.0%	1,247
Shading vs Western cohort: $ \Delta \$/\text{pupil}  \geq 5.0\%$ , $ \Delta \text{Enrollment}  \geq 5.0\%$ , $ \Delta \text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Large (1601-4000 FTE)

PPE vs Enrollment — Weighted average per district. Expense category table shaded by comparison to weighted average of all Western MA (excluding Springfield)

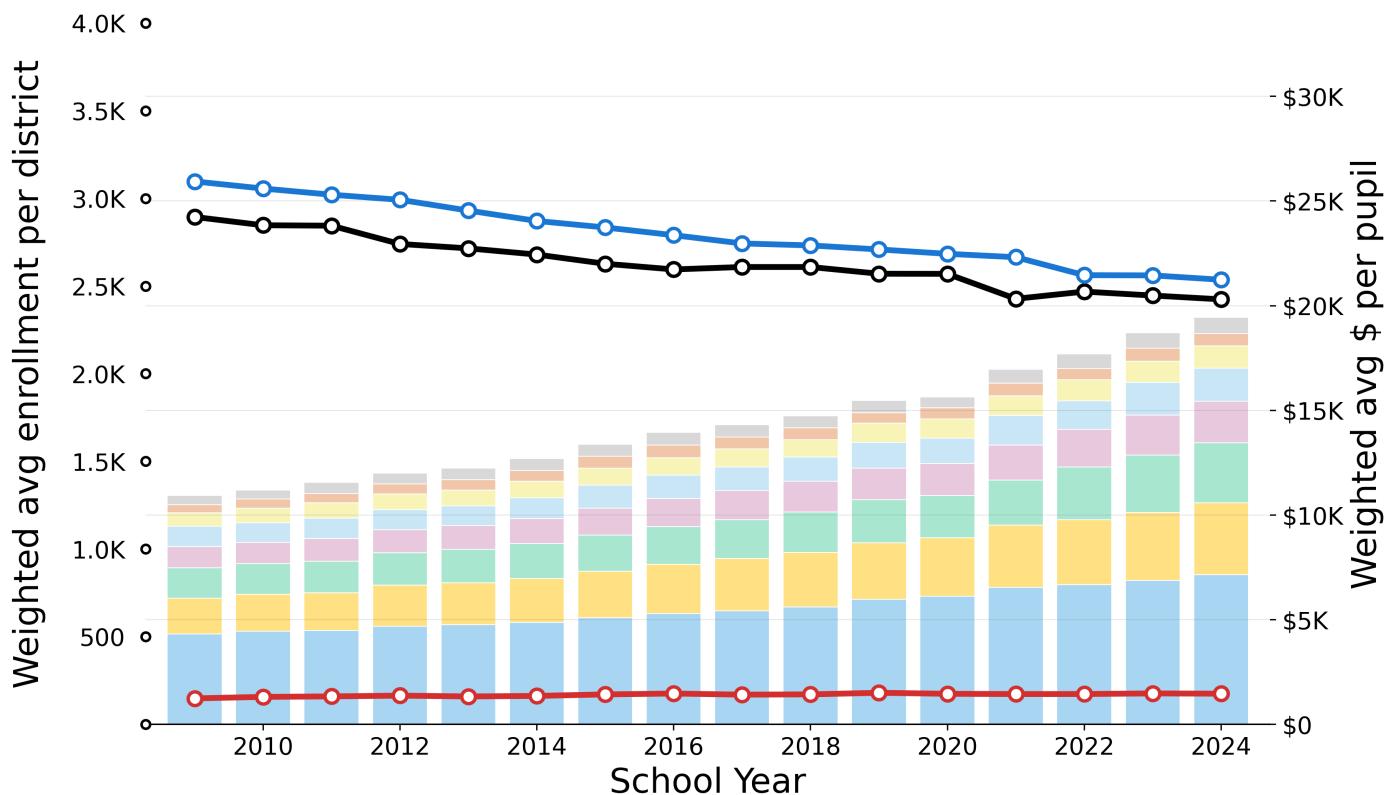


Figure 21

Table 20

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$442	+3.7%	+2.9%	+5.7%	\$765
Administration	\$397	+2.8%	+1.7%	+3.6%	\$601
Instructional Leadership	\$641	+3.4%	+2.9%	+2.7%	\$1,054
Operations and Maintenance	\$981	+3.3%	+4.9%	+5.3%	\$1,586
Other Teaching Services	\$995	+4.7%	+5.2%	+5.8%	\$1,989
Pupil Services	\$1,458	+4.6%	+5.6%	+6.8%	\$2,865
Insurance, Retirement and Other	\$1,707	+4.8%	+5.0%	+4.9%	\$3,427
Teachers	\$4,321	+3.4%	+3.9%	+3.7%	\$7,152
Total	\$10,942	+3.9%	+4.3%	+4.7%	\$19,439

Table 21

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	2,894	-1.2%	-1.0%	-1.2%	2,424
Foundation Enrollment	3,097	-1.3%	-1.2%	-1.3%	2,536
Out-of-District FTE Pupils	148	+1.1%	+0.8%	-0.6%	175

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$  Above Western MA (excl. Springfield)

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Large (1601-4000 FTE)

Chapter 70 Aid and Net School Spending (NSS). Weighted avg funding per district: State aid (Ch70), Required local contribution, and Actual spending above requirement. Funding component table shaded by comparison to weighted average of all Western MA (excluding Springfield)

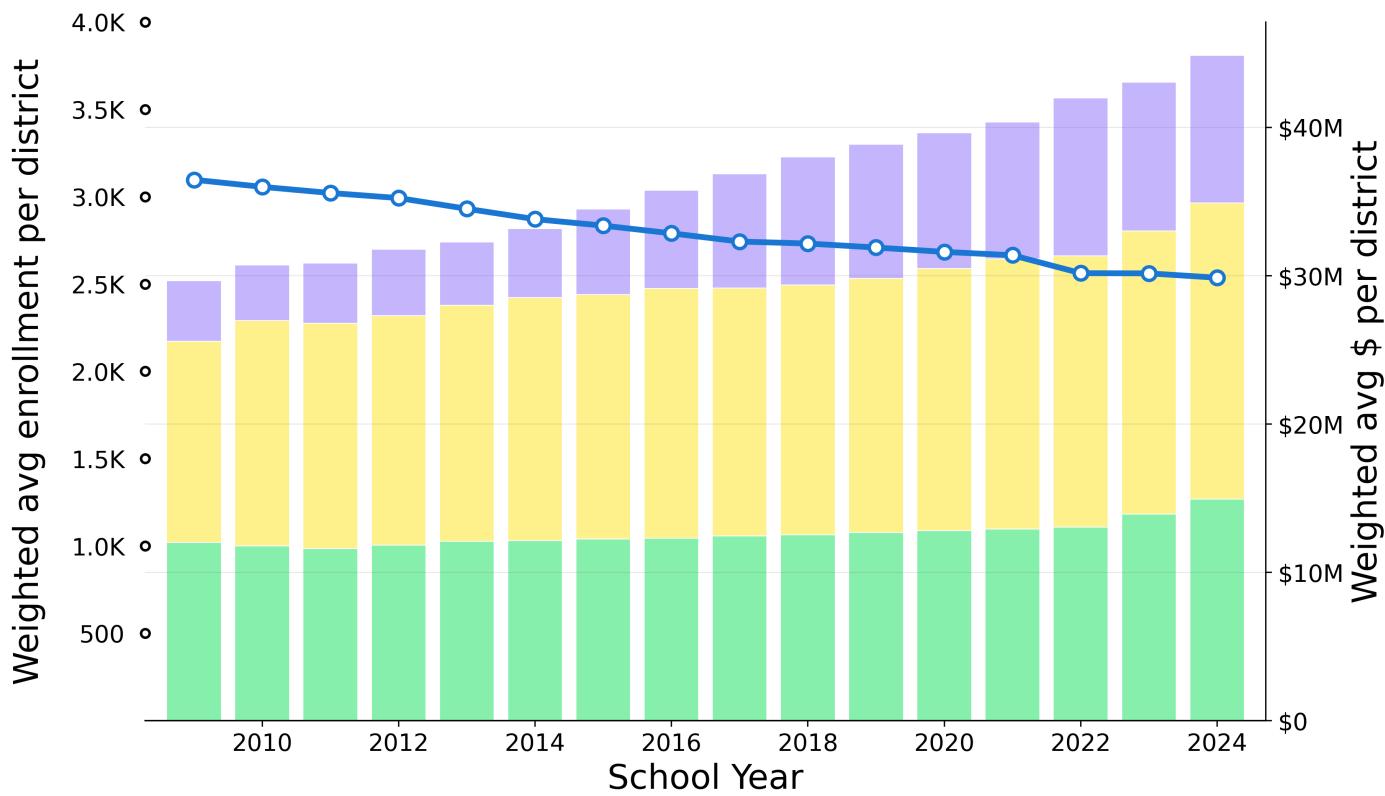


Figure 22

Table 22

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$4,074,406	6.14%	7.93%	1.95%	\$9,959,451
Req NSS (minus Ch70)	\$13,548,022	2.62%	2.01%	3.12%	\$19,974,072
Ch70 Aid	\$12,026,998	1.45%	2.08%	3.30%	\$14,925,532
Total (Actual NSS)	\$29,649,426	2.80%	3.07%	2.91%	\$44,859,055

Table 23

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	3,097	-1.3%	-1.2%	-1.3%	2,536
Shading vs Western cohort: $ \Delta \$/\text{pupil}  \geq 5.0\%$ , $ \Delta \text{Enrollment}  \geq 5.0\%$ , $ \Delta \text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: X-Large (4001-10K FTE)

PPE vs Enrollment — Weighted average per district. Expense category table shaded by comparison to weighted average of all Western MA (excluding Springfield)

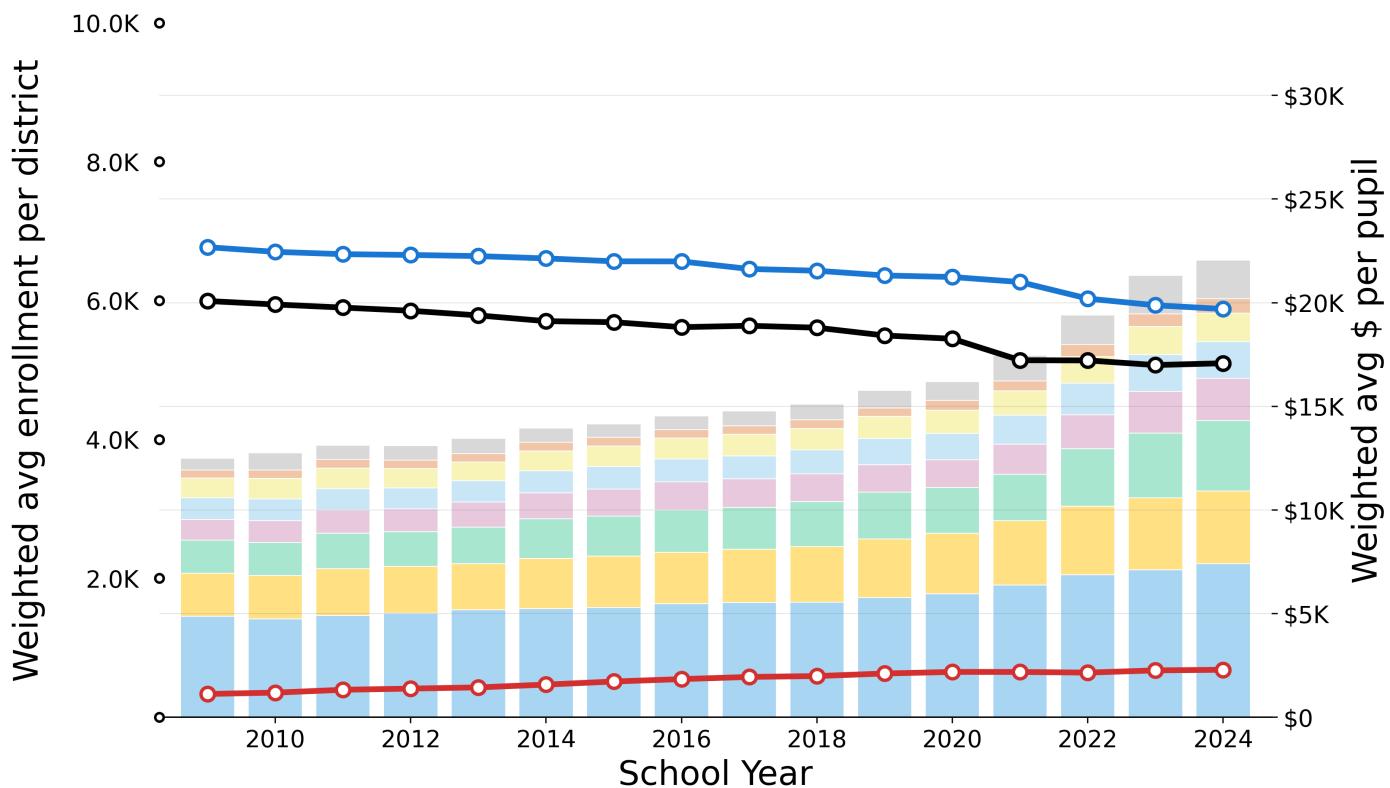


Figure 23

Table 24

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$576	+8.1%	+10.5%	+17.0%	\$1,847
Administration	\$388	+3.9%	+5.0%	+10.9%	\$689
Instructional Leadership	\$958	+2.5%	+3.7%	+5.5%	\$1,383
Operations and Maintenance	\$1,043	+3.6%	+5.3%	+7.0%	\$1,765
Other Teaching Services	\$985	+5.0%	+5.0%	+9.1%	\$2,047
Pupil Services	\$1,595	+5.2%	+5.9%	+8.5%	\$3,391
Insurance, Retirement and Other	\$2,088	+3.5%	+3.7%	+4.3%	\$3,504
Teachers	\$4,866	+2.8%	+3.5%	+5.1%	\$7,413
Total	\$12,498	+3.9%	+4.7%	+6.9%	\$22,040

Table 25

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	5,994	-1.1%	-1.1%	-1.5%	5,098
Foundation Enrollment	6,769	-0.9%	-1.2%	-1.6%	5,880
Out-of-District FTE Pupils	335	+4.9%	+3.8%	+1.6%	683
Shading vs Western cohort: $ \Delta \$/\text{pupil}  \geq 5.0\%$ , $ \Delta \text{Enrollment}  \geq 5.0\%$ , $ \Delta \text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
CAGR = $(\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: X-Large (4001-10K FTE)

Chapter 70 Aid and Net School Spending (NSS). Weighted avg funding per district: State aid (Ch70), Required local contribution, and Actual spending above requirement. Funding component table shaded by comparison to weighted average of all Western MA (excluding Springfield)

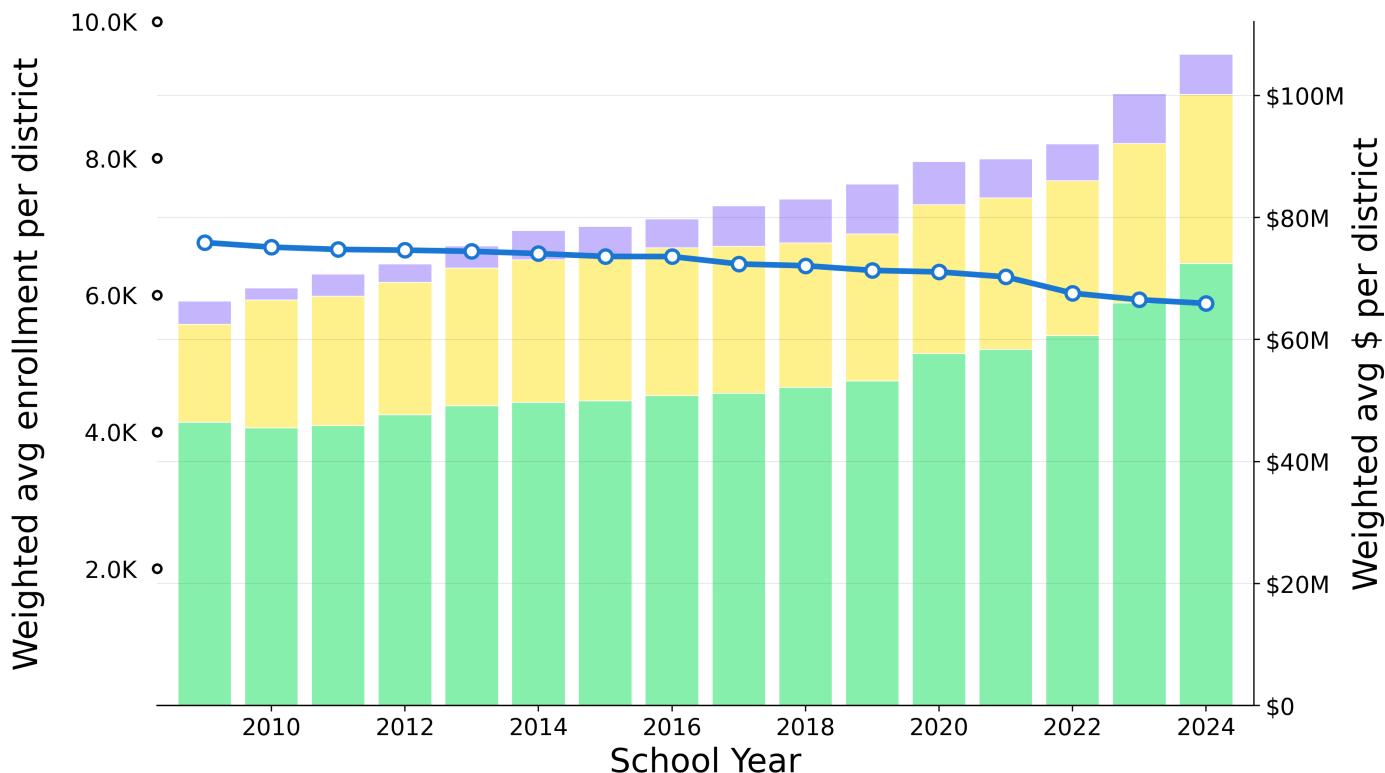


Figure 24

Table 26

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$3,837,084	3.68%	3.32%	-4.21%	\$6,599,054
Req NSS (minus Ch70)	\$16,053,654	3.72%	1.74%	2.89%	\$27,764,807
Ch70 Aid	\$46,414,933	3.01%	3.83%	6.36%	\$72,407,809
Total (Actual NSS)	\$66,305,670	3.23%	3.21%	4.55%	\$106,771,670

Table 27

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	6,769	-0.9%	-1.2%	-1.6%	5,880
Shading vs Western cohort: $ \Delta\$/\text{pupil}  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
CAGR = $(\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Outliers (Springfield at 23,723 FTE in 2024)

PPE vs Enrollment — Weighted average per district. Expense category table shaded by comparison to weighted average of all Western MA (excluding Springfield)

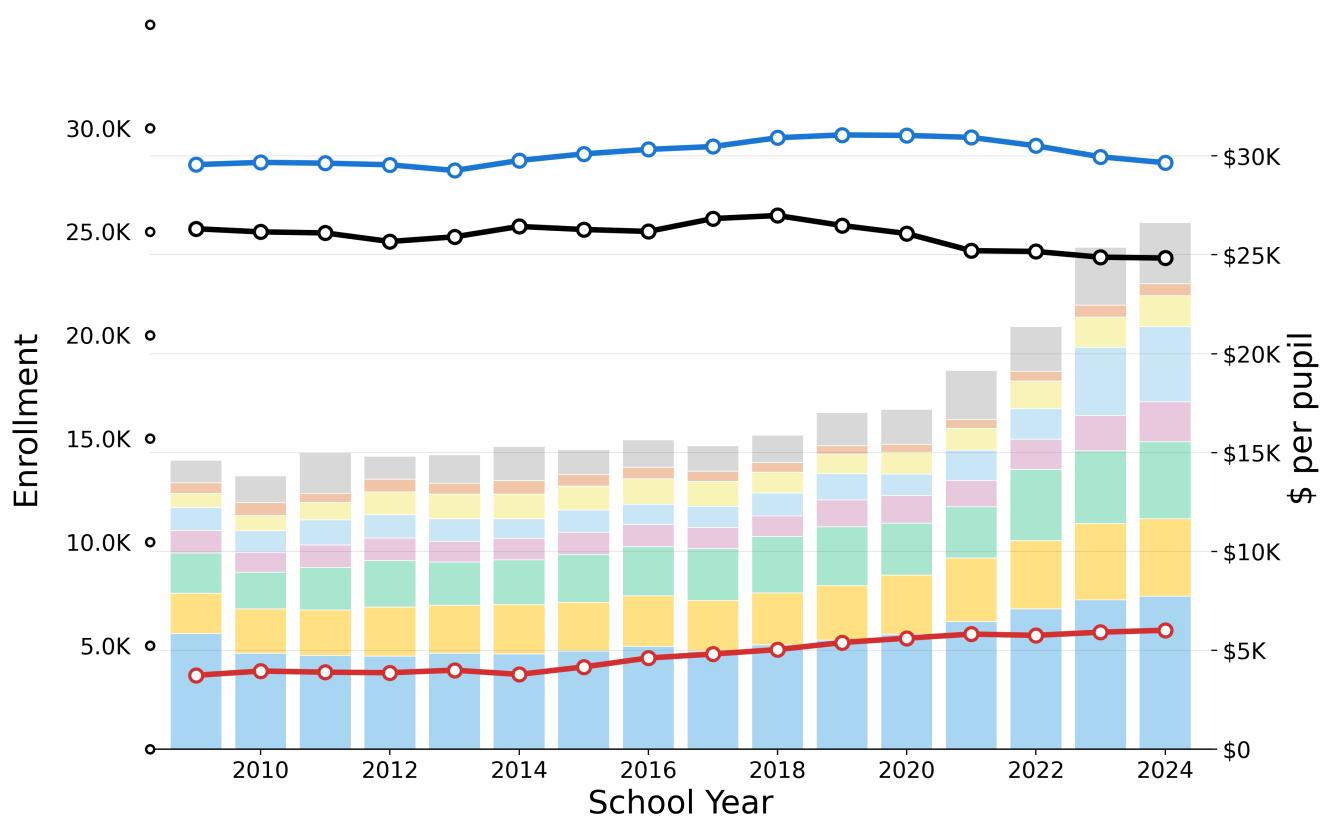


Figure 25

Table 28

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$1,143	+6.8%	+5.9%	+12.9%	\$3,071
Administration	\$533	+0.9%	-1.1%	+7.9%	\$609
Instructional Leadership	\$719	+5.3%	+2.4%	+9.8%	\$1,571
Operations and Maintenance	\$1,150	+8.3%	+14.3%	+23.3%	\$3,806
Other Teaching Services	\$1,143	+3.8%	+6.4%	+8.2%	\$2,014
Pupil Services	\$2,031	+4.4%	+5.6%	+5.6%	\$3,901
Insurance, Retirement and Other	\$2,050	+4.4%	+4.6%	+7.2%	\$3,906
Teachers	\$5,839	+1.9%	+4.8%	+7.0%	\$7,737
Total	\$14,608	+4.1%	+5.7%	+9.4%	\$26,615

Table 29

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	25,137	-0.4%	-0.6%	-1.3%	23,723
Foundation Enrollment	28,235	+0.0%	-0.0%	-0.9%	28,326
Out-of-District FTE Pupils	3,571	+3.2%	+4.7%	+2.2%	5,745

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$  Above Western MA (excl. Springfield)

$$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$$

Below Western MA (excl. Springfield)

## All Western MA Traditional Districts: Outliers (Springfield at 23,723 FTE in 2024)

Chapter 70 Aid and Net School Spending (NSS). Weighted avg funding per district: State aid (Ch70), Required local contribution, and Actual spending above requirement. Funding component table shaded by comparison to weighted average of all Western MA (excluding Springfield)

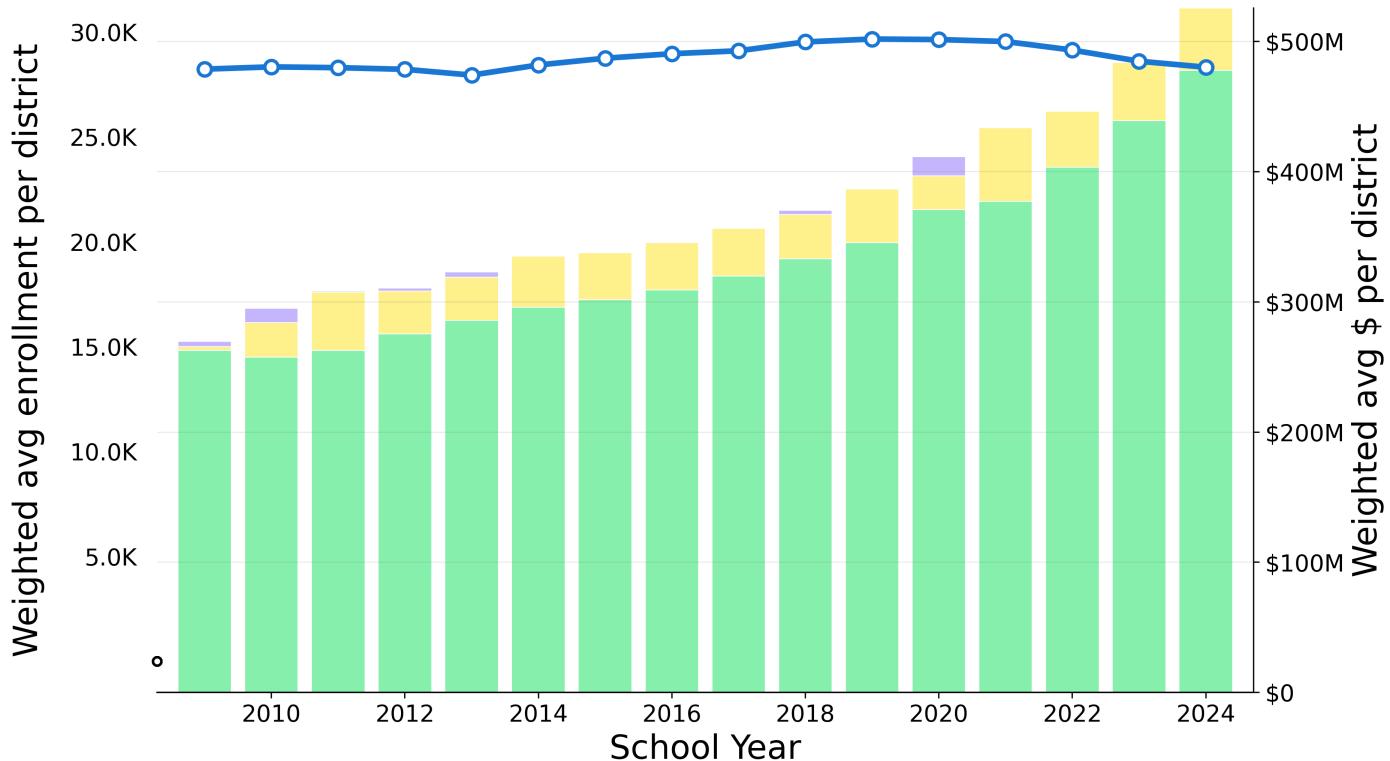


Figure 26

Table 30

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$-4,240,600	-59.67%	-49.84%	22.43%	\$-5
Req NSS (minus Ch70)	\$6,986,338	13.71%	2.05%	3.02%	\$48,026,087
Ch70 Aid	\$262,734,913	4.07%	4.91%	6.70%	\$477,737,768
Total (Actual NSS)	\$265,480,651	4.66%	4.61%	6.33%	\$525,763,850

Table 31

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	28,235	+0.0%	-0.0%	-0.9%	28,326
Shading vs Western cohort: $ \Delta\$/\text{pupil}  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western MA (excl. Springfield)
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western MA (excl. Springfield)

## Amherst-Pelham Regional

### PPE vs Enrollment

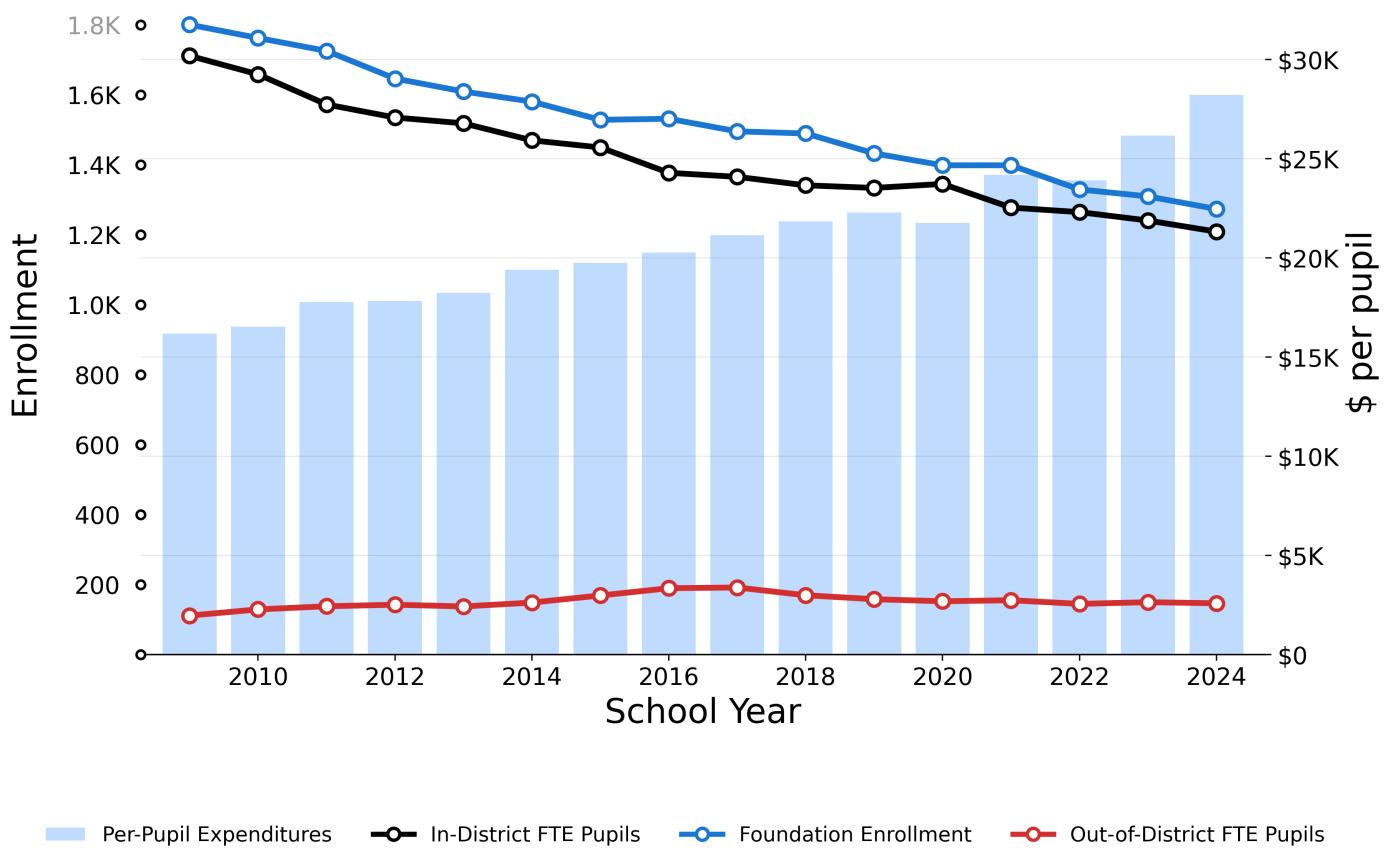


Figure 27

## Amherst-Pelham Regional

PPE vs Enrollment. Per-pupil expenditures stacked by expense category, expense category table shaded by comparison to weighted average of Western MA 2024 Medium cohort

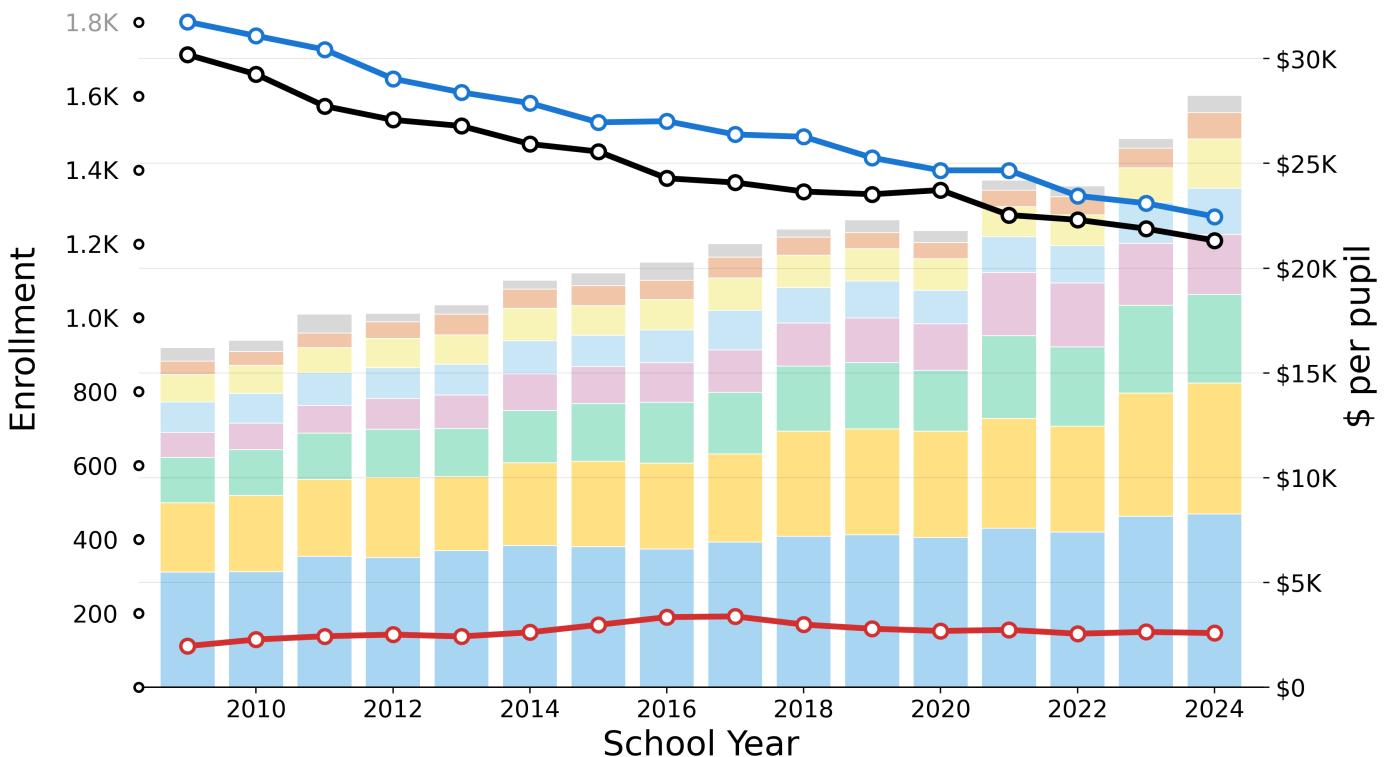


Figure 28

Table 32

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$646	+1.4%	+6.5%	+5.5%	\$799
Administration	\$652	+4.6%	+3.5%	+11.0%	\$1,277
Instructional Leadership	\$1,289	+4.0%	+4.2%	+8.6%	\$2,336
Operations and Maintenance	\$1,459	+2.8%	+3.4%	+4.6%	\$2,221
Other Teaching Services	\$1,199	+5.9%	+5.1%	+6.1%	\$2,851
Pupil Services	\$2,170	+4.6%	+5.4%	+6.0%	\$4,231
Insurance, Retirement and Other	\$3,305	+4.3%	+4.7%	+4.4%	\$6,248
Teachers	\$5,491	+2.8%	+2.0%	+2.6%	\$8,270
Total	\$16,211	+3.8%	+3.8%	+4.8%	\$28,233

Table 33

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	1,712	-2.3%	-1.9%	-1.9%	1,209
Foundation Enrollment	1,801	-2.3%	-2.1%	-2.3%	1,274
Out-of-District FTE Pupils	112	+1.8%	-0.1%	-1.5%	147

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$  Above Western (Medium (801-1600 FTE))

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Below Western (Medium (801-1600 FTE))

## Amherst-Pelham Regional

Chapter 70 Aid, Net School Spending (NSS), and Foundation Enrollment. Funding component table shaded by comparison to weighted average of Western MA Medium (801-1600 FTE)

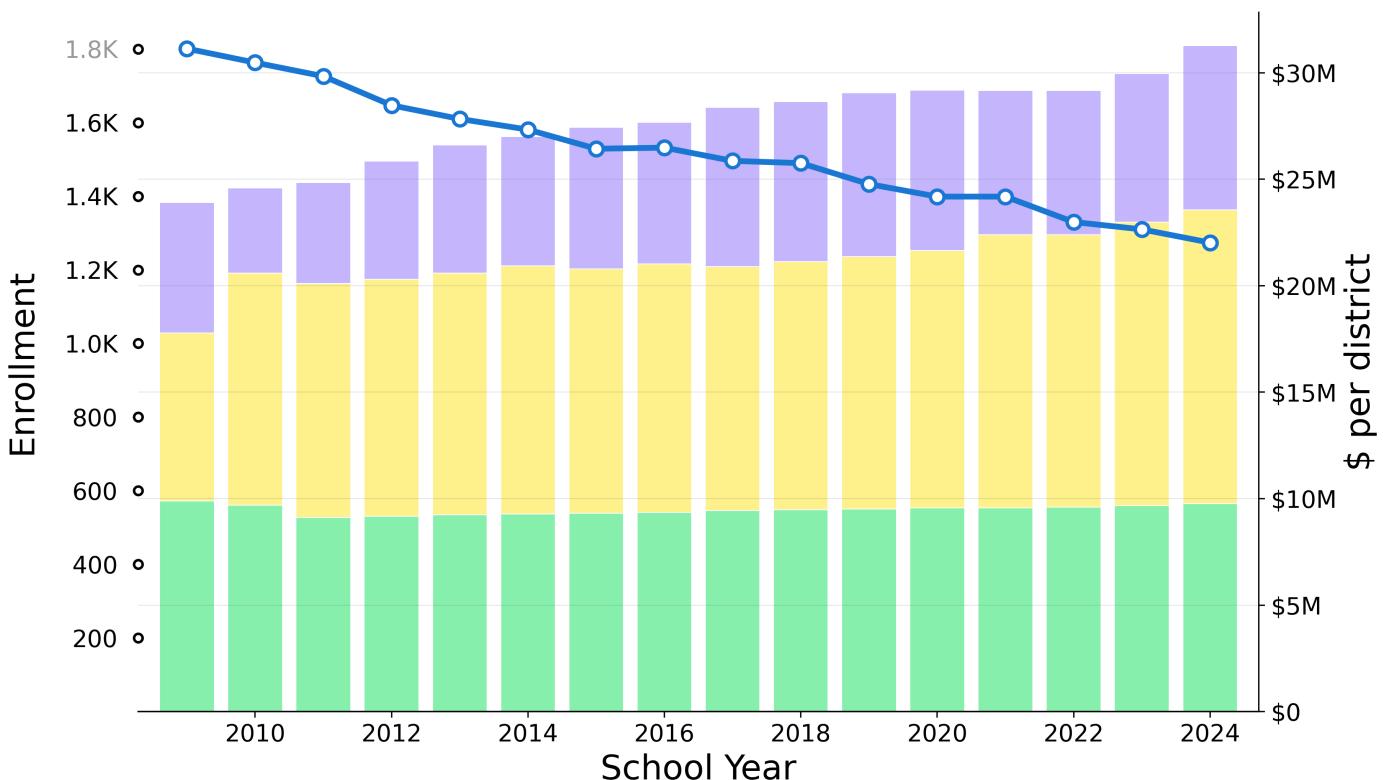


Figure 29

Table 34

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$6,135,991	1.54%	2.44%	0.08%	\$7,719,079
Req NSS (minus Ch70)	\$7,893,198	3.80%	1.70%	3.09%	\$13,803,543
Ch70 Aid	\$9,883,632	-0.09%	0.51%	0.49%	\$9,756,397
Total (Actual NSS)	\$23,912,821	1.81%	1.48%	1.48%	\$31,279,019

Table 35

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	1,801	-2.3%	-2.1%	-2.3%	1,274
Shading vs Western cohort: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western (Medium (801-1600 FTE))
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western (Medium (801-1600 FTE))

## Amherst

### PPE vs Enrollment

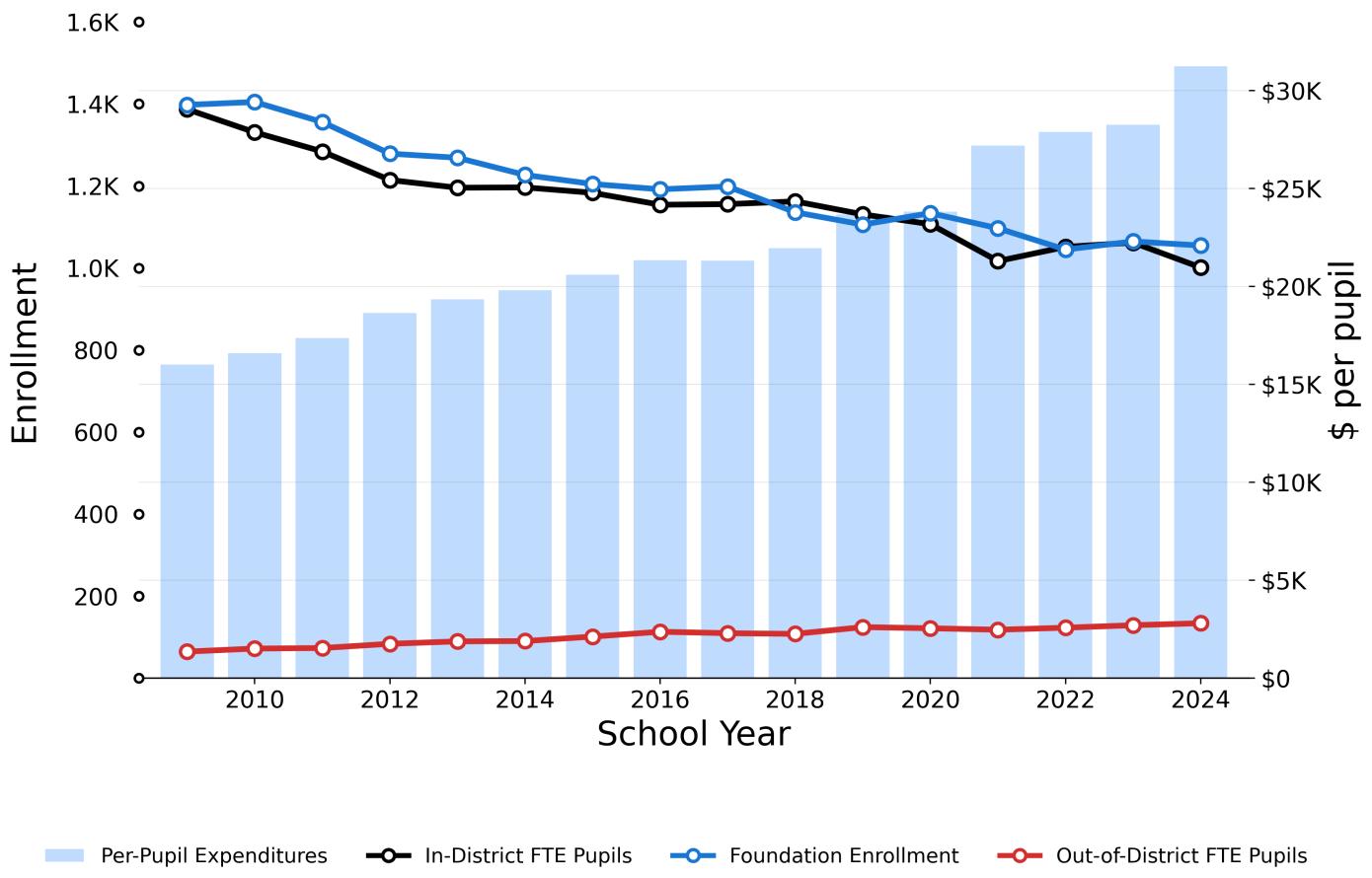


Figure 30

## Amherst

PPE vs Enrollment. Per-pupil expenditures stacked by expense category, expense category table shaded by comparison to weighted average of Western MA 2024 Medium cohort

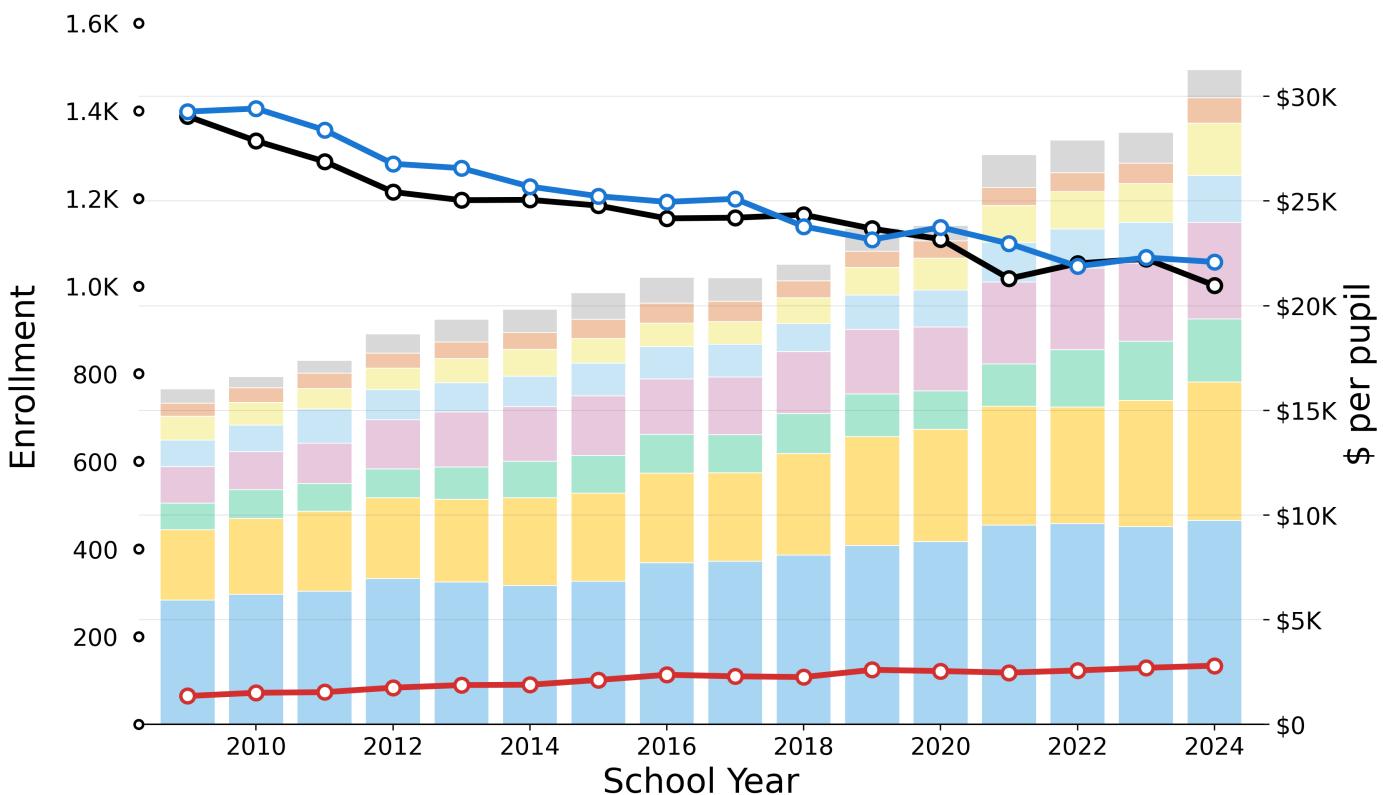


Figure 31

Table 36

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$684	+4.5%	+1.9%	+4.0%	\$1,328
Administration	\$627	+4.5%	+4.1%	+9.6%	\$1,213
Instructional Leadership	\$1,134	+5.4%	+7.0%	+13.5%	\$2,498
Operations and Maintenance	\$1,264	+3.9%	+4.5%	+6.4%	\$2,248
Other Teaching Services	\$1,762	+6.6%	+5.9%	+8.4%	\$4,612
Pupil Services	\$1,261	+6.0%	+5.5%	+8.3%	\$3,018
Insurance, Retirement and Other	\$3,353	+4.6%	+4.7%	+4.9%	\$6,605
Teachers	\$5,944	+3.4%	+3.9%	+2.7%	\$9,745
Total	\$16,029	+4.6%	+4.7%	+5.7%	\$31,267

Table 37

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	1,387	-2.1%	-1.8%	-2.4%	1,002
Foundation Enrollment	1,398	-1.9%	-1.5%	-0.9%	1,055
Out-of-District FTE Pupils	65	+5.0%	+4.0%	+1.5%	134

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$

Above Western (Medium (801-1600 FTE))

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Below Western (Medium (801-1600 FTE))

## Amherst

Chapter 70 Aid, Net School Spending (NSS), and Foundation Enrollment. Funding component table shaded by comparison to weighted average of Western MA Medium (801-1600 FTE)

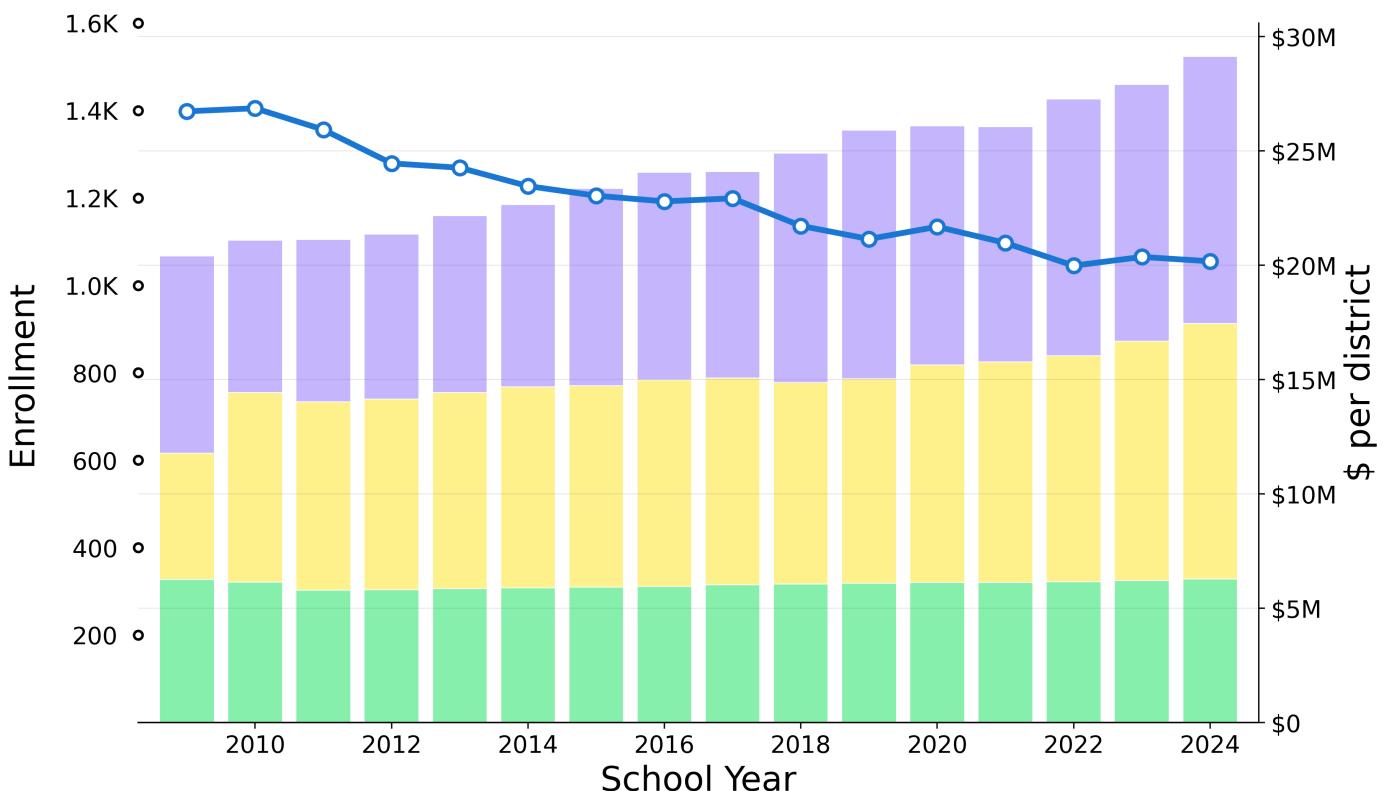


Figure 32

Table 38

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$8,624,390	2.05%	3.90%	1.45%	\$11,687,238
Req NSS (minus Ch70)	\$5,517,195	4.81%	2.43%	4.54%	\$11,168,148
Ch70 Aid	\$6,266,707	0.01%	0.64%	0.62%	\$6,280,773
Total (Actual NSS)	\$20,408,292	2.40%	2.55%	2.37%	\$29,136,159

Table 39

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	1,398	-1.9%	-1.5%	-0.9%	1,055
Shading vs Western cohort: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western (Medium (801-1600 FTE))
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western (Medium (801-1600 FTE))

## Leverett

### PPE vs Enrollment

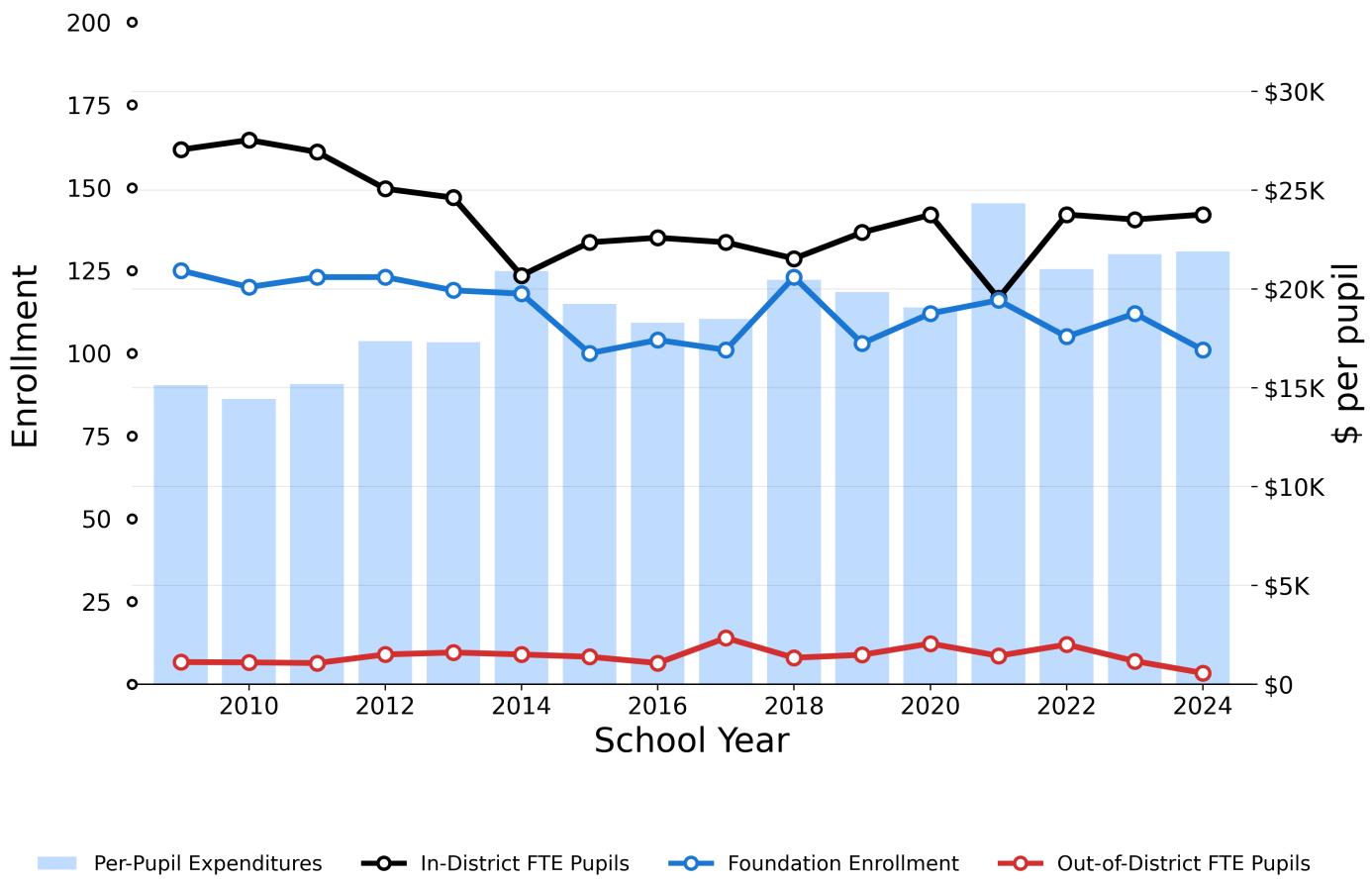


Figure 33

## Leverett

PPE vs Enrollment. Per-pupil expenditures stacked by expense category, expense category table shaded by comparison to weighted average of Western MA 2024 Tiny cohort

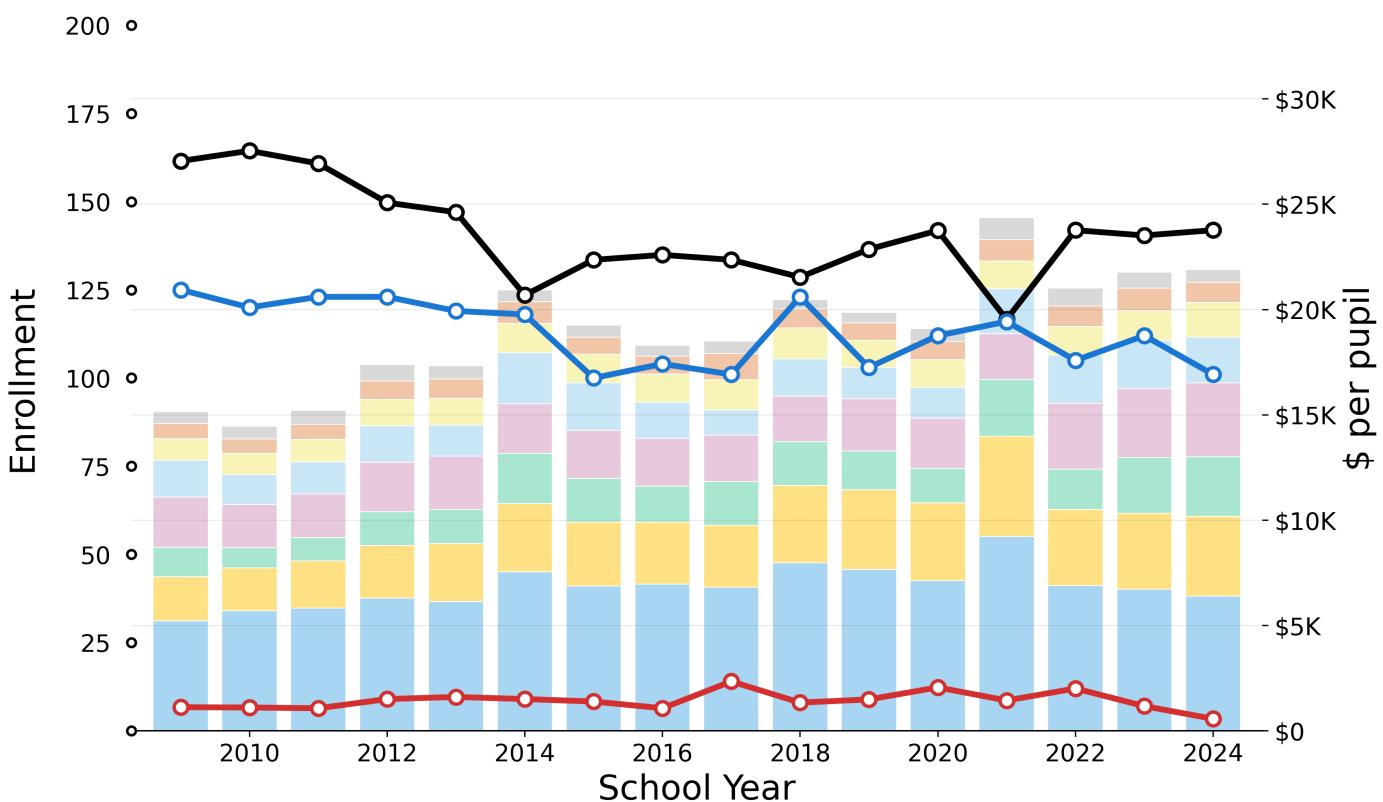


Figure 34

Table 40

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$575	+0.4%	+0.9%	+3.9%	\$608
Administration	\$715	+1.9%	-0.8%	+2.9%	\$953
Instructional Leadership	\$1,015	+3.3%	+1.8%	+5.4%	\$1,663
Operations and Maintenance	\$1,755	+1.4%	-1.1%	+7.7%	\$2,158
Other Teaching Services	\$2,385	+2.6%	+4.1%	+7.3%	\$3,526
Pupil Services	\$1,395	+4.8%	+1.6%	+8.8%	\$2,814
Insurance, Retirement and Other	\$2,098	+4.0%	+1.6%	+0.1%	\$3,793
Teachers	\$5,218	+1.4%	-1.6%	-3.6%	\$6,395
Total	\$15,156	+2.5%	+0.5%	+2.0%	\$21,910

Table 41

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	162	-0.9%	+1.4%	+0.8%	142
Foundation Enrollment	125	-1.4%	-1.5%	-0.4%	101
Out-of-District FTE Pupils	7	-4.4%	-9.3%	-17.5%	3
Shading vs Western cohort: $ \Delta \$/\text{pupil}  \geq 5.0\%$ , $ \Delta \text{Enrollment}  \geq 5.0\%$ , $ \Delta \text{CAGR}  \geq 1.0\text{pp}$					Above Western (Tiny (0-200 FTE))
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western (Tiny (0-200 FTE))

## Leverett

Chapter 70 Aid, Net School Spending (NSS), and Foundation Enrollment. Funding component table shaded by comparison to weighted average of Western MA Tiny (0-200 FTE)

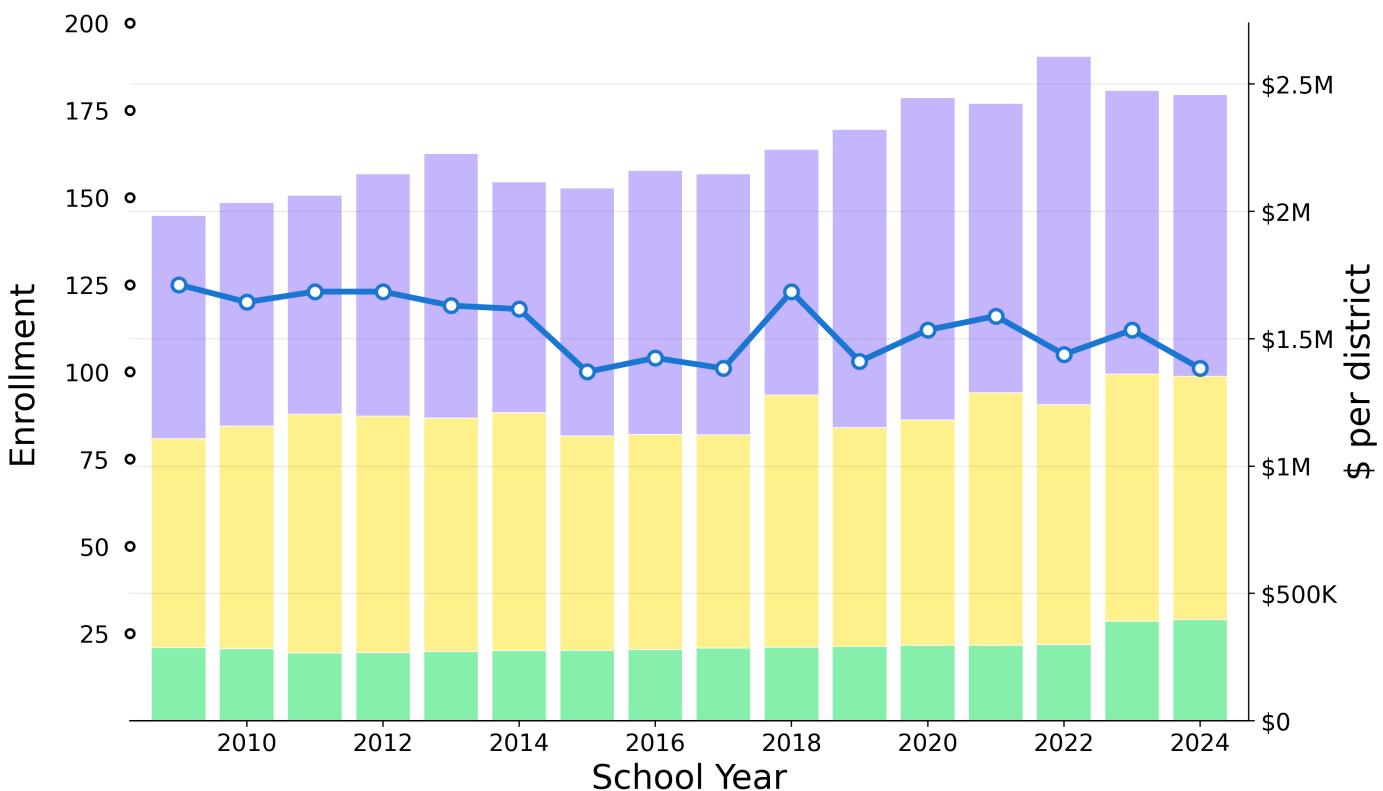


Figure 35

Table 42

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$876,790	1.56%	2.03%	-1.13%	\$1,106,701
Req NSS (minus Ch70)	\$819,372	1.02%	0.21%	2.15%	\$954,740
Ch70 Aid	\$287,813	2.17%	3.75%	6.32%	\$396,968
Total (Actual NSS)	\$1,983,975	1.44%	1.52%	1.15%	\$2,458,409

Table 43

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	125	-1.4%	-1.5%	-0.4%	101
Shading vs Western cohort: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western (Tiny (0-200 FTE))
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western (Tiny (0-200 FTE))

## Pelham

### PPE vs Enrollment

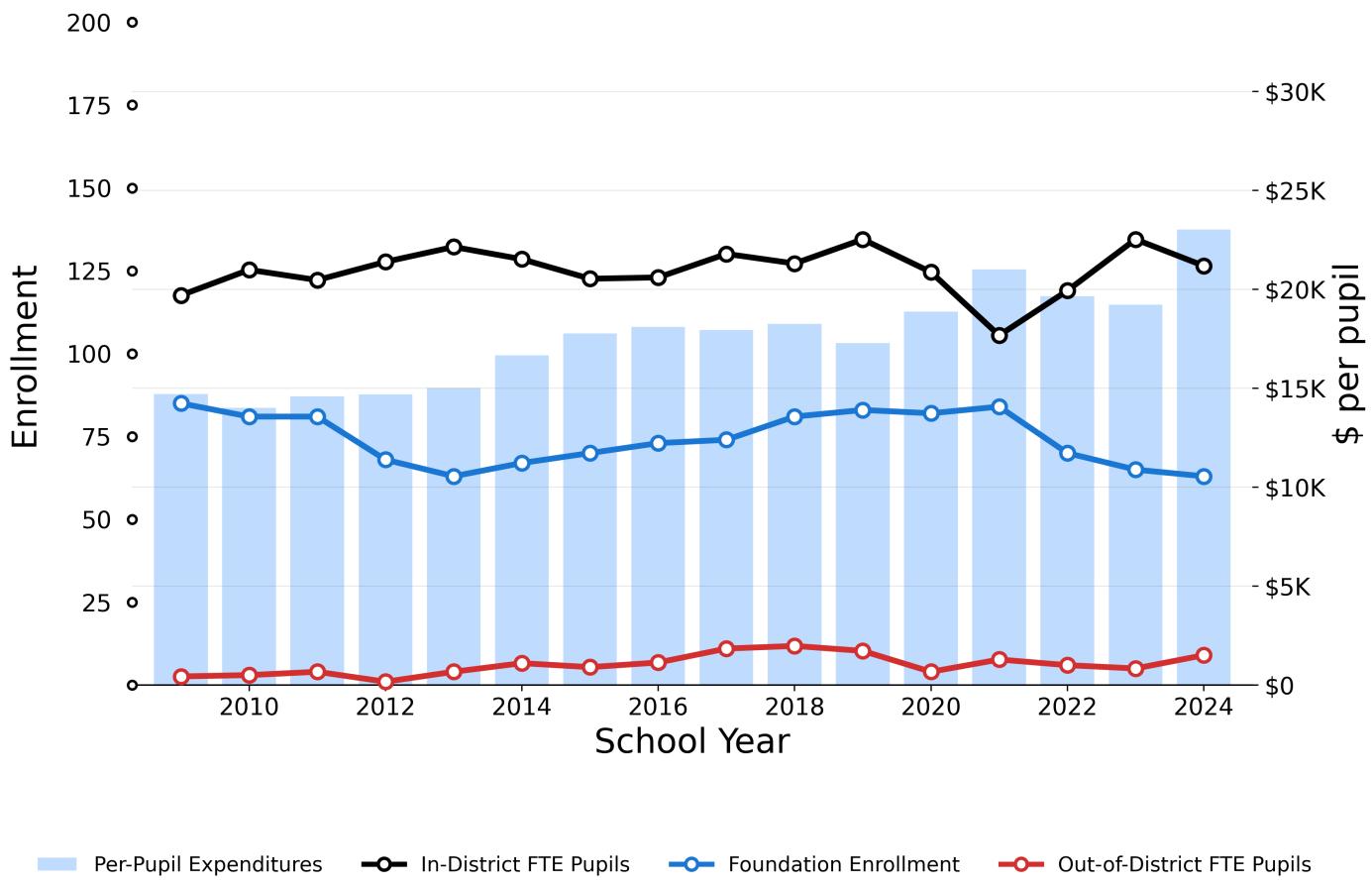


Figure 36

## Pelham

PPE vs Enrollment. Per-pupil expenditures stacked by expense category, expense category table shaded by comparison to weighted average of Western MA 2024 Tiny cohort

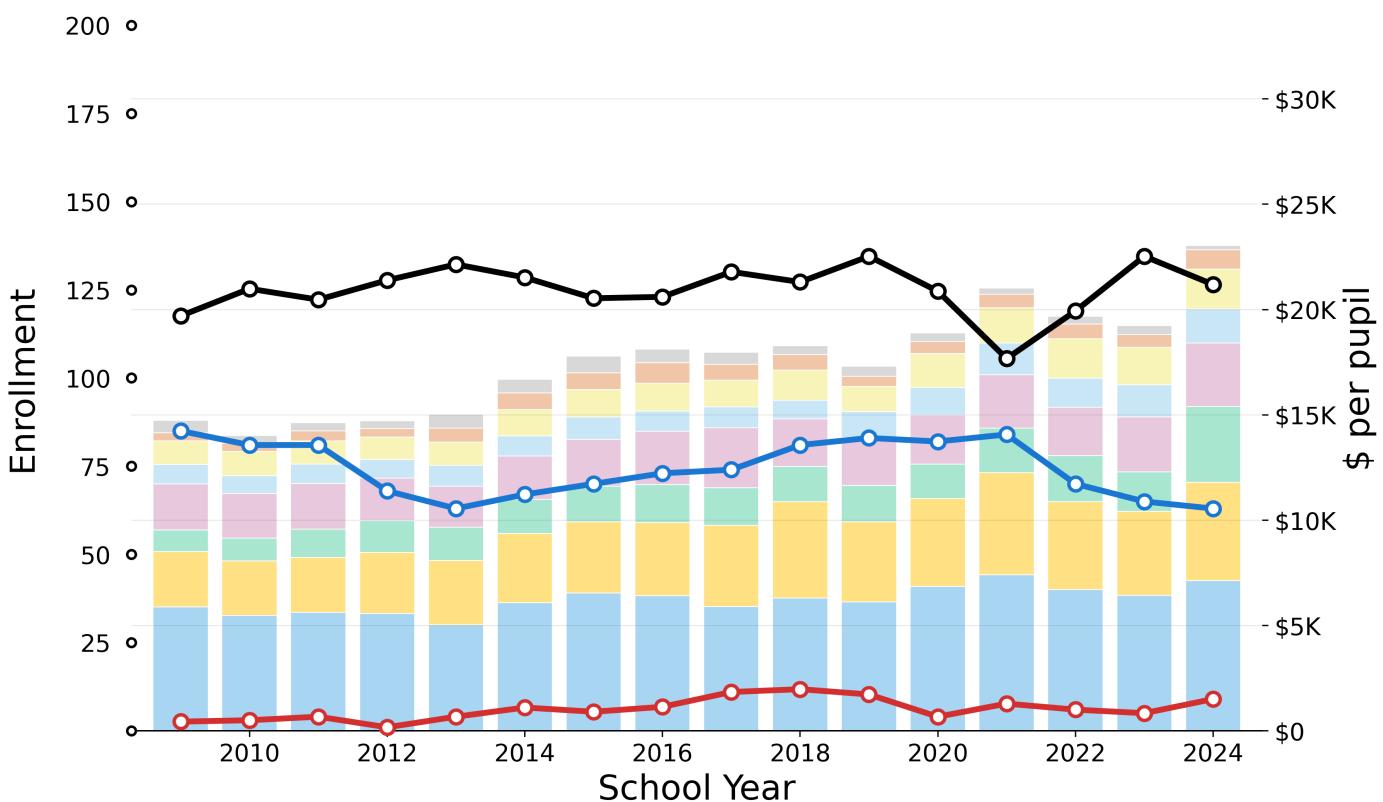


Figure 37

Table 44

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$580	-6.6%	-10.7%	-15.0%	\$207
Administration	\$390	+5.9%	+1.4%	+13.4%	\$917
Instructional Leadership	\$1,123	+3.5%	+4.2%	+9.6%	\$1,885
Operations and Maintenance	\$920	+3.8%	+5.5%	+5.6%	\$1,614
Other Teaching Services	\$2,184	+2.2%	+3.9%	+5.8%	\$3,010
Pupil Services	\$1,032	+8.7%	+8.4%	+15.8%	\$3,610
Insurance, Retirement and Other	\$2,615	+3.9%	+3.6%	+4.3%	\$4,670
Teachers	\$5,889	+1.3%	+1.6%	+3.1%	\$7,127
Total	\$14,733	+3.0%	+3.3%	+5.9%	\$23,040

Table 45

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	118	+0.5%	-0.2%	-1.2%	126
Foundation Enrollment	85	-2.0%	-0.6%	-5.4%	63
Out-of-District FTE Pupils	3	+8.6%	+3.2%	-2.7%	9

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$

Above Western (Tiny (0-200 FTE))

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Below Western (Tiny (0-200 FTE))

## Pelham

Chapter 70 Aid, Net School Spending (NSS), and Foundation Enrollment. Funding component table shaded by comparison to weighted average of Western MA Tiny (0-200 FTE)

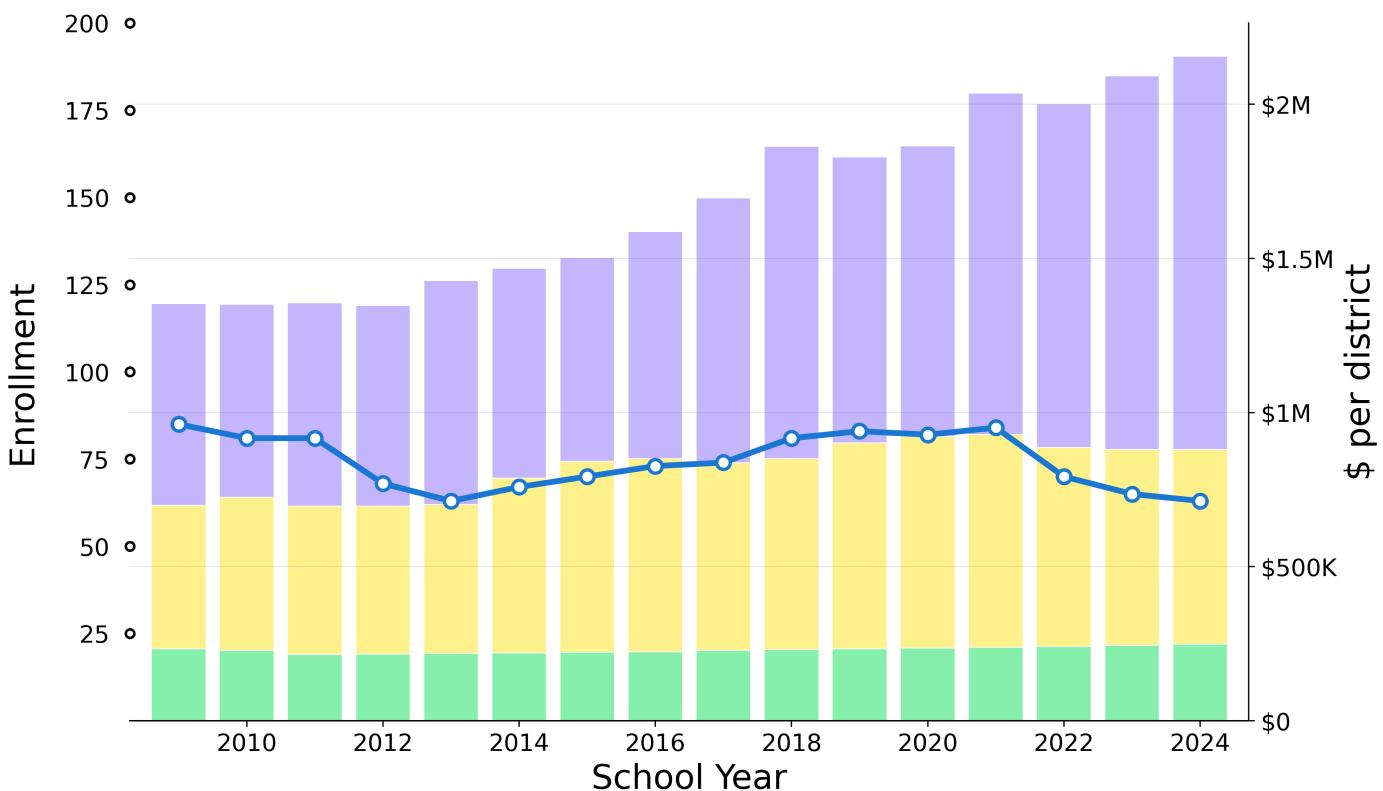


Figure 38

Table 46

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$654,027	4.56%	6.48%	6.59%	\$1,275,888
Req NSS (minus Ch70)	\$466,026	2.05%	1.10%	-1.12%	\$631,932
Ch70 Aid	\$233,169	0.42%	1.19%	1.27%	\$248,263
Total (Actual NSS)	\$1,353,222	3.15%	3.92%	3.35%	\$2,156,083

Table 47

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	85	-2.0%	-0.6%	-5.4%	63
Shading vs Western cohort: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western (Tiny (0-200 FTE))
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western (Tiny (0-200 FTE))

## Shutesbury

### PPE vs Enrollment

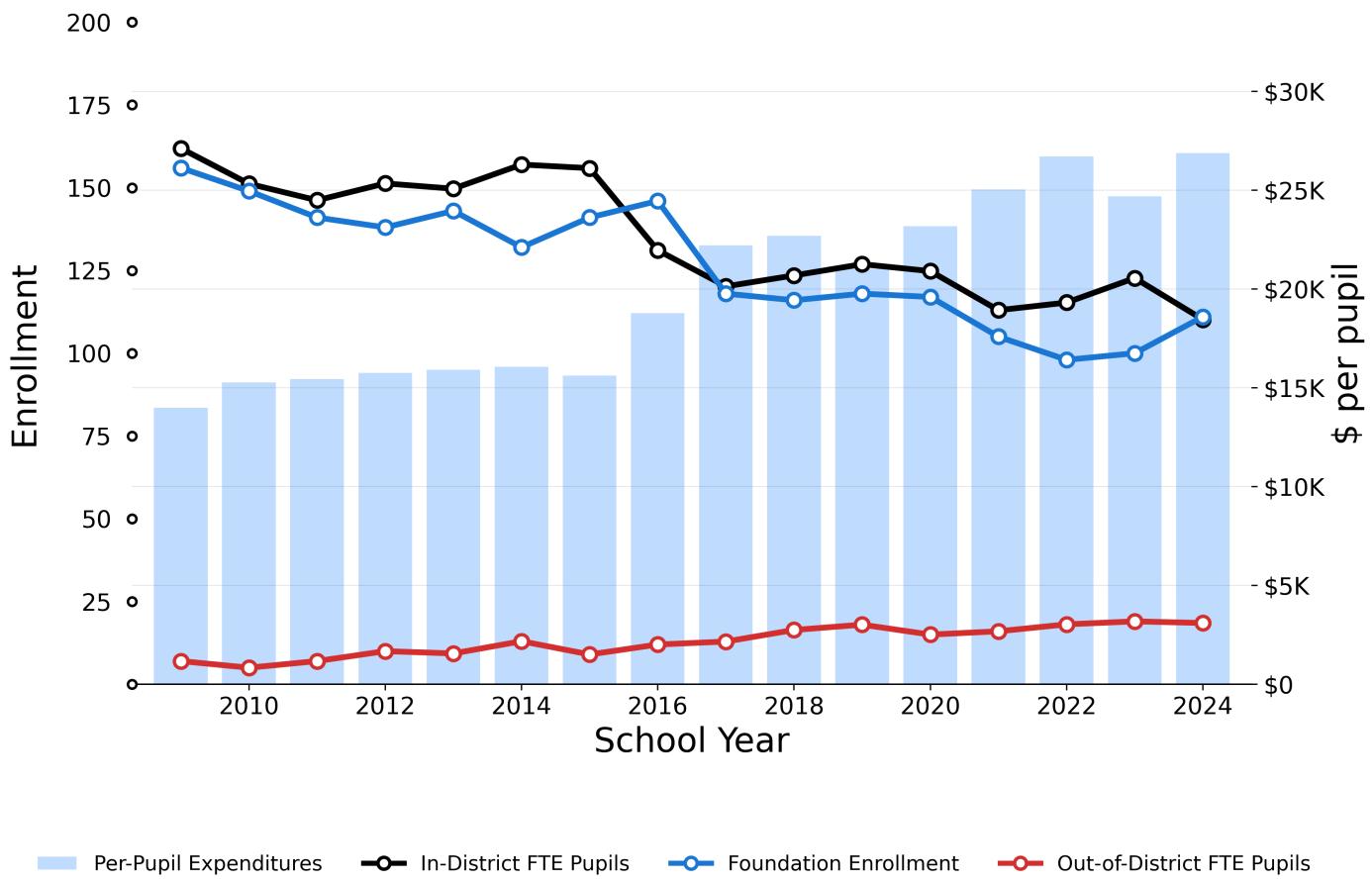


Figure 39

## Shutesbury

PPE vs Enrollment. Per-pupil expenditures stacked by expense category, expense category table shaded by comparison to weighted average of Western MA 2024 Tiny cohort

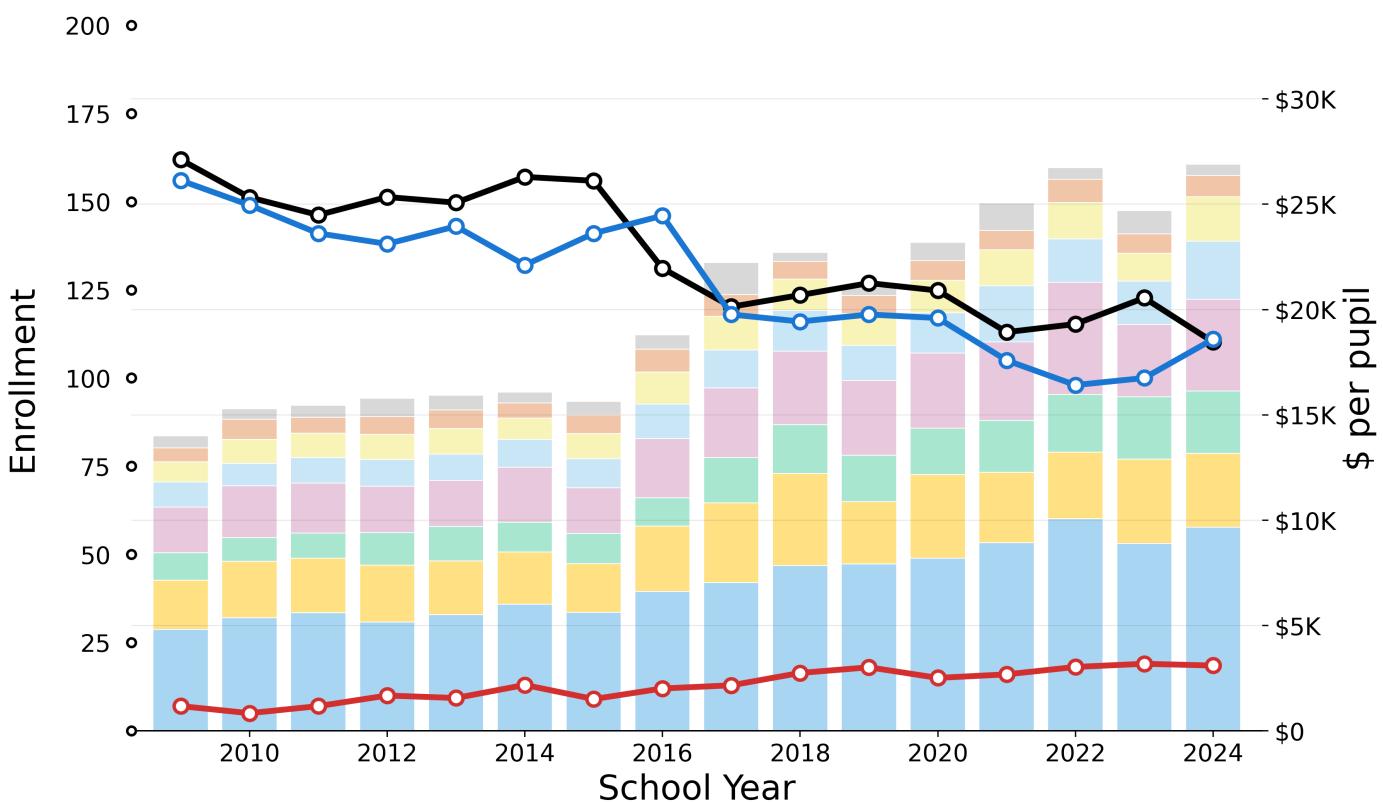


Figure 40

Table 48

Category	2009 \$/pupil	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$/pupil
Other	\$580	-0.4%	+0.6%	+7.2%	\$545
Administration	\$652	+3.0%	+3.4%	+3.5%	\$1,015
Instructional Leadership	\$969	+5.3%	+7.7%	+6.8%	\$2,103
Operations and Maintenance	\$1,180	+5.8%	+7.5%	+10.6%	\$2,754
Other Teaching Services	\$2,185	+4.7%	+5.3%	+4.2%	\$4,359
Pupil Services	\$1,292	+5.7%	+7.6%	+6.1%	\$2,962
Insurance, Retirement and Other	\$2,332	+2.7%	+3.5%	+3.3%	\$3,501
Teachers	\$4,821	+4.7%	+4.9%	+4.1%	\$9,669
Total	\$14,011	+4.4%	+5.3%	+5.0%	\$26,908

Table 49

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
In-District FTE Pupils	162	-2.5%	-3.5%	-2.8%	110
Foundation Enrollment	156	-2.2%	-1.7%	-1.2%	111
Out-of-District FTE Pupils	7	+6.7%	+3.6%	+0.5%	18

Shading vs Western cohort:  $|\Delta \$/\text{pupil}| \geq 5.0\%$ ,  $|\Delta \text{Enrollment}| \geq 5.0\%$ ,  $|\Delta \text{CAGR}| \geq 1.0\text{pp}$

Above Western (Tiny (0-200 FTE))

CAGR =  $(\text{End}/\text{Start})^{(1/\text{years})} - 1$

Below Western (Tiny (0-200 FTE))

## Shutesbury

Chapter 70 Aid, Net School Spending (NSS), and Foundation Enrollment. Funding component table shaded by comparison to weighted average of Western MA Tiny (0-200 FTE)

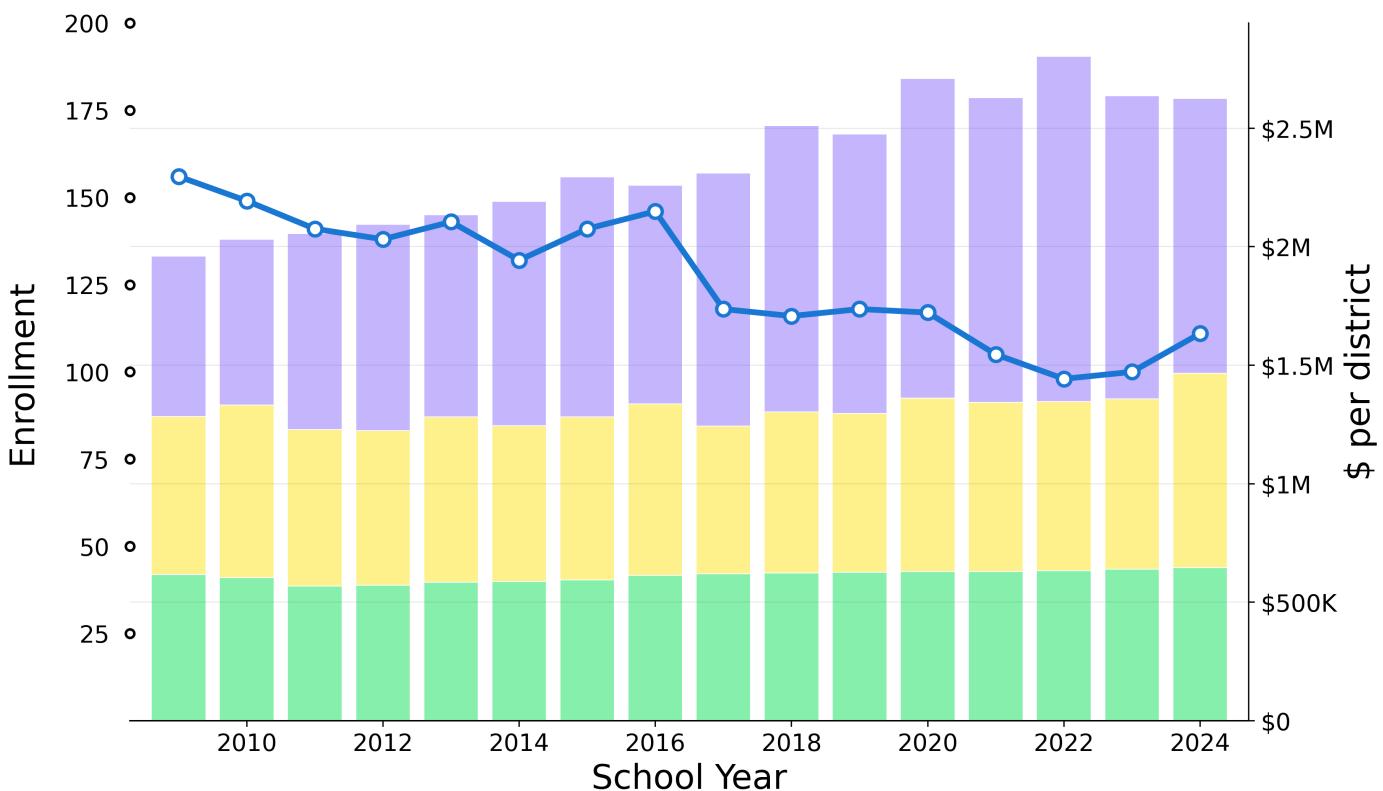


Figure 41

Table 50

Component	2009 \$	CAGR 15y	CAGR 10y	CAGR 5y	2024 \$
Actual NSS (minus Req NSS)	\$675,633	3.67%	2.06%	-0.35%	\$1,159,959
Req NSS (minus Ch70)	\$667,645	1.38%	2.24%	4.16%	\$820,401
Ch70 Aid	\$616,453	0.31%	0.94%	0.60%	\$645,986
Total (Actual NSS)	\$1,959,731	1.97%	1.83%	1.18%	\$2,626,346

Table 51

Enrollment	2009	CAGR 15y	CAGR 10y	CAGR 5y	2024
Foundation Enrollment	156	-2.2%	-1.7%	-1.2%	111
Shading vs Western cohort: $ \Delta\$/pupil  \geq 5.0\%$ , $ \Delta\text{Enrollment}  \geq 5.0\%$ , $ \Delta\text{CAGR}  \geq 1.0\text{pp}$					Above Western (Tiny (0-200 FTE))
$\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$					Below Western (Tiny (0-200 FTE))

## Appendix A. Data Sources & Calculation Methodology

Threshold Analysis: Statistical Rationale for 5% / 1pp Shading Thresholds

Table 52

Scenario	PPE/ Enrollment	CAGR	PPE Sensitivity	CAGR Sensitivity	Balance Ratio	Assessment
Previous (2%/2pp)	2.0%	2.00pp	0.09 SD	0.62 SD	6.97x	Unbalanced
Equal SD (5%/0.72pp)	5.0%	0.72pp	0.22 SD	0.22 SD	1.00x	Too tight for CAGR
<b>Selected (5%/1pp)</b>	<b>5.0%</b>	<b>1.00pp</b>	<b>0.22 SD</b>	<b>0.31 SD</b>	<b>1.41x</b>	<b>Well-balanced</b>
Proportional (5%/5pp)	5.0%	5.00pp	0.22 SD	1.55 SD	6.97x	CAGR too loose

### Rationale for 5% / 1pp Shading Thresholds

**Problem Statement:** Different metrics have different natural variation. Using a uniform threshold (e.g., 2% for everything) creates unbalanced sensitivity where some comparisons over-flag minor differences while others under-flag meaningful ones.

**Data Analysis:** Examining all 59 Western MA traditional districts:

- **PPE variation:** Mean = \$24,237, SD = \$5,462, CV = 0.225 (22.5% typical variation)
- **CAGR variation:** Mean = 6.00pp, SD = 3.24pp, CV = 0.540 (54% typical variation)
- **Key insight:** CAGR naturally varies 2.4x more than PPE relative to their means

### Methodology:

1. Calculated how many standard deviations each threshold represents
2. Compared 'sensitivity' (how strict each threshold is relative to typical variation)
3. Tested scenarios ranging from 2%/2pp (original) to 5%/5pp (proportional loosening)
4. Selected thresholds that balance statistical rigor with practical communication

### Scenario Comparison:

- **Previous (2% / 2pp):** PPE=0.09 SD, CAGR=0.62 SD → CAGR 7x more sensitive (unbalanced)
- **Equal SD (5% / 0.72pp):** Both=0.22 SD → Perfect balance but 0.72pp too precise to communicate
- **Selected (5% / 1pp):** PPE=0.22 SD, CAGR=0.31 SD → 1.4x ratio (well-balanced, simple numbers)
- **Proportional (5% / 5pp):** PPE=0.22 SD, CAGR=1.55 SD → CAGR 7x looser (under-flags growth differences)

### Selected Thresholds (5% / 1pp):

- **5% for PPE and enrollment:** Flags differences  $\geq \$1,212$  (at mean), or  $\sim 1/5$  of typical variation
- **1pp for CAGR:** Flags growth rate differences  $\geq 1\text{pp}$ , or  $\sim 1/3$  of typical variation
- **Balance ratio:** 1.4x (CAGR slightly more sensitive, recognizing higher natural variation)
- **Flagging rates:** ~82% for PPE, ~76% for CAGR (similar selectivity)

### Design Philosophy: Why ~80% Flagging Rates Work with Gradient Shading

With **gradient shading** (not binary on/off), having ~80% of comparisons show some level of shading is actually ideal. The threshold acts as a **noise floor** that filters trivial differences while the graduated intensity creates three distinct levels of information:

- **No shading (white background):** Districts are statistically similar to their cohort (differences  $<5\% / <1\text{pp}$ )
- **Light shading (subtle color):** Notable differences worth attention but not alarming
- **Intense shading (saturated color):** Exceptional outliers that immediately grab the eye

This creates a natural visual hierarchy where readers' eyes are drawn to the most intense colors (true outliers) while still being able to see the full pattern of variation across the lighter-shaded cells. The threshold filters out noise while the gradient intensity tells you *how much* a district differs from its peers.

#### **The Goldilocks Solution (5% / 1pp):**

This threshold pair hits the sweet spot across multiple dimensions:

##### **Statistical balance:**

- Similar flagging rates (~82% vs ~76%) despite very different natural variation (CV = 22.5% vs 54%)
- Proportional to underlying variation - neither metric dominates the visual attention

##### **Practical communication:**

- Round, memorable numbers (5% and 1pp)
- Easy to explain: "We flag 5% differences in dollars/enrollment, 1 percentage point differences in growth rates"
- Contrast with alternatives: 0.72pp would be statistically perfect but impractically precise to communicate

##### **Appropriate sensitivity:**

- Loosens overly-tight previous thresholds (2%/2pp had 93% PPE flagging)
- Filters trivial noise while capturing meaningful differences
- Reserves intense shading for truly exceptional cases

**Shading Intensity:** Both metrics use graduated shading with darker colors for larger differences:

- PPE/Enrollment: 5% (lightest), 10%, 15%, 20%+ (darkest)
- CAGR: 1pp (lightest), 2pp, 3pp, 4pp+ (darkest)

**Note:** These thresholds apply to all comparison tables throughout this report. They represent a balance between highlighting meaningful differences and avoiding excessive flagging of normal variation.

# **Appendix A. Data Sources & Calculation Methodology (continued)**

## **1. Data Sources**

### **District Expenditures by Spending Category:**

Source: Massachusetts Department of Elementary and Secondary Education (DESE)

Last updated: August 12, 2025

URL: <https://educationontcareer.data.mass.gov/Finance-and-Budget/District-Expenditures-by-Spending-Category/er3w-dtyi/>

This dataset provides detailed expenditure data by category for all Massachusetts school districts, including:

- Expenditures per pupil (EPP) by spending category
- Student enrollment (In-District FTE, Out-of-District FTE, Total FTE)
- Annual data from FY1993 to present

### **Chapter 70 District Profiles:**

Source: Massachusetts Department of Elementary and Secondary Education (DESE)

URL: Various sources compiled in profile\_DataC70 spreadsheet tab

From the Ch70 website:

"Chapter 70 District Profiles: The on-line Chapter 70 database shows, for each school district, yearly spending and state aid totals in comparison to the foundation budget. Trend data is available for each year going back to FY1993."

This dataset provides:

- Chapter 70 Aid (c70aid): State aid received by each district
- Required Net School Spending (rqnss2): Minimum spending required by state law
- Actual Net School Spending (actualNSS): Total district spending on education
- Foundation Enrollment (distfoundenro): District foundation enrollment used for Ch70 funding calculations

### **Regional Classifications:**

Source: DESE district profiles and regional service mappings

- Districts classified as Western MA based on EOHHS regional designations
- School type classifications (Traditional, Regional, Charter, etc.)

# Appendix A. Data Sources & Calculation Methodology (continued)

## 2. Per-Pupil Expenditure (PPE) Definition

Per-pupil expenditure (PPE) is reported in the End of Year Report (EOYR) for municipal and regional districts, and is calculated by in-district FTE.

Per the DESE's Researcher's Guide, section XV. Using financial data:

*"The out-of-district total cannot be properly reported as a per-pupil expenditure because the cost of tuitions varies greatly depending on the reason for going out of district."*

## 3. Compound Annual Growth Rate (CAGR)

CAGR measures the mean annual growth rate over a specified time period, assuming constant growth.

**Formula:**  $\text{CAGR} = (\text{End\_Value} / \text{Start\_Value})^{(1 / \text{Years})} - 1$

**Example:** If expenditures grow from \$10,000 to \$12,000 over 5 years:

$$\text{CAGR} = (\$12,000 / \$10,000)^{(1/5)} - 1 = 1.2^{0.2} - 1 = 0.0371 = 3.71\% \text{ per year}$$

Note: CAGR requires positive values at both endpoints and is undefined if data is missing.

### 3a. Year-over-Year (YoY) Growth Rate

YoY growth rate measures the percentage change from one year to the next, providing insight into annual fluctuations.

**Formula:**  $\text{YoY Growth} = (\text{Value}_\text{year} / \text{Value}_\text{previous\_year} - 1) \times 100$

**Example:** If expenditures increase from \$10,000 (Year 1) to \$10,500 (Year 2):

$$\text{YoY Growth} = (\$10,500 / \$10,000 - 1) \times 100 = 5.0\%$$

If expenditures then increase to \$11,000 (Year 3):

$$\text{YoY Growth} = (\$11,000 / \$10,500 - 1) \times 100 = 4.76\%$$

#### Key differences from CAGR:

- YoY shows year-to-year changes; CAGR smooths growth over multiple years
- YoY captures annual volatility; CAGR assumes constant growth
- YoY is useful for identifying specific years with unusual growth patterns

## 4. Enrollment-Based Peer Groups

Districts are grouped by total in-district FTE enrollment into five cohorts (based on IQR analysis) for meaningful peer comparison:

**Tiny (0-200 FTE):** 17 districts (Cohort 1: below Q1)

**Member districts:** conway, erving, farmington river reg, florida, hancock, hawlemont, leverett, new salem-wendell, pelham, petersham, richmond, rowe, savoy, shutesbury, sunderland, and 2 others

**Small (201-800 FTE):** 13 districts (Cohort 2: Q1 to median)

**Member districts:** clarksburg, deerfield, frontier, gateway, granby, hadley, hatfield, lee, lenox, orange, pioneer valley, ralph c mahar, southern berkshire

**Medium (801-1600 FTE):** 15 districts (Cohort 3: median to Q3)

**Member districts:** amherst, amherst-pelham, berkshire hills, central berkshire, easthampton, gill-montague, greenfield, hoosac valley regional, mohawk trail, monson, mount greylock, north adams, palmer, southwick-tolland-granville regional school district, ware

**Large (1601-4000 FTE):** 9 districts (Cohort 4: above Q3)

**Member districts:** agawam, athol-royalston, belchertown, east longmeadow, hampden-wilbraham, longmeadow, ludlow, northampton, south hadley

**Springfield (~8000 FTE):** 1 district (Cohort 5: statistical outlier, analyzed separately)

**Member districts:** springfield

#### Weighted EPP Formula (for aggregate calculations):

For each category and year:  $\text{Weighted\_EPP} = \sum(\text{District\_EPP} \times \text{District\_In-District\_FTE}) / \sum(\text{District\_In-District\_FTE})$

**Example:** District A spends \$5,000/pupil (500 students), District B spends \$6,000/pupil (300 students)

$$\text{Weighted average} = (\$5,000 \times 500 + \$6,000 \times 300) / (500 + 300) = \$5,375/\text{pupil}$$

**Enrollment Calculation:** For each series (In-District FTE, Out-of-District FTE) and year: Sum across all member districts in the enrollment group.

## Appendix A. Data Sources & Calculation Methodology (continued)

### 5. Orange/Blue Shading Logic (District Comparison Tables)

District pages include tables comparing each district's per-pupil expenditures (PPE) and growth rates (CAGR) to their enrollment-based peer group aggregate (Tiny, Small, Medium, Large, or Springfield).

**Two independent tests determine shading:**

#### Test 1 - Dollar Amount (2024 \$/pupil column):

Compares the district's 2024 PPE to the baseline's 2024 PPE using relative difference: (District – Baseline) / Baseline

- **Orange shading:** District spending is  $\geq 5.0\%$  higher than baseline
- **Blue shading:** District spending is  $\geq 5.0\%$  lower than baseline
- **No shading:** Difference is less than 5.0%

#### Test 2 - CAGR (5y, 10y, 15y columns):

Compares the district's CAGR to the baseline's CAGR using absolute percentage point difference: District\_CAGR – Baseline\_CAGR

- **Orange shading:** District CAGR is  $\geq 1.0$  percentage points higher than baseline
- **Blue shading:** District CAGR is  $\geq 1.0$  percentage points lower than baseline
- **No shading:** Difference is less than 1.0 percentage points

**Shading Intensity:** Both metrics use graduated shading where darker colors indicate larger differences:

- PPE/Enrollment bins: 5% (lightest), 10%, 15%, 20%+ (darkest)
- CAGR bins: 1pp (lightest), 2pp, 3pp, 4pp+ (darkest)

**Key insight:** The tests are independent. An orange 2024 \$/pupil with unshaded CAGRs typically means:

- The district started at a higher baseline 15 years ago, AND
- The district has been growing at roughly the same rate as peers
- Therefore it remains higher in absolute dollars but isn't growing faster

**Statistical Rationale:** The 5%/1pp thresholds were selected through analysis of variation across all Western MA districts. See the Threshold Analysis page for detailed methodology and alternative scenarios considered.

## Appendix A. Data Sources & Calculation Methodology (continued)

### 6. Chapter 70 Aid and Net School Spending (NSS) Calculations

Chapter 70 is Massachusetts' primary state aid program for K-12 education. Net School Spending (NSS) is the total amount a district spends on education from local and state sources.

#### Data Sources:

- **Chapter 70 Aid (c70aid):** State aid received by the district (DESE profile\_DataC70 sheet)
- **Required NSS (rqnss2):** Minimum spending required by state law, adjusted (DESE profile\_DataC70 sheet)
- **Actual NSS (actualNSS):** Total district spending on education (DESE profile\_DataC70 sheet)

#### Important Note:

NSS/Ch70 values are reported in **absolute dollars**, NOT per-pupil. Unlike PPE (which divides by in-district FTE), NSS/Ch70 values represent total district funding amounts.

#### Stacked Components (bottom to top in plots):

##### 1. Ch70 Aid (\$): c70aid

- Green bar in plots • State funding received by district

##### 2. Req NSS (adj) (\$): $\max(0, \text{rqnss2} - \text{c70aid})$

- Amber bar in plots • Required local contribution (after subtracting Ch70)
- Uses  $\max(0, \dots)$  to handle rare cases where Ch70 > Required NSS

##### 3. Actual NSS (adj) (\$): $\text{actualNSS} - \text{rqnss2}$

- Purple bar in plots • Spending above minimum requirement
- Represents discretionary local spending beyond state mandates

**Total NSS (\$):** Sum of all three components = actualNSS

#### Example Calculation (Amherst, FY2024):

- Ch70 Aid: \$6,791,000
- Required NSS: \$18,859,000; Req NSS (adj):  $\$18,859,000 - \$6,791,000 = \$12,068,000$
- Actual NSS: \$31,511,000; Actual NSS (adj):  $\$31,511,000 - \$18,859,000 = \$12,652,000$
- Total NSS:  $\$6,791,000 + \$12,068,000 + \$12,652,000 = \$31,511,000$

#### Aggregate Calculation (Weighted Per-District Average):

For aggregate enrollment groups (Tiny, Small, Medium, Large, X-Large, Springfield):

1. Convert each district's absolute dollars to per-pupil values
2. Compute enrollment-weighted average per-pupil across all member districts
3. Multiply by average enrollment per district to get weighted avg \$ per district

This methodology produces per-district values that are weighted by enrollment size, enabling fair comparison across different-sized district aggregates.

**Important:** Only districts with valid PPE (per-pupil expenditure) data are included in NSS/Ch70 aggregates to ensure data quality and consistency across all analyses.

#### Shading:

NSS/Ch70 comparison tables use the same orange/blue shading logic as PPE tables (5% dollar threshold, 1pp CAGR threshold).

## **Appendix B. Calculations and Examples**

Complete calculations and worked examples for all figures and tables

### **Purpose**

This appendix provides calculations and worked examples for all figures and tables in the report. It combines step-by-step calculation procedures with detailed examples for verification.

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### **Figure 1: Year-over-Year (YoY) Growth Rates**

*Location:* Executive Summary page

*Source:* executive\_summary\_plots.py, lines 44-63

#### **Formula:**

$$\text{YoY Growth(year)} = [(\text{PPE}(\text{year}) / \text{PPE}(\text{year}-1)) - 1] \times 100$$

#### **Calculation Steps:**

1. For each district, get total PPE by year:

- Load expenditure data from df (all expense categories)
- Pivot to get PPE by category and year
- Sum across all categories:  $\text{total\_ppe}[\text{year}] = \text{sum}(\text{PPE\_category}[\text{year}])$  for all categories)

2. Calculate YoY growth:

- For year in [2010, 2011, ..., 2024]:

$$\text{YoY}[\text{year}] = [(\text{total\_ppe}[\text{year}] / \text{total\_ppe}[\text{year}-1]) - 1] \times 100$$

- First year (2009) has no YoY value (no prior year)

3. For cohort aggregates:

- Get all districts in cohort
- Calculate weighted aggregate PPE (see Calculation #5)
- Apply same YoY formula to aggregate PPE series

#### **Example (Amherst 2023-2024):**

- $\text{PPE}(2023) = \$25,432.18$
  - $\text{PPE}(2024) = \$26,789.45$
  - $\text{YoY Growth} = [(26,789.45 / 25,432.18) - 1] \times 100 = 5.34\%$
- 
- 

### **Figure 2: 5-Year CAGR (Compound Annual Growth Rate) - Grouped Bars**

*Location:* Executive Summary page

*Source:* executive\_summary\_plots.py, lines 66-95

**Formula:**

$$\text{CAGR} = [(End\_Value / Start\_Value)^{(1/Years)} - 1] \times 100$$

**Calculation Steps:**

1. Define three 5-year periods:

- Period 1: 2009-2014 (5 years)
- Period 2: 2014-2019 (5 years)
- Period 3: 2019-2024 (5 years)

2. For each district and each period:

- Get total\_ppe[start\_year] and total\_ppe[end\_year]
- $\text{CAGR} = [(total\_ppe[end] / total\_ppe[start])^{(1/5)} - 1] \times 100$

3. For cohort aggregates:

- Use weighted aggregate PPE (see Calculation #5)
- Apply same CAGR formula

**Example (Medium Cohort 2019-2024):**

- Weighted PPE(2019) = \$22,145.67
- Weighted PPE(2024) = \$28,934.21
- $\text{CAGR} = [(28,934.21 / 22,145.67)^{(1/5)} - 1] \times 100$
- $\text{CAGR} = [1.30672^{0.2} - 1] \times 100$
- $\text{CAGR} = [1.05497 - 1] \times 100 = 5.50\%$

=====

**Figure 3: 15-Year CAGR (2009-2024)**

*Location:* Executive Summary page

*Source:* executive\_summary\_plots.py, lines 98-118

**Formula:**

$$\text{CAGR\_15yr} = [(PPE(2024) / PPE(2009))^{(1/15)} - 1] \times 100$$

**Calculation Steps:**

1. Get total\_ppe[2009] and total\_ppe[2024] for each district
2. Apply CAGR formula with years = 15
3. For cohort aggregates, use weighted aggregate PPE

### **Example (Amherst):**

- PPE(2009) = \$18,234.56
  - PPE(2024) = \$26,789.45
  - CAGR =  $[(26,789.45 / 18,234.56)^{(1/15)} - 1] \times 100$
  - CAGR =  $[1.46923^{0.06667} - 1] \times 100 = 2.61\%$
- 
- 

## **2. COHORT DETERMINATION CALCULATIONS**

**Purpose:** Assign each district to one of 6 enrollment-based cohorts

*Source:* school\_shared.py, lines 140-200 (calculate\_cohort\_boundaries)

### **Cohort Definitions:**

- TINY: 0 - Q1 (25th percentile)
- SMALL: Q1 - Q2 (median)
- MEDIUM: Q2 - Q3 (75th percentile)
- LARGE: Q3 - P90 (90th percentile)
- X-LARGE: P90 - 10,000 FTE
- SPRINGFIELD: > 10,000 FTE (outlier district)

### **Calculation Steps (FY2024):**

1. Get all Western MA traditional districts
2. Get FY2024 FTE enrollment for each district
3. Create array of all enrollments (INCLUDING Springfield):

```
all_enrollments = [154.7, 287.3, ..., 24,567.8] # 59 districts
```

#### 4. Calculate percentiles ON FULL DATASET:

- Q1 (25th) = np.percentile(all\_enrollments, 25) = 154.7
- Q2 (50th) = np.percentile(all\_enrollments, 50) = 520.3
- Q3 (75th) = np.percentile(all\_enrollments, 75) = 1,597.6
- P90 (90th) = np.percentile(all\_enrollments, 90) = 3,892.1

#### 5. Round to clean boundaries:

- Q1: 154.7 → 200 FTE
- Median: 520.3 → 500 FTE
- Q3: 1,597.6 → 1,600 FTE
- P90: 3,892.1 → 4,000 FTE

- Outlier threshold: Fixed at 10,000 FTE

## 6. Final FY2024 Cohort Boundaries:

- TINY: 0-200 FTE (13 districts)
- SMALL: 201-500 FTE (16 districts)
- MEDIUM: 501-1,600 FTE (15 districts)
- LARGE: 1,601-4,000 FTE (9 districts)
- X-LARGE: 4,001-10,000 FTE (5 districts)
- SPRINGFIELD: >10,000 FTE (1 district: 24,567.8 FTE)

**Note:** For historical data, cohorts are calculated year-by-year using that year's enrollment distribution.

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## 3. WEIGHTED AGGREGATION METHODOLOGY

**Purpose:** Calculate enrollment-weighted per-pupil expenditure for a group of districts

**Source:** school\_shared.py, lines 1001-1050 (weighted\_epp\_aggregation)

### Formula:

$$\text{Weighted PPE}(\text{category}, \text{year}) = \frac{\sum[\text{PPE}(d, \text{cat}, \text{yr}) \times \text{FTE}(d, \text{yr})]}{\sum[\text{FTE}(d, \text{yr})]}$$

where d = district, cat = category, yr = year

### Calculation Steps:

#### 1. For each district d in cohort:

- Get PPE by category and year:  $\text{PPE}(d, \text{category}, \text{year})$
- Get FTE enrollment by year:  $\text{FTE}(d, \text{year})$

#### 2. For each category and year:

- Calculate weighted numerator:

$\text{numerator}(\text{cat}, \text{yr}) = \sum[\text{PPE}(d, \text{cat}, \text{yr}) \times \text{FTE}(d, \text{yr})]$  for all d in cohort

- Calculate total FTE:

$\text{denominator}(\text{yr}) = \sum[\text{FTE}(d, \text{yr})]$  for all d in cohort

- Weighted PPE(cat, yr) =  $\text{numerator}(\text{cat}, \text{yr}) / \text{denominator}(\text{yr})$

### Example (Medium Cohort, Instruction category, 2024):

Districts in Medium cohort (FY2024): 15 districts

District A: PPE\_instruction = \$12,345, FTE = 678

District B: PPE\_instruction = \$13,456, FTE = 891

...

District O: PPE\_instruction = \$11,234, FTE = 1,234

$$\begin{aligned}\text{Numerator} &= (12,345 \times 678) + (13,456 \times 891) + \dots + (11,234 \times 1,234) \\ &= 8,369,910 + 11,989,296 + \dots + 13,862,756 \\ &= 156,432,890\end{aligned}$$

$$\text{Denominator} = 678 + 891 + \dots + 1,234 = 13,456 \text{ FTE}$$

$$\text{Weighted PPE\_instruction} = 156,432,890 / 13,456 = \$11,627.45/\text{pupil}$$

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#### 4. SHADING THRESHOLD CALCULATIONS

**Purpose:** Determine 5% / 1pp thresholds for gradient shading in comparison tables

**Source:** Appendix A (Threshold Analysis), compose\_pdf.py lines 1212-1349

##### Statistical Analysis (All 59 Western MA Districts):

1. Calculate variation in PPE:

- Mean PPE = \$24,237
- Std Dev PPE = \$5,462
- Coefficient of Variation (CV) =  $5,462 / 24,237 = 0.225$  (22.5%)

2. Calculate variation in CAGR:

- Mean CAGR = 6.00 percentage points
- Std Dev CAGR = 3.24 percentage points
- Coefficient of Variation (CV) =  $3.24 / 6.00 = 0.540$  (54.0%)

3. Key insight: CAGR varies 2.4x more than PPE relative to means ( $54.0\% / 22.5\% = 2.4$ )

4. Evaluate threshold scenarios:

Scenario: 5% PPE / 1pp CAGR (SELECTED)

- PPE:  $5\% = 0.05 \times 24,237 = \$1,212$
- PPE Standard Deviations:  $1,212 / 5,462 = 0.22$  SD
- CAGR Standard Deviations:  $1.00 / 3.24 = 0.31$  SD
- Balance ratio:  $0.31 / 0.22 = 1.4x$  (well-balanced)
- PPE flagging rate: ~82% of comparisons
- CAGR flagging rate: ~76% of comparisons

##### Gradient Shading Bins:

- CAGR bins (absolute percentage points): [1pp, 2pp, 3pp, 4pp+]
  - Dollar bins (relative percent): [5%, 10%, 15%, 20%+]
  - Intensity increases with bin: lightest shade → darkest shade
- =====
- =====

## 5. DISTRICT COMPARISON TABLE CALCULATIONS

**Purpose:** Compare district PPE to baseline (cohort or Western MA aggregate)

Source: compose\_pdf.py, lines 425-583 (\_build\_category\_table)

**For Each Category (e.g., Instruction, Student Support, etc.):**

1. Get latest year (2024) and 5-year-ago baseline (2019)

2. Calculate CAGR:

District CAGR =  $[(\text{PPE}_{2024} / \text{PPE}_{2019})^{(1/5)} - 1] \times 100$

Baseline CAGR =  $[(\text{Baseline\_PPE}_{2024} / \text{Baseline\_PPE}_{2019})^{(1/5)} - 1] \times 100$

3. Calculate CAGR difference (absolute percentage points):

CAGR\_diff =  $|\text{District\_CAGR} - \text{Baseline\_CAGR}|$

4. Determine CAGR shading:

if CAGR\_diff < 1.0pp: No shading (white)

elif CAGR\_diff < 2.0pp: Lightest shade

elif CAGR\_diff < 3.0pp: Light shade

elif CAGR\_diff < 4.0pp: Medium shade

else: Darkest shade

Color: Amber if above baseline, Teal if below

5. Calculate dollar difference (relative percent):

Dollar\_diff =  $|\text{PPE}_{2024} - \text{Baseline\_PPE}_{2024}| / \text{Baseline\_PPE}_{2024}$

6. Determine dollar shading:

if Dollar\_diff < 5%: No shading

elif Dollar\_diff < 10%: Lightest shade

elif Dollar\_diff < 15%: Light shade

elif Dollar\_diff < 20%: Medium shade

else: Darkest shade

Color: Amber if above baseline, Teal if below

### **Example (Amherst Instruction vs Medium Cohort):**

- Amherst PPE\_2019 = \$10,234, PPE\_2024 = \$12,456
- Medium PPE\_2019 = \$9,876, PPE\_2024 = \$11,234

CAGR calculations:

- Amherst CAGR =  $[(12,456 / 10,234)^{0.2} - 1] \times 100 = 4.01\%$
- Medium CAGR =  $[(11,234 / 9,876)^{0.2} - 1] \times 100 = 2.60\%$
- CAGR\_diff =  $|4.01 - 2.60| = 1.41\text{pp}$  → Light amber shade

Dollar calculations:

- Dollar\_diff =  $|12,456 - 11,234| / 11,234 = 10.88\%$
- 10.88% is in [10%, 15%) range → Light amber shade

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## **6. ENROLLMENT FTE CALCULATIONS**

**Purpose:** Calculate total FTE enrollment from component categories

**Source:** school\_shared.py, prepare\_district\_epp\_lines()

### **FTE Categories:**

- Foundation Enrollment (low-income, ELL, special ed weighted)
- PK (Pre-Kindergarten)
- K-6 (Kindergarten through 6th grade)
- 7-12 (7th through 12th grade)

### **Calculation:**

Total FTE(year) = Foundation(year) + PK(year) + K6(year) + 712(year)

### **Example (Amherst 2024):**

- Foundation = 1,234.5 FTE
- PK = 89.2 FTE
- K-6 = 678.3 FTE
- 7-12 = 543.1 FTE
- Total FTE =  $1,234.5 + 89.2 + 678.3 + 543.1 = 2,545.1$  FTE

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## **7. NSS/CH70 FUNDING CALCULATIONS**

**Purpose:** Calculate Chapter 70 aid and Net School Spending from components

Source: school\_shared.py, prepare\_district\_nss\_ch70()

### **Components:**

- Foundation Budget: State-determined minimum spending level
- Required Local Contribution: Municipality's required contribution
- Chapter 70 Aid: State aid = Foundation - Required Local Contribution
- Actual Net School Spending (NSS): Actual spending by district

### **Calculations:**

Ch70 Aid = Foundation Budget - Required Local Contribution

NSS Gap = Actual NSS - Foundation Budget

Total Spending = Required Local Contribution + Ch70 Aid + NSS Gap

### **Example (Amherst 2024):**

- Foundation Budget = \$45,678,901
  - Required Local Contribution = \$38,234,567
  - Ch70 Aid = \$45,678,901 - \$38,234,567 = \$7,444,334
  - Actual NSS = \$52,123,456
  - NSS Gap = \$52,123,456 - \$45,678,901 = \$6,444,555
- 
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### **NOTES**

- All dollar values shown are illustrative examples for demonstration purposes
  - Actual data values are stored in Appendix C (Data Tables)
  - All calculations use enrollment-weighted aggregations for cohort comparisons
  - CAGR calculations exclude negative or zero values
  - Shading applies independently to CAGR and dollar comparisons
  - Year-specific cohort assignments are used for all historical maps and scatterplots
- 
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### **DETAILED WORKED EXAMPLES**

The following sections provide complete worked examples for specific districts and cohorts:

This appendix provides calculation examples showing the source of numbers and demonstrating every step of the analysis for two examples:

1. Western MA Medium Cohort (aggregate cohort calculations)

## 2. Amherst-Pelham Regional (individual district calculations)

The following pages detail:

- Data sources and cohort determination methodology
- Weighted average per-pupil expenditure calculations
- Time series analysis and compound annual growth rate (CAGR) formulas
- Chapter 70 state aid and Net School Spending calculations
- Comparative analysis methods

## PART 1: DATA SOURCES AND COHORT DETERMINATION

**All calculations use data from the file "E2C\_Hub\_MA\_DESE\_Data.xlsx" which contains multiple sheets:**

- Sheet "District Expend by Category": Contains expenditure and enrollment data with columns DIST\_NAME, YEAR, IND\_CAT, IND\_SUBCAT, IND\_VALUE, SOURCE
- Sheet "District Regions": Contains regional classifications and school types
- Sheet "profile\_DataC70": Contains Chapter 70 and Net School Spending data

**Data sources by sheet (per SOURCE column):**

### District Expend by Category - Expenditures per Pupil:

Source: Massachusetts Department of Elementary and Secondary Education (DESE)

Dataset: "District Expenditures by Spending Category"

Last updated: August 12, 2025

URL: <https://educationtocareer.data.mass.gov/Finance-and-Budget/District-Expenditures-by-Spending-Category/er3w-dtyi/>

### This dataset provides:

- Expenditures per pupil (EPP) by spending category for all Massachusetts school districts
- Annual data from FY1993 to present
- Eight spending categories: Teachers, Insurance/Retirement/Other, Pupil Services, Other Teaching Services, Operations and Maintenance, Instructional Leadership, Administration, Other

### District Expend by Category - Student Enrollment:

Source: Massachusetts Department of Elementary and Secondary Education (DESE)

Dataset: "District Expenditures by Spending Category"

URL: <https://educationtocareer.data.mass.gov/Finance-and-Budget/District-Expenditures-by-Spending-Category/er3w-dtyi/>

### This dataset provides three enrollment indicators:

- In-District FTE Pupils: Students enrolled in district-operated schools (used for cohort calculations)
- Out-of-District FTE Pupils: District students placed in other schools
- Total FTE Pupils: Sum of In-District and Out-of-District FTE

### **profile\_DataC70 - Chapter 70 and Net School Spending:**

Source: Massachusetts Department of Elementary and Secondary Education (DESE)

Dataset: Chapter 70 District Profiles (compiled from various DESE sources)

URL: Various sources compiled in profile\_DataC70 spreadsheet

### **This dataset provides:**

- Chapter 70 Aid (c70aid): State aid received by each district
- Required Net School Spending (rqdnss2): Minimum spending required by state law
- Actual Net School Spending (actualNSS): Total district spending on education
- Foundation Enrollment (distfoundenro): District foundation enrollment used for Ch70 funding calculations

### **District Regions - Regional Classifications:**

Source: DESE district profiles and regional service mappings

### **This dataset provides:**

- EOHHS regional designations (Western MA, Central MA, etc.)
- School type classifications (Traditional, Regional, Charter, Virtual, etc.)

## 1.1 COHORT BOUNDARY DETERMINATION

Cohort boundaries are determined by reference to Interquartile Range (IQR) analysis on Fiscal Year 2024 Full-Time Equivalent (FTE) in-district enrollment for all traditional public school districts in Western Massachusetts. Cohort boundaries are rounded for easier readability.

### **Step 1: Extract FY24 In-district FTE enrollment data**

**From Sheet "District Expend by Category", filter rows where:**

- IND\_CAT = "Student Enrollment"
- IND\_SUBCAT = "In-District FTE Pupils" (Full-Time Equivalent students enrolled in district-operated schools)
- YEAR = 2024

### **Step 2: Calculate quartile statistics**

Using the 60 traditional districts in Western MA with valid data (including Springfield), calculate:

- First quartile (Q1) = 25th percentile = 154.7 In-district FTE
- Second quartile/Median (Q2) = 50th percentile = 792.0 In-district FTE

- Third quartile (Q3) = 75th percentile = 1,597.6 In-district FTE
- 90th percentile (P90) = 3,571.1 In-district FTE

### **Step 3: Define cohort boundaries**

- TINY: 0 to 200 In-district FTE (from zero to Q1 rounded to nearest 100)
- SMALL: 201 to 800 In-district FTE (from max TINY +1 to Median rounded to nearest 100)
- MEDIUM: 801 to 1,600 In-district FTE (from max SMALL +1 to Q3 rounded to nearest 100)
- LARGE: 1,601 to 4,000 In-district FTE (from max MEDIUM +1 to P90 rounded to nearest 1,000)
- X-LARGE: 4,001 to 10K In-district FTE (from max LARGE +1 to fixed threshold of 10,000)
- OUTLIERS (Springfield): Greater than fixed threshold of 10,000 In-district FTE

### **Step 4: Assign each district to its cohort**

For each district, compare its FY24 In-district FTE enrollment to the boundaries above.

Example: Amherst-Pelham Regional has 1,209.3 In-district FTE in FY24

Since  $801 \leq 1,209.3 \leq 1,600$ , Amherst-Pelham is assigned to the MEDIUM cohort.

Example: Gill-Montague Regional has 899.8 In-district FTE in FY24

Since  $801 \leq 899.8 \leq 1,600$ , Gill-Montague is assigned to the MEDIUM cohort.

Example: Belchertown has 2,067.8 In-district FTE in FY24

Since  $1,601 \leq 2,067.8 \leq 4,000$ , Belchertown is assigned to the LARGE cohort.

## 1.2 EXPENDITURE CATEGORIES

**All Per-Pupil Expenditure (PPE) calculations use eight categories:**

1. Teachers
2. Insurance, Retirement and Other
3. Pupil Services
4. Other Teaching Services
5. Operations and Maintenance
6. Instructional Leadership
7. Administration
8. Other

These categories are derived from the Massachusetts Department of Elementary and Secondary Education (DESE) function code groupings in end-of-year reporting, and provide a standardized breakdown of all district expenditures. Note: District budgeting practices typically use categories that do not match the DESE end-of-year reporting standard.

## **PART 2: WESTERN MA MEDIUM COHORT CALCULATIONS**

**The Medium cohort contains 15 districts with in-district enrollment between 801 and 1,600 FTE in FY24. This section demonstrates how weighted average Per-Pupil Expenditure (PPE) is calculated for the cohort.**

## 2.1 MEMBER DISTRICTS

**Districts in the Medium cohort (sorted by FY24 In-district FTE enrollment):**

1. Mohawk Trail: 804.8 In-district FTE
2. Monson: 807.8 In-district FTE
3. Gill-Montague: 899.8 In-district FTE
4. Amherst: 1,001.5 In-district FTE
5. Hoosac Valley Regional: 1,002.7 In-district FTE
6. Palmer: 1,061.5 In-district FTE
7. Ware: 1,095.8 In-district FTE
8. Berkshire Hills: 1,174.4 In-district FTE
9. North Adams: 1,196.0 In-district FTE
10. Mount Greylock: 1,206.9 In-district FTE
11. Amherst-Pelham: 1,209.3 In-district FTE
12. Southwick-Tolland-Granville Regional School District: 1,312.8 In-district FTE
13. Greenfield: 1,394.0 In-district FTE
14. Easthampton: 1,403.7 In-district FTE
15. Central Berkshire: 1,585.9 In-district FTE

Total In-district FTE for Medium cohort = Sum of all member In-district FTE = 17,156.9 FTE

## 2.2 WEIGHTED AVERAGE PPE CALCULATION (EXAMPLE: FY2024 TEACHERS)

For each expenditure category, we calculate an enrollment-weighted average across all districts in the cohort.

**Step 1: Extract per-pupil expenditure data for Teachers category**

**From Sheet "District Expend by Category", filter rows where:**

- IND\_CAT = "Expenditures per Pupil"
- IND\_SUBCAT = "Teachers"
- YEAR = 2024

**Step 2: For each district, multiply PPE by enrollment weight**

**Example calculations for first three districts:**

**Mohawk Trail:**

- FY24 Teachers PPE = [actual value from data] per pupil
- FY24 In-district FTE Enrollment = 804.8 FTE
- Weight =  $804.8 / 17,156.9 = 0.0469$  (4.69% of cohort enrollment)
- Weighted contribution = [Teachers PPE]  $\times 0.0469$

**Monson:**

- FY24 Teachers PPE = [actual value from data] per pupil
- FY24 In-district FTE Enrollment = 807.8 FTE
- Weight =  $807.8 / 17,156.9 = 0.0471$  (4.71% of cohort enrollment)
- Weighted contribution = [Teachers PPE]  $\times 0.0471$

**Gill-Montague:**

- FY24 Teachers PPE = [actual value from data] per pupil
- FY24 In-district FTE Enrollment = 899.8 FTE
- Weight =  $899.8 / 17,156.9 = 0.0524$  (5.24% of cohort enrollment)
- Weighted contribution = [Teachers PPE]  $\times 0.0524$

[Continue for all 15 districts...]

**Step 3: Sum all weighted contributions**

Weighted Average Teachers PPE = Sum of all weighted contributions = [calculated value] per pupil

**This weighted average calculation is repeated for all eight categories:**

1. Teachers
2. Insurance, Retirement and Other
3. Pupil Services
4. Other Teaching Services
5. Operations and Maintenance
6. Instructional Leadership
7. Administration
8. Other

**Step 4: Calculate total weighted average PPE**

Total Weighted Average PPE (FY24) = Sum of all eight category weighted averages

= Teachers + Insurance + Pupil Services + Other Teaching + Operations + Instructional Leadership + Administration + Other  
= [sum of actual calculated values] per pupil

The same weighted average calculation is performed for each fiscal year from 2009 to 2024, producing a time series of cohort-level PPE values.

**For each year Y from 2009 to 2024:**

1. Extract FY Y enrollment for all 13 Medium cohort districts
2. Calculate cohort total enrollment for year Y
- 3. For each of the 8 expenditure categories:**
  - a. Extract PPE values for year Y
  - b. Calculate enrollment weight for each district in year Y
  - c. Calculate weighted average PPE for that category in year Y
4. Sum the 8 category weighted averages to get total PPE for year Y

**This produces arrays:**

- Years: [2009, 2010, 2011, ..., 2024]
- Total PPE: [PPE\_2009, PPE\_2010, PPE\_2011, ..., PPE\_2024]
- Teachers PPE: [Teachers\_2009, Teachers\_2010, ..., Teachers\_2024]
- [Similar arrays for other 7 categories]

**2.4 COMPOUND ANNUAL GROWTH RATE (CAGR)**

CAGR measures the annualized growth rate over multiple years.

**Formula:**

$$\text{CAGR} = ((\text{Value\_end} / \text{Value\_start})^{(1/\text{number\_of\_years})} - 1) \times 100\%$$

**Where:**

- Value\_end = PPE in final year (2024)
- Value\_start = PPE in initial year (2009)
- number\_of\_years = 2024 - 2009 = 15 years

**Example for Medium cohort Total PPE:**

- PPE\_2009 = [calculated weighted average for 2009] per pupil
- PPE\_2024 = [calculated weighted average for 2024] per pupil
- Number of years = 15

$$\begin{aligned}\text{CAGR} &= ((\text{PPE}_\text{2024} / \text{PPE}_\text{2009})^{(1/15)} - 1) \times 100\% \\ &= [\text{calculated value}] \% \text{ per year}\end{aligned}$$

**This calculation is performed for:**

- Total PPE CAGR

- Each of the 8 category-specific PPE CAGRs
- Chapter 70 state aid CAGR
- Net School Spending (NSS) CAGR
- Enrollment CAGR

## 2.5 YEAR-OVER-YEAR (YOY) GROWTH RATE

Year-over-Year (YoY) growth rate measures the percentage change from one year to the next, providing insight into annual fluctuations in expenditures.

### **Formula:**

$$\text{YoY Growth Rate} = ((\text{Value\_year} / \text{Value\_previous\_year}) - 1) \times 100\%$$

### **Where:**

- Value\_year = PPE in current year
- Value\_previous\_year = PPE in previous year

### **Example for Medium cohort Total PPE:**

#### **Assume the time series shows:**

- PPE\_2009 = \$12,000 per pupil
- PPE\_2010 = \$12,500 per pupil
- PPE\_2011 = \$13,000 per pupil
- PPE\_2012 = \$13,100 per pupil
- ...

#### **YoY calculations:**

- YoY\_2010 =  $((\$12,500 / \$12,000) - 1) \times 100\% = 4.17\%$
- YoY\_2011 =  $((\$13,000 / \$12,500) - 1) \times 100\% = 4.00\%$
- YoY\_2012 =  $((\$13,100 / \$13,000) - 1) \times 100\% = 0.77\%$
- ...

#### **Key differences from CAGR:**

- YoY shows year-to-year changes; CAGR smooths growth over multiple years
- YoY captures annual volatility; CAGR assumes constant growth
- YoY is useful for identifying specific years with unusual growth patterns

#### **Example comparison:**

If CAGR from 2009 to 2024 is 3.71% per year, but YoY rates vary from 0.5% to 8.0% across individual years, this reveals that growth was not constant—some years had much higher or lower increases than the average.

#### **Use cases:**

- Identifying years with budget constraints (low YoY)
- Identifying years with significant increases (high YoY)
- Understanding the impact of specific events (e.g., pandemic, policy changes) on year-to-year spending

**This YoY calculation is performed for:**

- Total PPE YoY for each year from 2010 to 2024 (15 values)
- Each of the 8 category-specific PPE YoY rates
- Chapter 70 state aid YoY
- Net School Spending (NSS) YoY
- Enrollment YoY

Note: YoY for year N requires data from year N-1, so the first YoY value is for 2010 (comparing 2010 to 2009).

## **PART 3: AMHERST-PELHAM REGIONAL DISTRICT CALCULATIONS**

**This section demonstrates all calculations for a single district:  
Amherst-Pelham Regional.**

### **3.1 DISTRICT PROFILE**

District: Amherst-Pelham Regional

Cohort Assignment: MEDIUM (801-1,600 In-district FTE)

FY24 In-district FTE Enrollment: 1,209.3 FTE

Data Source: Appendix A Data Tables

- Enrollment data: See "In-District FTE" column in Appendix A
- PPE data: See expenditure category columns in Appendix A
- Chapter 70 data: See "Chapter 70 Aid" column in Appendix A
- NSS data: See "Required NSS" and "Actual NSS" columns in Appendix A

### **3.2 ENROLLMENT TIME SERIES**

**Step 1: Extract in-district enrollment data**

**From Appendix A Data Tables, locate:**

- District: "Amherst-Pelham Regional"
- Find the "In-District FTE" column
- Read values for all years from 2009 to 2024

**Step 2: Create time series array**

Years: [2009, 2010, 2011, ..., 2023, 2024]

In-district FTE: [FTE\_2009, FTE\_2010, FTE\_2011, ..., FTE\_2023, 1,209.3]

(Extract actual values for each year from Appendix A)

### **Step 3: Calculate enrollment CAGR**

$$\begin{aligned} \text{CAGR} &= ((\text{FTE}_{2024} / \text{FTE}_{2009})^{(1/15)} - 1) \times 100\% \\ &= ((1,209.3 / \text{FTE}_{2009})^{(1/15)} - 1) \times 100\% \\ &= [\text{calculated value}] \% \text{ per year} \end{aligned}$$

#### **Where:**

- $\text{FTE}_{2024} = 1,209.3$  In-district FTE (from data)
- $\text{FTE}_{2009} = [\text{actual value from data}]$  In-district FTE
- Number of years = 15 (2024 - 2009)

A negative CAGR indicates declining enrollment, positive indicates growth.

## 3.3 PER-PUPIL EXPENDITURE CALCULATIONS

**For Amherst-Pelham Regional, PPE is calculated for each of the eight categories:**

1. Teachers
2. Insurance, Retirement and Other
3. Pupil Services
4. Other Teaching Services
5. Operations and Maintenance
6. Instructional Leadership
7. Administration
8. Other

### **Step 1: Extract PPE data for each category**

**From Appendix A Data Tables, locate:**

- District: "Amherst-Pelham Regional"
- Find the columns for each of the 8 expenditure categories
- Read values for all years from 2009 to 2024

### **Step 2: Example calculation for Teachers category (FY2024)**

**From Appendix A Data Tables:**

- District: "Amherst-Pelham Regional"
- Year: 2024
- Column: "Teachers"

- Value: [actual value from Appendix A] per pupil

This value represents the amount Amherst-Pelham Regional spent per Full-Time Equivalent (FTE) student on Teachers in FY2024.

### **Step 3: Calculate total PPE for FY2024**

Total PPE (FY2024) = Teachers + Insurance, Retirement and Other + Pupil Services + Other Teaching Services + Operations and Maintenance + Instructional Leadership + Administration + Other

**Using column IND\_VALUE for YEAR = 2024 and each category:**

- Teachers: [actual value]
- Insurance, Retirement and Other: [actual value]
- Pupil Services: [actual value]
- Other Teaching Services: [actual value]
- Operations and Maintenance: [actual value]
- Instructional Leadership: [actual value]
- Administration: [actual value]
- Other: [actual value]

Total PPE (FY2024) = [sum of actual values] per pupil

### **Step 4: Repeat for all years 2009-2024**

For each year from 2009 to 2024, extract IND\_VALUE for each of the 8 categories and sum them to get total PPE for that year.

**This produces time series arrays:**

- Years: [2009, 2010, ..., 2024]
- Total PPE: [PPE\_2009, PPE\_2010, ..., PPE\_2024]
- Teachers: [Teachers\_2009, Teachers\_2010, ..., Teachers\_2024]
- Insurance, Retirement and Other: [Insurance\_2009, Insurance\_2010, ..., Insurance\_2024]
- Pupil Services: [Pupil\_Services\_2009, Pupil\_Services\_2010, ..., Pupil\_Services\_2024]
- Other Teaching Services: [Other\_Teaching\_2009, Other\_Teaching\_2010, ..., Other\_Teaching\_2024]
- Operations and Maintenance: [Operations\_2009, Operations\_2010, ..., Operations\_2024]
- Instructional Leadership: [Instructional\_Leadership\_2009, Instructional\_Leadership\_2010, ..., Instructional\_Leadership\_2024]
- Administration: [Administration\_2009, Administration\_2010, ..., Administration\_2024]
- Other: [Other\_2009, Other\_2010, ..., Other\_2024]

### **Step 5: Calculate CAGR for each category**

Formula: CAGR = ((Value\_2024 / Value\_2009)<sup>(1/15)</sup> - 1) × 100%

#### **Example for Teachers:**

- Teachers\_2009 = [actual value from data] per pupil
- Teachers\_2024 = [actual value from data] per pupil
- CAGR\_Teachers = ((Teachers\_2024 / Teachers\_2009)<sup>(1/15)</sup> - 1) × 100%  
= [calculated value] % per year

Repeat this calculation for all 8 categories plus total PPE to get 9 CAGR values.

### **3.4 CHAPTER 70 STATE AID CALCULATIONS**

Chapter 70 is the major state aid program for Massachusetts K-12 public schools.

#### **Step 1: Extract Chapter 70 data**

**From Appendix A Data Tables, locate:**

- District: "Amherst-Pelham Regional"
- Column: "Chapter 70 Aid"
- Read values for all years from 2009 to 2024

#### **Step 2: Extract total district expenditures**

**From Appendix A Data Tables, calculate total expenditure as:**

- District: "Amherst-Pelham Regional"
- Sum of all expenditure categories for each year
- Alternatively, use "Actual NSS" column if available

#### **Step 3: Calculate Chapter 70 as percentage of total expenditure (FY2024 example)**

- Chapter 70 Aid (FY2024) = [value from "Chapter 70 Aid" column in Appendix A for 2024]
- Total Expenditure (FY2024) = [sum of expenditure categories from Appendix A for 2024]
- Percentage = (Chapter 70 Aid / Total Expenditure) × 100%

This percentage shows what portion of the district's total expenditure came from Chapter 70 state aid in FY2024.

#### **Step 4: Calculate Chapter 70 per-pupil (FY2024 example)**

- Chapter 70 Aid (FY2024) = [value from "Chapter 70 Aid" column in Appendix A]
- Enrollment (FY2024) = 1,209.3 In-district FTE
- Chapter 70 Per-Pupil = Chapter 70 Aid / 1,209.3 FTE = [calculated value] per FTE

#### **Step 5: Calculate Chapter 70 CAGR**

- Chapter 70 Aid (2009) = [value from "Chapter 70 Aid" column in Appendix A for 2009]

- Chapter 70 Aid (2024) = [value from "Chapter 70 Aid" column in Appendix A for 2024]
- CAGR =  $((\text{Ch70Aid\_2024} / \text{Ch70Aid\_2009})^{(1/15)} - 1) \times 100\%$   
= [calculated value] % per year

A negative CAGR indicates that Chapter 70 aid decreased, positive indicates growth.

### 3.5 NET SCHOOL SPENDING (NSS) CALCULATIONS

Net School Spending (NSS) is the total amount a school district spends on education from all sources, excluding certain items like transportation, debt service, and capital expenditures.

#### **Step 1: Extract NSS data**

**From Appendix A Data Tables, locate:**

- District: "Amherst-Pelham Regional"
- Columns: "Required NSS" and "Actual NSS"
- Read values for all years from 2009 to 2024

#### **Step 2: Calculate NSS per-pupil (FY2024 example)**

- Total NSS (FY2024) = [value from "Actual NSS" column in Appendix A for 2024]
- Enrollment (FY2024) = 1,209.3 In-district FTE
- NSS Per-Pupil = Total NSS / 1,209.3 FTE = [calculated value] per FTE

#### **Step 3: Calculate NSS CAGR**

- NSS (2009) = [value from "Actual NSS" column in Appendix A for 2009]
- NSS (2024) = [value from "Actual NSS" column in Appendix A for 2024]
- CAGR =  $((\text{NSS\_2024} / \text{NSS\_2009})^{(1/15)} - 1) \times 100\%$   
= [calculated value] % per year

This indicates the average annual growth rate of NSS from 2009 to 2024.

#### **Step 4: Compare NSS per-pupil to cohort average**

Using the weighted average calculation method described in Part 2, the MEDIUM cohort average NSS per-pupil (FY2024) = [calculated weighted average] per FTE.

Amherst-Pelham's NSS per-pupil ([actual value from calculation]) is [percentage difference]% [above/below] the MEDIUM cohort average.

Calculation:  $((\text{Amherst-Pelham NSS per-pupil} - \text{MEDIUM cohort average}) / \text{MEDIUM cohort average}) \times 100\%$

### 3.6 COMPARATIVE ANALYSIS

**All district-specific calculations can be compared to:**

1. Cohort averages (in this case, MEDIUM cohort weighted averages for Amherst-Pelham Regional)
2. Regional averages (all Western MA traditional districts)
3. Statewide averages (if available)

For each metric (Total PPE, each of 8 category PPEs, Chapter 70 per-pupil, NSS per-pupil, enrollment growth), calculate:

- District value
- Cohort average
- Difference = District value - Cohort average
- Percentage difference = (Difference / Cohort average) × 100%

These comparisons reveal whether a district is spending more or less than similar-sized districts, and where specific spending differences occur across the eight categories:

1. Teachers
2. Insurance, Retirement and Other
3. Pupil Services
4. Other Teaching Services
5. Operations and Maintenance
6. Instructional Leadership
7. Administration
8. Other

## **END OF APPENDIX C**

## Appendix C. Data Tables

All data values used in plots

This appendix contains the underlying data tables for all districts and regions shown in the report. Each table shows PPE by category (in \$/pupil), FTE enrollment counts, and NSS/Ch70 funding components (in absolute dollars) across all available years.

### Data: All Western MA Traditional Districts: Tiny (0-200 FTE)

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

PPE by Category (\$/pupil)

Table 53

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$577	\$571	\$623	\$643	\$647	\$665	\$676	\$709	\$780	\$579	\$673	\$738	\$1,380	\$1,042	\$1,304	\$1,057
Administration	\$770	\$808	\$814	\$853	\$915	\$851	\$774	\$819	\$863	\$869	\$770	\$833	\$950	\$1,003	\$1,114	\$1,126
Instructional Leadership	\$1,042	\$1,096	\$1,125	\$1,225	\$1,269	\$1,316	\$1,496	\$1,584	\$1,510	\$1,524	\$1,543	\$1,589	\$1,817	\$1,733	\$1,777	\$1,991
Operations and Maintenance	\$1,374	\$1,312	\$1,460	\$1,416	\$1,359	\$1,558	\$1,554	\$1,452	\$1,433	\$1,468	\$1,811	\$1,670	\$2,060	\$2,389	\$2,232	\$2,652
Other Teaching Services	\$1,899	\$1,926	\$1,987	\$2,112	\$2,412	\$2,378	\$2,494	\$2,635	\$2,673	\$2,707	\$3,004	\$3,115	\$3,322	\$3,677	\$3,638	\$3,757
Pupil Services	\$1,669	\$1,792	\$1,802	\$1,899	\$2,023	\$2,061	\$2,145	\$2,206	\$2,290	\$2,261	\$2,323	\$2,204	\$2,695	\$2,673	\$2,954	\$3,406
Insurance, Retirement and Other	\$2,258	\$2,405	\$2,595	\$2,737	\$2,926	\$3,148	\$3,125	\$3,143	\$3,905	\$3,390	\$3,662	\$3,769	\$4,357	\$4,048	\$4,506	\$5,009
Teachers	\$5,148	\$5,382	\$5,545	\$5,277	\$5,430	\$5,906	\$6,187	\$6,222	\$6,245	\$6,520	\$6,792	\$6,982	\$8,015	\$7,858	\$7,808	\$8,507
Total	\$14,738	\$15,291	\$15,950	\$16,161	\$16,981	\$17,882	\$18,452	\$18,770	\$19,700	\$19,319	\$20,577	\$20,900	\$24,596	\$24,423	\$25,334	\$27,504

FTE Enrollment

Table 54

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	131	127	125	125	123	120	122	116	121	123	122	122	107	115	114	113
Foundation Enrollment	123	120	116	109	109	108	107	111	108	107	105	102	101	91	93	94
Out-of-District FTE Pupils	41	41	41	37	40	38	37	39	38	36	35	33	31	34	34	32

NSS/Ch70 Funding Components (\$)

Table 55

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$412K	\$404K	\$386K	\$387K	\$394K	\$397K	\$400K	\$417K	\$423K	\$426K	\$430K	\$433K	\$441K	\$446K	\$469K	\$500K
Req NSS (minus Ch70)	\$680K	\$762K	\$749K	\$752K	\$766K	\$790K	\$786K	\$837K	\$811K	\$819K	\$830K	\$838K	\$867K	\$835K	\$867K	\$917K
Actual NSS (minus Req NSS)	\$565K	\$539K	\$597K	\$598K	\$645K	\$642K	\$673K	\$709K	\$891K	\$895K	\$1.0M	\$999K	\$1.0M	\$1.1M	\$1.1M	\$1.1M
Total NSS	\$1.7M	\$1.7M	\$1.7M	\$1.7M	\$1.8M	\$1.8M	\$1.9M	\$2.0M	\$2.1M	\$2.1M	\$2.3M	\$2.3M	\$2.3M	\$2.4M	\$2.5M	\$2.5M

## Data: All Western MA Traditional Districts: Small (201-800 FTE)

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

### PPE by Category (\$/pupil)

Table 56

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$558	\$505	\$540	\$533	\$585	\$515	\$503	\$583	\$539	\$596	\$558	\$512	\$915	\$777	\$1,064	\$1,150
Administration	\$523	\$515	\$567	\$601	\$648	\$665	\$701	\$739	\$999	\$752	\$788	\$802	\$854	\$942	\$948	\$976
Instructional Leadership	\$811	\$805	\$838	\$824	\$909	\$947	\$967	\$1,024	\$1,028	\$1,042	\$1,016	\$1,097	\$1,188	\$1,260	\$1,336	\$1,463
Operations and Maintenance	\$1,108	\$1,056	\$1,043	\$1,101	\$1,198	\$1,264	\$1,295	\$1,338	\$1,254	\$1,285	\$1,473	\$1,422	\$1,676	\$1,878	\$2,176	\$2,454
Other Teaching Services	\$1,061	\$1,089	\$1,193	\$1,151	\$1,289	\$1,311	\$1,353	\$1,446	\$1,575	\$1,718	\$1,799	\$1,806	\$1,779	\$1,899	\$2,151	\$2,402
Pupil Services	\$1,813	\$1,788	\$1,859	\$1,993	\$2,216	\$2,221	\$2,216	\$2,477	\$2,438	\$2,470	\$2,643	\$2,670	\$2,903	\$3,433	\$3,656	\$4,084
Insurance, Retirement and Other	\$2,128	\$2,107	\$2,230	\$2,317	\$2,486	\$2,568	\$2,711	\$2,955	\$3,219	\$3,345	\$3,362	\$3,420	\$3,734	\$3,801	\$3,969	\$4,254
Teachers	\$4,522	\$4,588	\$4,679	\$4,870	\$5,353	\$5,423	\$5,557	\$5,771	\$6,026	\$6,075	\$6,152	\$6,450	\$6,922	\$7,338	\$7,596	\$7,838
Total	\$12,523	\$12,453	\$12,949	\$13,388	\$14,684	\$14,916	\$15,302	\$16,333	\$17,077	\$17,283	\$17,791	\$18,177	\$19,972	\$21,330	\$22,896	\$24,622

### FTE Enrollment

Table 57

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	775	779	763	742	696	680	661	644	628	614	617	601	560	556	553	542
Foundation Enrollment	695	676	666	646	628	603	590	559	542	536	528	526	522	494	484	481
Out-of-District FTE Pupils	75	78	73	73	80	82	86	82	85	88	90	88	85	87	87	84

### NSS/Ch70 Funding Components (\$)

Table 58

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$2.7M	\$2.6M	\$2.5M	\$2.5M	\$2.5M	\$2.6M	\$2.6M	\$2.6M	\$2.6M	\$2.6M	\$2.6M	\$2.7M	\$2.7M	\$2.7M	\$2.8M	\$2.9M
Req NSS (minus Ch70)	\$3.4M	\$3.8M	\$3.9M	\$4.0M	\$4.0M	\$4.1M	\$4.0M	\$3.9M	\$3.8M	\$3.7M	\$3.8M	\$3.9M	\$4.0M	\$4.0M	\$4.2M	\$4.4M
Actual NSS (minus Req NSS)	\$1.5M	\$1.1M	\$1.2M	\$1.2M	\$1.4M	\$1.5M	\$1.6M	\$2.0M	\$2.2M	\$2.3M	\$2.5M	\$2.5M	\$2.5M	\$2.7M	\$3.0M	\$3.0M
Total NSS	\$7.6M	\$7.6M	\$7.6M	\$7.7M	\$7.9M	\$8.2M	\$8.2M	\$8.5M	\$8.5M	\$8.7M	\$8.9M	\$9.1M	\$9.2M	\$9.4M	\$10.0M	\$10.3M

## Data: All Western MA Traditional Districts: Medium (801-1600 FTE)

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

### PPE by Category (\$/pupil)

Table 59

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$461	\$484	\$558	\$494	\$561	\$552	\$524	\$573	\$586	\$534	\$644	\$607	\$930	\$1,064	\$1,055	\$1,200
Administration	\$494	\$521	\$512	\$533	\$575	\$576	\$614	\$653	\$678	\$711	\$653	\$700	\$747	\$785	\$835	\$911
Instructional Leadership	\$893	\$902	\$885	\$1,039	\$1,062	\$1,091	\$1,113	\$1,169	\$1,150	\$1,071	\$1,063	\$1,113	\$1,191	\$1,263	\$1,373	\$1,573
Operations and Maintenance	\$1,150	\$1,085	\$1,155	\$1,095	\$1,146	\$1,208	\$1,233	\$1,218	\$1,228	\$1,203	\$1,326	\$1,383	\$1,564	\$1,663	\$1,836	\$1,953
Other Teaching Services	\$1,014	\$1,078	\$1,100	\$1,135	\$1,235	\$1,317	\$1,362	\$1,400	\$1,444	\$1,596	\$1,681	\$1,729	\$1,936	\$2,180	\$2,311	\$2,395
Pupil Services	\$1,724	\$1,693	\$1,757	\$1,763	\$1,901	\$1,984	\$2,096	\$2,184	\$2,208	\$2,406	\$2,464	\$2,403	\$2,634	\$2,967	\$3,353	\$3,581
Insurance, Retirement and Other	\$2,483	\$2,574	\$2,743	\$2,707	\$2,707	\$2,943	\$3,074	\$3,251	\$3,266	\$3,622	\$3,631	\$3,789	\$4,169	\$4,166	\$4,480	\$4,740
Teachers	\$4,813	\$4,890	\$5,055	\$5,048	\$5,152	\$5,357	\$5,513	\$5,578	\$5,674	\$5,960	\$6,251	\$6,385	\$6,758	\$6,773	\$7,182	\$7,431
Total	\$13,032	\$13,227	\$13,766	\$13,815	\$14,340	\$15,028	\$15,529	\$16,025	\$16,234	\$17,103	\$17,713	\$18,110	\$19,930	\$20,859	\$22,426	\$23,785

### FTE Enrollment

Table 60

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	1,466	1,434	1,416	1,402	1,388	1,334	1,306	1,277	1,268	1,247	1,268	1,249	1,160	1,175	1,158	1,144
Foundation Enrollment	1,622	1,596	1,567	1,528	1,509	1,507	1,472	1,451	1,422	1,399	1,381	1,376	1,361	1,289	1,283	1,247
Out-of-District FTE Pupils	154	161	164	164	166	167	176	185	187	194	201	198	190	191	194	194

### NSS/Ch70 Funding Components (\$)

Table 61

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$8.4M	\$8.3M	\$7.9M	\$8.0M	\$8.2M	\$8.4M	\$8.5M	\$8.5M	\$8.7M	\$8.7M	\$8.8M	\$9.1M	\$9.2M	\$9.3M	\$9.9M	\$10.2M
Req NSS (minus Ch70)	\$5.8M	\$7.4M	\$7.5M	\$7.7M	\$8.0M	\$8.3M	\$8.3M	\$8.3M	\$8.2M	\$8.1M	\$8.3M	\$8.5M	\$8.7M	\$8.8M	\$9.1M	\$9.5M
Actual NSS (minus Req NSS)	\$3.4M	\$2.3M	\$2.5M	\$2.5M	\$2.6M	\$2.5M	\$2.9M	\$3.3M	\$3.5M	\$4.5M	\$4.6M	\$4.6M	\$4.4M	\$4.3M	\$4.6M	\$4.8M
Total NSS	\$17.7M	\$18.1M	\$17.9M	\$18.2M	\$18.8M	\$19.2M	\$19.7M	\$20.2M	\$20.3M	\$21.3M	\$21.7M	\$22.2M	\$22.3M	\$22.4M	\$23.6M	\$24.5M

## Data: All Western MA Traditional Districts: Large (1601-4000 FTE)

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

### PPE by Category (\$/pupil)

Table 62

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$442	\$432	\$541	\$510	\$562	\$573	\$583	\$614	\$591	\$572	\$580	\$509	\$668	\$694	\$735	\$765
Administration	\$397	\$436	\$441	\$485	\$490	\$508	\$557	\$601	\$576	\$583	\$502	\$532	\$598	\$550	\$627	\$601
Instructional Leadership	\$641	\$694	\$723	\$743	\$749	\$795	\$815	\$835	\$855	\$825	\$923	\$916	\$941	\$993	\$1,005	\$1,054
Operations and Maintenance	\$981	\$941	\$978	\$970	\$946	\$986	\$1,098	\$1,109	\$1,128	\$1,154	\$1,225	\$1,208	\$1,408	\$1,371	\$1,563	\$1,586
Other Teaching Services	\$995	\$1,015	\$1,084	\$1,097	\$1,137	\$1,198	\$1,286	\$1,353	\$1,386	\$1,460	\$1,502	\$1,522	\$1,680	\$1,803	\$1,899	\$1,989
Pupil Services	\$1,458	\$1,466	\$1,511	\$1,550	\$1,601	\$1,668	\$1,735	\$1,798	\$1,864	\$1,943	\$2,064	\$2,036	\$2,155	\$2,520	\$2,749	\$2,865
Insurance, Retirement and Other	\$1,707	\$1,759	\$1,804	\$1,959	\$1,988	\$2,107	\$2,229	\$2,353	\$2,505	\$2,607	\$2,698	\$2,785	\$2,963	\$3,099	\$3,240	\$3,427
Teachers	\$4,321	\$4,454	\$4,478	\$4,686	\$4,768	\$4,867	\$5,083	\$5,286	\$5,416	\$5,601	\$5,976	\$6,121	\$6,548	\$6,668	\$6,882	\$7,152
Total	\$10,942	\$11,197	\$11,560	\$12,000	\$12,241	\$12,701	\$13,385	\$13,948	\$14,320	\$14,745	\$15,470	\$15,629	\$16,961	\$17,699	\$18,701	\$19,439

### FTE Enrollment

Table 63

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	2,894	2,847	2,844	2,740	2,715	2,680	2,627	2,595	2,609	2,609	2,570	2,570	2,427	2,468	2,446	2,424
Foundation Enrollment	3,097	3,056	3,021	2,992	2,931	2,871	2,834	2,790	2,743	2,732	2,709	2,684	2,665	2,562	2,561	2,536
Out-of-District FTE Pupils	148	157	160	164	159	162	171	176	169	171	180	174	173	173	176	175

### NSS/Ch70 Funding Components (\$)

Table 64

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$12.0M	\$11.8M	\$11.6M	\$11.8M	\$12.1M	\$12.2M	\$12.2M	\$12.3M	\$12.5M	\$12.5M	\$12.7M	\$12.8M	\$12.9M	\$13.0M	\$13.9M	\$14.9M
Req NSS (minus Ch70)	\$13.5M	\$15.2M	\$15.2M	\$15.5M	\$15.9M	\$16.4M	\$16.5M	\$16.8M	\$16.7M	\$16.8M	\$17.1M	\$17.7M	\$18.2M	\$18.3M	\$19.1M	\$20.0M
Actual NSS (minus Req NSS)	\$4.1M	\$3.7M	\$4.1M	\$4.4M	\$4.3M	\$4.6M	\$5.8M	\$6.6M	\$7.7M	\$8.6M	\$9.0M	\$9.1M	\$9.2M	\$10.6M	\$10.0M	\$10.0M
Total NSS	\$29.6M	\$30.7M	\$30.9M	\$31.8M	\$32.3M	\$33.2M	\$34.5M	\$35.8M	\$36.9M	\$38.0M	\$38.9M	\$39.6M	\$40.3M	\$42.0M	\$43.0M	\$44.9M

## Data: All Western MA Traditional Districts: X-Large (4001-10K FTE)

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

### PPE by Category (\$/pupil)

Table 65

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$576	\$833	\$678	\$696	\$731	\$679	\$632	\$669	\$724	\$747	\$841	\$892	\$1,231	\$1,405	\$1,849	\$1,847
Administration	\$388	\$396	\$412	\$396	\$400	\$423	\$422	\$408	\$401	\$419	\$411	\$476	\$486	\$589	\$606	\$689
Instructional Leadership	\$958	\$1,001	\$988	\$951	\$912	\$963	\$999	\$1,012	\$1,040	\$1,036	\$1,061	\$1,123	\$1,161	\$1,291	\$1,360	\$1,383
Operations and Maintenance	\$1,043	\$1,039	\$1,035	\$1,000	\$1,016	\$1,055	\$1,088	\$1,089	\$1,097	\$1,150	\$1,259	\$1,263	\$1,395	\$1,519	\$1,790	\$1,765
Other Teaching Services	\$985	\$1,056	\$1,121	\$1,111	\$1,211	\$1,253	\$1,294	\$1,376	\$1,381	\$1,340	\$1,327	\$1,350	\$1,461	\$1,642	\$1,996	\$2,047
Pupil Services	\$1,595	\$1,596	\$1,718	\$1,664	\$1,779	\$1,907	\$1,943	\$2,032	\$2,019	\$2,175	\$2,260	\$2,206	\$2,237	\$2,769	\$3,133	\$3,391
Insurance, Retirement and Other	\$2,088	\$2,101	\$2,255	\$2,261	\$2,223	\$2,430	\$2,481	\$2,475	\$2,575	\$2,689	\$2,837	\$2,915	\$3,100	\$3,310	\$3,471	\$3,504
Teachers	\$4,866	\$4,734	\$4,905	\$5,021	\$5,177	\$5,236	\$5,287	\$5,481	\$5,537	\$5,542	\$5,768	\$5,954	\$6,386	\$6,877	\$7,104	\$7,413
Total	\$12,498	\$12,756	\$13,112	\$13,100	\$13,448	\$13,946	\$14,146	\$14,543	\$14,774	\$15,098	\$15,763	\$16,180	\$17,457	\$19,402	\$21,310	\$22,040

### FTE Enrollment

Table 66

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	5,994	5,944	5,899	5,854	5,787	5,704	5,690	5,617	5,638	5,610	5,498	5,450	5,141	5,138	5,072	5,098
Foundation Enrollment	6,769	6,702	6,668	6,658	6,641	6,608	6,566	6,564	6,456	6,430	6,362	6,340	6,267	6,029	5,933	5,880
Out-of-District FTE Pupils	335	354	395	412	430	470	514	549	580	593	630	652	652	642	674	683

### NSS/Ch70 Funding Components (\$)

Table 67

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$46.4M	\$45.5M	\$45.9M	\$47.7M	\$49.1M	\$49.7M	\$49.9M	\$50.8M	\$51.2M	\$52.2M	\$53.2M	\$57.7M	\$58.4M	\$60.6M	\$66.0M	\$72.4M
Req NSS (minus Ch70)	\$16.1M	\$21.0M	\$21.2M	\$21.7M	\$22.6M	\$23.4M	\$23.8M	\$24.2M	\$24.1M	\$23.7M	\$24.1M	\$24.4M	\$24.8M	\$25.4M	\$26.2M	\$27.8M
Actual NSS (minus Req NSS)	\$3.8M	\$2.0M	\$3.7M	\$3.0M	\$3.7M	\$4.8M	\$4.8M	\$4.7M	\$6.7M	\$7.2M	\$8.2M	\$7.1M	\$6.4M	\$6.0M	\$8.2M	\$6.6M
Total NSS	\$66.3M	\$68.5M	\$70.7M	\$72.4M	\$75.4M	\$77.8M	\$78.6M	\$79.8M	\$81.9M	\$83.0M	\$85.5M	\$89.2M	\$89.6M	\$92.0M	\$100.3M	\$106.8M

# Data: All Western MA Traditional Districts: Outliers (Springfield at 23,723 FTE in 2024)

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

PPE by Category (\$/pupil)

Table 68

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$1,143	\$1,337	\$2,068	\$1,143	\$1,424	\$1,734	\$1,241	\$1,376	\$1,286	\$1,371	\$1,673	\$1,765	\$2,487	\$2,260	\$2,923	\$3,071
Administration	\$533	\$654	\$446	\$645	\$550	\$677	\$596	\$580	\$507	\$490	\$416	\$407	\$441	\$501	\$599	\$609
Instructional Leadership	\$719	\$778	\$892	\$1,173	\$1,257	\$1,245	\$1,208	\$1,282	\$1,280	\$1,060	\$983	\$1,090	\$1,103	\$1,402	\$1,534	\$1,571
Operations and Maintenance	\$1,150	\$1,081	\$1,262	\$1,176	\$1,132	\$997	\$1,121	\$1,027	\$1,063	\$1,156	\$1,337	\$1,093	\$1,534	\$1,536	\$3,453	\$3,806
Other Teaching Services	\$1,143	\$1,002	\$1,146	\$1,130	\$1,051	\$1,086	\$1,150	\$1,135	\$1,070	\$1,036	\$1,357	\$1,390	\$1,337	\$1,518	\$1,776	\$2,014
Pupil Services	\$2,031	\$1,873	\$2,156	\$2,353	\$2,183	\$2,257	\$2,393	\$2,467	\$2,613	\$2,845	\$2,968	\$2,631	\$2,590	\$3,602	\$3,675	\$3,901
Insurance, Retirement and Other	\$2,050	\$2,226	\$2,280	\$2,474	\$2,437	\$2,496	\$2,467	\$2,566	\$2,562	\$2,635	\$2,765	\$3,001	\$3,217	\$3,461	\$3,852	\$3,906
Teachers	\$5,839	\$4,859	\$4,750	\$4,711	\$4,848	\$4,823	\$4,963	\$5,196	\$4,962	\$5,274	\$5,510	\$5,800	\$6,442	\$7,095	\$7,561	\$7,737
Total	\$14,608	\$13,810	\$15,000	\$14,805	\$14,882	\$15,315	\$15,139	\$15,629	\$15,343	\$15,867	\$17,009	\$17,177	\$19,151	\$21,375	\$25,373	\$26,615

FTE Enrollment

Table 69

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	25,137	24,987	24,935	24,521	24,747	25,249	25,101	25,009	25,629	25,776	25,294	24,906	24,079	24,040	23,763	23,723
Foundation Enrollment	28,235	28,343	28,305	28,226	27,951	28,434	28,755	28,970	29,109	29,533	29,670	29,645	29,551	29,144	28,613	28,326
Out-of-District FTE Pupils	3,571	3,775	3,719	3,695	3,817	3,613	3,974	4,406	4,596	4,812	5,150	5,363	5,559	5,500	5,652	5,745

NSS/Ch70 Funding Components (\$)

Table 70

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$262.7M	\$257.5M	\$262.7M	\$275.4M	\$285.9M	\$295.8M	\$301.6M	\$309.2M	\$319.9M	\$333.0M	\$345.4M	\$370.7M	\$377.2M	\$403.3M	\$439.2M	\$477.7M
Req NSS (minus Ch70)	\$7.0M	\$37.5M	\$45.6M	\$35.2M	\$37.1M	\$39.2M	\$36.1M	\$36.4M	\$36.7M	\$37.4M	\$41.4M	\$40.8M	\$56.7M	\$43.2M	\$44.7M	\$48.0M
Actual NSS (minus Req NSS)	-\$4.2M	-\$10.9M	-\$985K	-\$2.4M	-\$4.0M	\$1	\$50K	\$59K	\$-1	-\$3.1M	-\$2	-\$14.8M	\$3	\$7	-\$2	-\$5
Total NSS	\$265.5M	\$284.1M	\$307.3M	\$308.2M	\$319.0M	\$335.0M	\$337.7M	\$345.7M	\$356.6M	\$367.2M	\$386.8M	\$396.8M	\$433.8M	\$446.5M	\$483.9M	\$525.8M

## Data: Amherst-Pelham

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

PPE by Category (\$/pupil)

Table 71

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$646	\$534	\$900	\$417	\$459	\$424	\$599	\$860	\$635	\$384	\$610	\$559	\$477	\$527	\$457	\$799
Administration	\$652	\$664	\$687	\$789	\$987	\$907	\$953	\$926	\$996	\$857	\$759	\$780	\$788	\$859	\$928	\$1,277
Instructional Leadership	\$1,289	\$1,337	\$1,209	\$1,397	\$1,390	\$1,545	\$1,429	\$1,437	\$1,541	\$1,555	\$1,544	\$1,501	\$1,436	\$1,472	\$1,644	\$2,336
Operations and Maintenance	\$1,459	\$1,416	\$1,559	\$1,468	\$1,481	\$1,585	\$1,473	\$1,577	\$1,904	\$1,678	\$1,776	\$1,601	\$1,705	\$1,778	\$1,957	\$2,221
Other Teaching Services	\$1,199	\$1,264	\$1,313	\$1,468	\$1,588	\$1,739	\$1,770	\$1,883	\$2,014	\$2,066	\$2,122	\$2,214	\$3,010	\$3,050	\$2,968	\$2,851
Pupil Services	\$2,170	\$2,196	\$2,205	\$2,302	\$2,291	\$2,497	\$2,753	\$2,908	\$2,931	\$3,109	\$3,161	\$2,902	\$3,951	\$3,780	\$4,177	\$4,231
Insurance, Retirement and Other	\$3,305	\$3,636	\$3,673	\$3,811	\$3,526	\$3,954	\$4,086	\$4,103	\$4,218	\$5,006	\$5,047	\$5,074	\$5,237	\$5,062	\$5,887	\$6,248
Teachers	\$5,491	\$5,511	\$6,254	\$6,199	\$6,533	\$6,765	\$6,704	\$6,590	\$6,927	\$7,208	\$7,285	\$7,155	\$7,592	\$7,404	\$8,158	\$8,270
Total	\$16,211	\$16,558	\$17,800	\$17,851	\$18,255	\$19,416	\$19,767	\$20,284	\$21,166	\$21,863	\$22,304	\$21,786	\$24,196	\$23,932	\$26,176	\$28,233

FTE Enrollment

Table 72

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	1,712	1,659	1,573	1,536	1,519	1,470	1,450	1,378	1,366	1,342	1,334	1,346	1,278	1,265	1,241	1,209
Foundation Enrollment	1,801	1,763	1,726	1,647	1,610	1,581	1,529	1,532	1,496	1,490	1,433	1,399	1,399	1,330	1,310	1,274
Out-of-District FTE Pupils	112	129	138	143	138	149	169	190	192	170	158	152	155	145	150	147

NSS/Ch70 Funding Components (\$)

Table 73

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$9.9M	\$9.7M	\$9.1M	\$9.2M	\$9.2M	\$9.3M	\$9.3M	\$9.3M	\$9.4M	\$9.5M	\$9.5M	\$9.6M	\$9.6M	\$9.6M	\$9.7M	\$9.8M
Req NSS (minus Ch70)	\$7.9M	\$10.9M	\$11.0M	\$11.1M	\$11.4M	\$11.7M	\$11.5M	\$11.7M	\$11.5M	\$11.6M	\$11.9M	\$12.1M	\$12.8M	\$12.8M	\$13.3M	\$13.8M
Actual NSS (minus Req NSS)	\$6.1M	\$4.0M	\$4.7M	\$5.5M	\$6.0M	\$6.1M	\$6.6M	\$6.7M	\$7.5M	\$7.5M	\$7.7M	\$7.5M	\$6.8M	\$6.8M	\$7.0M	\$7.7M
Total NSS	\$23.9M	\$24.6M	\$24.8M	\$25.8M	\$26.6M	\$27.0M	\$27.4M	\$27.7M	\$28.4M	\$28.6M	\$29.1M	\$29.2M	\$29.2M	\$30.0M	\$31.3M	

## Data: Amherst

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

PPE by Category (\$/pupil)

Table 74

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$684	\$547	\$606	\$931	\$1,098	\$1,098	\$1,265	\$1,242	\$1,119	\$798	\$1,092	\$733	\$1,563	\$1,561	\$1,475	\$1,328
Administration	\$627	\$698	\$735	\$709	\$787	\$809	\$919	\$944	\$981	\$799	\$767	\$827	\$874	\$896	\$981	\$1,213
Instructional Leadership	\$1,134	\$1,079	\$965	\$1,032	\$1,153	\$1,275	\$1,175	\$1,131	\$1,087	\$1,231	\$1,325	\$1,527	\$1,750	\$1,783	\$1,847	\$2,498
Operations and Maintenance	\$1,264	\$1,271	\$1,636	\$1,436	\$1,399	\$1,451	\$1,577	\$1,530	\$1,555	\$1,340	\$1,646	\$1,764	\$1,897	\$1,874	\$1,941	\$2,248
Other Teaching Services	\$1,762	\$1,813	\$1,923	\$2,345	\$2,621	\$2,610	\$2,840	\$2,652	\$2,751	\$2,973	\$3,084	\$3,053	\$3,908	\$3,898	\$3,746	\$4,612
Pupil Services	\$1,261	\$1,386	\$1,335	\$1,386	\$1,553	\$1,761	\$1,802	\$1,850	\$1,818	\$1,909	\$2,030	\$1,844	\$2,035	\$2,740	\$2,821	\$3,018
Insurance, Retirement and Other	\$3,353	\$3,610	\$3,821	\$3,852	\$3,941	\$4,189	\$4,201	\$4,295	\$4,231	\$4,840	\$5,212	\$5,363	\$5,661	\$5,561	\$6,022	\$6,605
Teachers	\$5,944	\$6,213	\$6,355	\$6,963	\$6,804	\$6,627	\$6,841	\$7,712	\$7,792	\$8,091	\$8,538	\$8,725	\$9,528	\$9,598	\$9,451	\$9,745
Total	\$16,029	\$16,617	\$17,376	\$18,654	\$19,356	\$19,820	\$20,620	\$21,356	\$21,334	\$21,981	\$23,694	\$23,836	\$27,216	\$27,911	\$28,284	\$31,267

FTE Enrollment

Table 75

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	1,387	1,331	1,284	1,215	1,196	1,197	1,184	1,154	1,156	1,163	1,131	1,107	1,017	1,052	1,062	1,002
Foundation Enrollment	1,398	1,405	1,356	1,279	1,269	1,227	1,205	1,192	1,199	1,136	1,106	1,134	1,097	1,045	1,065	1,055
Out-of-District FTE Pupils	65	72	73	84	90	90	101	113	110	108	124	122	118	123	129	134

NSS/Ch70 Funding Components (\$)

Table 76

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$6.3M	\$6.1M	\$5.8M	\$5.8M	\$5.9M	\$5.9M	\$5.9M	\$6.0M	\$6.0M	\$6.1M	\$6.1M	\$6.1M	\$6.1M	\$6.2M	\$6.2M	\$6.3M
Req NSS (minus Ch70)	\$5.5M	\$8.3M	\$8.2M	\$8.3M	\$8.6M	\$8.8M	\$8.8M	\$9.0M	\$9.1M	\$8.8M	\$8.9M	\$9.5M	\$9.6M	\$9.9M	\$10.5M	\$11.2M
Actual NSS (minus Req NSS)	\$8.6M	\$6.7M	\$7.1M	\$7.2M	\$7.7M	\$8.0M	\$8.6M	\$9.1M	\$9.0M	\$10.0M	\$10.9M	\$10.5M	\$10.3M	\$11.2M	\$11.2M	\$11.7M
Total NSS	\$20.4M	\$21.1M	\$21.1M	\$21.4M	\$22.2M	\$22.6M	\$23.4M	\$24.1M	\$24.1M	\$24.9M	\$25.9M	\$26.1M	\$26.1M	\$27.3M	\$27.9M	\$29.1M

## Data: Leverett

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

PPE by Category (\$/pupil)

Table 77

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$575	\$602	\$651	\$766	\$616	\$556	\$563	\$529	\$596	\$453	\$503	\$606	\$1,041	\$840	\$756	\$608
Administration	\$715	\$676	\$710	\$888	\$925	\$1,029	\$809	\$842	\$1,244	\$899	\$826	\$857	\$1,010	\$987	\$1,061	\$953
Instructional Leadership	\$1,015	\$1,008	\$1,072	\$1,244	\$1,257	\$1,393	\$1,357	\$1,344	\$1,431	\$1,461	\$1,278	\$1,317	\$1,318	\$1,354	\$1,430	\$1,663
Operations and Maintenance	\$1,755	\$1,427	\$1,532	\$1,741	\$1,479	\$2,421	\$2,272	\$1,707	\$1,209	\$1,765	\$1,491	\$1,458	\$2,131	\$2,296	\$2,292	\$2,158
Other Teaching Services	\$2,385	\$2,040	\$2,074	\$2,346	\$2,540	\$2,352	\$2,274	\$2,281	\$2,193	\$2,175	\$2,477	\$2,386	\$2,178	\$3,119	\$3,266	\$3,526
Pupil Services	\$1,395	\$970	\$1,096	\$1,599	\$1,613	\$2,392	\$2,073	\$1,701	\$2,082	\$2,081	\$1,845	\$1,641	\$2,690	\$1,910	\$2,635	\$2,814
Insurance, Retirement and Other	\$2,098	\$2,041	\$2,253	\$2,499	\$2,753	\$3,245	\$3,041	\$2,937	\$2,943	\$3,677	\$3,781	\$3,686	\$4,766	\$3,630	\$3,611	\$3,793
Teachers	\$5,218	\$5,690	\$5,818	\$6,301	\$6,138	\$7,547	\$6,868	\$6,967	\$6,814	\$7,967	\$7,665	\$7,134	\$9,224	\$6,888	\$6,724	\$6,395
Total	\$15,156	\$14,454	\$15,206	\$17,384	\$17,321	\$20,935	\$19,257	\$18,308	\$18,512	\$20,478	\$19,866	\$19,085	\$24,358	\$21,024	\$21,775	\$21,910

FTE Enrollment

Table 78

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	162	164	161	150	147	124	134	135	134	129	136	142	117	142	140	142
Foundation Enrollment	125	120	123	123	119	118	100	104	101	123	103	112	116	105	112	101
Out-of-District FTE Pupils	7	7	6	9	10	9	8	6	14	8	9	12	9	12	7	3

NSS/Ch70 Funding Components (\$)

Table 79

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$288K	\$282K	\$266K	\$267K	\$272K	\$275K	\$277K	\$280K	\$285K	\$289K	\$292K	\$296K	\$296K	\$299K	\$391K	\$397K
Req NSS (minus Ch70)	\$819K	\$875K	\$938K	\$929K	\$916K	\$935K	\$841K	\$844K	\$837K	\$990K	\$858K	\$885K	\$993K	\$943K	\$971K	\$955K
Actual NSS (minus Req NSS)	\$877K	\$878K	\$860K	\$952K	\$1.0M	\$905K	\$974K	\$1.0M	\$1.0M	\$963K	\$1.2M	\$1.3M	\$1.1M	\$1.4M	\$1.1M	\$1.1M
Total NSS	\$2.0M	\$2.0M	\$2.1M	\$2.1M	\$2.2M	\$2.1M	\$2.1M	\$2.2M	\$2.1M	\$2.2M	\$2.3M	\$2.4M	\$2.4M	\$2.6M	\$2.5M	\$2.5M

## Data: Pelham

### PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

#### PPE by Category (\$/pupil)

Table 80

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$580	\$361	\$384	\$366	\$658	\$639	\$780	\$652	\$569	\$414	\$466	\$407	\$292	\$365	\$422	\$207
Administration	\$390	\$398	\$478	\$391	\$664	\$796	\$806	\$980	\$739	\$731	\$489	\$574	\$656	\$688	\$614	\$917
Instructional Leadership	\$1,123	\$1,159	\$1,089	\$1,064	\$1,113	\$1,252	\$1,288	\$1,322	\$1,278	\$1,431	\$1,194	\$1,609	\$1,670	\$1,873	\$1,782	\$1,885
Operations and Maintenance	\$920	\$847	\$925	\$884	\$992	\$947	\$1,080	\$942	\$987	\$889	\$1,229	\$1,304	\$1,498	\$1,380	\$1,524	\$1,614
Other Teaching Services	\$2,184	\$2,109	\$2,166	\$2,026	\$1,937	\$2,063	\$2,218	\$2,541	\$2,850	\$2,269	\$2,273	\$2,324	\$2,540	\$2,292	\$2,594	\$3,010
Pupil Services	\$1,032	\$1,090	\$1,347	\$1,507	\$1,584	\$1,615	\$1,696	\$1,797	\$1,774	\$1,672	\$1,732	\$1,642	\$2,112	\$2,203	\$1,888	\$3,610
Insurance, Retirement and Other	\$2,615	\$2,585	\$2,602	\$2,897	\$3,052	\$3,283	\$3,376	\$3,473	\$3,863	\$4,561	\$3,791	\$4,168	\$4,850	\$4,157	\$3,983	\$4,670
Teachers	\$5,889	\$5,474	\$5,627	\$5,576	\$5,035	\$6,090	\$6,540	\$6,418	\$5,904	\$6,310	\$6,129	\$6,860	\$7,406	\$6,714	\$6,430	\$7,127
Total	\$14,733	\$14,023	\$14,618	\$14,711	\$15,035	\$16,685	\$17,784	\$18,125	\$17,964	\$18,277	\$17,303	\$18,888	\$21,024	\$19,672	\$19,237	\$23,040

#### FTE Enrollment

Table 81

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	118	125	122	128	132	128	123	123	130	127	134	125	106	119	134	126
Foundation Enrollment	85	81	81	68	63	67	70	73	74	81	83	82	84	70	65	63
Out-of-District FTE Pupils	3	3	4	1	4	7	5	7	11	12	10	4	8	6	5	9

#### NSS/Ch70 Funding Components (\$)

Table 82

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$233K	\$229K	\$215K	\$216K	\$219K	\$221K	\$222K	\$224K	\$228K	\$231K	\$233K	\$236K	\$238K	\$241K	\$244K	\$248K
Req NSS (minus Ch70)	\$466K	\$497K	\$482K	\$480K	\$483K	\$566K	\$620K	\$627K	\$609K	\$620K	\$668K	\$688K	\$690K	\$646K	\$636K	\$632K
Actual NSS (minus Req NSS)	\$654K	\$626K	\$660K	\$651K	\$726K	\$681K	\$660K	\$736K	\$859K	\$1.0M	\$927K	\$942K	\$1.1M	\$1.1M	\$1.2M	\$1.3M
Total NSS	\$1.4M	\$1.4M	\$1.4M	\$1.3M	\$1.4M	\$1.5M	\$1.5M	\$1.6M	\$1.7M	\$1.9M	\$1.8M	\$1.9M	\$2.0M	\$2.1M	\$2.2M	

## Data: Shutesbury

PPE (\$/pupil), FTE Enrollment, and NSS/Ch70 Funding (\$)

PPE by Category (\$/pupil)

Table 83

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Other	\$580	\$498	\$564	\$865	\$704	\$515	\$636	\$684	\$1,510	\$420	\$385	\$873	\$1,296	\$551	\$1,102	\$545
Administration	\$652	\$943	\$767	\$836	\$877	\$726	\$884	\$1,084	\$1,040	\$846	\$856	\$938	\$925	\$1,100	\$934	\$1,015
Instructional Leadership	\$969	\$1,138	\$1,149	\$1,198	\$1,227	\$1,003	\$1,192	\$1,517	\$1,604	\$1,481	\$1,517	\$1,541	\$1,707	\$1,736	\$1,323	\$2,103
Operations and Maintenance	\$1,180	\$1,079	\$1,221	\$1,276	\$1,251	\$1,338	\$1,384	\$1,637	\$1,791	\$1,941	\$1,663	\$1,916	\$2,665	\$2,048	\$2,051	\$2,754
Other Teaching Services	\$2,185	\$2,447	\$2,361	\$2,193	\$2,179	\$2,591	\$2,164	\$2,817	\$3,301	\$3,491	\$3,545	\$3,560	\$3,722	\$5,320	\$3,441	\$4,359
Pupil Services	\$1,292	\$1,128	\$1,195	\$1,556	\$1,628	\$1,418	\$1,427	\$1,340	\$2,165	\$2,301	\$2,206	\$2,198	\$2,456	\$2,748	\$2,946	\$2,962
Insurance, Retirement and Other	\$2,332	\$2,687	\$2,596	\$2,690	\$2,564	\$2,484	\$2,328	\$3,107	\$3,773	\$4,388	\$2,970	\$3,963	\$3,350	\$3,154	\$4,007	\$3,501
Teachers	\$4,821	\$5,363	\$5,603	\$5,169	\$5,509	\$6,012	\$5,620	\$6,612	\$7,043	\$7,838	\$7,914	\$8,204	\$8,933	\$10,075	\$8,898	\$9,669
Total	\$14,011	\$15,283	\$15,456	\$15,783	\$15,939	\$16,087	\$15,635	\$18,798	\$22,227	\$22,706	\$21,056	\$23,193	\$25,054	\$26,732	\$24,702	\$26,908

FTE Enrollment

Table 84

FTE Series	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
In-District FTE Pupils	162	151	146	151	150	157	156	131	120	124	127	125	113	115	123	110
Foundation Enrollment	156	149	141	138	143	132	141	146	118	116	118	117	105	98	100	111
Out-of-District FTE Pupils	7	5	7	10	9	13	9	12	13	16	18	15	16	18	19	18

NSS/Ch70 Funding Components (\$)

Table 85

Component	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ch70 Aid	\$616K	\$604K	\$569K	\$572K	\$585K	\$588K	\$594K	\$613K	\$620K	\$623K	\$627K	\$630K	\$630K	\$633K	\$639K	\$646K
Req NSS (minus Ch70)	\$668K	\$728K	\$660K	\$653K	\$697K	\$658K	\$689K	\$723K	\$624K	\$680K	\$669K	\$730K	\$712K	\$713K	\$719K	\$820K
Actual NSS (minus Req NSS)	\$676K	\$700K	\$826K	\$870K	\$854K	\$946K	\$1.0M	\$923K	\$1.1M	\$1.2M	\$1.2M	\$1.3M	\$1.3M	\$1.5M	\$1.3M	\$1.2M
Total NSS	\$2.0M	\$2.0M	\$2.1M	\$2.1M	\$2.1M	\$2.2M	\$2.3M	\$2.3M	\$2.3M	\$2.5M	\$2.5M	\$2.7M	\$2.6M	\$2.8M	\$2.6M	\$2.6M