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Executive Summary

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

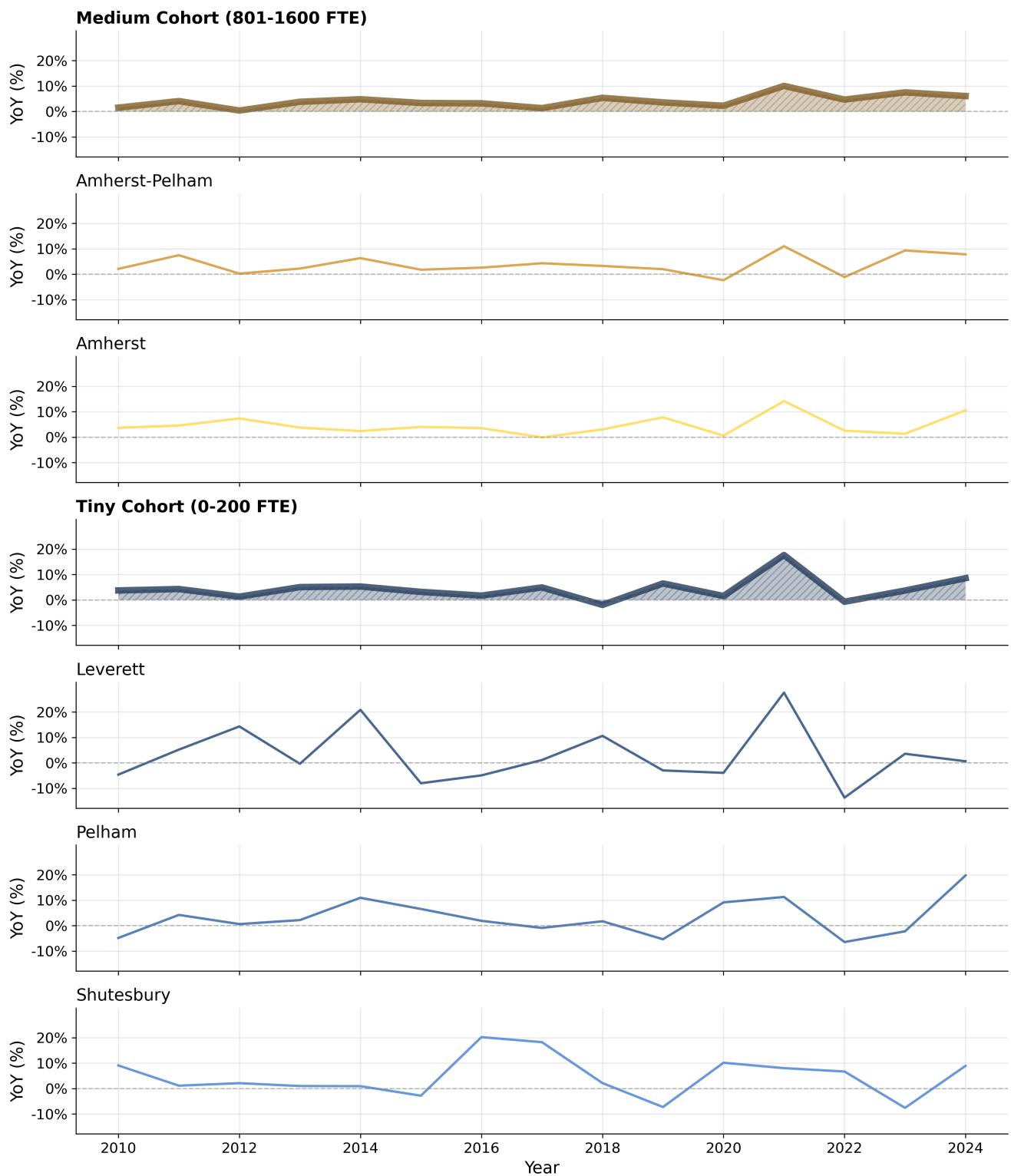


Figure 1

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.

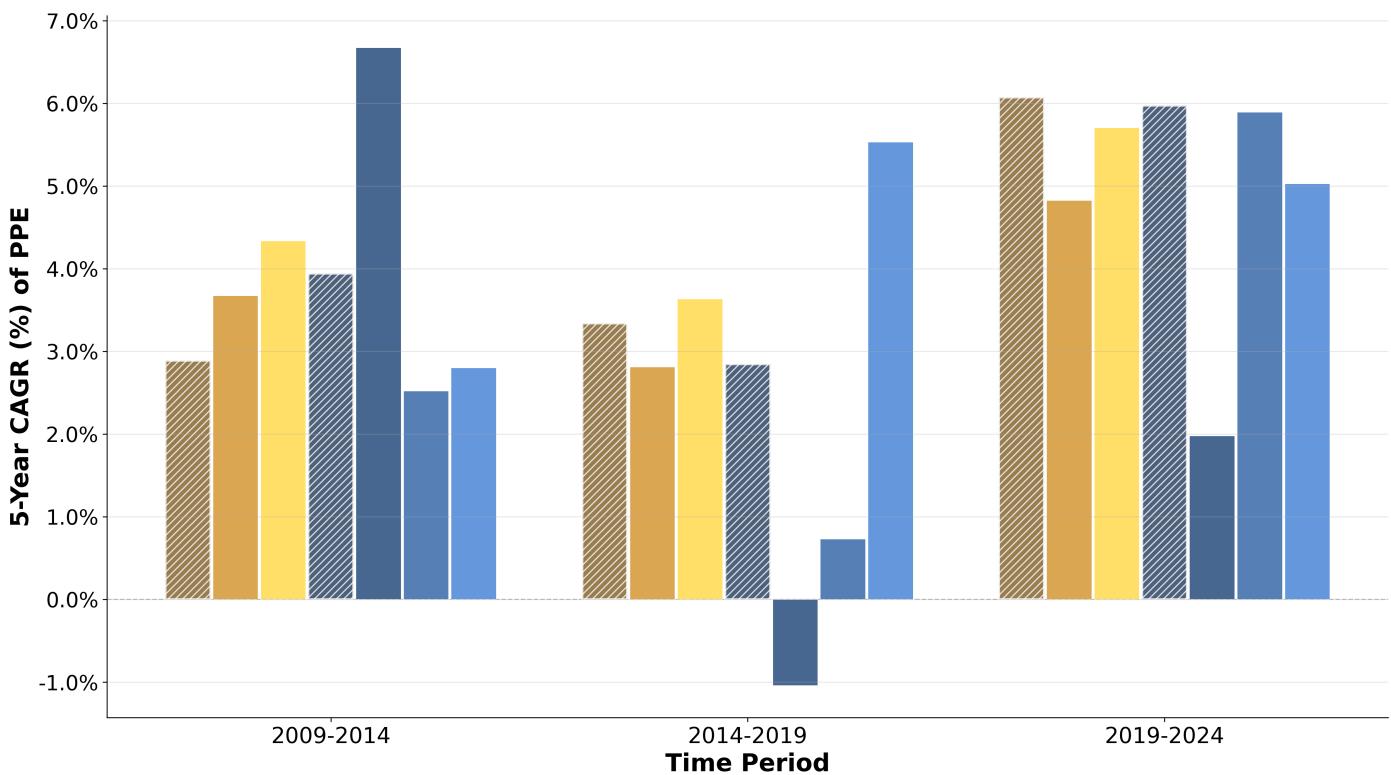


Figure 2

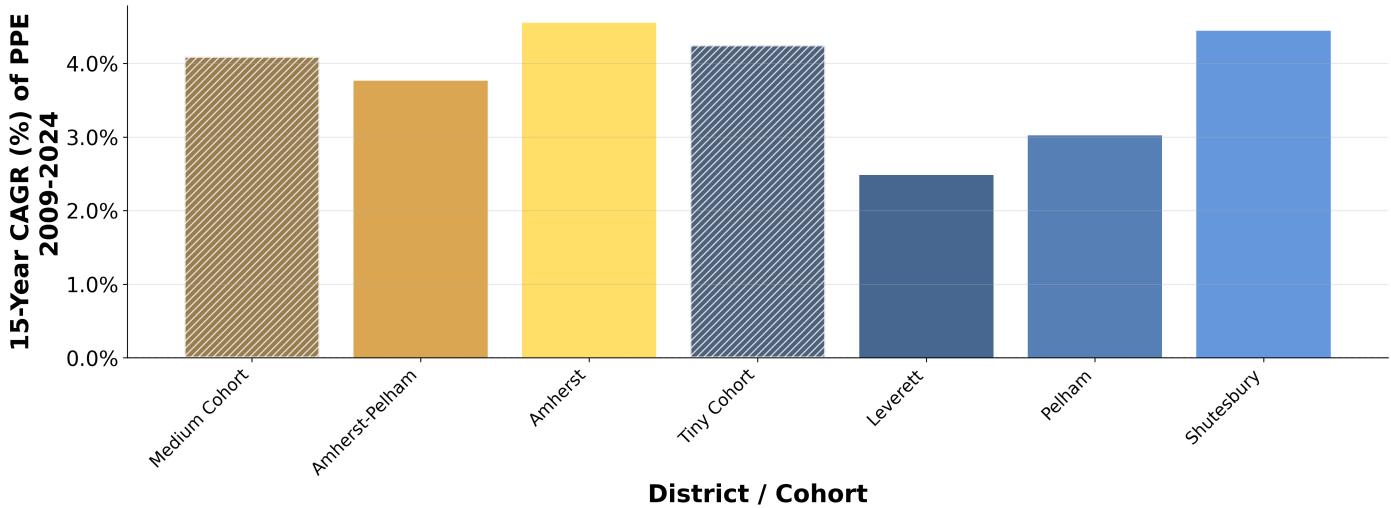


Figure 3

Executive Summary (continued)

Cohort comparison: Western Massachusetts enrollment groups

| Cohort/District | 2009 \$/pupil | Shading vs baseline: $ \Delta\$/\text{pupil} \geq 5.0\%$, $ \Delta\text{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 |

All Western MA Traditional Districts

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

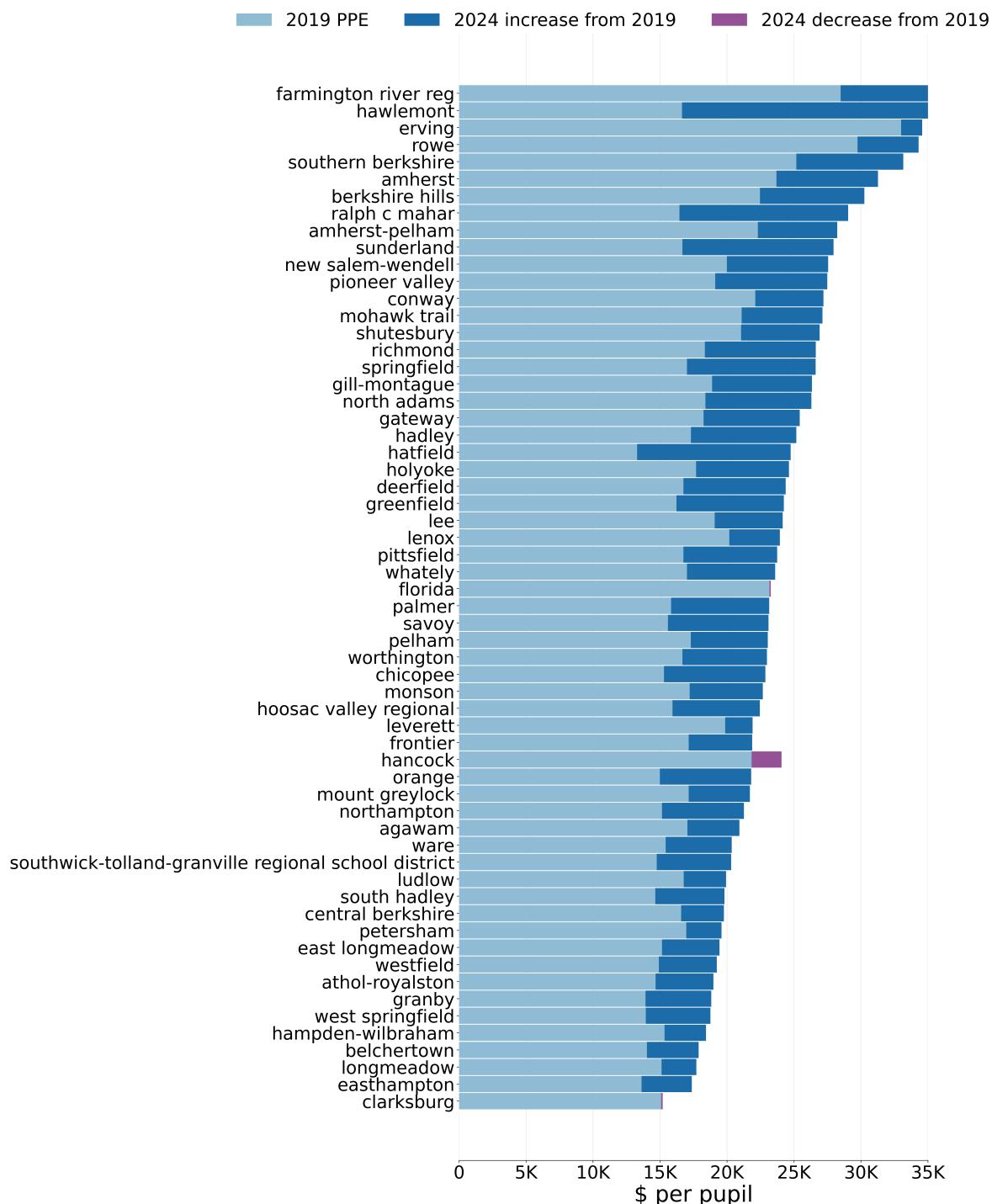


Figure 4

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

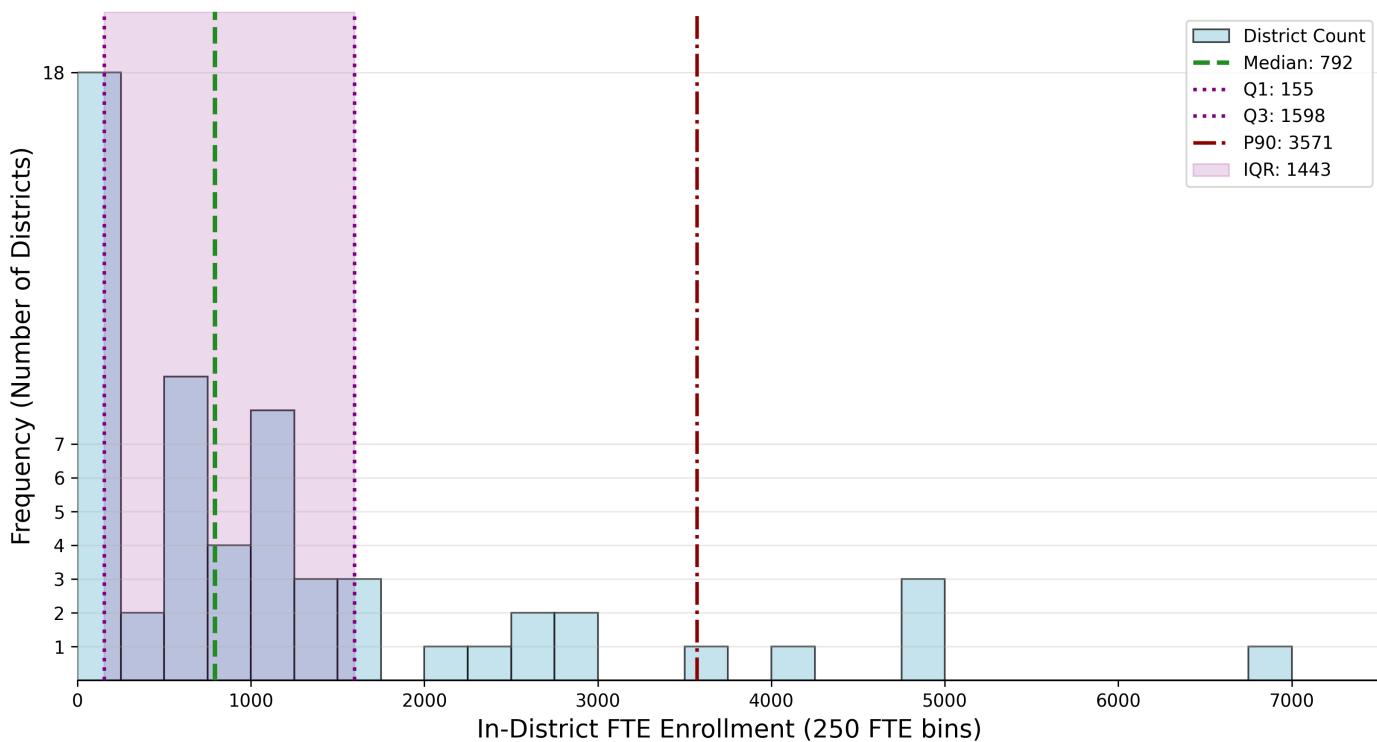


Figure 5

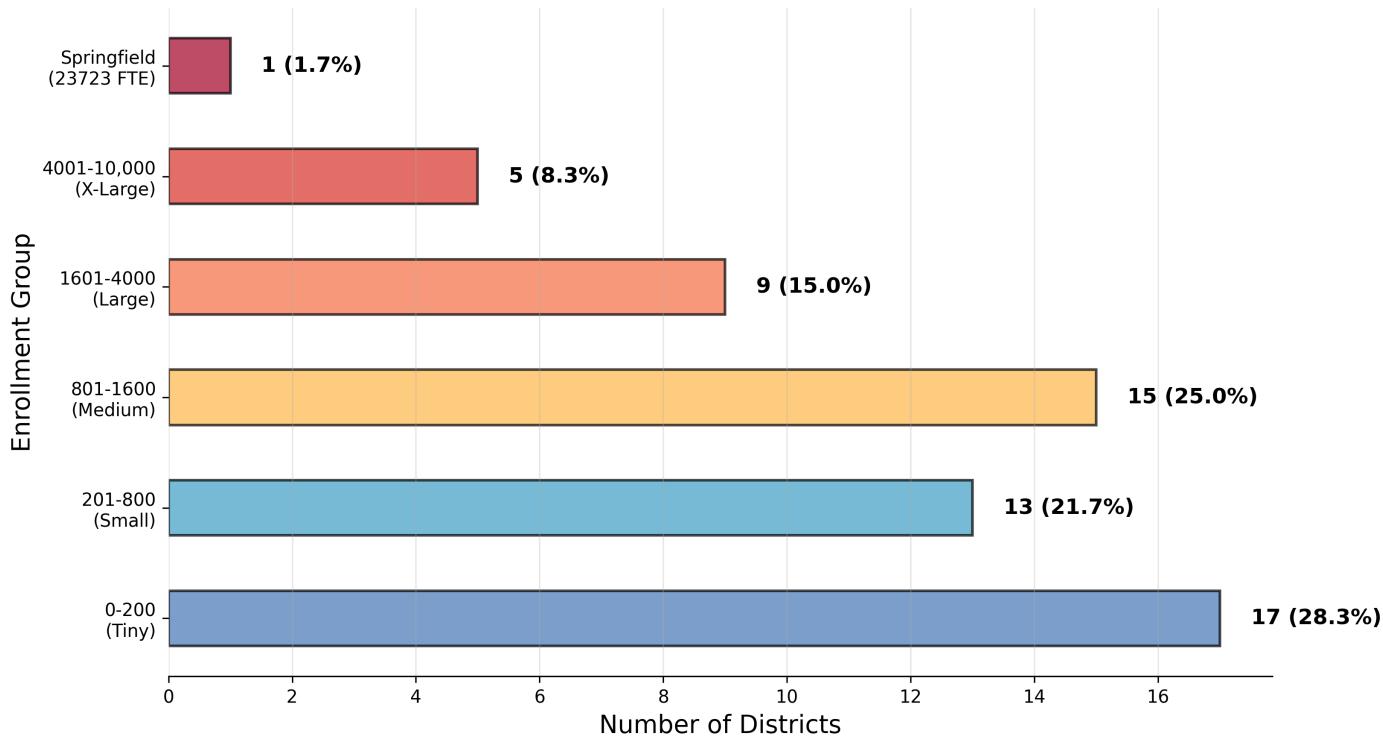


Figure 6

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)

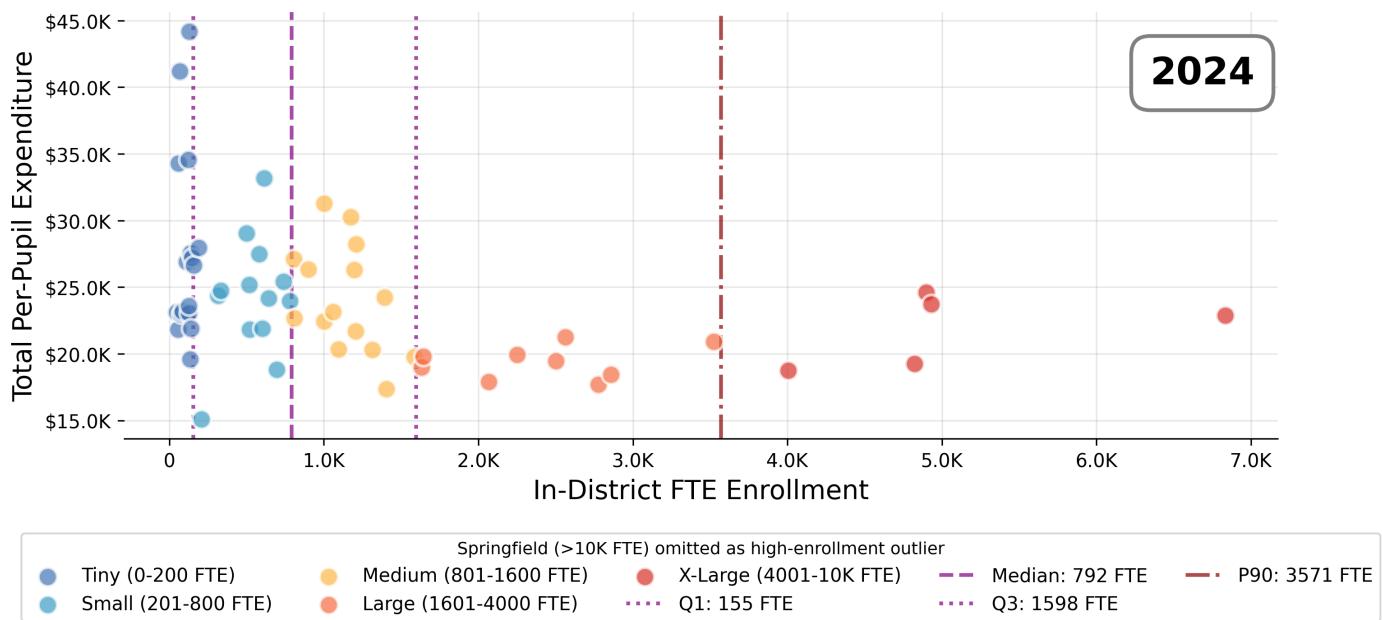


Figure 7

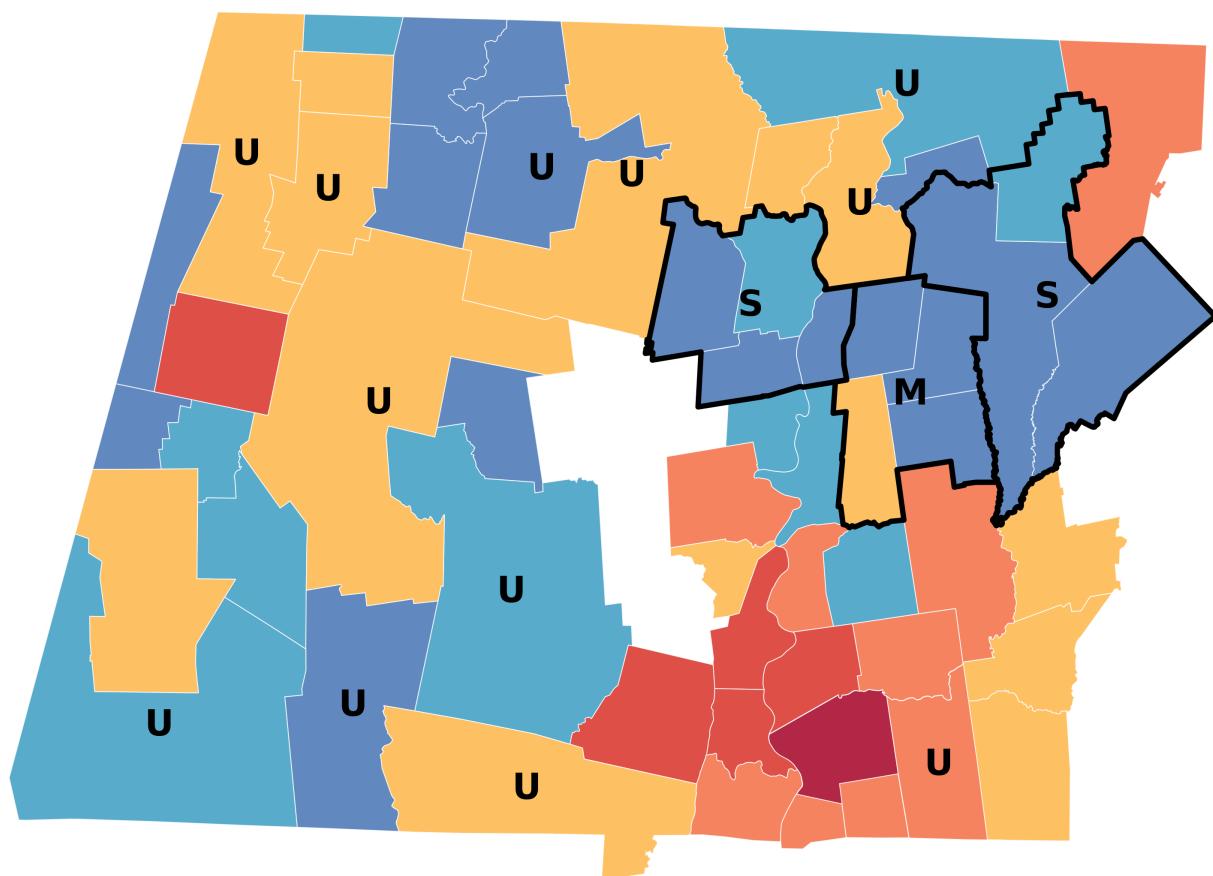
Table 4

| 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)

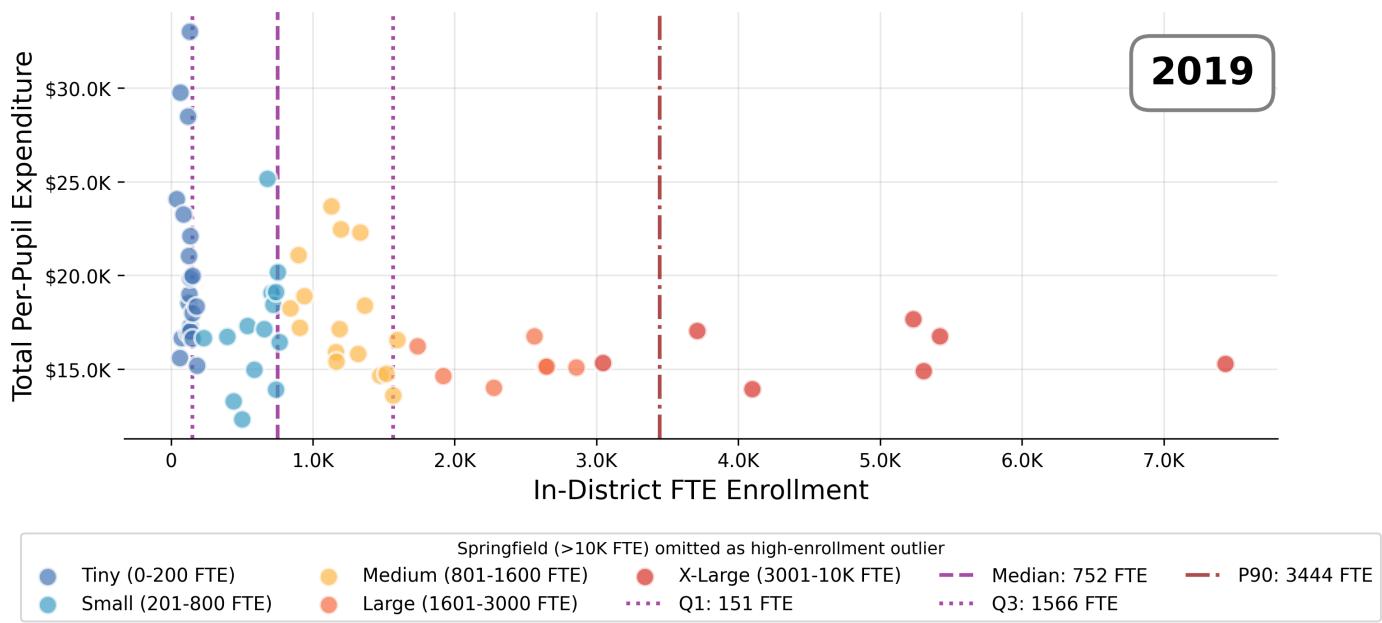


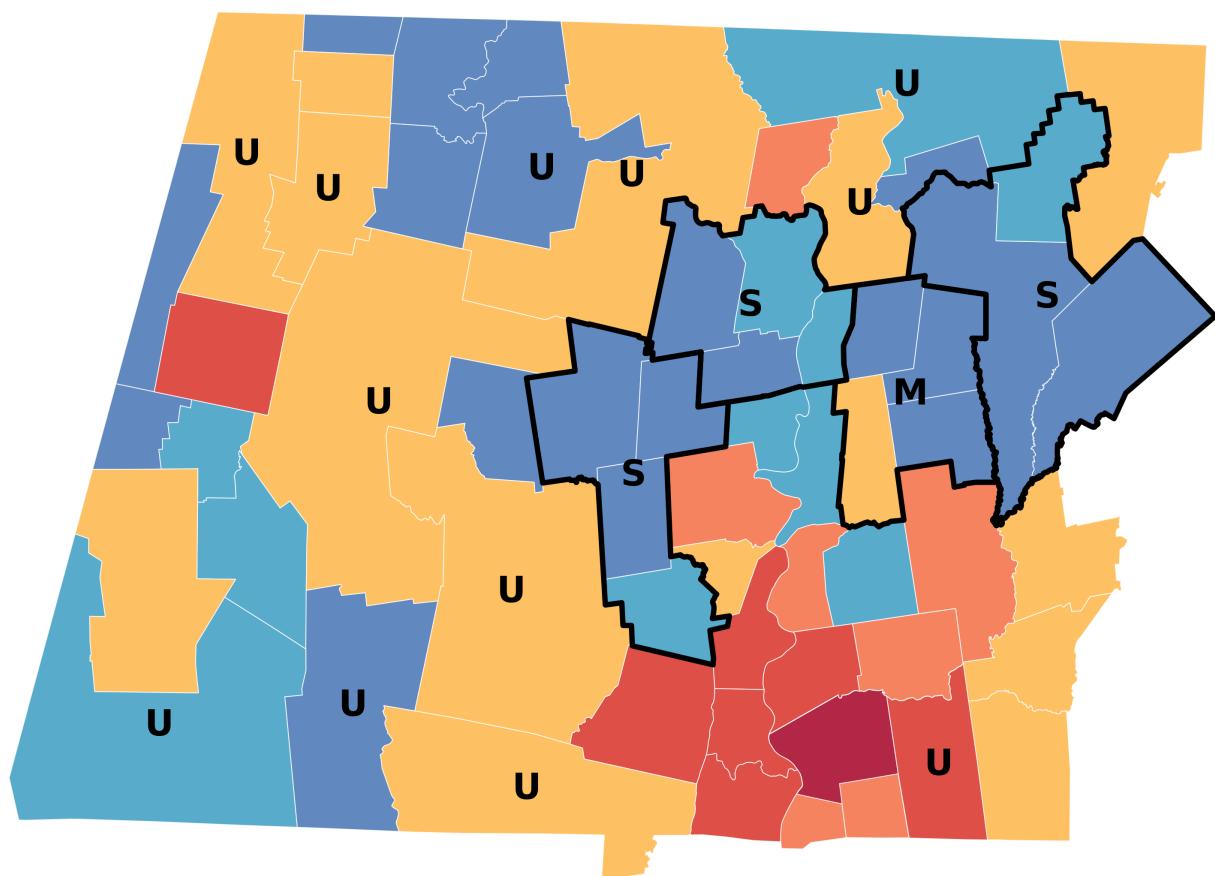
Figure 9

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)

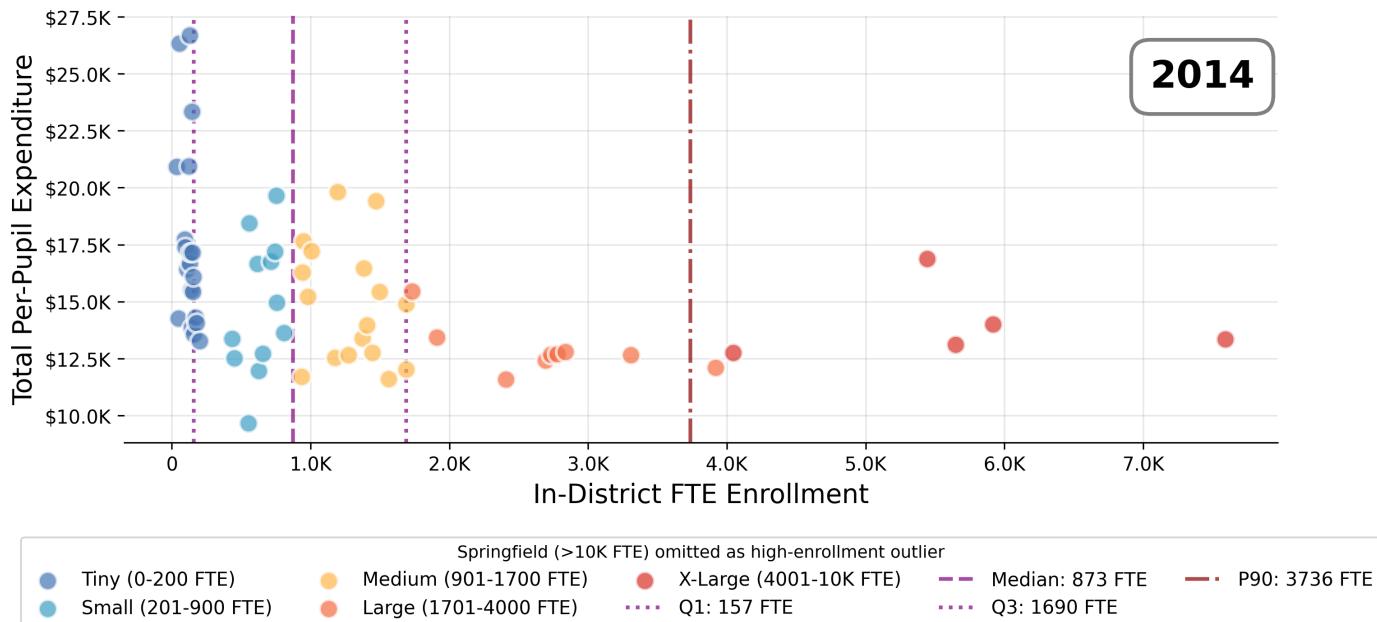


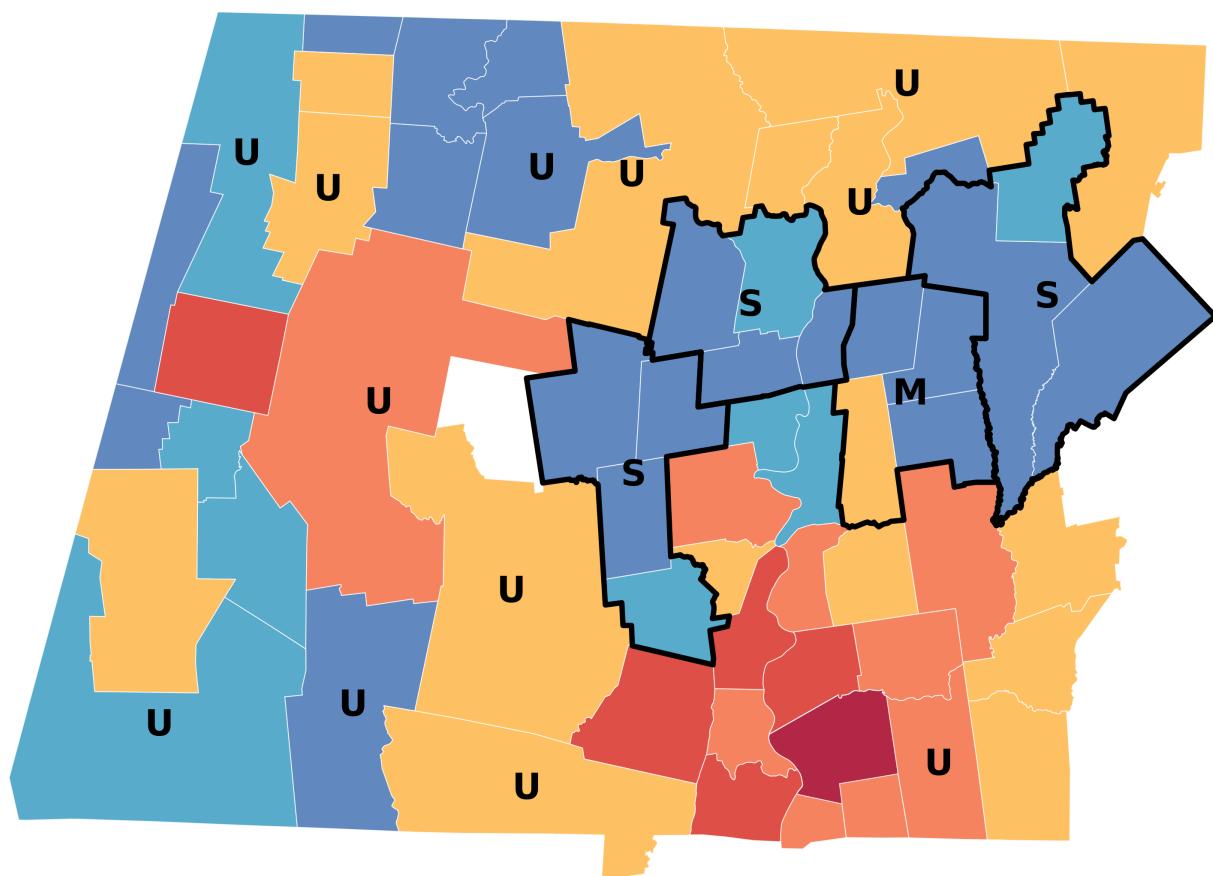
Figure 11

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)

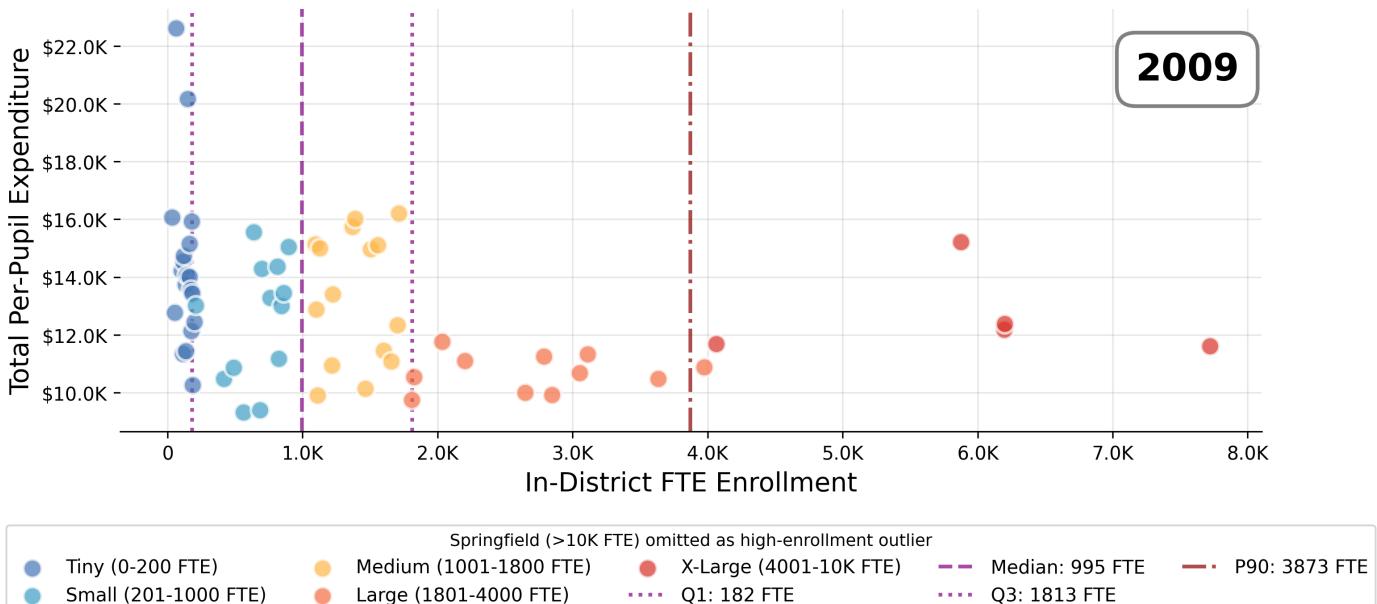


Figure 13

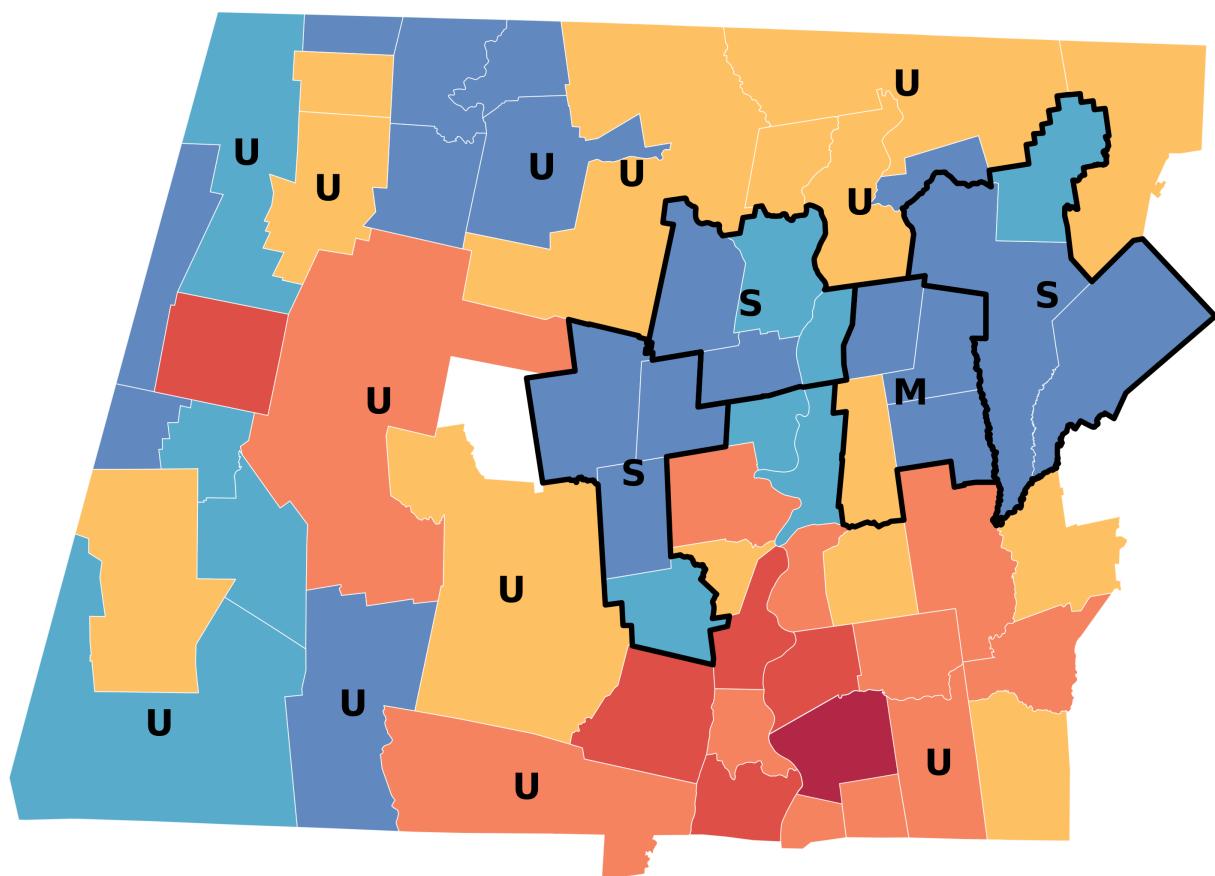
Table 7

| 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) | | |
| ■ | X-Large (4001-10K FTE): 5 district(s) | | |
| | | ■ | U = Unified regional district (PK-12) |

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)

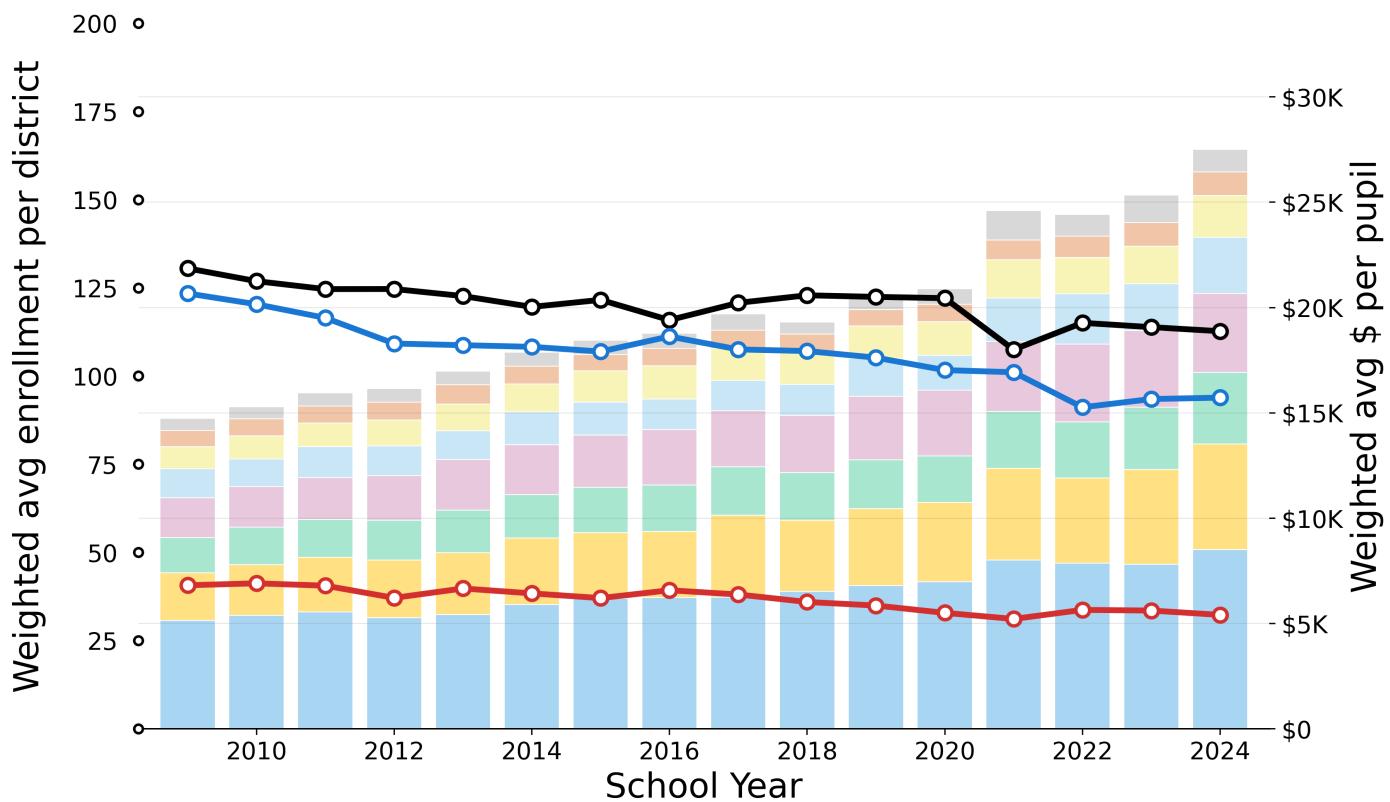


Figure 15

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)

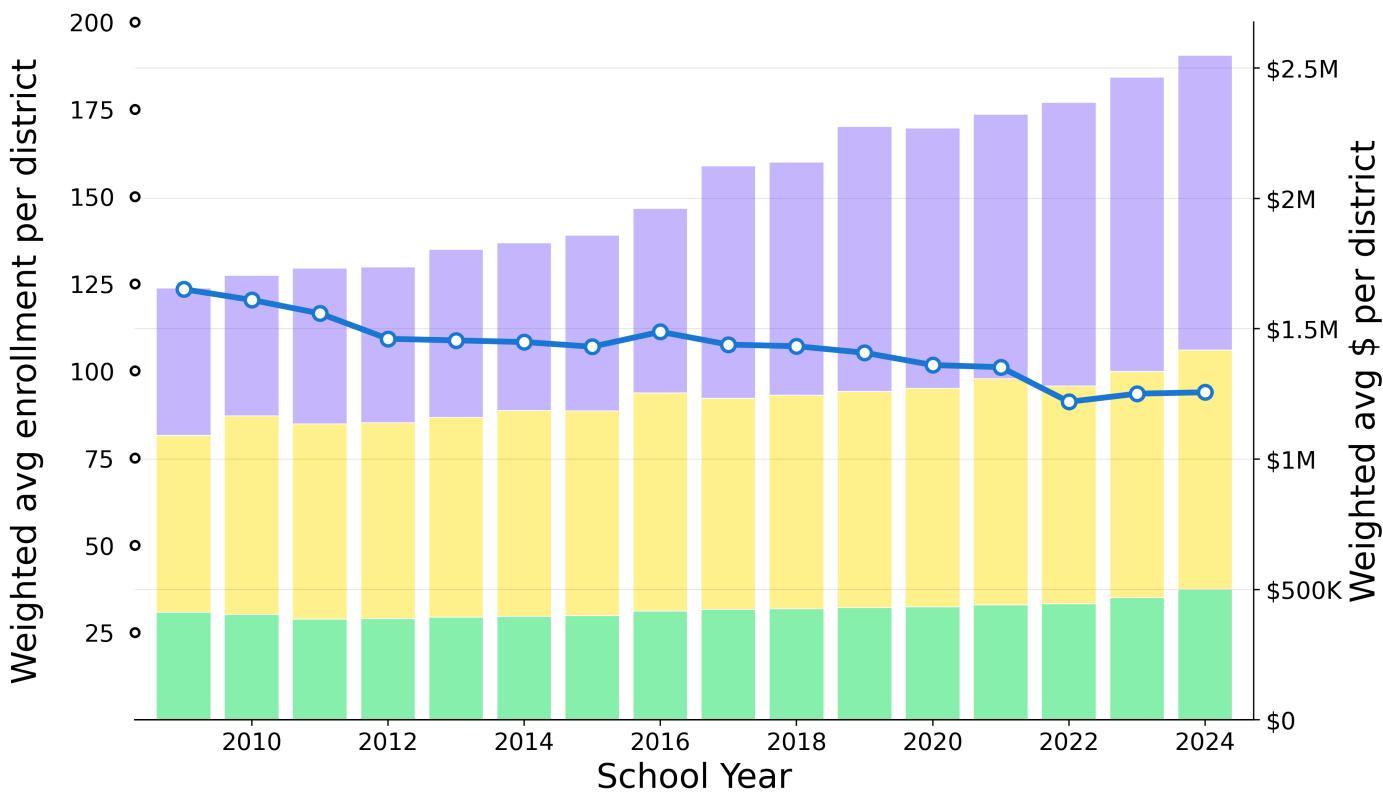


Figure 16

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)

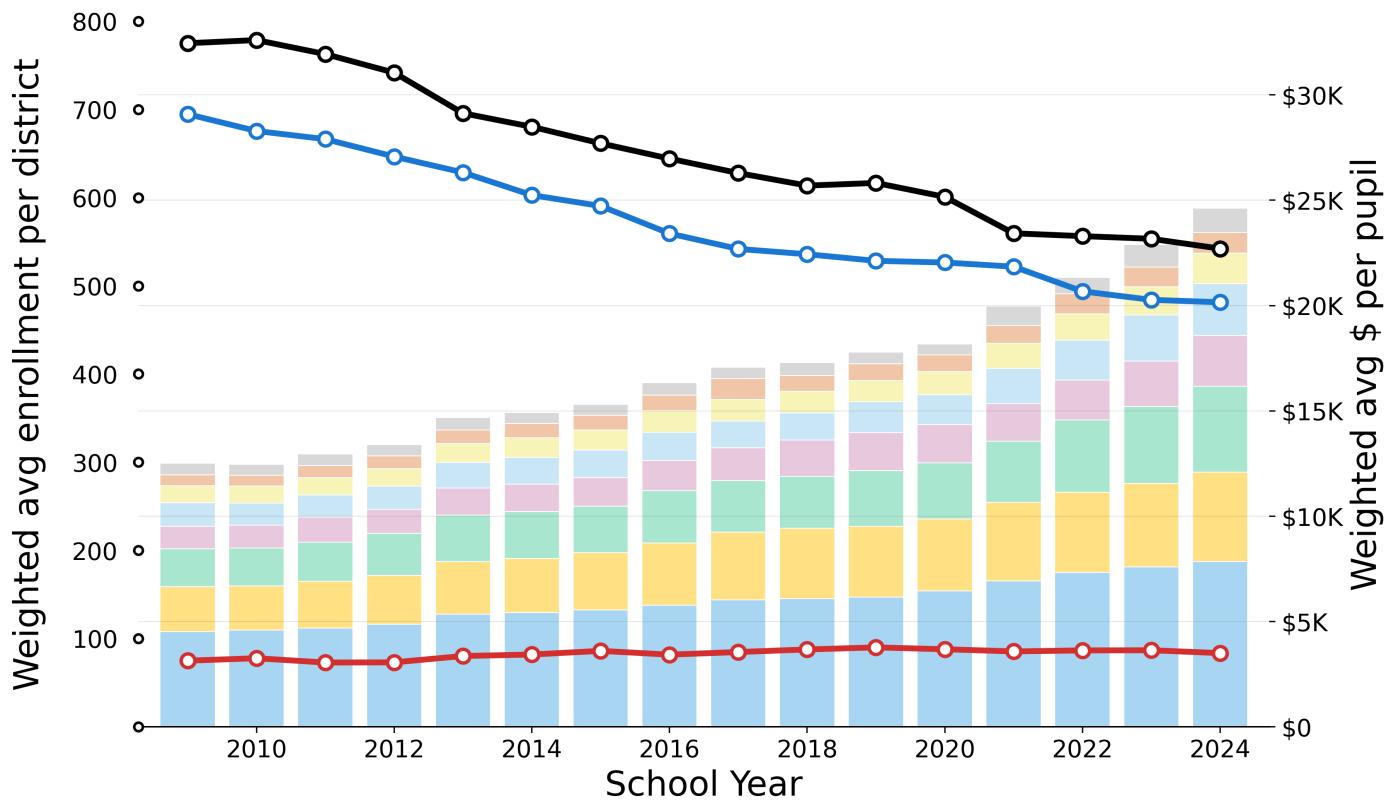


Figure 17

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)

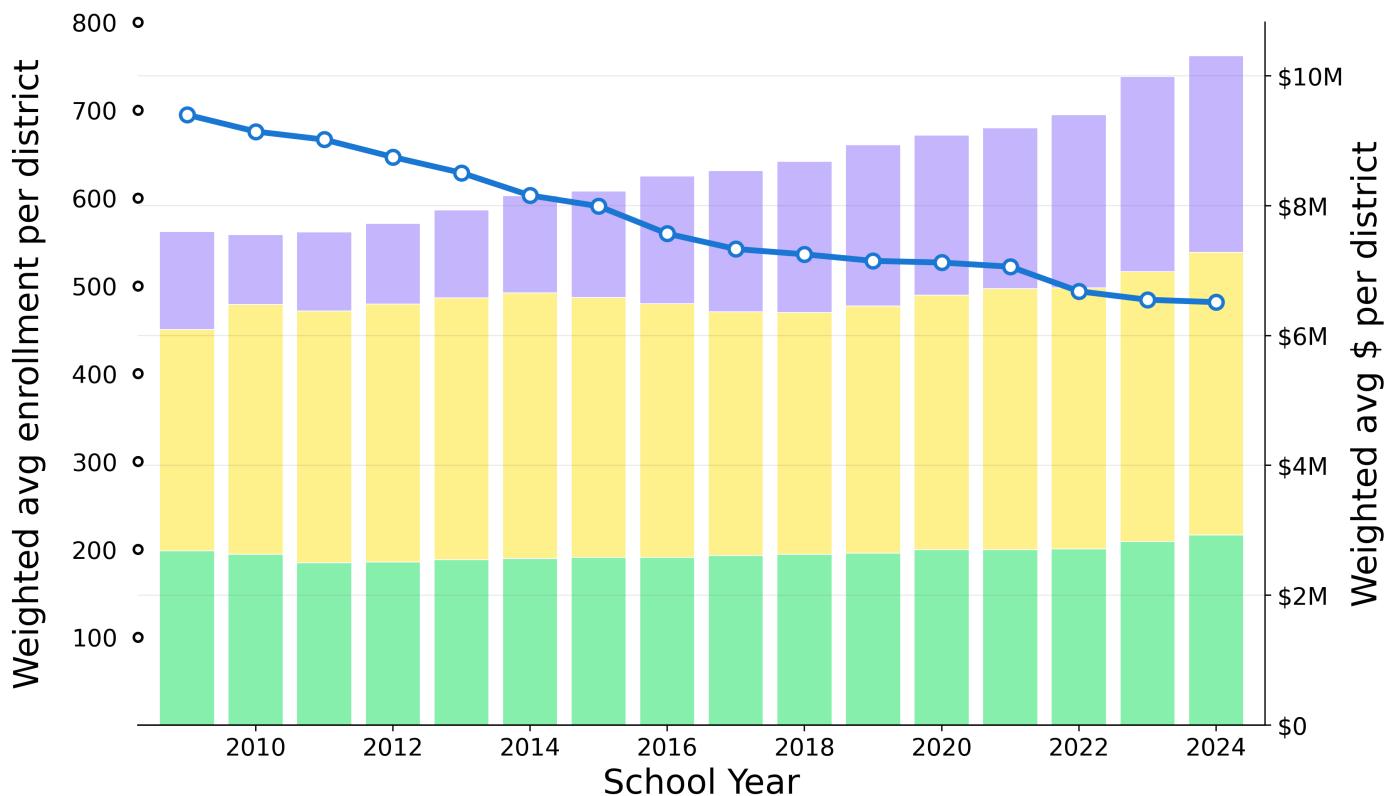


Figure 18

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)

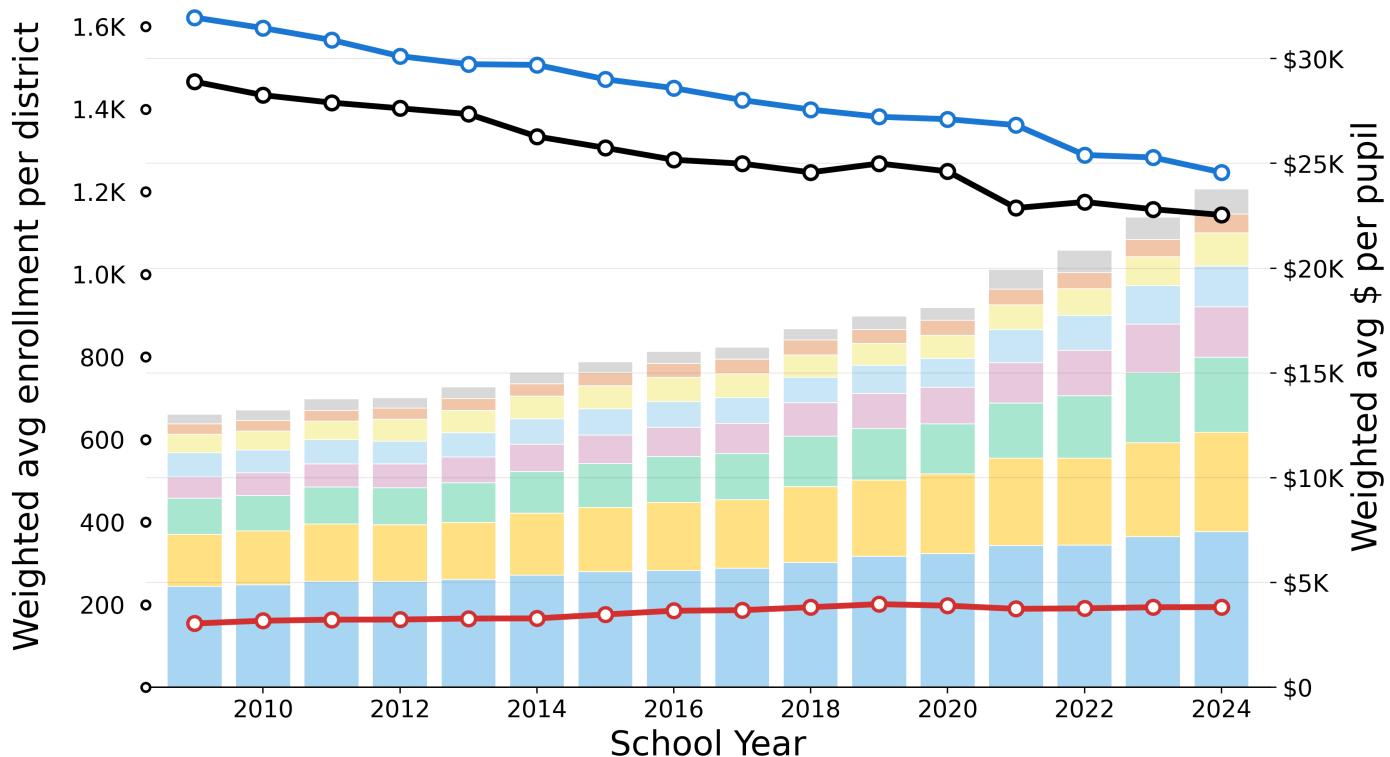


Figure 19

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)

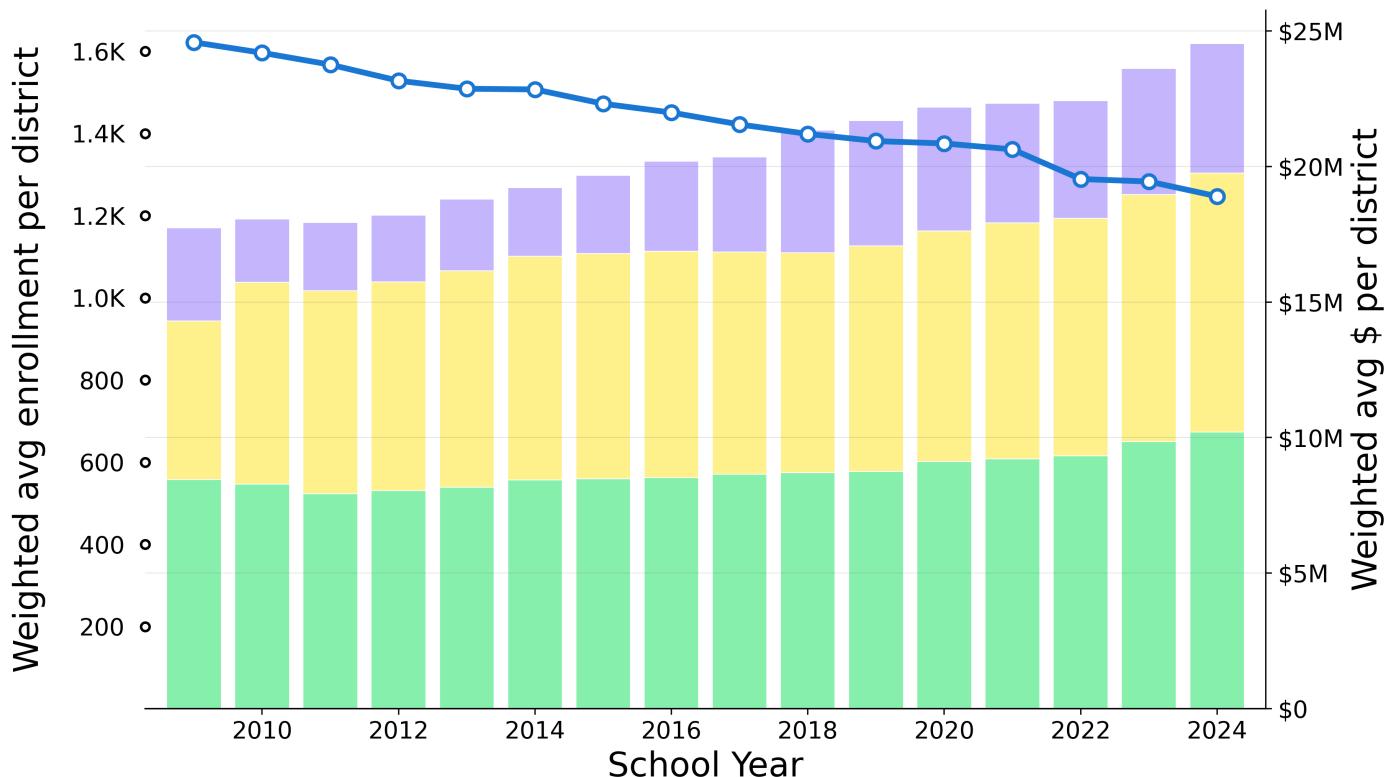


Figure 20

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)

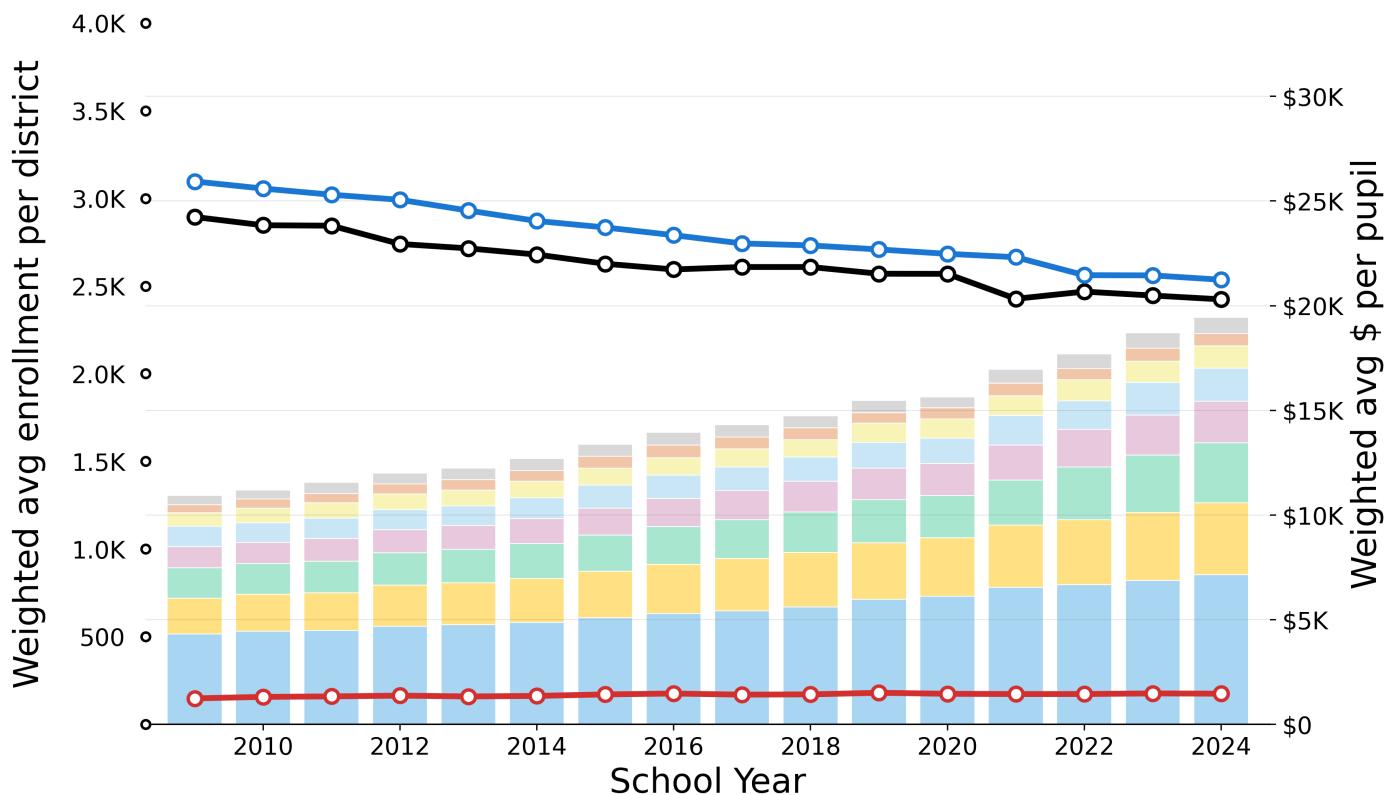


Figure 21

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

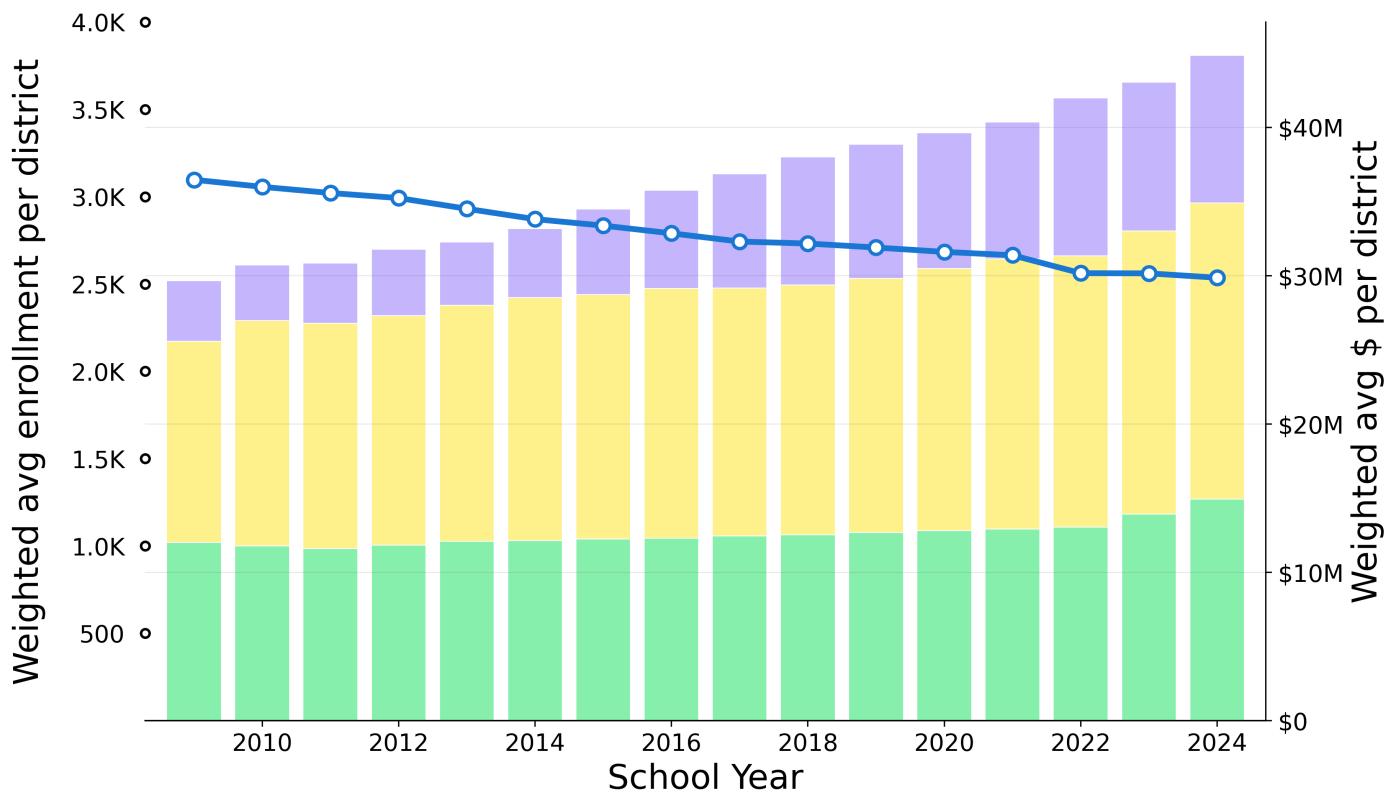


Figure 22

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)

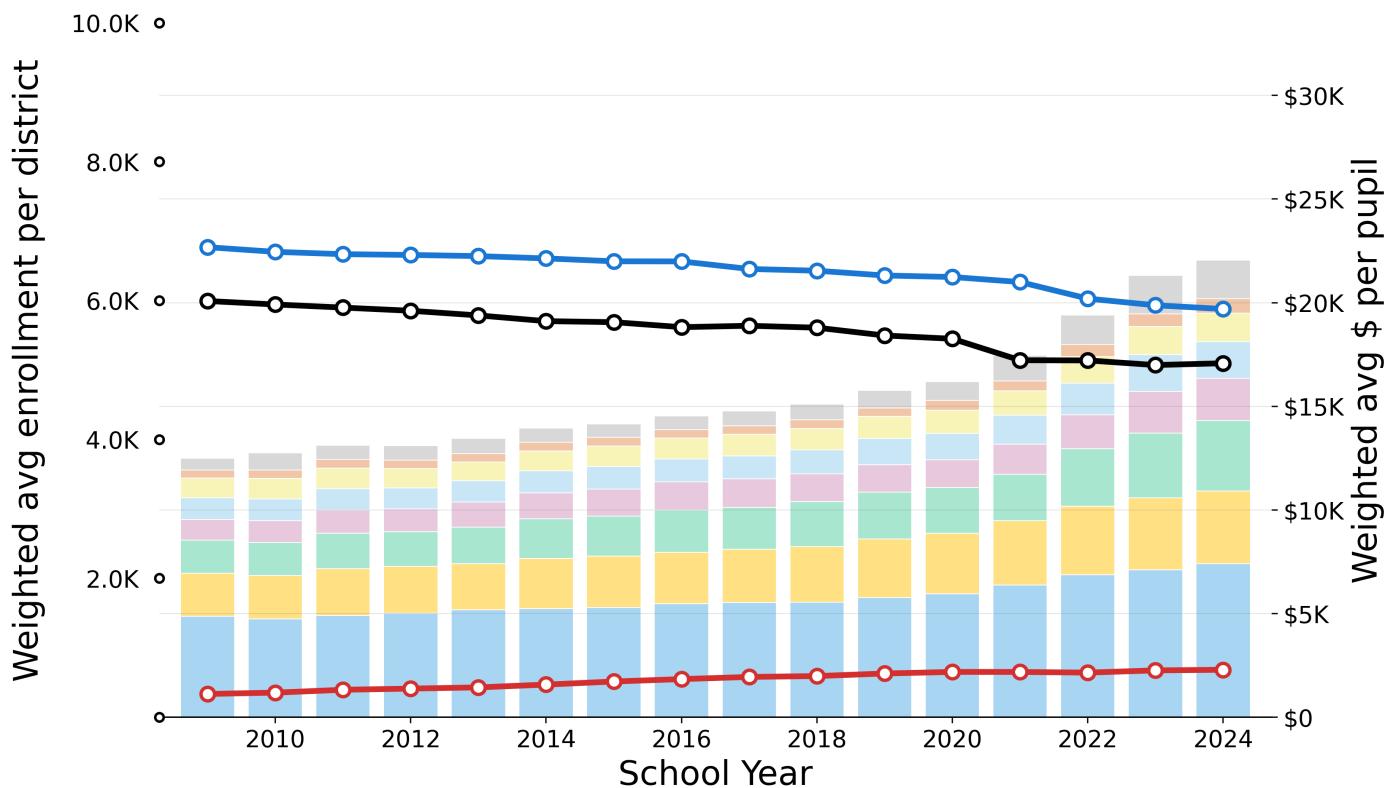


Figure 23

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) |
| $\text{CAGR} = (\text{End}/\text{Start})^{(1/\text{years})} - 1$ | | | | | Below Western MA (excl. Springfield) |

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

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)

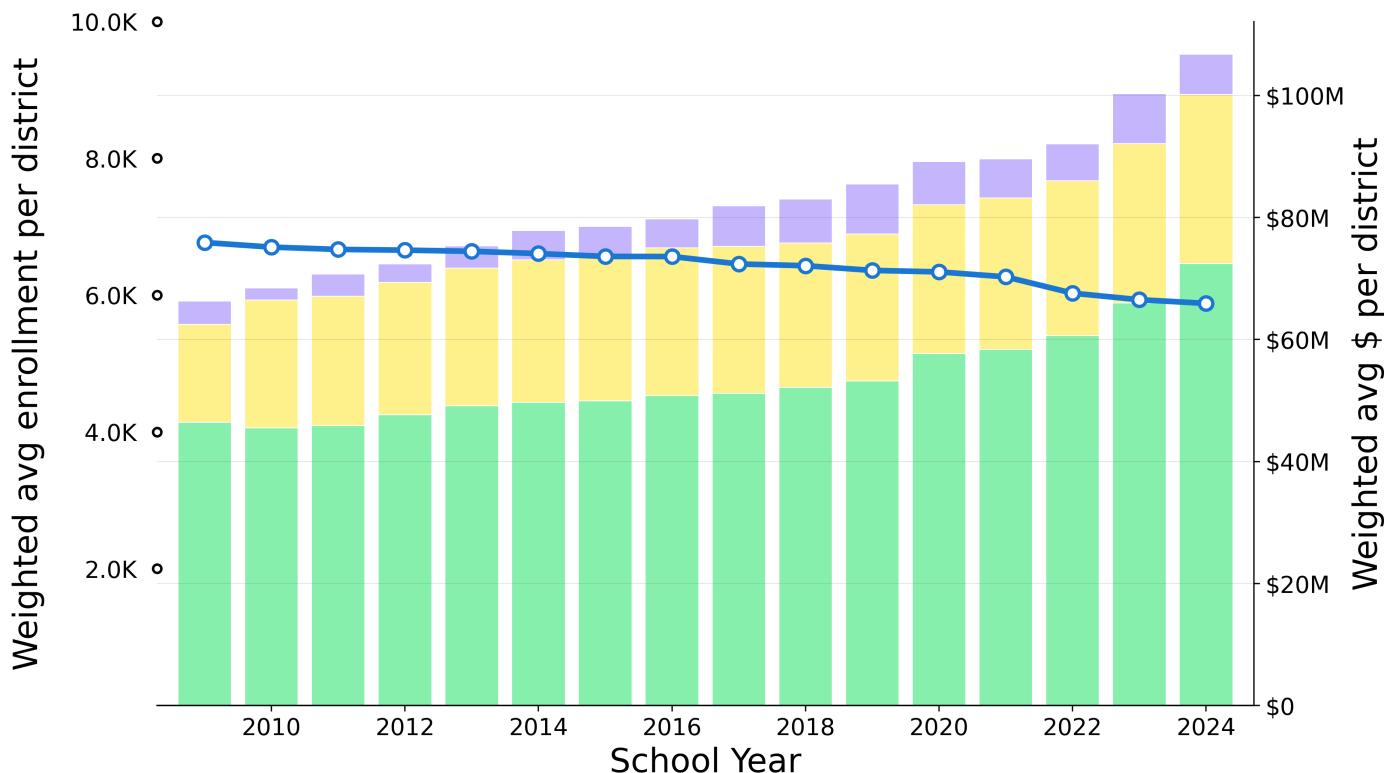


Figure 24

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)

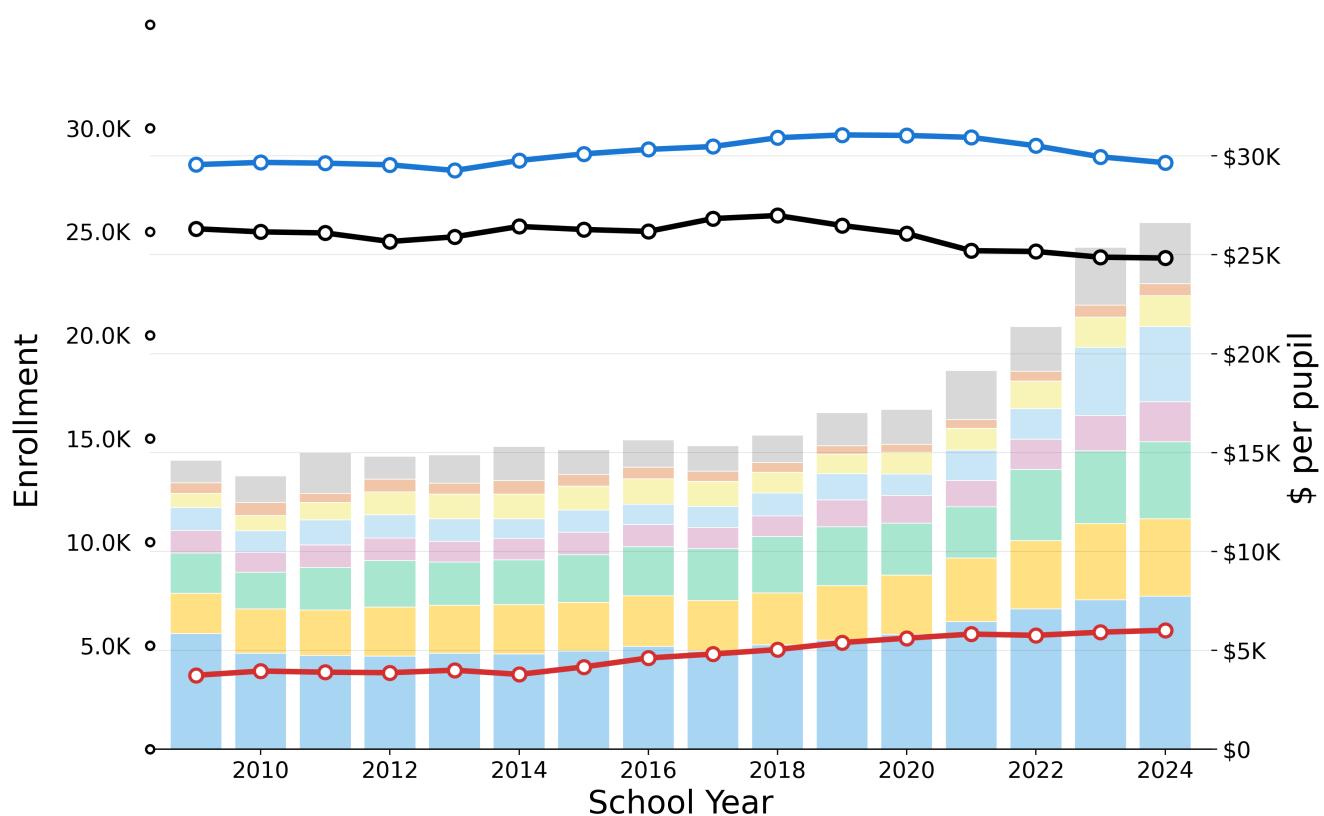


Figure 25

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)

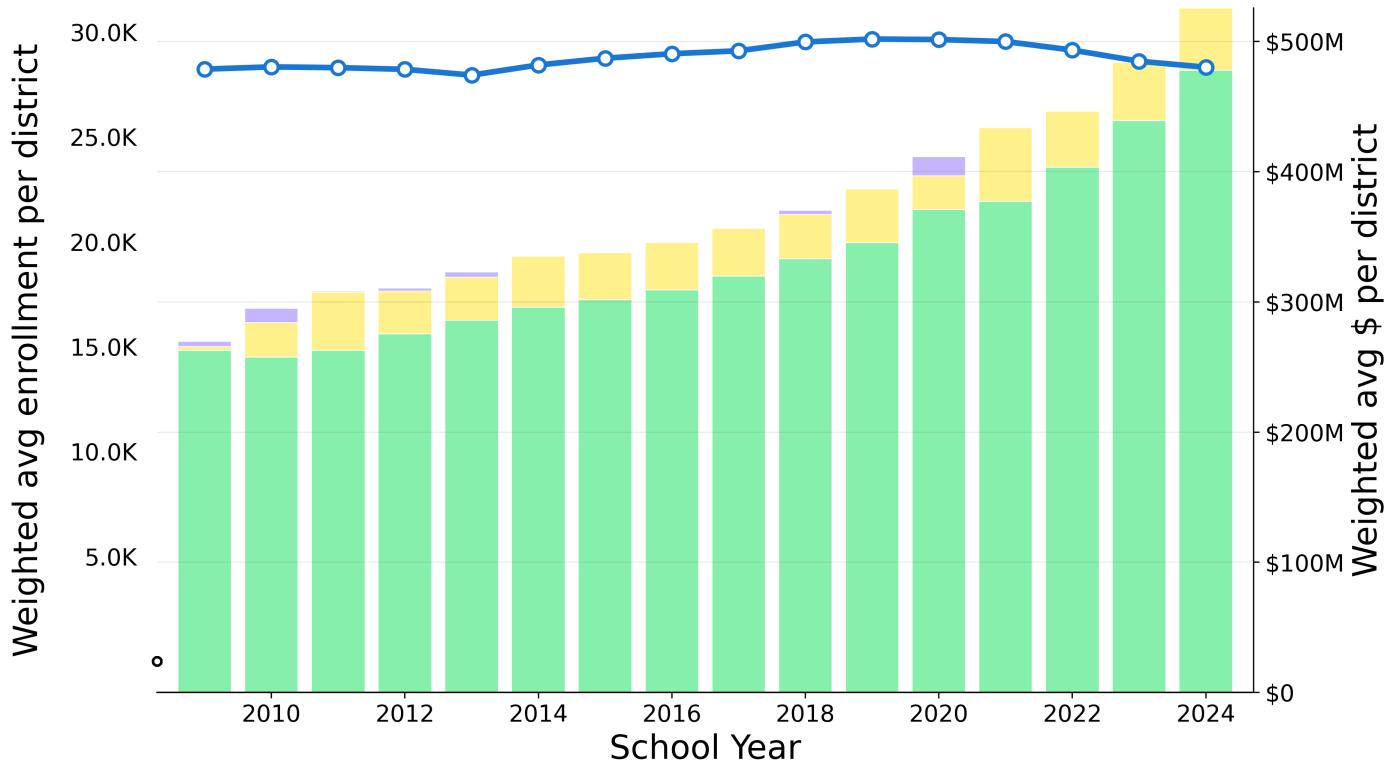


Figure 26

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

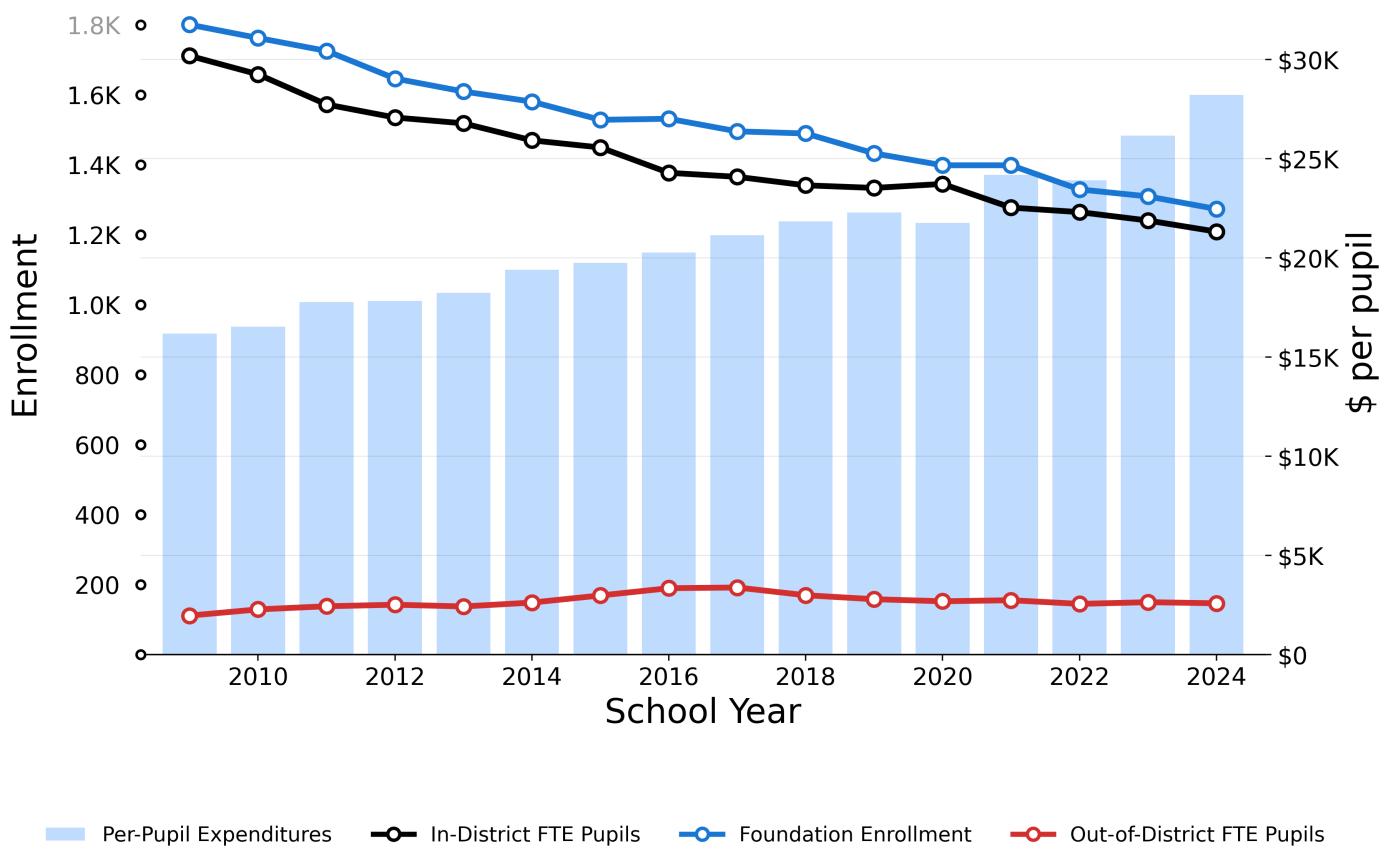


Figure 27

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

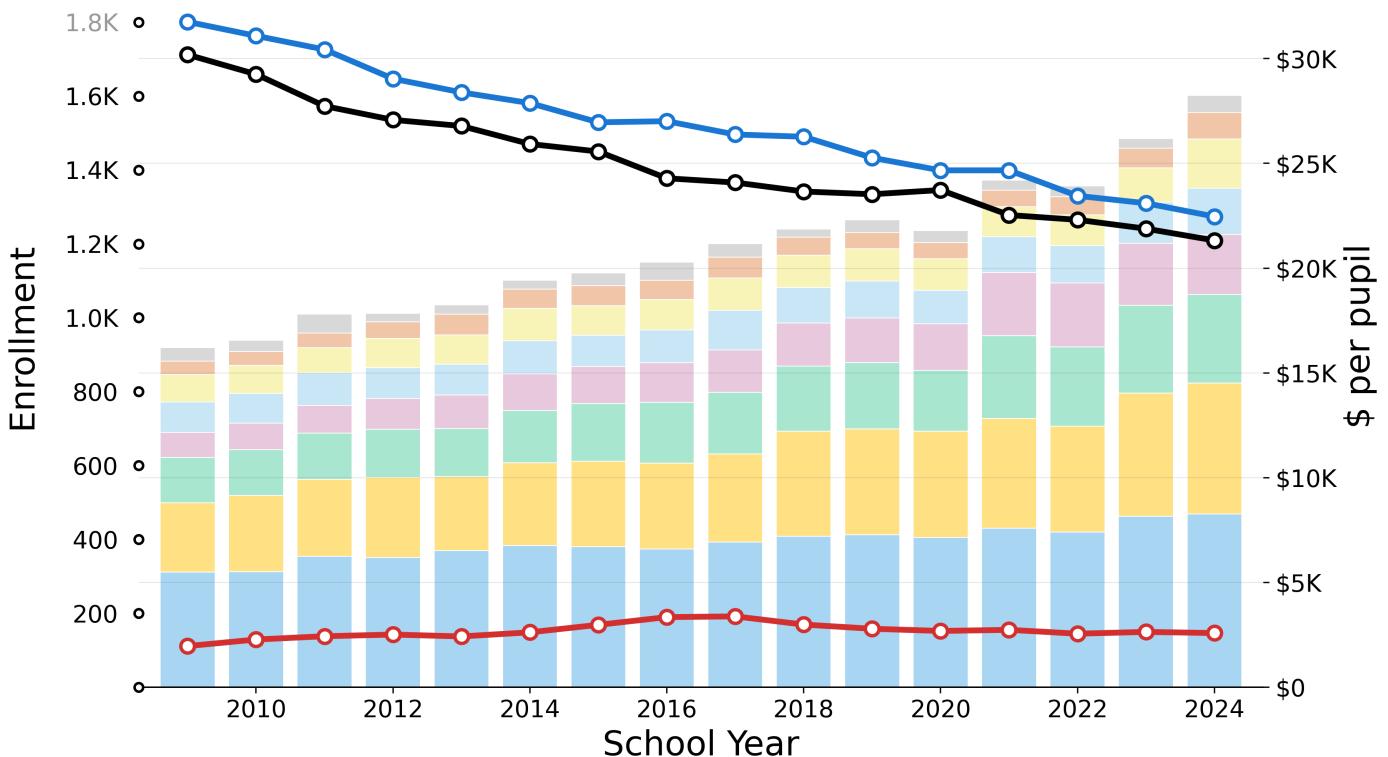


Figure 28

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)

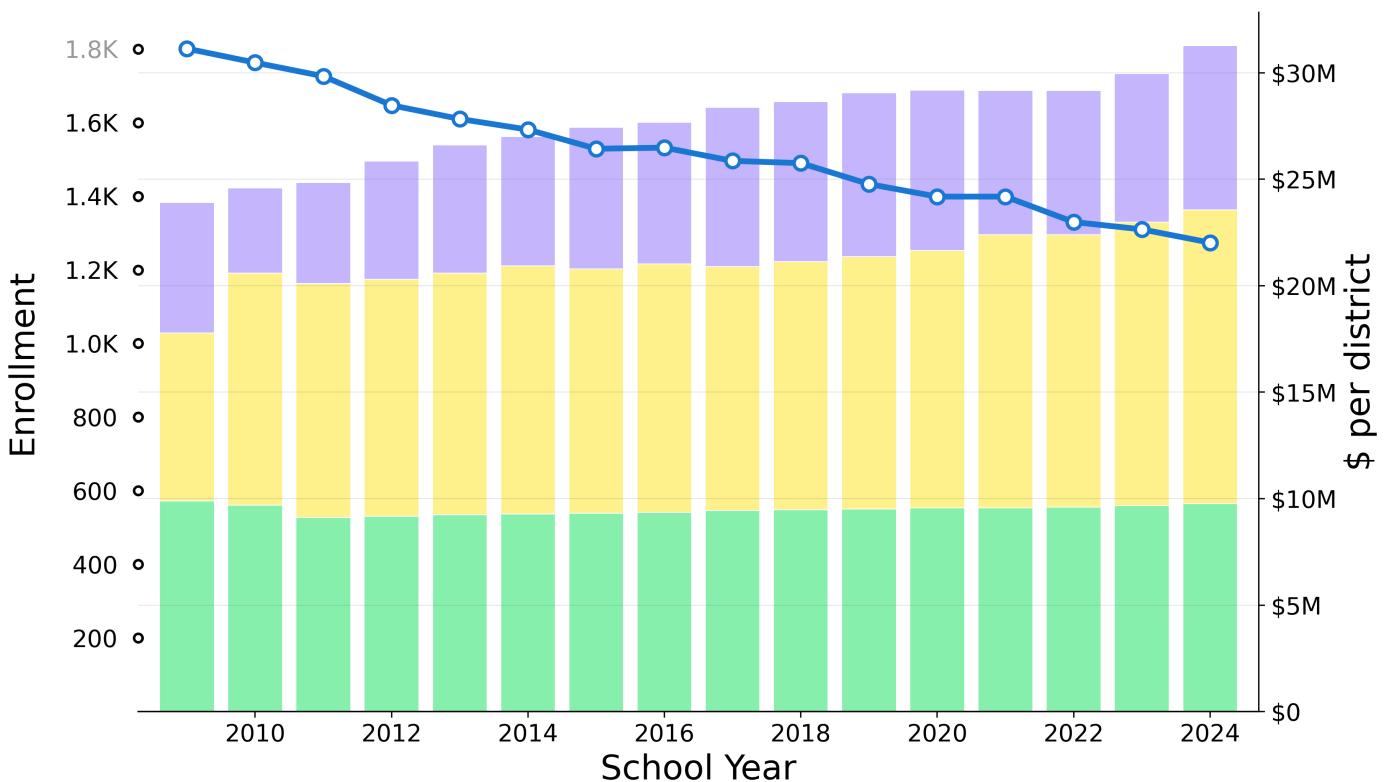


Figure 29

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

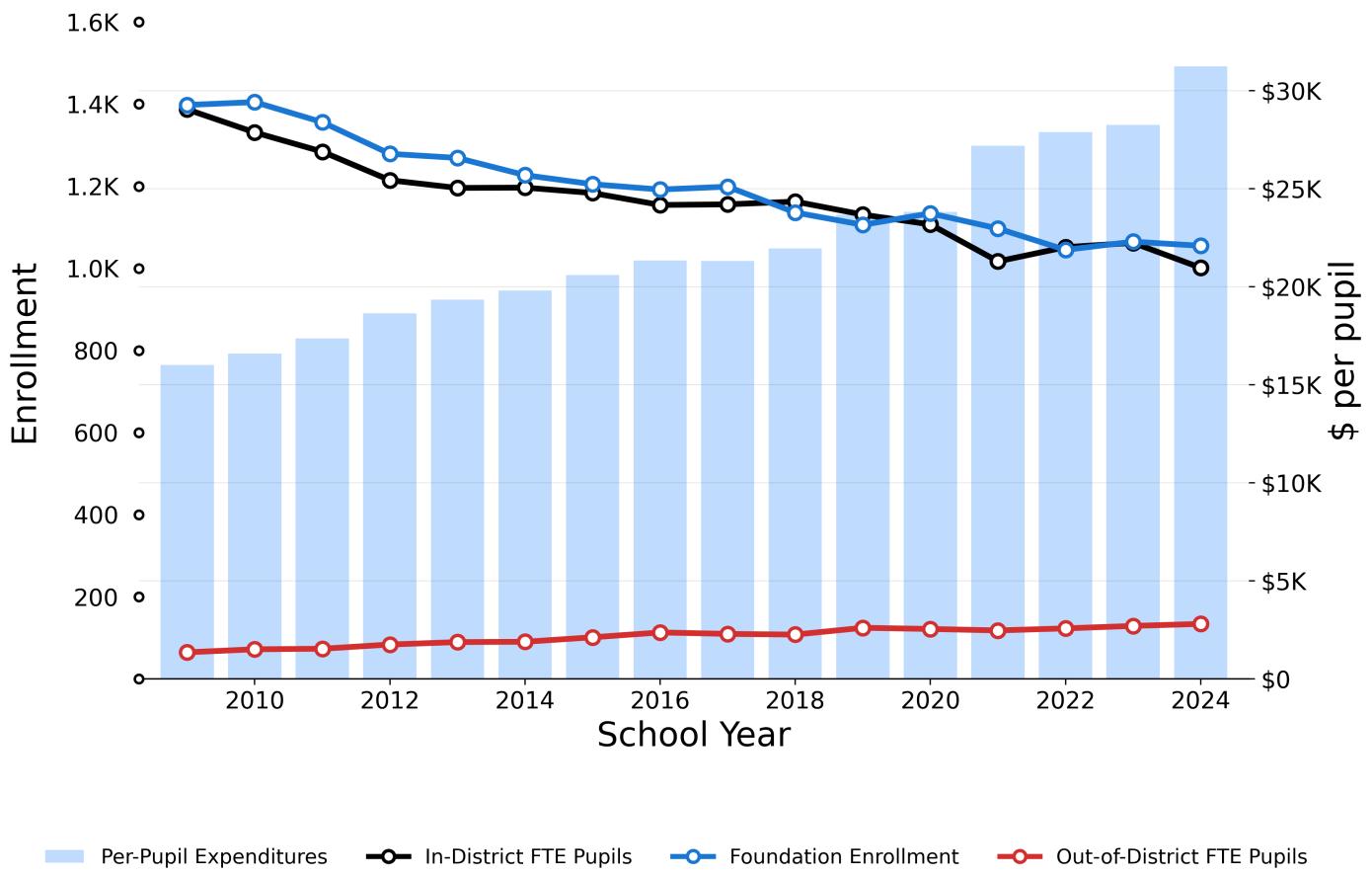


Figure 30

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

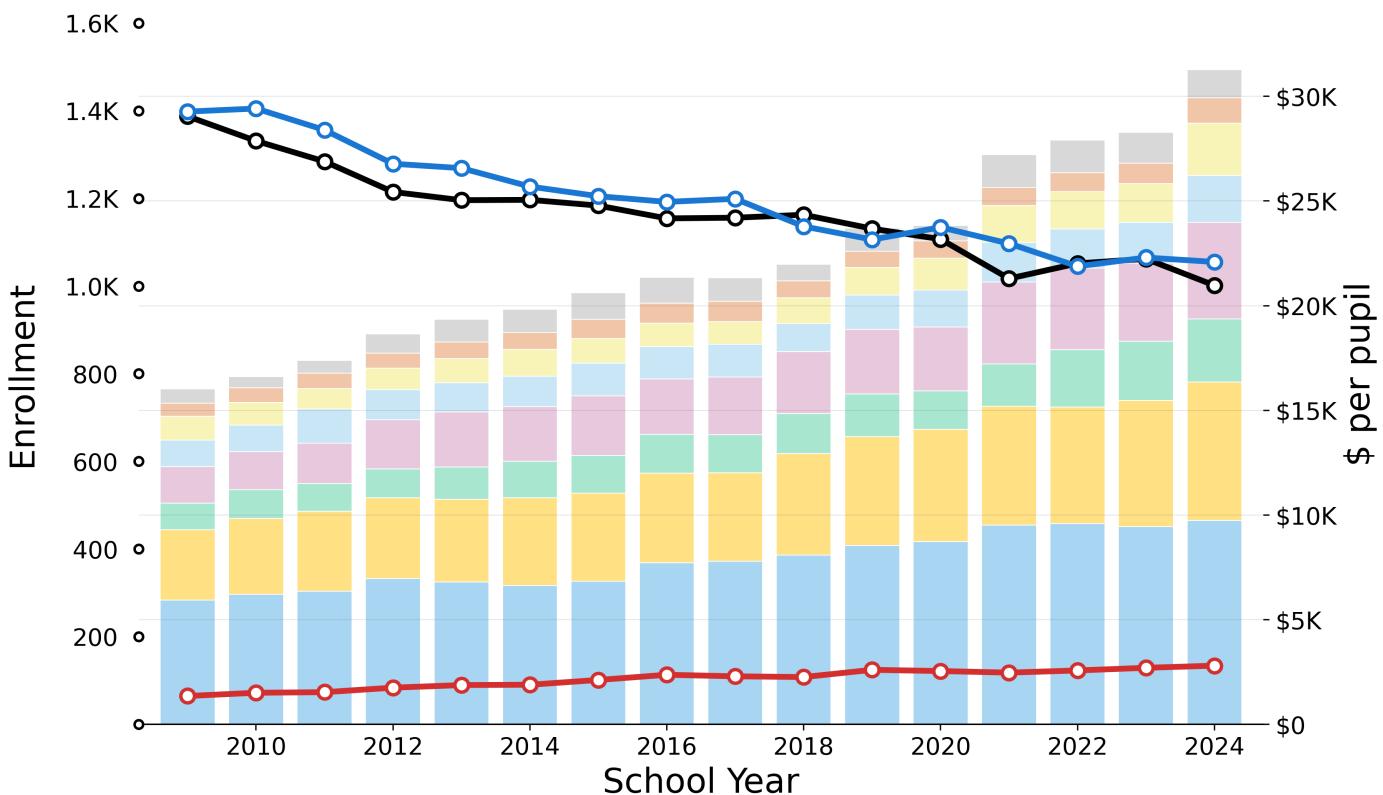


Figure 31

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

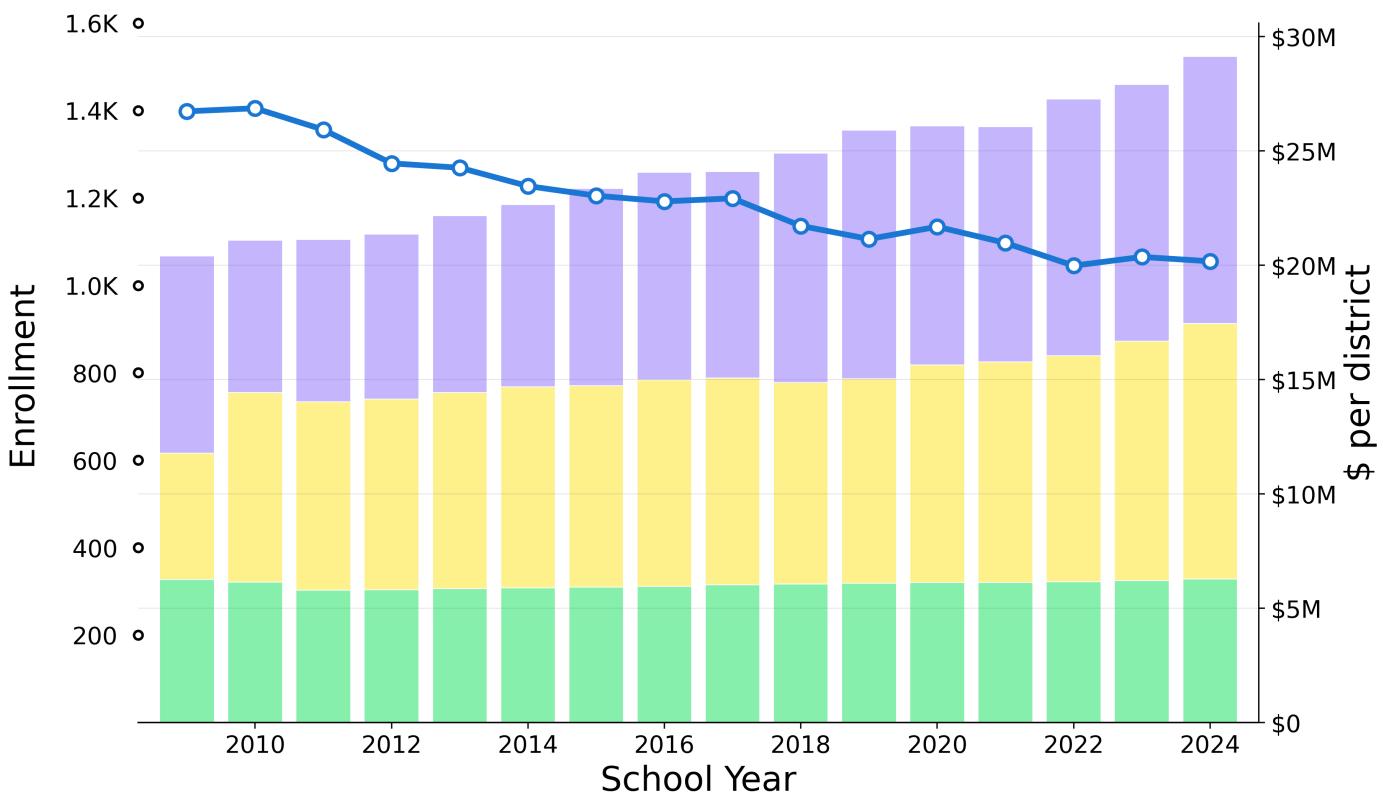


Figure 32

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

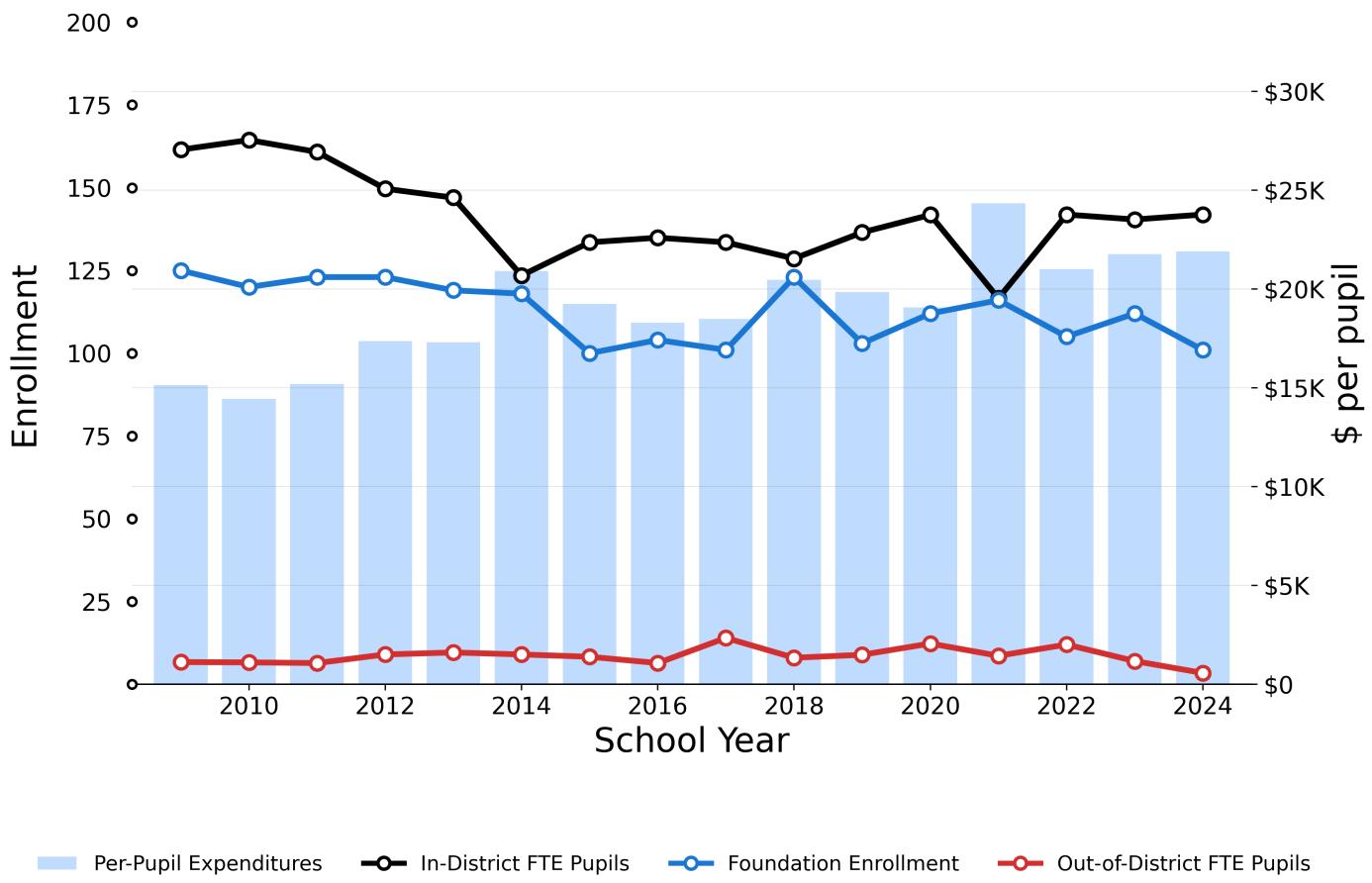


Figure 33

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

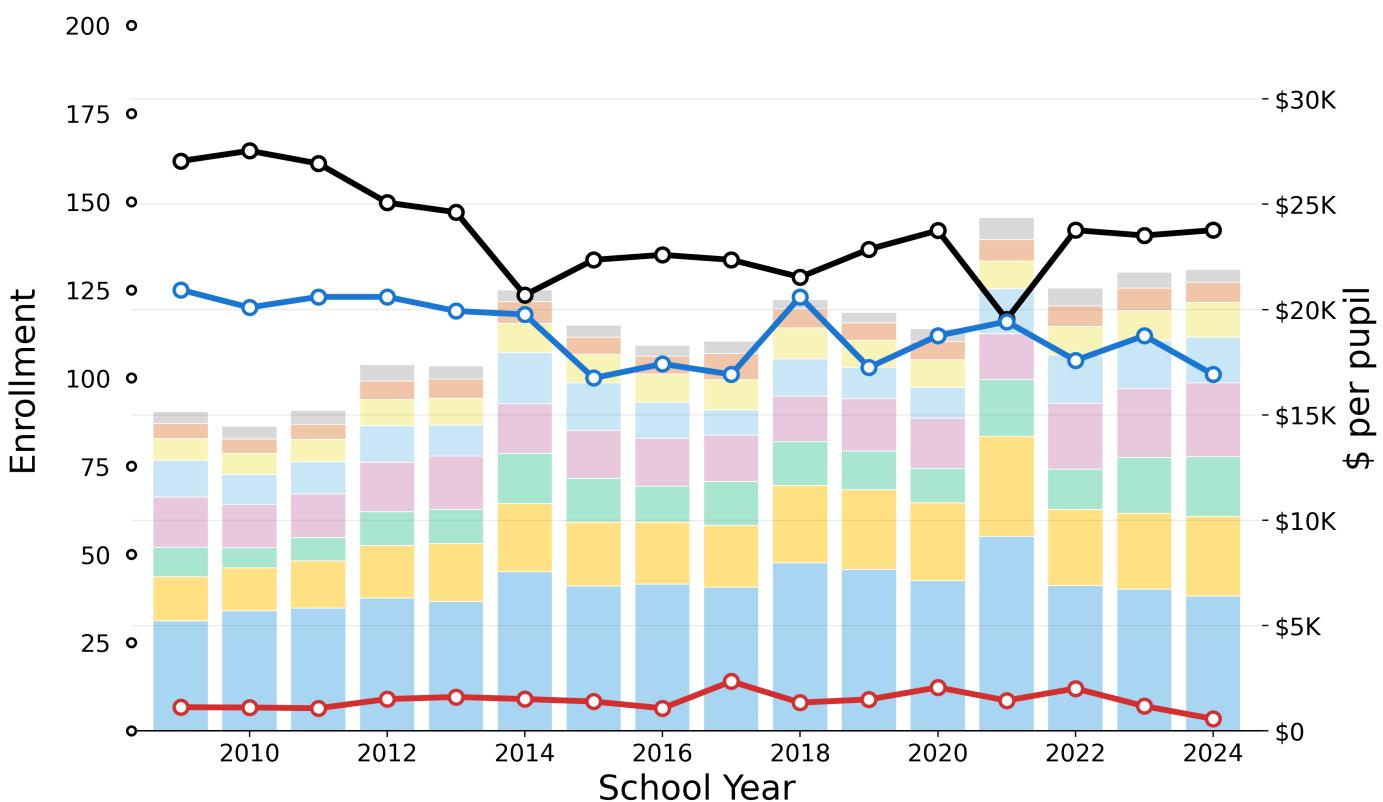


Figure 34

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)) |
| 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)

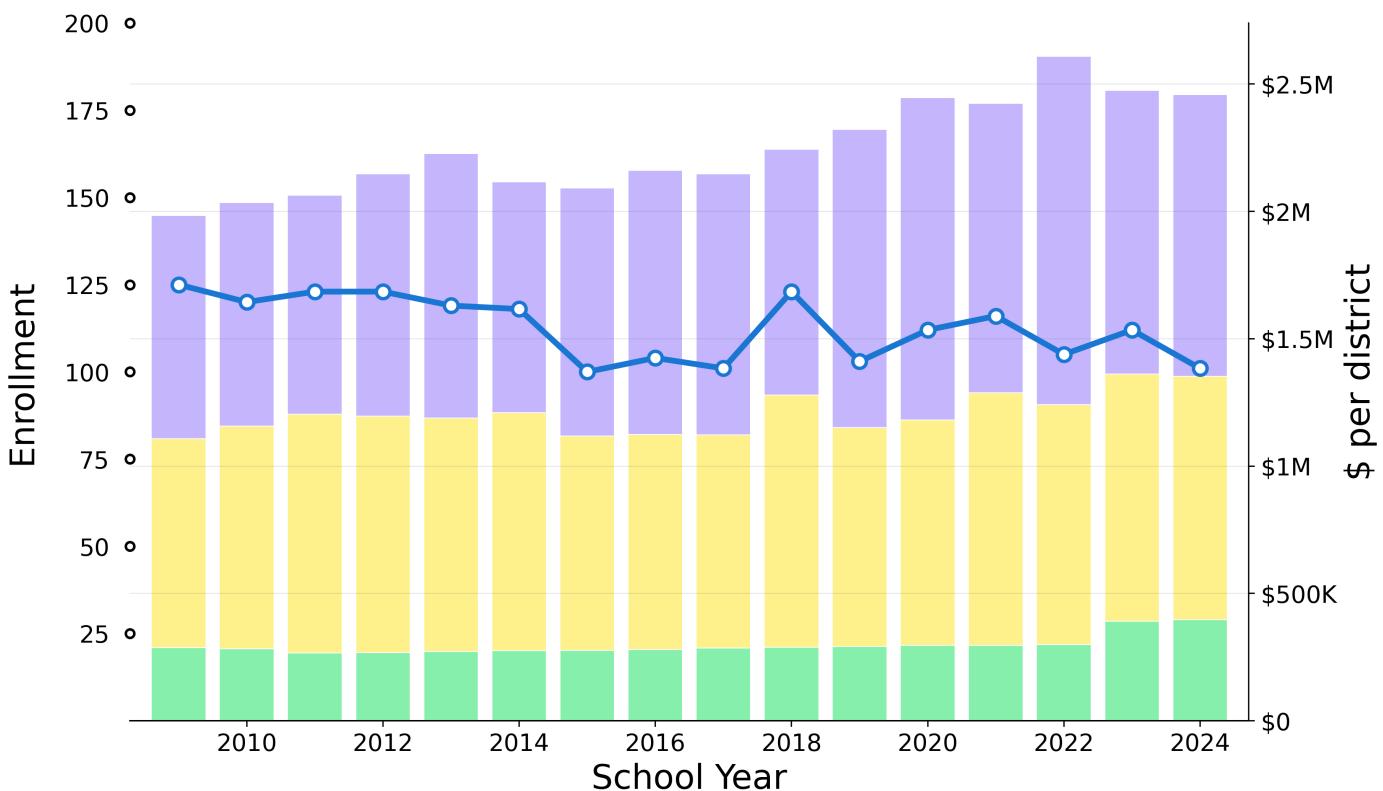


Figure 35

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

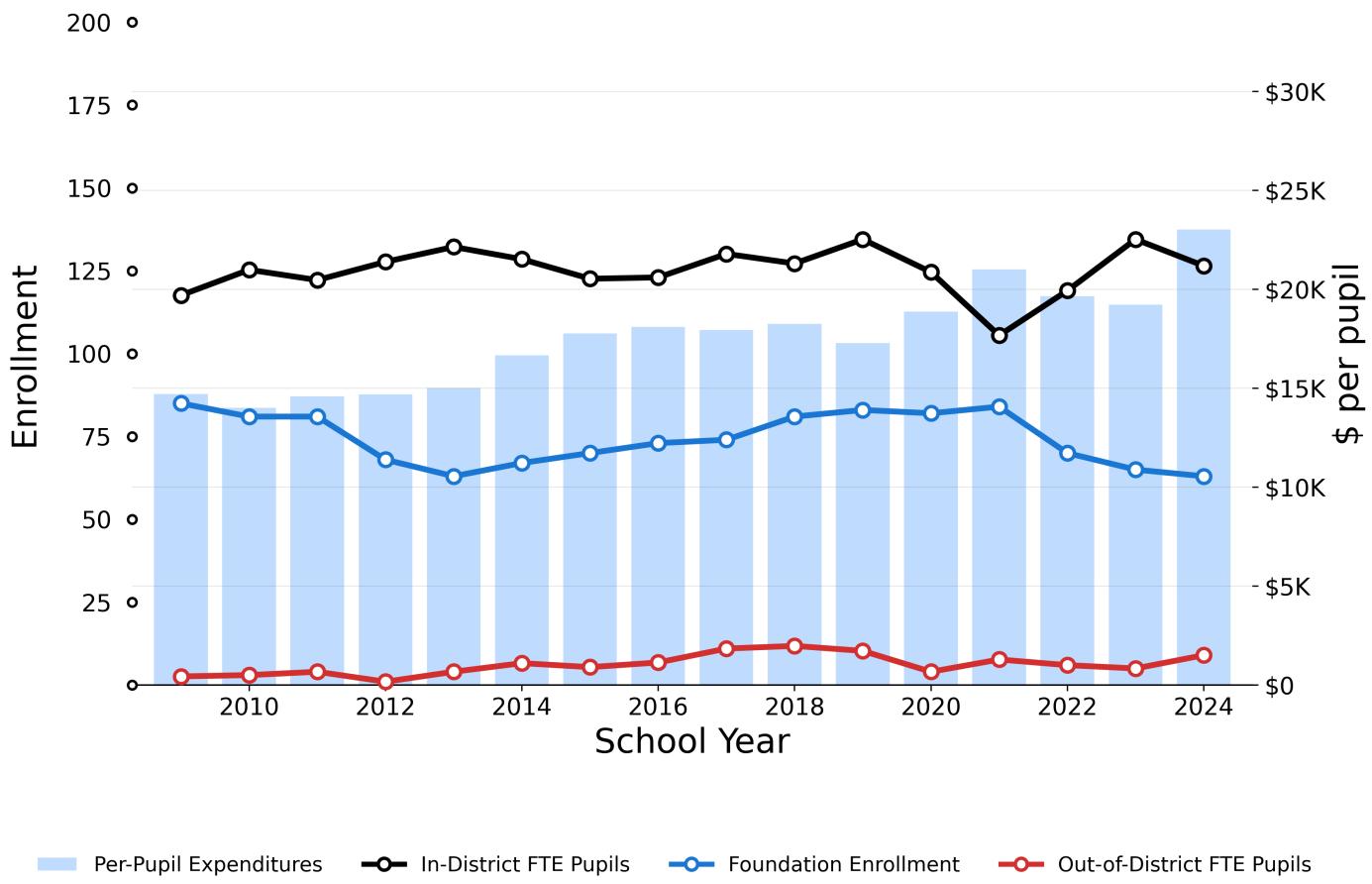


Figure 36

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

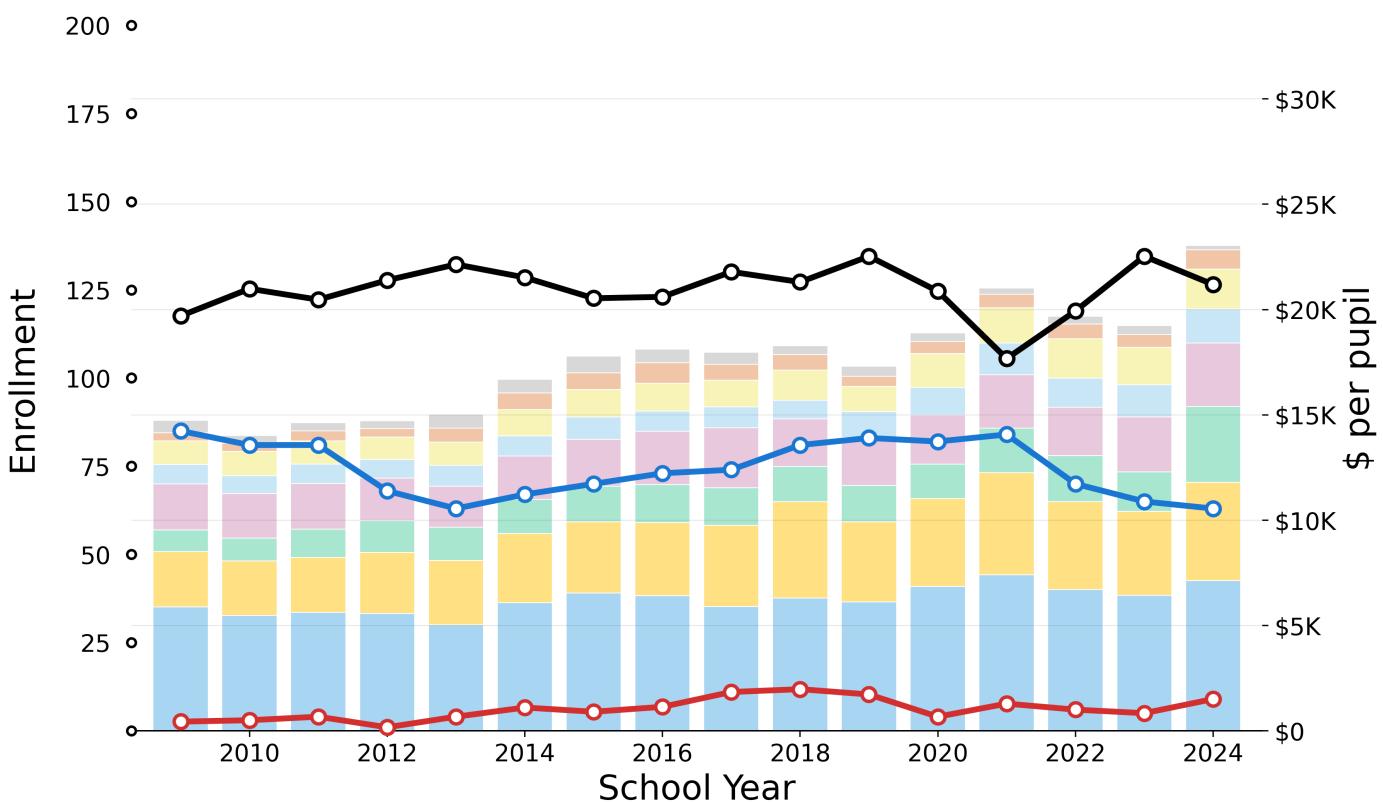


Figure 37

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)

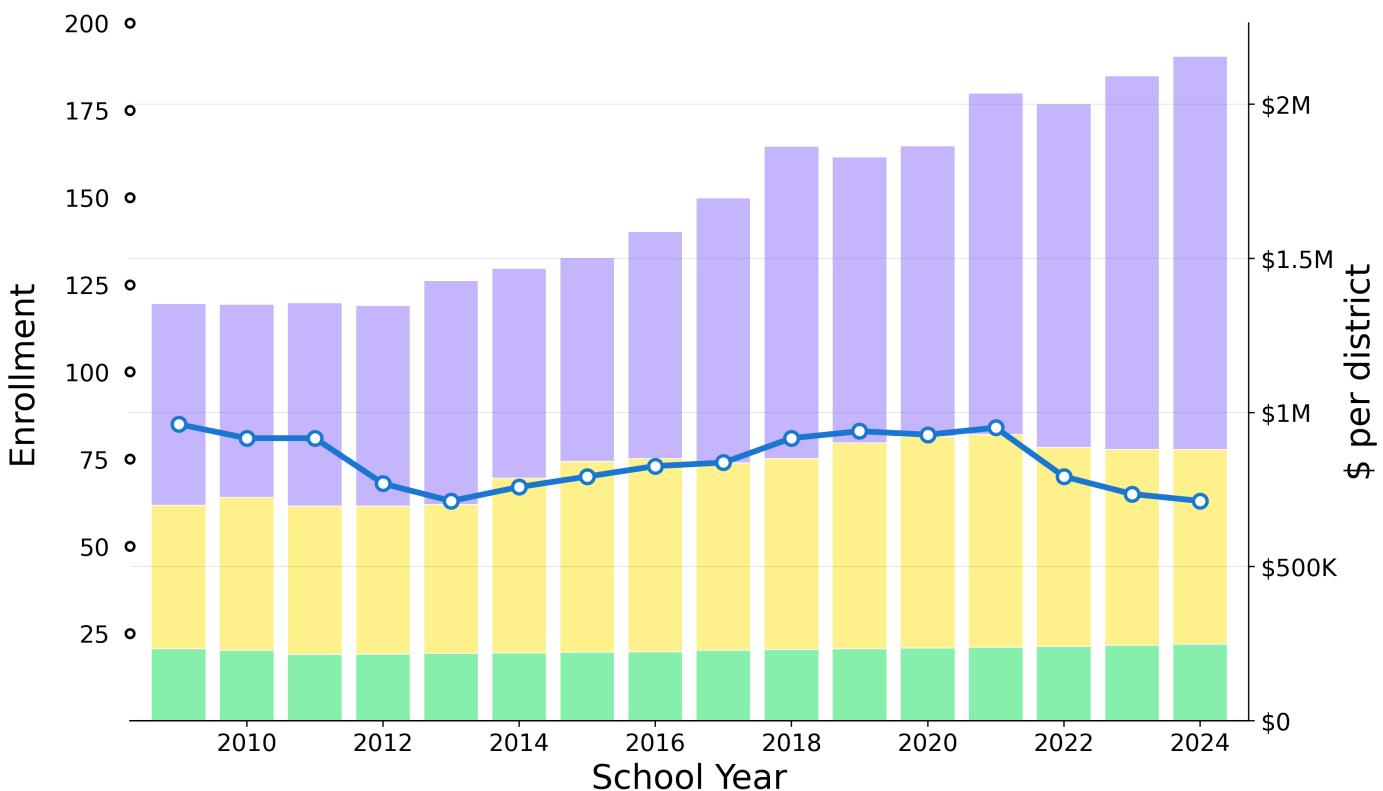


Figure 38

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

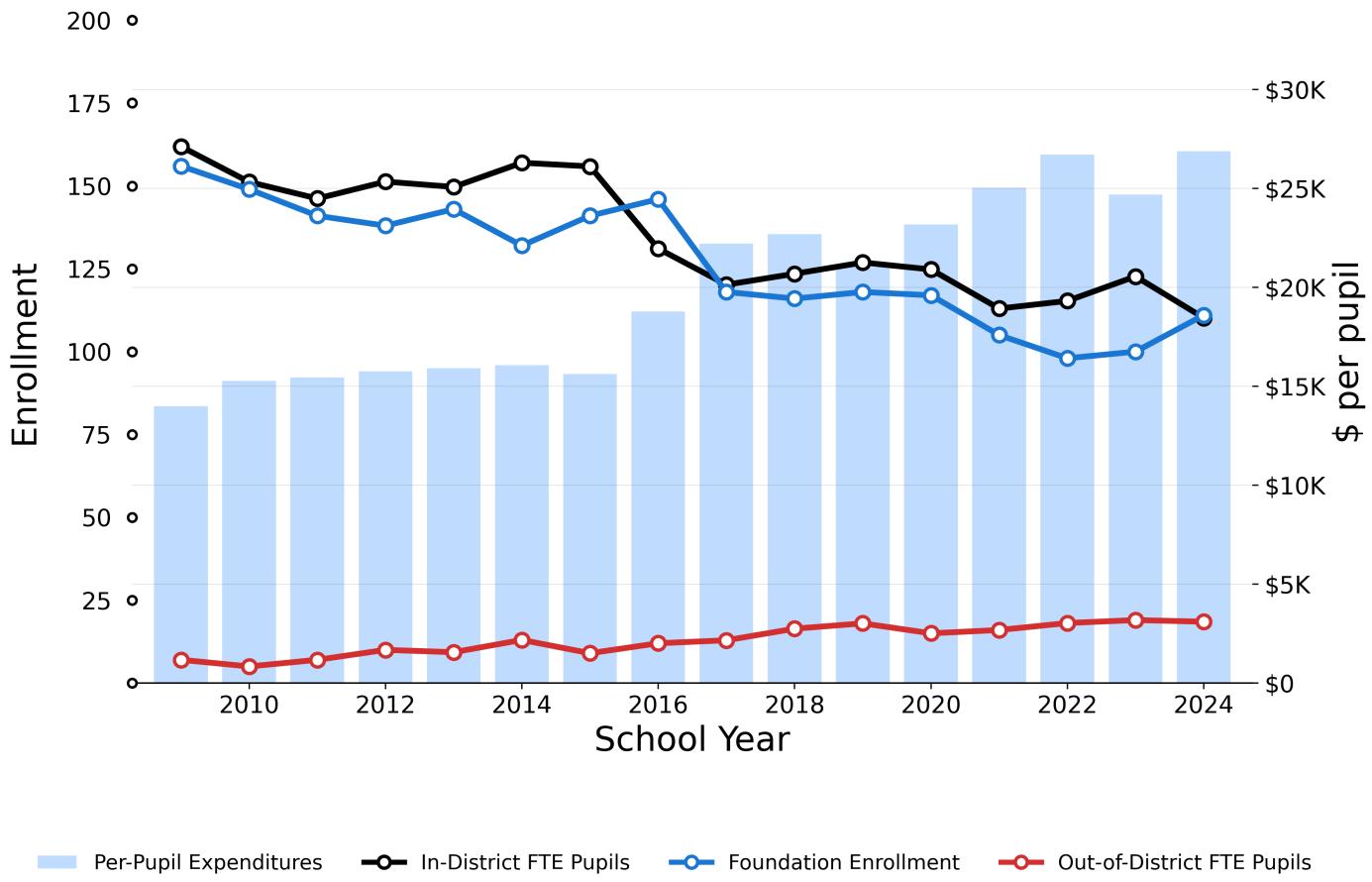


Figure 39

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

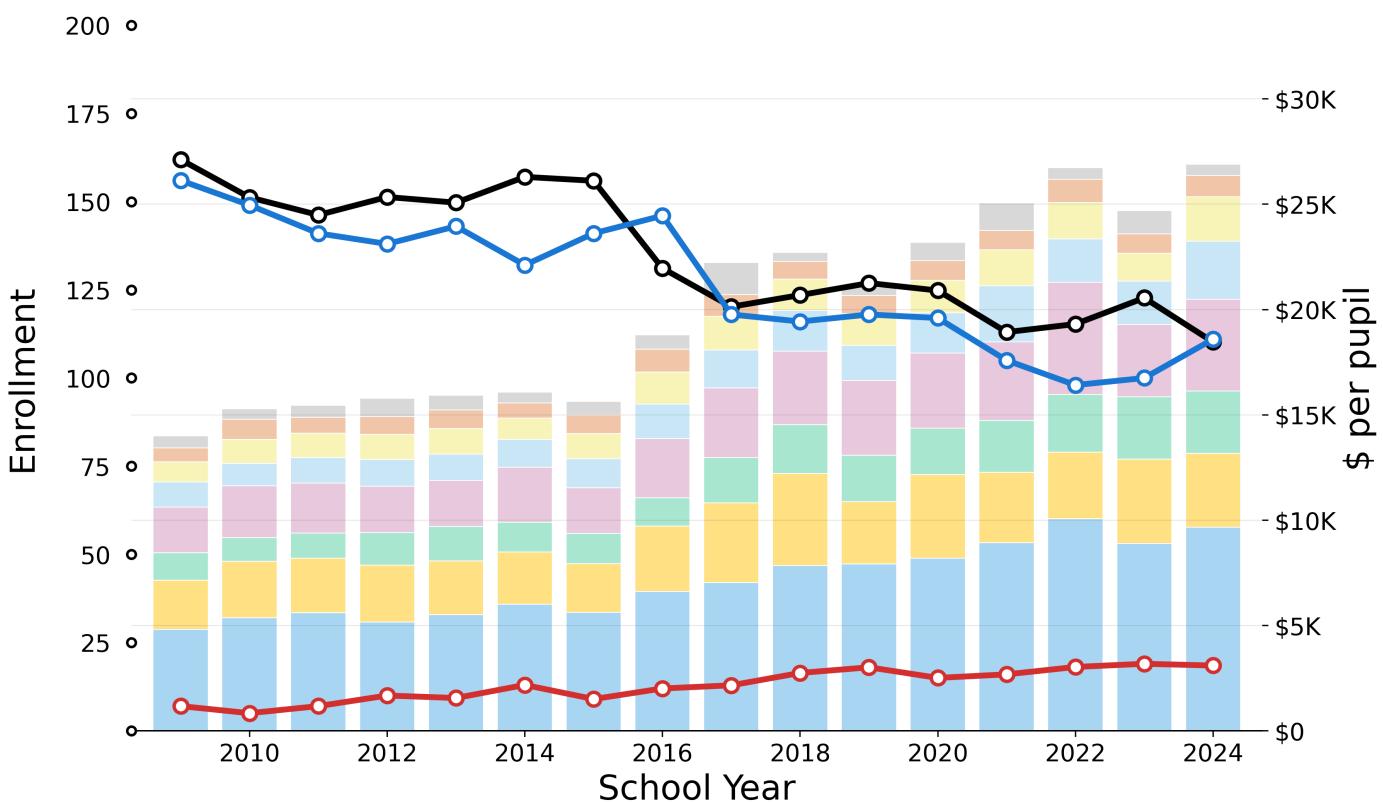


Figure 40

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)

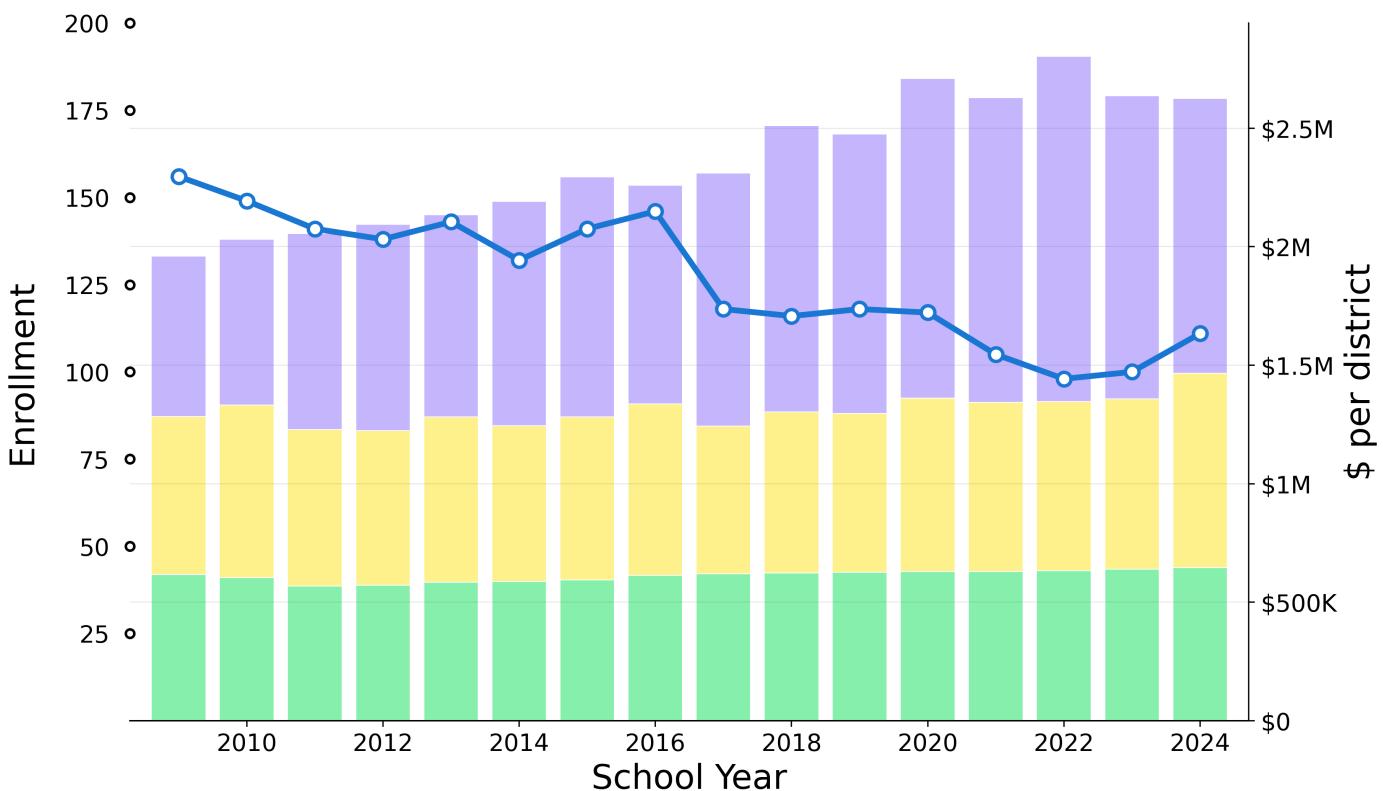


Figure 41

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 |
| Selected (5%/1pp) | 5.0% | 1.00pp | 0.22 SD | 0.31 SD | 1.41x | Well-balanced |
| 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)

Appendix A. Data Sources & Calculation Methodology (continued)

Appendix A. Data Sources & Calculation Methodology (continued)

Appendix A. Data Sources & Calculation Methodology (continued)

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.

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]
- $\text{CAGR} = [(total_ppe[\text{end}] / total_ppe[\text{start}])^{(1/5)} - 1] \times 100$

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.

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

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

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

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

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

=====

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

=====

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
-
-

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
-
-

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)^(1/15) - 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)^(1/15) - 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)

| Category | Table 80 | | | | | | | | | | | | | | | |
|---------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 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

| FTE Series | Table 81 | | | | | | | | | | | | | | | |
|----------------------------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 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 (\$)

| Component | Table 82 | | | | | | | | | | | | | | | |
|----------------------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 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 |