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Preliminary Report:
Housing Cost Measures as a Basis for a Geographic
Cost-of-Education Adjustment in Maine

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Introduction

Like most other states, Maine has struggled for many years to create a fairer school funding formula, one that generates and distributes funds in an equitable fashion to ensure success for all Maine’s children, regardless of where they live and attend school. Maine’s citizens have made, and continue to make, significant investments in our public schools. However, not all school districts have benefited equally from this investment, and it is clear that the old school funding approach is not working as well as we would like. Substantial disparities exist across Maine’s school districts, which have contributed significantly to differences in resources and educational opportunities. Fortunately, in the last five years, Maine’s policymakers have embarked on a new course of action, a course which is designed to produce a new funding approach that holds great promise of producing the desired outcomes for all of Maine’s students. The new approach is based on what is nationally known as an adequacy model, and is being used in states such as Wyoming, New Jersey, and Ohio in reforming their school funding formulas. In Maine, this adequacy model is called the Essential Programs and Services (EPS) model, which defines the amount of resources needed to provide equitable educational opportunities throughout the state.

According to Duncombe and Lukemeyer (2002), developing an adequacy school funding model involves three key steps. First, “...measures of student performance ...must be selected that can be used to identify adequate and inadequate performance” (p. 3). In Maine, this measure of student performance is the Maine Education Assessment (MEA) tests, tests designed to measure our statewide learning standards. The second step involves the “...identification of the required spending for adequacy...” (p. 3). Using

performance in high performing school districts, the Maine State Board of Education has estimated the resources needed in all schools in order to achieve our learning standards. The final step involves making adjustments to the adequacy spending level to reflect differences in student characteristics and potential geographic cost differences to school districts. Maine's EPS model includes weighted measures to account for certain student characteristics, such as special needs, limited English proficiency, and at-risk status. This paper describes one of the two methods being examined for adjusting for geographic differences in the cost of education services.

The basic form of Maine's education funding formula for each district is:

$$\textbf{Per-Pupil Guarantee} = \textbf{State Subsidy} + \textbf{Local Contribution}$$

The local contribution is determined by the district's ability to pay, which is measured as a function of the local state property valuation and local median household income. Although it is reasonable to suppose that the cost of providing comparable education to students varies throughout the state, the per-pupil guarantee is currently a statewide constant set by the legislature.

Adjustments Based on Cost of Living Indices

There are several possible ways one might adjust the per pupil guarantee in consideration of the possible variation in the cost of education. One reasonable sounding approach is to base the per pupil guarantee on a geographical cost of living index. A cost of living index would measure the relative cost of providing a household a specified standard of living in various parts of the state. The cost of purchasing the goods and services to provide a household with a set standard of living might well differ from the cost of purchasing the goods and services to provide a set level of education to students. Employee costs, however, constitute the largest portion of the costs of providing education. According to Maine's Preliminary Essential Programs and Services Model 1999-2000 Cost Estimates, 60.8% of a model district's total expenditures relate to personnel costs. This figure includes costs for personnel salary and benefits, instructional leadership support and system administration/support. In principle, it would be reasonable to take 60.8% of

the per-pupil guarantee and gross it up or down in proportion to the districts local cost of living. In doing so, one assumes, perhaps quite reasonably, that employees pass costs of living through to their employers through higher salary demands.

Though such an approach would be reasonable in principle, it would be impractical in Maine. Neither using an existing index nor making a new one would be feasible. ACCRA, an organization devoted to economic development and policy research, puts out the most widely used geographical cost of living index. However, ACCRA's Cost of Living Index (COLI) cannot be used for adjusting Maine's per-pupil guarantee for several reasons, the most obvious of which is that not all areas in Maine participate, or are even eligible to participate, in the index. ACCRA's COLI is designed to measure relative differences in the cost of providing a managerial or moderately affluent professional urban lifestyle. To do so, representatives from each participating area price a specified market basket of goods and services. Rural areas are not eligible to participate in the index. ACCRA's position is that rural and urban lifestyles are qualitatively different. Rural areas "simply don't support the kind of lifestyle embodied in the *ACCRA Cost of Living Index*." (ACCRA, 2000, p. 1.3) They may provide an attractive alternative, but they are excluded from the index based on the qualitative difference. Some of the goods and services in the market basket may be unavailable in a rural area. But even if all the goods and services are available, the cost of living in rural and urban areas remains incommensurable due to the qualitative difference in lifestyle. Buying the same goods and services is not equivalent to buying the same lifestyle.

McMahon and Chang (1996) use a regression analysis to generalize from the areas represented in ACCRA's COLI to other areas. They derive a regression equation according to which the relative cost of living of an area is a function of its other characteristics. Prima facie, such an approach has some degree of validity for urban areas like those represented in the index. It becomes highly suspect when applied to areas, such as rural areas, unlike those represented in the index.

Conceivably, Maine could design and implement its own cost of living index similar to ACCRA's. In fact, Maine did just that, with limited success, when the funding formula included a cost of living adjustment to the local ability-to-pay term of the formula. Maine's cost of living adjustment had many problems, including the possibility of relatively large inaccuracies and fluctuations, small samples, and judgment calls. Improvement in these areas might be possible, but would likely be cost prohibitive. Furthermore, there is still the conceptual problem of comparing urban and rural lifestyles.

Measuring geographic differences in the cost of living is many times more difficult than measuring differences over time in the cost of living, because time is in one dimension, and place, on the surface of the earth, is in two dimensions. The Consumer Price Index published by the Bureau of Labor Statistics is well-known. One can compare the cost of living in two times as different as 1930 and 2002, because one must go through each intervening year. Adjustments to the market basket may be made incrementally each year. As long as each intervening year is comparable to the ones immediately before and after it, the overall comparison is meaningful. Comparing costs of living in two very different places, say New York City and Limestone, Maine, is not as easy. One cannot simply line up all the places in between and make incremental adjustments to the market basket. Many paths lead from New York City to Limestone.

Other Comprehensive Approaches

A number of other comprehensive approaches to geographic cost of education adjustments exist in the literature. They are useful for current research and promising for future policy decisions. At this time, however, these approaches, are not accurate enough or theoretically developed enough to be used in education funding formulas. Or they require data that is not readily available enough.

Chambers and Fowler (1995) present the Teacher Cost Index, a measure of teacher salary cost based on the hedonic wage model. Using regression analysis, they attempt to derive the necessary teacher salaries of a district as a

function of factors beyond the district's control, such as population, climate, and crime rates. Chambers (1998) builds on the Teacher Cost Index to create the Geographical Cost-of-Education Index by including education costs in addition to teacher salaries. In this approach as many factors as practicable that relate to the cost of education are identified and factored in. One disadvantage of this approach is that as one adds in more and more factors, one must accept data that is less and less adequate. Our approach contrasts with Chambers', in that we concentrate on a small number of factors.

Duncomb, Ruggiero, and Yinger (1996) use a production function approach to measure differences in education costs. Such an approach adjusts for the fact that inputs to the process of providing education can be changed for different economic environments. For example, in an area with higher labor costs, the lowest cost way to provide a given quantity and quality of education may be to use fewer teachers but more books, equipment, and so forth than in an area with lower labor costs. Currently, not enough is known about education production functions for such an approach to be useful in making school funding decisions.

Simplified Approaches

For now, policymakers are forced to use less ambitious means. Two kinds of simplified approaches include the proxy approach and the piecemeal approach. To use a proxy approach, one uses a measure other than cost of education as if it were cost of education. For example, Massachusetts bases their cost of education adjustment on ES-202 wages, which are used as a proxy for cost of living. The idea is that the cost of living is probably higher in areas where employees make higher wages.

A piecemeal approach isolates one or more components of the cost of providing education and, if cost differences are found, adjusts for those components only. Maine's Essential Programs and Services (EPS) model, which is used to determine the per pupil cost of education based on a number of components, is well suited to a piecemeal approach. If a component of the EPS, such as personnel costs, is shown to vary across the state, a regional

adjustment may be made to that component, provided a careful and reasonable method of adjustment can be developed.

Barro (1994) presents a teacher salary index based on the level of experience and training of teachers in each area. Clearly, since these factors vary from region to region, they are an important source of variation in education expenditures. Some researchers (e.g., Fowler & Monk 2001) suggest that these factors are within the district's control and that, therefore, they represent optional expenditures rather than necessary costs. Furthermore, if teachers with more experience or training tend to provide a higher quality or quantity of education, the cost of providing a fixed amount of education might remain constant even as the expenditure per teacher is higher. If both the amount spent and the amount of education received are greater, what we are calling the cost of education may well be the same. There are reasons, though, to treat higher salaries due to teacher experience and training levels as necessary costs. First, the control a district has of teacher experience and training levels is limited. One does not terminate a teacher for having become too experienced, even if one's salary scale requires a large premium for additional experience. Second, a teacher's incentive to maintain employment is not a simple function of current salary. Arguably, an inexperienced teacher might accept a lower current salary based on an expectation of future salary increased. Changing the high end of the salary scale changes the incentives for all teachers, including the less experienced ones.

We are currently examining two approaches, one in this paper and one elsewhere. In this paper, we look at the largest component of the cost of living, which is the cost of housing, and at how it might affect the cost of education. The cost of living of an area is a significant consideration of employees in determining whether to take or to keep a job. Housing costs are the largest component of cost of living. Therefore, it is reasonable to ask what the relation between housing costs and education costs is. Elsewhere, we will examine an approach that bases the teacher salary costs of each district on levels of experience and training of its teachers and on salaries in nearby districts.

School districts compete for teacher labor with nearby districts. Therefore, arguably, teacher salaries in nearby districts will largely determine the cost to a district of acquiring the services of a teacher with a given level of experience and training.

Housing Affordability for Maine Teachers

Some areas of Maine have notoriously unaffordable housing. The Housing Opportunity Index, a measure of home affordability based on median income and prices of houses sold published by the National Association of Home Builders, ranked the Portsmouth-Rochester, NH-ME PMSA as the tenth least affordable of 186 areas in the US, and the absolute least affordable area of 39 in the Northeast. No other Maine areas were included in the survey. But this indicates that housing affordability may be an especially relevant problem for some teachers in Maine.

We studied housing affordability for teachers across Maine in order to help determine whether there is a need for an adjustment to the per pupil guarantee based on housing costs. We then created a preliminary housing cost adjustment.

Methodology

The approach examined in this paper is a modest, piecemeal approach. The general idea is to look only at housing costs and, based on the assumption that regional differences in housing costs are passed on to employers through higher salary requirements, only the portion of the cost of providing education that is attributed to what school district employees spend on housing is adjusted. Because its approach is piecemeal, a housing cost adjustment could potentially be combined with other regional adjustments, such as an adjustment for teacher experience and training levels, if care is taken to avoid double counting.

The Maine Department of Labor has identified 35 labor market areas in Maine, based on commuting patterns evident in data from the 1990 U.S. Census. We measured the affordability for teachers of housing in these areas. One could use school districts or counties as the geographic unit, but since

teachers need not live and teach in the same district or even the same county, a division of the state based on actual commuting patterns is more likely to be reflective of housing costs for teachers employed in the district. Teachers working in labor market areas with high housing costs might be able to save money by living in another labor market area. The additional cost of living near work might be considered an optional expenditure for the teacher. But it does not follow that any additional salary costs incurred by a school district due to its being located in a labor market area with high housing costs are subject to the district's discretion. Certainly, teachers could commute farther than others in Maine. There is no evidence, however, that they are willing to do so without raising their salary requirements. Additionally, there may be value to having teachers living closer to school, in that they may be more active in after-school activities. If so, any savings on the cost side provided by having teachers with long commutes might be offset by a reduction in the quality or quantity of education.

The Maine State Housing Authority (n.d.) has published a Home Affordability Index, which is a function of median household income and median price of houses sold for each market area. Assuming a householder can afford to spend 28% of household income on a mortgage payment and property taxes, as argued by ACCRA, the value of the index for an area is equal to the median house price of the area divided by the price of an affordable house for a median income household. An equivalent calculation for the index sets it equal to the mortgage payment on an affordable house divided by the mortgage payment on a house at the median price.

We modified the Home Affordability Index to create for the labor market areas a Teachers' Home Affordability Index. In place of the median household income of an area, we used the state average teacher salary. Therefore, the Teachers' Home Affordability Index will help answer the question, are houses in the area affordable to teachers, if employers are assumed not adjust salaries to account for varying house prices. This will help policymakers answer the question whether a geographic adjustment ought to be made to account for

housing cost differences. Whereas the Maine State Housing Authority uses household income, we use the average individual teacher salary, which ignores any other income in the teacher's household, such as income from another person in the household.

In any area with a Teachers' Home Affordability Index less than one, a teacher paid the state average salary could not afford to make mortgage payments and pay property taxes on a house purchased at the median sales price for the area using 28% of his or her salary. The Teachers' Home Affordability Index assumes a teacher can afford to pay \$797 per month for a mortgage payment and property taxes, which is 28% of the state average teacher salary of \$2,845 per month (or \$34,142 per year). We assume a 30-year mortgage with 7% interest and a 5% down payment.

We determined which labor market areas have a Teachers' Home Affordability Index was less than one. We also determined the number of public school pupils in those areas.

While home ownership perhaps should be considered a desirable and realistic goal for experienced teachers throughout the state, it is probably too much for a beginning teacher to expect in much of the state. Being able to afford rent on an apartment within normal commuting distance of work, however, should perhaps be considered realistic everywhere in Maine. For this reason, we created the Beginning Teachers' Rent Affordability Index. The value of the index for each labor market area is 28% of the state average monthly beginning teacher salary divided by the cost of a two-bedroom apartment in the market area. Here, too, we were looking for index values less than one. The Beginning Teachers' Rent Affordability Index assumes a teacher can afford to pay \$499 per month for rent, which is 28% of the state average beginning teacher salary of \$1,782 per month (or \$21,386 per year).

We completed our housing affordability study using existing data. Median house prices and rents are both from the Maine State Housing Authority. Their source for median house price is the Maine Multiple Listing Service. Rents are from a survey of landlords by Planning Decisions, Inc.

Because median price for houses is based on all available sales, and average rent is based on surveys with small, nonrandom samples, the figures on house prices are likely to be more accurate than the rent figures. Data sufficient to calculate median house prices and rent averages does not exist for all labor market areas. Rent and teacher salary data are from 1997-1998. Median house sale price data are from 1998.

We analyzed correlations between the housing cost measures and average salaries for teachers in the labor market areas. These two should be related closely enough that one would expect to find a significant correlation between housing cost measures and actual teacher salaries, if housing costs get passed on employers. Of course, the correlation will not be perfect, because housing costs are only one among many factors that may affect the cost of education. Nevertheless, if there were no correlation or only a very small correlation between these factors, an adjustment to the cost of education based on housing costs would seem to be ruled out.

Results

Table 1 shows the Teachers' Home Affordability Index. The first column shows the labor market area number and name. The second column shows the median price of houses sold in each area. The third column shows the monthly mortgage payment on a median-priced house, assuming a 30-year mortgage at 7% interest with a 5% down payment. The fourth column is the median property tax per month in the market area, calculated based on the median household income of the area and property tax as a percentage income. The fifth column adds the mortgage payment and property tax. The last column gives the Teachers' Home Affordability Index, which is \$797, or 28% of the state average teacher salary of \$2,845 per month, less median property tax per month of the area divided by the mortgage payment on a median priced house. A row in ***bold Italics*** indicates a market area with a Teachers' Home Affordability Index of less than one. This implies that a teacher paid the state average teacher salary could not afford to make a mortgage payment on a median priced home in the market area. For instance, a teacher who lives in

the Kittery labor market area and is paid the state average teacher salary would only be able to afford 77% of the mortgage payment of \$833 on a median-priced home.

Figure 1 is a map of Maine's labor market areas. Areas in gray indicate a Teachers' Home Affordability Index of less than one. Areas in white indicate a Teachers' Home Affordability Index of one or greater. Areas in black indicate insufficient data to calculate a Teachers' Home Affordability Index.

Table 2 shows the Beginning Teachers' Rent Affordability Index. The first column shows the labor market area number and name. The second column shows the median rent on a two-bedroom apartment in the labor market area. The last column shows the Beginning Teachers' Rent Affordability Index, which is \$499, or 28% of the state average beginning teacher salary of \$1,782 per month, divided by the median two-bedroom apartment rent. A row in ***bold italics*** indicates a market area with a Beginning Teachers' Rent Affordability Index of less than one. This implies that a teacher paid the state average beginning teacher salary could not afford to rent a median-rent two-bedroom apartment in the market area.

Figure 2 is another map of Maine's labor market areas. Areas in gray indicate a Beginning Teachers' Rent Affordability Index of less than one. Areas in white indicate a Beginning Teachers' Rent Affordability Index of one or greater. Areas in black indicate insufficient data to calculate a Beginning Teachers' Rent Affordability Index.

Table 3 shows the number of students in each labor market area. Only, four areas are below 1.00 in both measures, but these four areas include 67,000 students or 32.4% of Maine's total, based on 2000-2001 K-12 enrollment in public schools, excluding vocational and other specialized

Table 1
Teachers' Home Affordability Index

| Market Area | Median House Price | Mortgage Payment | Median Property Tax Per Month | Mortgage Payment Plus Property Tax | Teachers' Home Affordability Index |
|------------------------------------|--------------------|------------------|-------------------------------|------------------------------------|------------------------------------|
| 1. Kittery – York | 131,800 | 833 | 159 | 992 | 0.77 |
| 2. Sanford | 86,000 | 544 | 157 | 700 | 1.18 |
| 3. Biddeford | 112,000 | 708 | 148 | 856 | 0.92 |
| 4. Greater Portland | 114,750 | 725 | 237 | 962 | 0.77 |
| 5. Bath – Brunswick | 109,900 | 695 | 144 | 839 | 0.94 |
| 6. Boothbay Harbor | 127,250 | 804 | 146 | 950 | 0.81 |
| 7. Sebago Lake | 82,000 | 518 | 126 | 644 | 1.29 |
| 8. Lewiston – Auburn | 76,150 | 481 | 205 | 686 | 1.23 |
| 9. Rockland | 100,000 | 632 | 148 | 780 | 1.03 |
| 10. Norway – Paris | 75,000 | 474 | 110 | 584 | 1.45 |
| 11. Stonington | 93,750 | 593 | 106 | 698 | 1.17 |
| 12. Augusta | 77,500 | 490 | 134 | 624 | 1.35 |
| 13. Waterville | 69,000 | 436 | 133 | 569 | 1.52 |
| 14. Belfast | 86,000 | 544 | 144 | 687 | 1.20 |
| 15. Bucksport | 74,000 | 468 | 149 | 616 | 1.39 |
| 17. Bangor | 80,250 | 507 | 145 | 653 | 1.28 |
| 19. Dexter – Pittsfield | 56,000 | 354 | 146 | 500 | 1.84 |
| 20. Ellsworth - Bar Harbor | 110,000 | 695 | 149 | 845 | 0.93 |
| 21. Outer Bangor | 70,000 | 442 | 86 | 529 | 1.61 |
| 22. Rumford | 61,750 | 390 | 88 | 478 | 1.81 |
| 23. Lincoln – Howland | 53,000 | 335 | 72 | 407 | 2.16 |
| 24. Farmington | 64,000 | 405 | 146 | 551 | 1.61 |
| 26. Patten - Island Falls | 48,900 | 309 | 69 | 378 | 2.36 |
| 27. Millinocket – East Millinocket | 60,533 | 383 | 87 | 469 | 1.85 |
| 28. Houlton | 54,900 | 347 | 149 | 496 | 1.87 |
| 29. Skowhegan | 55,900 | 353 | 79 | 432 | 2.03 |
| 31. Dover – Foxcroft | 46,500 | 294 | 146 | 440 | 2.21 |

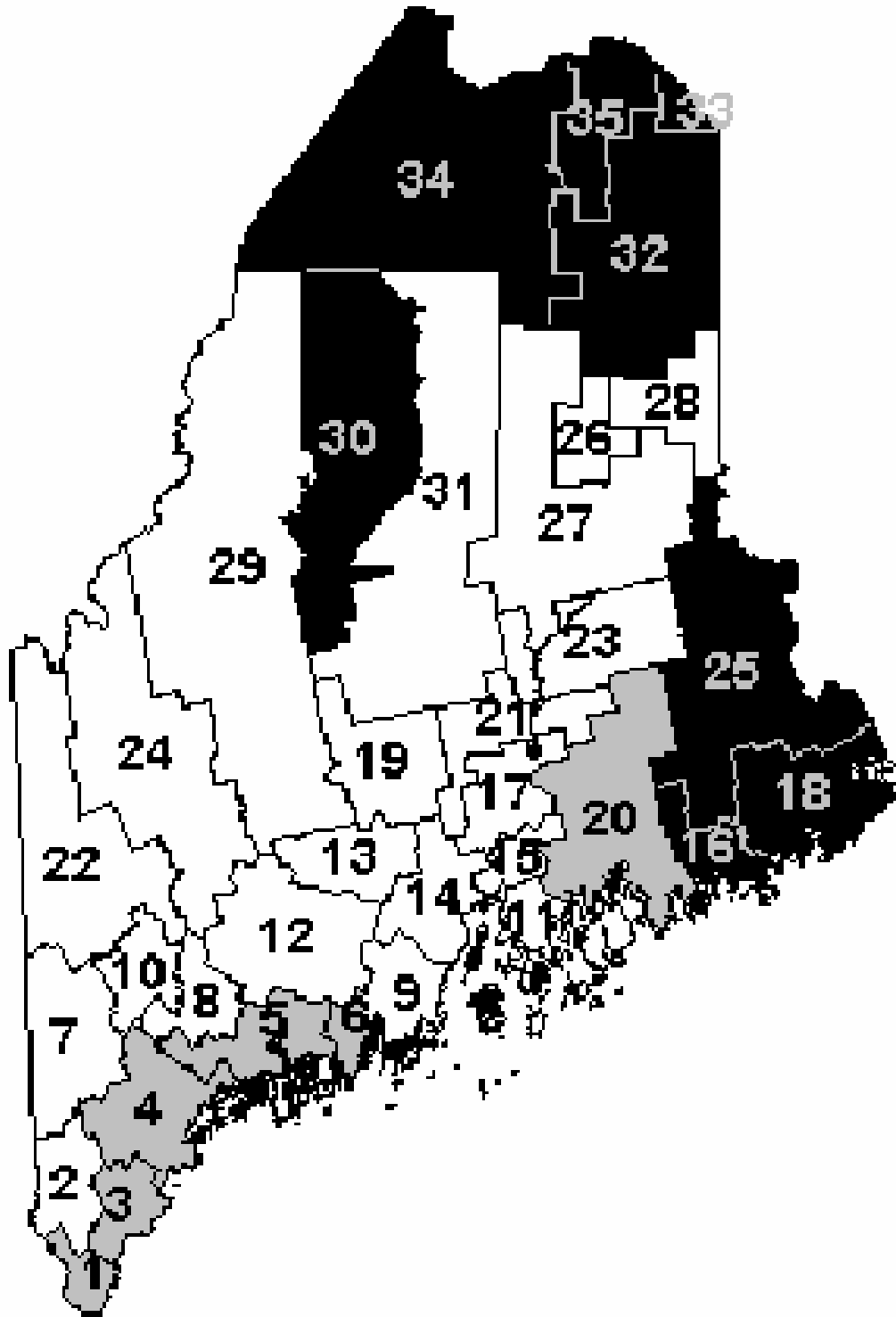


Figure 1: Teachers' Home Affordability Index. Gray areas indicate a Teachers' Home Affordability Index less than 1.00. White areas indicate a Teachers' Home Affordability Index of 1.00 or greater. Black areas indicate insufficient data to calculate a Teachers' Home Affordability Index.

Table 2
Beginning Teachers' Rent Affordability Index

| Market Area | Median Rent for 2-Bedroom Apartment | Beginning Teachers' Rent Affordability Index |
|----------------------------|---|--|
| 1. Kittery – York | 630 | 0.79 |
| 2. Sanford | 509 | 0.98 |
| 3. Biddeford | 544 | 0.92 |
| 4. Greater Portland | 698 | 0.71 |
| 5. Bath – Brunswick | 558 | 0.89 |
| 6. Boothbay Harbor | 430 | 1.16 |
| 7. Sebago Lake | 425 | 1.17 |
| 8. Lewiston – Auburn | 462 | 1.08 |
| 9. Rockland | 500 | 1.00 |
| 10. Norway – Paris | 475 | 1.05 |
| 12. Augusta | 510 | 0.98 |
| 13. Waterville | 392 | 1.27 |
| 14. Belfast | 450 | 1.11 |
| 15. Bucksport | 450 | 1.11 |
| 17. Bangor | 478 | 1.04 |
| 19. Dexter – Pittsfield | 433 | 1.15 |
| 21. Outer Bangor | 350 | 1.43 |
| 23. Lincoln – Howland | 460 | 1.08 |
| 29. Skowhegan | 362 | 1.38 |
| 30. Greenville | 400 | 1.25 |
| 31. Dover – Foxcroft | 450 | 1.11 |
| 32. Presque Isle - Caribou | 450 | 1.11 |

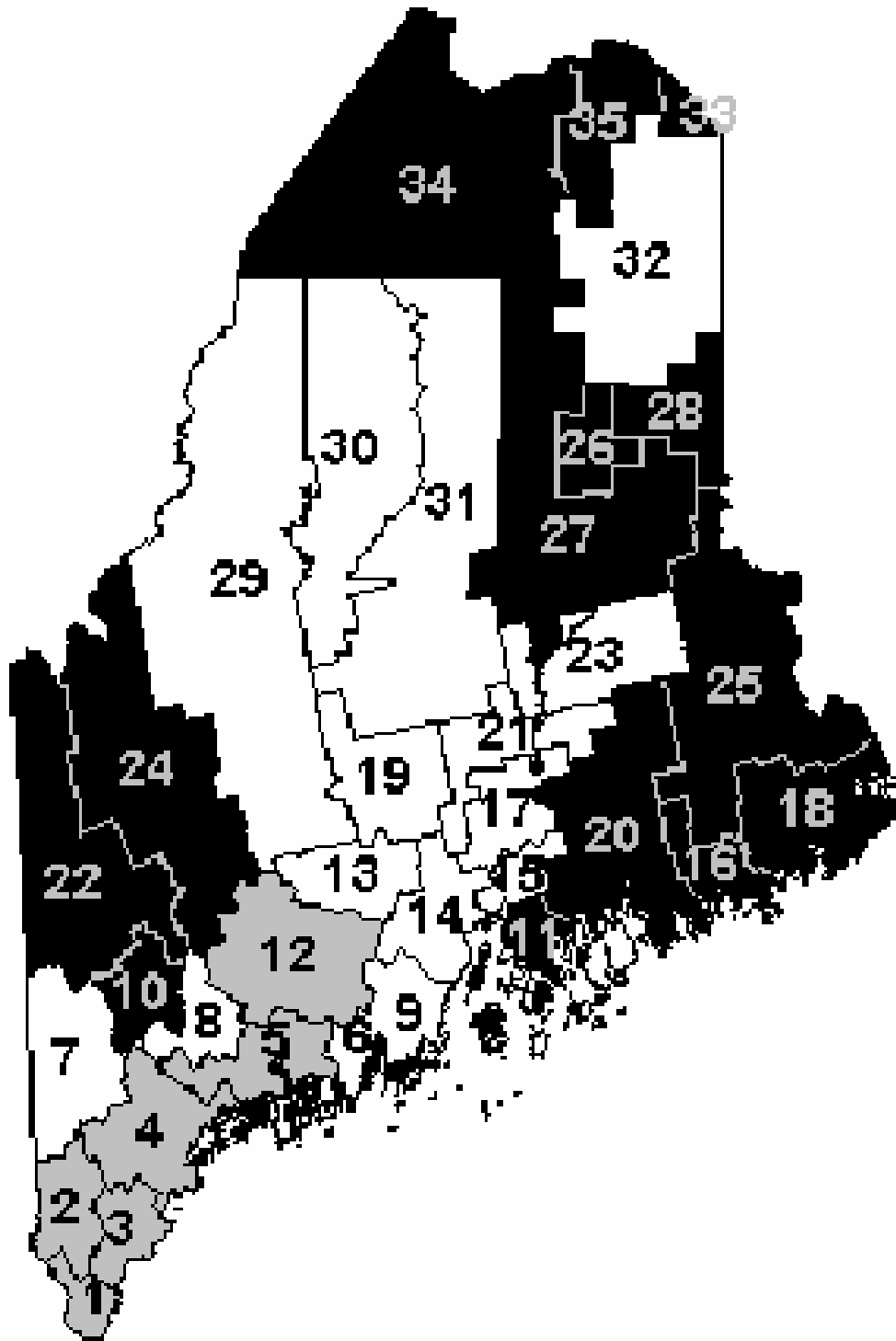


Figure 2: Beginning Teachers' Rent Affordability Index. Gray areas indicate a Beginning Teachers' Rent Affordability Index less than 1.00. White areas indicate a Beginning Teachers' Rent Affordability Index of 1.00 or greater. Black areas indicate insufficient data to calculate a Beginning Teachers' Rent Affordability Index.

Table 3

**Number of Student by Market Area
With Housing Indexes**

| Market Area | Number of Students | Percent of Total | Teachers' Home Affordability Index | Beginning Teachers' Rent Affordability Index |
|------------------------------------|--------------------|------------------|------------------------------------|--|
| 1. Kittery – York | 6,144 | 3.0 | 0.77 | 0.79 |
| 2. Sanford | 10,985 | 5.3 | 1.18 | 0.98 |
| 3. Biddeford | 9,705 | 4.7 | 0.92 | 0.92 |
| 4. Greater Portland | 39,208 | 18.9 | 0.77 | 0.71 |
| 5. Bath – Brunswick | 12,031 | 5.8 | 0.94 | 0.89 |
| 6. Boothbay Harbor | 1,861 | 0.9 | 0.81 | 1.16 |
| 7. Sebago Lake | 4,503 | 2.2 | 1.29 | 1.17 |
| 8. Lewiston – Auburn | 14,765 | 7.1 | 1.23 | 1.08 |
| 9. Rockland | 6,990 | 3.4 | 1.03 | 1.00 |
| 10. Norway – Paris | 4,723 | 2.3 | 1.45 | ** |
| 11. Stonington | 1,217 | 0.6 | 1.17 | ** |
| 12. Augusta | 12,554 | 6.1 | 1.35 | 0.98 |
| 13. Waterville | 10,657 | 5.1 | 1.52 | 1.27 |
| 14. Belfast | 3,510 | 1.7 | 1.20 | 1.11 |
| 15. Bucksport | 1,625 | 0.8 | 1.39 | 1.11 |
| 16. Jonesport – Milbridge | 1,229 | 0.6 | ** | ** |
| 17. Bangor | 14,430 | 7.0 | 1.28 | 1.04 |
| 18. Machias – Eastport | 2,015 | 1.0 | ** | ** |
| 19. Dexter – Pittsfield | 4,209 | 2.0 | 1.84 | 1.15 |
| 20. Ellsworth - Bar Harbor | 5,265 | 2.5 | 0.93 | ** |
| 21. Outer Bangor | 2,109 | 1.0 | 1.61 | 1.43 |
| 22. Rumford | 3,865 | 1.9 | 1.81 | ** |
| 23. Lincoln – Howland | 2,371 | 1.1 | 2.16 | 1.08 |
| 24. Farmington | 6,171 | 3.0 | 1.61 | ** |
| 25. Calais | 1,940 | 0.9 | ** | ** |
| 26. Patten - Island Falls | 510 | 0.2 | 2.36 | ** |
| 27. Millinocket – East Millinocket | 1,712 | 0.8 | 1.85 | ** |
| 28. Houlton | 2,457 | 1.2 | 1.87 | ** |
| 29. Skowhegan | 5,496 | 2.7 | 2.03 | 1.38 |
| 30. Greenville | 347 | 0.2 | ** | 1.25 |
| 31. Dover – Foxcroft | 2,596 | 1.3 | 2.21 | 1.11 |
| 32. Presque Isle - Caribou | 6,839 | 3.3 | ** | 1.11 |
| 33. Van Buren | 489 | 0.2 | ** | ** |
| 34. Fort Kent | 1,243 | 0.6 | ** | ** |
| 35. Madawaska | 1,182 | 0.6 | ** | ** |
| Total | 206,953 | 100.0 | ** | ** |

**no data

schools. Six labor market areas are below 1.00 in each index. The six areas with a Teachers' Home Affordability Index below one include 74,000 students or 35.9% of Maine's total. The six areas with a Beginning Teachers' Rent Affordability Index below 1.00 include 91,000 students or 43.8% of Maine's total. In both cases, a small number of areas with high housing costs serve a substantial portion of Maine's students.

As expected, moderate correlations exist between median home price and average teacher salary (Pearson $r = .555$; $p < .01$) and between rent and beginning teacher salary (Pearson $r = .441$; $p < .05$). Beginning teacher salary has a slightly higher correlation to median house price (Pearson $r = .603$; $p < .01$). These correlation coefficients are sufficient to support the claim that making an adjustment on the basis of housing costs would be reasonable.

Geographic Adjustment to the Per-Pupil Guarantee

Based on the study of housing affordability for Maine Teachers or based on other principles, an adjustment to the per-pupil guarantee might be indicated. Such an adjustment could be based on housing costs in all the market areas or only in those where housing is unaffordable for teachers.

Methodology

According to Maine's EPS Model, personnel costs account for 60.8% of all school district costs. Twenty-eight percent is often considered a good approximation for the proportion of pay workers spend on housing. For instance, in ACCRA's COLI, the housing component comprises 28% of the index. Maine also used this percentage when they had a cost of living adjustment to a district's ability to pay. If a reliable measure of housing costs can be found, it seems reasonable to adjust a district's cost of education by 28% of 60.8%, that is 17.0%, of the proportional difference in housing costs.

We provide three methods for adjusting the cost of education for housing costs. One method, Method A, uses measures of both house prices and rent. The other two methods, Methods B and C, use only the house price measure and are therefore simpler. Method B provides a slightly larger adjustment than

Method C, because Method B, in effect, adjusts a larger portion of the cost of education.

Method A, the most comprehensive method, is to assume that 17.0% of the cost of education consists of housing cost. The 17.0% represents the portion of school district costs associated with personnel (60.8%, according to the EPS model) times the portion of household income spent on housing (28%, according to a standard estimate). A Housing Cost Index is developed. It contains two components: the House Price Component Index, which is the median house price in each market area divided by the state average, and the Rent Component Index, which is the two-bedroom apartment rent in each market area divided by the state average. The Housing Cost Index is a weighted average of the components, where the weights are 80.8% for the House Price Component Index and 19.2% for the Rent Component Index. These weights are the ones used by ACCRA for its Cost of Living Index. One adjusts 17.0% of the per-pupil guarantee by the resulting Housing Cost Index, and leaves the other 83.0% unchanged.

Methods B and C do not use the Rent Component Index. Method B substitutes the House Price Component Index for the Housing Cost Index. So one adjusts 17.0% of the per pupil guarantee by the House Price Component Index, and leaves the other 83.0% unchanged. Method C adjusts 13.8% of the per pupil guarantee by the House Price Component Index, and leaves the other 86.2% unchanged. The 13.8% is intended to represent the portion of school district costs employees spend on purchasing houses, which is 80.8% of 28% of 60.8%. Method C would be equivalent to Method A, if the Rent Component Index were 1.00 for all labor market areas.

Results

Table 4 shows the Housing Cost Index and its components as well as the cost of education adjustments according to the three methods. For areas with data available, the cost of education adjustment ranges from .91 to 1.07, according to method B, which gives the widest range, and from .93 to 1.05 for method A, which gives the narrowest.

Under Methods B and C, seven labor market areas have an adjustment greater than 1.00. These are the same areas where the Teachers' Home Affordability Index is less than 1.00, together with area 9, Rockland, which has an adjustment of 1.01 and a Teachers' Home Affordability Index of 1.03. One of these seven areas, area 20, Ellsworth-Bar Harbor, lacks the rent data to calculate an adjustment by Method A, but has an adjustment greater than 1.00 under Methods B & C.

Preliminary figures from the EPS model indicate a statewide per-pupil guarantee for students in grades 9 through 12 of \$5,462. If one of the adjustment methods in this paper were adopted, the per-pupil guarantee in a labor market area would be \$5,462 times the cost of education adjustment. For example, the per-pupil guarantee in the Kittery labor market area would be increased to \$5,790 for method A, \$5,844 for method B, or \$5,735 for method C.

Discussion

The housing affordability study presented here shows a moderate relation between teacher salaries and housing costs across the state. It also indicates that in substantial portions of the state, houses are not affordable for teachers paid a state-average salary.

The cost of education adjustment approach presented in this paper has some advantages and disadvantages. One advantage is that it does not adjust for any voluntary expenditures. A school district has no control of housing costs. Therefore, when regional differences in housing costs influence school district employee salaries, this constitutes a necessary cost of providing education. However, this approach assumes that teachers pass on housing costs to their employers through higher salary requirements on a dollar for dollar basis. This assumption seems reasonable, and the existence of a

Table 4
Housing Cost Index and Cost of Education Adjustments

| Market area | Rent Component Index | House Price Component Index | Housing Cost Index | Cost of Education Adjustment (Method A) | Cost of Education Adjustment (Method B) | Cost of Education Adjustment (Method C) |
|------------------------------------|----------------------|-----------------------------|--------------------|---|---|---|
| 1. Kittery – York | 1.19 | 1.39 | 1.35 | 1.06 | 1.07 | 1.05 |
| 2. Sanford | 0.96 | 0.91 | 0.92 | 0.99 | 0.98 | 0.99 |
| 3. Biddeford | 1.03 | 1.18 | 1.15 | 1.03 | 1.03 | 1.02 |
| 4. Greater Portland | 1.32 | 1.21 | 1.23 | 1.04 | 1.04 | 1.03 |
| 5. Bath – Brunswick | 1.06 | 1.16 | 1.14 | 1.02 | 1.03 | 1.02 |
| 6. Boothbay Harbor | 0.81 | 1.34 | 1.24 | 1.04 | 1.06 | 1.05 |
| 7. Sebago Lake | 0.80 | 0.87 | 0.86 | 0.98 | 0.98 | 0.98 |
| 8. Lewiston – Auburn | 0.88 | 0.80 | 0.82 | 0.97 | 0.97 | 0.97 |
| 9. Rockland | 0.95 | 1.06 | 1.04 | 1.01 | 1.01 | 1.01 |
| 10. Norway – Paris | 0.9 | 0.79 | 0.81 | 0.97 | 0.96 | 0.97 |
| 11. Stonington | ** | 0.99 | ** | ** | 1.00 | 1.00 |
| 12. Augusta | 0.97 | 0.82 | 0.85 | 0.97 | 0.97 | 0.98 |
| 13. Waterville | 0.74 | 0.73 | 0.73 | 0.95 | 0.95 | 0.96 |
| 14. Belfast | 0.85 | 0.91 | 0.90 | 0.98 | 0.98 | 0.99 |
| 15. Bucksport | 0.85 | 0.78 | 0.79 | 0.96 | 0.96 | 0.97 |
| 16. Jonesport – Milbridge | ** | ** | ** | ** | ** | ** |
| 17. Bangor | 0.91 | 0.85 | 0.86 | 0.98 | 0.97 | 0.98 |
| 18. Machias – Eastport | ** | ** | ** | ** | ** | ** |
| 19. Dexter – Pittsfield | 0.82 | 0.59 | 0.63 | 0.94 | 0.93 | 0.94 |
| 20. Ellsworth - Bar Harbor | ** | 1.16 | ** | ** | 1.03 | 1.02 |
| 21. Outer Bangor | 0.66 | 0.74 | 0.72 | 0.95 | 0.96 | 0.96 |
| 22. Rumford | ** | 0.65 | ** | ** | 0.94 | 0.95 |
| 23. Lincoln – Howland | 0.87 | 0.56 | 0.62 | 0.94 | 0.93 | 0.94 |
| 24. Farmington | ** | 0.68 | ** | ** | 0.95 | 0.96 |
| 25. Calais | ** | ** | ** | ** | ** | ** |
| 26. Patten - Island Falls | ** | 0.52 | ** | ** | 0.92 | 0.93 |
| 27. Millinocket – East Millinocket | ** | 0.64 | ** | ** | 0.94 | 0.95 |
| 28. Houlton | ** | 0.58 | ** | ** | 0.93 | 0.94 |
| 29. Skowhegan | 0.69 | 0.59 | 0.61 | 0.93 | 0.93 | 0.94 |
| 30. Greenville | 0.76 | ** | ** | ** | ** | ** |
| 31. Dover – Foxcroft | 0.85 | 0.49 | 0.56 | 0.92 | 0.91 | 0.93 |
| 32. Presque Isle - Caribou | 0.85 | ** | ** | ** | ** | ** |
| 33. Van Buren | ** | ** | ** | ** | ** | ** |
| 34. Fort Kent | ** | ** | ** | ** | ** | ** |
| 35. Madawaska | ** | ** | ** | ** | ** | ** |

**no data

moderate correlation between housing costs and teacher salaries provides some empirical support for it.

Our approach also assumes that teachers' housing costs are proportional to median house prices, even though teacher salaries are not always median salaries. The primary alternative approach would be to price houses that meet a set of specifications, as ACCRA does. This approach has at least two drawbacks. First, different sizes and styles of houses might be appropriate for teachers living in different parts of the state. Second, not all areas will have actual sales of houses meeting the specifications. Lacking actual sales data, estimates would need to be used, which are less reliable. Of the alternatives, median house price is the superior measure.

Some areas have a cost of education adjustment substantially less than 1.00. However, if one adjusts only those areas with an index greater than 1.00, no area is penalized for having very inexpensive housing, yet areas where housing is unaffordable for teachers will have their salary costs more realistically modeled.

Our modest, piecemeal approach is limited to considering one aspect of the variation in the cost of education. By focusing in this way, though, a careful and reliable adjustment can be developed. Other factors, too, such as levels of teacher experience and training, may be incorporated by further studies.

Our approach, if used as a stand-alone adjustment, has a potential political drawback. We can be fairly certain that the methods of adjustment examined in this paper would benefit only a minority of the population, since most public school students in Maine go to school outside the areas with high housing costs.

If this approach were implemented in the school funding formula, reliable, accurate rent data for areas throughout the state may be difficult to obtain. Methods B & C, which use only median house prices and which have results similar to method A, do not have this problem. They may be more cost effective.

The data used in this study are incomplete and somewhat out-of-date. If work in this area is to be continued, complete, updated housing cost data needs to be gathered, whether rents will be used or house prices only. Once this is accomplished, our approach promises a fair, reliable, accurate, simple adjustment to the per pupil guarantee for housing costs, a factor entirely beyond the control of the school districts.

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