Washington Wages: An Analysis of Educator and Comparable Non-educator Wages in the State of Washington

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Submitted by:

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Introduction

Wages vary substantially from one part of Washington to another. According to the National Center for Education Statistics' Comparable Wage index (NCES CWI) for 2005 (the most recent data available), the prevailing wage for college graduates is 9 percent higher in Seattle than it is in Olympia, and 11 percent higher in Olympia than it is in Bellingham. The difference in wages from the most expensive labor market in the state (Seattle) to the least expensive labor markets in the state (rural eastern Washington) approaches 28 percent.

Because school districts must compete for workers in all of these labor markets, they must pay teacher wages that are comparable to those outside of the teaching profession. Large geographic differences in the price of labor imply equally large differences in the purchasing power of school districts. Meanwhile, rapid growth in labor costs can imply substantial erosion in school district purchasing power over time.

This report examines salary differentials for cities and school districts in the state of Washington. The analysis updates the NCES CWI through 2007, extends the CWI to cover workers who are not college graduates, and compares educator salaries in Washington school districts with those of comparable workers outside education. In all cases, the analysis has been conducted for each school district, metropolitan area, and non-metropolitan labor market in the state.

Updating the NCES Comparable Wage Index

The NCES CWI measures the prevailing wage in for college graduates in 800 U.S. Labor markets. The baseline estimates (for 1999) come from a regression analysis of the individual earnings data from the 2000 U.S. Census. Annual updates to that baseline come from regression analyses of occupational earnings data provided by the U.S. Bureau of Labor Statistics.[1]

The baseline analysis yields predicted wages in each labor market, adjusted for regional differences in worker characteristics and the mix of industries and occupations in each location. As such, the NCES CWI does not indicate that the wage level is low in an area simply because most of the workers are young and inexperienced, nor does it indicate that the wage level is low in an area simply because there are a disproportionate number of low-skill jobs. Rather, the NCES CWI isolates the regional variation in wages that is attributable specifically to differences in location.

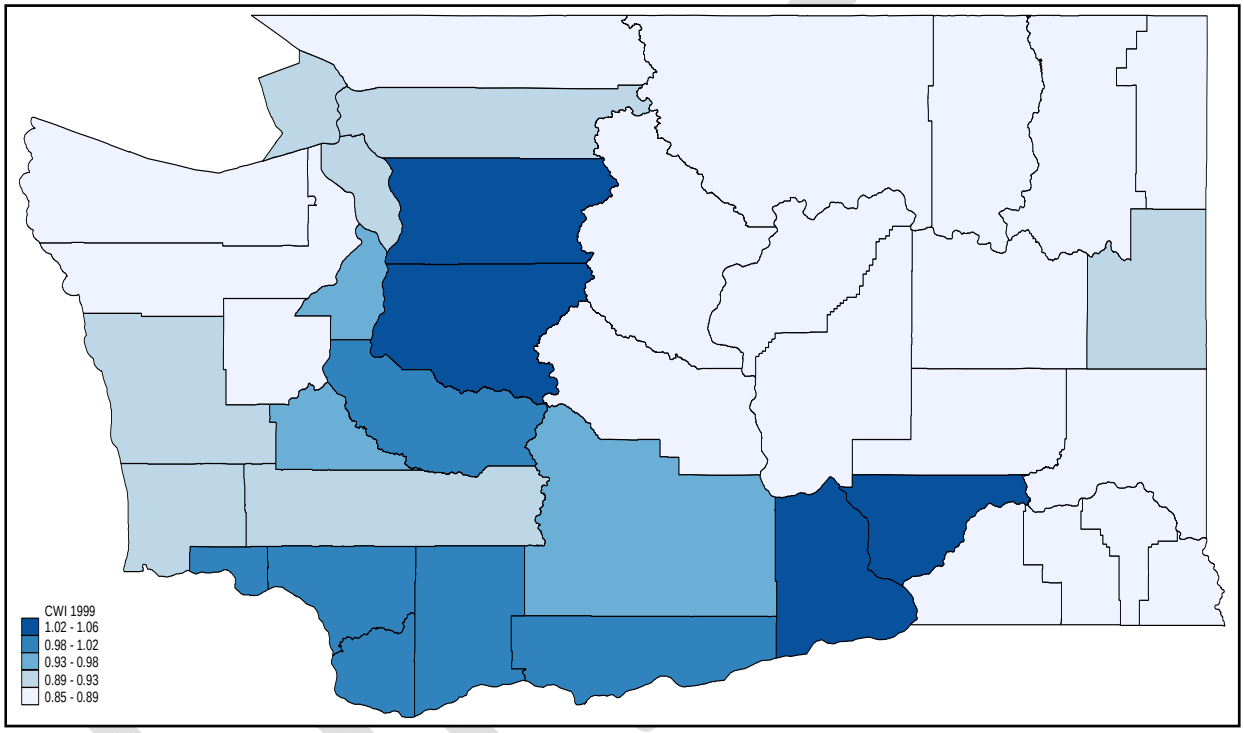
The labor markets in the NCES CWI are based on "place-of-work areas" as defined by the Census Bureau for the 2000 Census. Census place-of-work areas are geographic regions designed to contain at least 100,000 persons. The place-of-work areas do not cross state boundaries and generally follow the boundaries of county groups, single counties, or census-defined places (Ruggles et al. 2003). Counties in sparsely-populated parts of a state are clustered

[1] For more on the estimation of the NCES CWI, see Taylor and Fowler (2006).

together into a single Census place-of-work area. Each labor market in the NCES CWI is either a single place of work, or a cluster of the places-of-work that comprise a metropolitan area.

There are 16 NCES CWI labor market in the state of Washington. Nine correspond to metropolitan areas—Bellingham, Bremerton, Kennewick, Olympia, Portland, Seattle, Spokane, Tacoma, and Yakima—while seven represent clusters of rural counties. Each Washington school district is associated with one of the 16 labor market areas. Figure 1 illustrates the baseline CWI for the labor market areas in Washington.

Figure 1: The Baseline CWI



Taylor and Fowler (2006) used data from the Bureau of Labor Statistics' Occupational Employment Survey (OES) to extend the baseline estimates of the NCES CWI and provide annual index values for 1997 through 2005. The OES is a Bureau of Labor Statistics (BLS) database that contains average annual earnings by occupation for states and metropolitan areas. Each year, the BLS samples and contacts approximately 400,000 civilian, nonfarm establishments for the OES survey.[2] Survey respondents in the 2007 OES dataset employed 73.5 percent of the civilian, nonfarm workers in the United States.

When extending the baseline CWI, Taylor and Fowler used the OES data to estimate an occupationally adjusted wage in each labor market area, and then adjusted the baseline NCES

[2] Details on the OES survey come from BLS (2003).

CWI to reflect the annual growth in those wage estimates in each location.[3] For example, if their analysis of the OES data indicated that the wage level in Seattle increased by 5 percent between 1999 and 2001, they revised the baseline CWI for Seattle upward by 5 percent to generate an estimate of the Seattle CWI in 2001.

Following the same methodology as in that earlier work, I have updated the NCES CWI to cover 2006 and 2007. Thus, I have used OES data for 2006 and 2007 to estimate the occupationally adjusted wage level in each state and major metropolitan area in the United States. Using those estimates, I have also calculated the implied average wage level in the non-metropolitan remainder of each state. I then calculated the annual rate of change in the OES wage estimates and adjusted the baseline CWI accordingly.

Table 1 presents the updated values of the NCES CWI for the 16 labor market areas in Washington. As the table illustrates, the wage differences among Washington labor market areas widened slightly between 2005 and 2007. Where wages were almost 28 percent higher in Seattle than in rural eastern Washington in 2005, they were more than 29 percent higher in 2007.

Table 1: Comparable Wage Index Values

	NCES CWI 2005	Updated CWI 2006	Updated CWI 2007
Bellingham Metropolitan Area	1.143	1.190	1.236
Bremerton-Silverdale Metropolitan Area	1.305	1.384	1.430
Kennewick-Pasco-Richland Metropolitan Area	1.372	1.432	1.461
Olympia Metropolitan Area	1.273	1.339	1.367
Portland-Vancouver-Beaverton Metropolitan Area	1.234	1.282	1.317
Seattle-Bellevue-Everett Metropolitan Area	1.387	1.445	1.487
Spokane Metropolitan Area	1.150	1.201	1.242
Tacoma Metropolitan Area	1.298	1.363	1.396
Yakima Metropolitan Area	1.267	1.315	1.347
Island, San Juan and Skagit	1.174	1.212	1.243
Chelan, Douglas, Kittitas and Okanogan	1.085	1.121	1.150
Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens	1.104	1.140	1.169
Asotin, Columbia, Garfield, Walla Walla and Whitman	1.085	1.121	1.149
Cowlitz, Klickitat, Skamania and Wahkiakum	1.241	1.281	1.314
Grays Harbor, Lewis and Pacific	1.149	1.186	1.217
Clallam, Jefferson and Mason	1.116	1.152	1.181
State average	1.313	1.368	1.406

[3] The local wage level is a weighted average of the local predicted wages by occupation, where the weights are each occupation's share of total employment among the national sample of college graduates in the census database. Thus, occupations that are held only rarely by college graduates are given little weight in the construction of the OES wage levels, while occupations that employ college graduates intensively are given greater weight. See Appendix A of Taylor and Fowler (2006) for details.

The updated CWI also indicates substantial increases in the cost of college educated labor between 2005 and 2007. On average, wages for college graduates in Washington increased 3.5 percent per year over the two-year period. The slowest wage growth was in rural Washington, where the wage level increased by 2.9 percent each year. The most rapid wage growth was in Bremerton, where the wage level increased by 4.7 percent per year between 2005 and 2007.

Estimating a CWI for High School Graduates

The NCES CWI measures regional variations in the prevailing wage for college graduates. As such, it is a credible price index for teachers, administrators and other professional staffers. However, school districts also hire a large number of workers—such as clerical workers, teacher aides, cafeteria workers or custodians—who typically are not college graduates. Arguably, the wages of workers without a college degree may have a different geographic pattern than do the wages of college graduates. If so, then it would be inappropriate to use the CWI to adjust for variations in the cost of classified workers. Instead, a more appropriate price index for classified staff would be a comparable wage index for high school graduates.

Following the methodology used for the NCES CWI, I estimated a baseline comparable wage index for high school graduates (HS CWI) using the Individual Public Use Microdata Sample (IPUMS 5-Percent) from the 2000 U.S. Census. As with the NCES CWI, I extended the HS CWI to non-census years using data from the Bureau of Labor Statistics' Occupational Employment Statistics (OES) survey.

Table 2 presents the regression results for the baseline analysis of wages for individuals who have complete high school or received a G.E.D. degree, but have not completed a Bachelor's degree. The dependent variable is the log of annual wage and salary earnings. The independent variables are age, gender, race, educational attainment, amount of time worked, occupation and industry of each individual in the national sample. In addition, the estimation includes an indicator variable for each labor market area. This analysis uses the same definition of labor markets as in the NCES CWI.

Workers with a bachelor's degree (or more) and those without a high school diploma (or G.E.D.) have been excluded from the analysis, as has anyone who has a teaching occupation or who is employed in the elementary and secondary education industry. Self-employed workers were excluded because their reported earnings may not represent the market value of their time. Individuals who work less than half time or for less than $5,000 per year were excluded because such part-time employees are not directly comparable to non-certified school personnel. Workers who reported earnings and hours that implied an hourly wage of less than $3.00 per hour were also excluded. Finally, individuals employed outside the United States were excluded because their earnings may represent compensation for foreign travel or other working conditions not faced by domestic workers. After these exclusions, the estimation sample retained 1,831,792 employed, high school graduates drawn from 452 occupations and 256 industries.

The HS CWI is estimated from nationwide data because the national sample is much larger and yields much more precise estimates of wages by industry and occupation than could be generated using only the IPUMS data for the state of Washington. In Washington, there were 13,974 census respondents with a high school degree but no more education, 18,256 census respondents with some college but no post-secondary degree, and 6,534 census respondents with an associate's degree but no Bachelor's degree. More than half of those respondents (53 percent) lived in the Seattle or Tacoma metropolitan areas.

Table 2: The Comparable Wage Model for High School Graduates

Explanatory Variables	Estimate	Standard Error	p-value
Usual hours worked per week (log)	0.9136	0.0018	<.0001
Weeks worked last year (log)	1.0029	0.0030	<.0001
Age	0.0503	0.0002	<.0001
Age, squared	-0.0005	0.0000	<.0001
Associate degree, occupational program	0.0338	0.0009	<.0001
High school graduate, or GED	-0.0546	0.0007	<.0001
Some college, no degree	0.0000		.
Female	-0.1827	0.0008	<.0001
Male	0.0000		.
American Indian	-0.0500	0.0033	<.0001
Black/African American	-0.0646	0.0011	<.0001
Chinese	-0.1798	0.0049	<.0001
Japanese	0.0133	0.0065	0.0023
Other Asian or Pacific	-0.1193	0.0024	<.0001
Other race, nec	-0.0360	0.0021	<.0001
Two or more major races	-0.0627	0.0022	<.0001
White	0.0000		.
Hispanic	-0.0732	0.0015	<.0001

NOTE: The model also includes 452 occupational fixed effects, 256 industry fixed effects, 800 labor market fixed effects, and random effects for state. There are 1,831,792 observations, and the -2 residual log likelihood is 1,787,903.

As Table 2 illustrates, the model conforms to reasonable expectations about labor markets. Wage and salary earnings increase with the amount of time worked and the age of the worker (a rough proxy for experience). Persons with some collegiate experience earn systematically more than persons with no college, and workers with an associate's degree earn more than workers with some college experience but no degree to show for it. Women earn less than men of comparable age and educational attainment, possibly because age is a better indicator of experience for men than for women. Whites earn systematically more than apparently comparable individuals from most other racial groups. Hispanic workers earn systematically less than non-Hispanic workers with the same demographic profile.

Using the model, one can predict the wages that the typical high school graduate would earn in each labor market area.[4] The typical high school graduate has average demographic characteristics and works the average number of hours per week and the average number of weeks per year in a representative mix of occupations and industries. Equivalently, the predicted wage in each labor market area is the average wage one would expect to observe if every non-college graduate in the country lived in that market. The HS CWI for each labor market is the predicted local wage divided by the national average predicted wage. The HS CWI for each school district is the HS CWI for the corresponding labor market area.

As with the CWI, I extended the HS CWI to non-census years using OES-based estimates of state and metropolitan area wage growth. Again, if the OES estimated wage level for Portland in 2000 is 2 percent higher than the OES estimated wage level for Portland in 1999, then the HS CWI for Portland in 2000 is 2 percent higher than the HS CWI baseline. [5] I estimated an extended HS CWI for each year from1997-2007. Table 3 presents index values for 2005-2007.

Table 3: The Comparable Wage Index for High School Graduates

	HS CWI 2005	HS CWI 2006	HS CWI 2007
Bellingham Metropolitan Area	1.220	1.261	1.309
Bremerton-Silverdale Metropolitan Area	1.347	1.418	1.465
Kennewick-Pasco-Richland Metropolitan Area	1.288	1.335	1.362
Olympia Metropolitan Area	1.310	1.368	1.397
Portland-Vancouver-Beaverton Metropolitan Area	1.268	1.307	1.343
Seattle-Bellevue-Everett Metropolitan Area	1.451	1.500	1.544
Spokane Metropolitan Area	1.150	1.192	1.233
Tacoma Metropolitan Area	1.328	1.385	1.418
Yakima Metropolitan Area	1.230	1.268	1.298
Island, San Juan and Skagit	1.272	1.305	1.339
Chelan, Douglas, Kittitas and Okanogan	1.184	1.214	1.246
Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens	1.161	1.191	1.222
Asotin, Columbia, Garfield, Walla Walla and Whitman	1.148	1.177	1.208
Cowlitz, Klickitat, Skamania and Wahkiakum	1.271	1.304	1.338
Grays Harbor, Lewis and Pacific	1.234	1.266	1.299
Clallam, Jefferson and Mason	1.241	1.272	1.306
State average	1.331	1.377	1.415

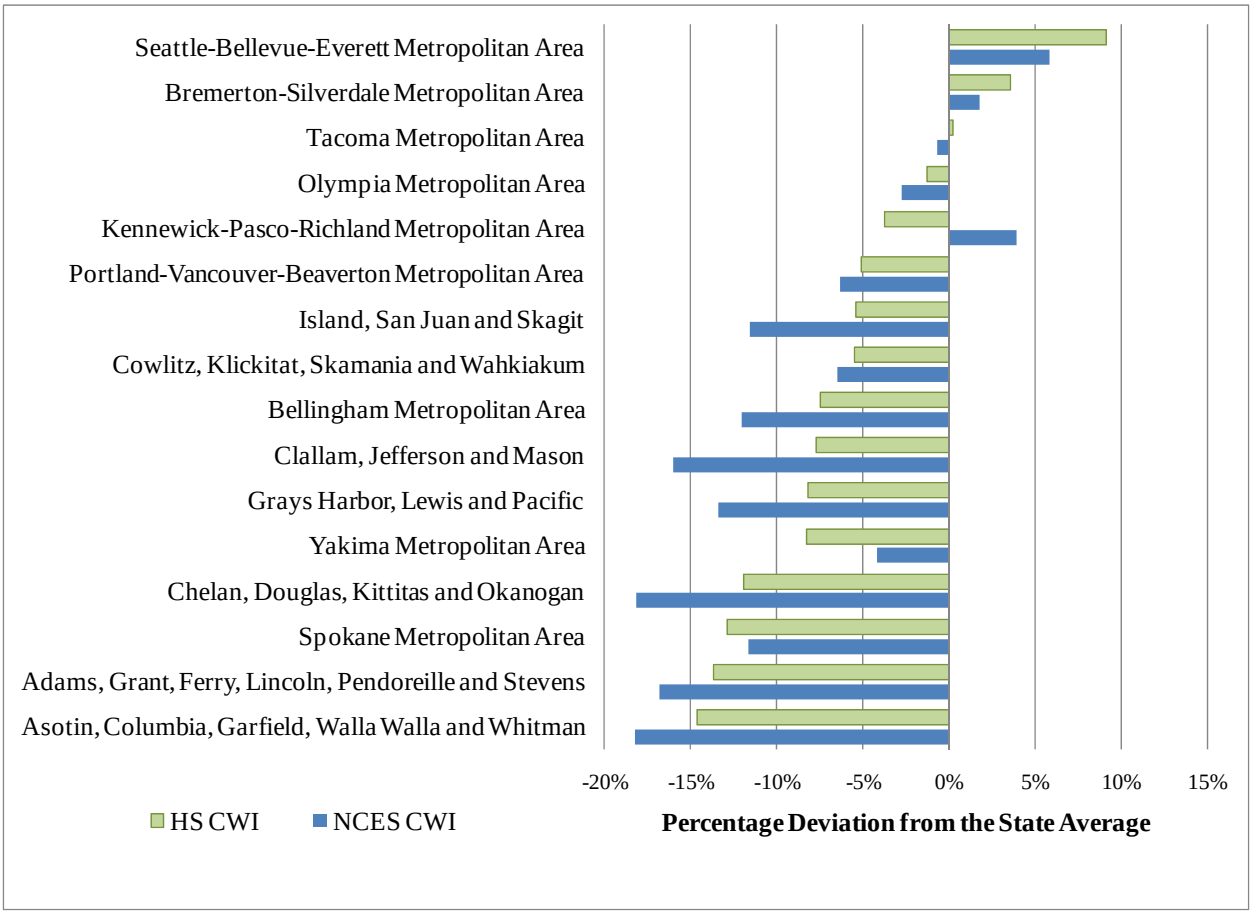
[4] Formally, the predicted wage level in each labor market area is the least-squares mean for the market fixed effect. The least-squares mean (or population marginal mean) is defined as the value of the mean for each effect (in this context, each market) that would be expected from a balanced design holding all covariates at their mean values and all classification variables (e.g., occupation or gender) at their population frequencies.

[5] The local wage level is a weighted average of the local predicted wages by occupation, where the weights are each occupation's share of total employment among the national sample of high school graduates in the census database. Thus, occupations that are held only rarely by high school graduates are given little weight in the construction of the OES wage levels, while occupations that employ high school graduates intensively are given greater weight.

Like the updated CWI, the HS CWI also indicates substantial increases in the cost of labor between 2005 and 2007. On average, wages for high school graduates in Washington increased 3.1 percent per year over the two-year period. The slowest wage growth was in rural Washington, where the wage level increased by 2.6 percent each year. The most rapid wage growth was in Seattle, where the wage level increased by 4.3 percent per year between 2005 and 2007

Figure 2 compares the 2007 CWI and HS CWI for the 16 labor markets in Washington. The figure indicates the percentage difference in wages between the local wage level and the state average wage level for each type of labor. As the table illustrates, the prevailing wage for college graduates does not track perfectly with the prevailing wage for high school graduates. In particular, wages in the Kennewick-Pasco-Richland Metropolitan Area are 4 percent above the state average for college graduates, but 4 percent below the state average for high school graduates. The wages of high school graduates show slightly less geographic variation than the wages of college graduates. However, both the CWI and the HS CWI indicate that hiring costs in the Seattle metropolitan area are at least 28 percent greater than hiring costs in the lowest-cost Washington counties.

Figure 2: Comparing the High School CWI with the NCES CWI, 2007



The wage differentials indicated by the NCES CWI and HS CWI are large, but they are dwarfed by the differences in the cost of housing. According to the U.S. Department of Housing and Urban Development (HUD), the fair market rent for a two-bedroom apartment in Seattle was $854 per month in 2007, while the fair market rent for a comparable two-bedroom apartment in Asotin County was only $570. Because housing costs are the primary determinants of the cost of living, the HUD data suggest that the cost of living in Seattle is nearly 50 percent higher than the cost of living in some other parts of Washington. A smaller variation in wages than in housing costs implies that the relatively high rent parts of the state must also boast local amenities that make people willing to accept a lower real wage than they would otherwise require. In other words, the attractions of Seattle make people willing to accept salaries that are not high enough to fully offset the higher cost of housing.

The Prevailing Wage for Washington Teachers

There are three basic reasons why wages differ from one person to another. First, differences in worker characteristics will drive differences in wages. All other things being equal, workers with advanced degrees or increased work experience can expect to earn higher wages than other workers. Second, differences in job characteristics will drive differences in wages. Workers will demand a wage premium to accept jobs that are relatively unattractive or dangerous, but may be willing to work at a discount when the job is particularly fulfilling or the working conditions are unusually pleasant. Finally, locational characteristics will drive differences in wages. Workers in areas with a low cost of living or an abundance of amenities will be willing to accept a lower nominal wage than otherwise equal workers in a less attractive locale. To calculate the prevailing wage, one needs to isolate the effect of the location from the other two sources of wage variation.

A hedonic wage model uses regression analysis to decompose the observed variation in wages into that which is attributable to worker characteristics, that which is attributable to working conditions and that which is attributable to locational characteristics. Chambers used hedonic wage models to construct the hedonic price indices for certified personnel, non-certified personnel and non-personnel inputs that comprise his geographic cost of education index.[6] [7] Taylor and Fowler (2006) used a hedonic wage model to estimate the NCES CWI. Taylor (2008) used a hedonic wage model to compare teacher and non-teacher salaries.

I use the same technique to estimate the prevailing salary for teachers and classified staff in Washington school districts and NCES labor markets. The hedonic salary model for

[6] The price index for non-personnel inputs that Chambers (1997b) used in the construction of the GCEI was based on geographic variations in the cost of hiring contractual personnel (which was estimated from the personnel indexes) and "some limited geographic variations in energy prices"

[7] For a more detailed discussion of the theoretical and empirical application of the hedonic wage method to the analysis of salaries of school personnel, see Chambers (1981b). For a comprehensive review of the literature and empirical issues in utilization of the hedonic wage model, see Chambers (1981a).

Washington teachers describes each teacher's salary as a function of her personal characteristics, her job assignments, and the school, school district, and NCES labor market in which she works. I use this model to predict the average full-time-equivalent salary in each school district, holding constant the influence of the demographic and job characteristics. Those predictions indicate the demographically and occupationally adjusted, or prevailing, salaries in the school district. Variations in the prevailing salaries reflect how much more or less it costs in different school districts to recruit and employ comparable school personnel to do comparable jobs. The prevailing salary for a labor market is just a weighted average of the prevailing salaries in its constituent school districts.

I estimated separate hedonic wage models for three sets of Washington teachers, and for classified school district personnel. The first model includes data for all types of teachers, and supports estimates of the prevailing wage for all types of teachers. The second model includes only data on beginning teachers, while the third model includes only data on teachers who are certified in math and science. The final piece of the analysis applies a modified version of the hedonic model to data on classified school district personnel. In all four cases, the discussion below describes the variation in prevailing wages indicated by the model, and compares those wages with the wages implied by the corresponding CWI.

Data and Estimation

Data for this part of the analysis were provided by the Washington State Institute for Public Policy and the Office of Superintendent for Public Instruction (OSPI). Data on earnings, worker characteristics and job assignments were drawn from the OSPI's S-275 files for the six school years from 2002-03 through 2007-08. Data on teacher certification and endorsements come from OSPI's teacher certification files.

The OSPI data report two alternative measures of teacher salaries—base salaries and final total salaries. Base salaries measure employee earnings during the school year under terms of the base employment contract.[8] Final total salaries represent any and all earnings of school district personnel; in other words, the final gross pay of each employee. During 2007-08, final total salaries for teachers exceeded base salaries by an average of $7,974.

According to a recent survey of Washington school districts, 65.8 percent of the difference between final total salaries and base salaries was paid to teachers specifically for compensation related to teaching activities, on average, while the remainder was paid for extra time and responsibilities. Therefore, I added 65.8 percent of the difference between her final and base salaries to each teacher's full time equivalent (F.T.E.) salary.[9] This full-time-equivalent

[8] A teacher's base salary is the sum of her certified base salary and her classified base salary (if any). It is equivalent to the sum of the salaries associated with all assignments with duty code '0'.

[9] Following the method in OSPI's school district personnel summary report, I calculated a teacher's full-time-equivalent (FTE) base salary as her base salary divided by the sum of the individual's certified FTE and classified FTE. According to the S-275 personnel manual, certified FTE should not exceed one for any individual. I exclude any personnel records with FTE greater than 1.1 on the grounds that such values must represent a coding error of some sort. I also exclude as erroneous any records where the teacher's full-time-equivalent salary was less than

teaching salary, which reflects the amount districts pay full time teachers specifically for teaching, forms the basis for all analyses of teacher salaries in this report.

The personal and assignment characteristics included in this analysis are outlined in Table 4. Most are self explanatory, but a few require a bit of additional explanation.

The highest degree held is the usual suspects—bachelor's degree (BA), master's degree (MA) or doctorate (D)—plus a number of degree identifiers specific to the state of Washington. According to the S-275 Personnel Reporting Handbook, a highest degree of H indicates a person who obtained a bachelor's degree while employed in the state of Washington as a non-degreed vocational/career and technical education instructor. A highest degree of G indicates a person with a grandfathered bachelor's degree.[10] A highest degree of V indicates someone without a bachelor's degree who holds appropriate vocational or career and technical education certificates. Finally, a highest degree of S indicates someone without a bachelor's degree who is in special circumstances. Among the teachers under analysis for the 2007-08 school year, less than 1 percent had a highest degree of H, V or S. Most held either a master's degree (62 percent) or a bachelor's degree (34 percent).

The salary mix factor indicates each teacher's place in the Legislature's Salary Allocation Model. The mix factor summarizes a teachers experience and educational attainment using specific weights determined by the Legislature. It is included in the analysis to provide greater flexibility to the specification, and to capture potentially important interactions between a teacher's educational attainment and her years of experience.

The analysis includes an indicator for whether or not the individual is new to the district. Recent analyses in Texas, New Mexico and Alaska indicate that new hires tend to earn less than employees with similar characteristics and assignments.

The certification endorsements indicate whether or not the teacher is certified in the designated subject areas. In each case, a teacher was considered certified if she held a current endorsement in the field. To be considered current for a particular academic year, a teacher's certificate must have been issued before September 1st of the academic year, and must not have expired before September 1st of that year. Any teacher could hold endorsements in one or more of the designated fields.

The activity factors indicate whether or not the teacher was assigned to the specific activity. Any teacher could have one or more activity assignments. Because all of the teachers under analysis were, by definition, assigned to the teaching activity for at least one half of an FTE, there is no need for an indicator for teaching assignment. Instead, the analysis includes a measure of the percent time spent in teaching.

$10,000 or more than $150,000. If the teacher's final total salary was less than her base salary, then I used her base salary as her teaching salary.

[10] Specifically, this is a person holding a bachelor's degree as the highest degree and whose total eligible credits reported on the S-275 report before January 1, 1992, were 135 or more (RCW 28A.150.410). See the S-275 Personnel Reporting Handbook.

Table 4: Explanatory Factors from the Hedonic Wage Model for Washington Teachers

Personal Characteristics	
Years of experience	
Highest degree held (BA, MA, PhD, H,G,V,S)	
Credit hours (academic, non-credit, in-service, other)	
Salary mix factor	
Gender	
Ethnicity (Asian, black, Hispanic, American Indian, white)	
Continuing employee	
Certification endorsements	
Math	English/Reading
Science	Bilingual/ESL
Administration	Health and Physical Education
Elementary	Early Childhood
Arts	Social Science
Special education	Emergency certification
Activities	
Board of Directors	Superintendants Office
Business Office	Human Resources
Public Relations	Supervision (Instruction)
Learning Resources	Principals Office
Guidance and Counseling	Pupil Management and Safety
Health Related Services	Extracurricular
Information Systems	
Programs	
Special education	Limited English proficiency
Compensatory education	Vocational education
Community service	Support
Other Assignment Characteristics	
Percent FTE in teaching	
Grade level assignment (elementary, secondary or other)	

The program factors indicate whether or not the teacher was assigned responsibilities in the designated educational program. Again, any teacher could have one or more program assignments

The Prevailing Salaries for Teachers

To estimate the prevailing teacher salary in each NCES labor market and school district, I applied the hedonic salary model described above to data on all teachers in the state of Washington during the 2007-08 school year. Complete data were available for 55,500 individual

teachers from 295 school districts.[11] Appendix table A.1 presents the coefficient estimates and standard errors from the salary model. The dependent variable is the log of each individual's full-time-equivalent teaching salary.

The hedonic model does a good job of capturing variations in teaching salaries. As expected, salaries increase with experience and educational attainment. Salaries are higher for teachers who are continuing with a district than they are for teachers who are new to the district, all other things being equal. Teachers with supervisory assignments earn 2.4 percent more, on average, than other teachers, while teachers with extracurricular assignments earn 4.2 percent more. Individuals who teach in the compensatory education, bilingual education or vocational education programs earn more than other teachers, all other things being equal. Teachers who are certified in social science earn slightly more than their peers, while those who are certified in English earn slightly less, all other things being equal. All told, the model explains 94.2 percent of the variation in full-time-equivalent teaching salaries.

Table 5 presents the prevailing teaching salaries for each labor market and compares them with the average non-educator salary implied by the updated CWI. The baseline national salary used to construct the NCES CWI was $47,836 (Taylor and Fowler 2006).[12] Multiplying the local CWI by $47,836 yields the comparable salary for college graduates in each Washington labor market.

Of course, the average college graduate works more weeks per year than does the average teacher in Washington.[13] Given a 10-month school year, a comparable baseline salary would have been $39,863 ($47,836*10/12). Assuming that the appropriate frame of reference is days worked, and that non-educators work 250 days a year (5 days a week * 50 weeks) while Washington teachers work 182 days (the contract norm), the comparable baseline salary would have been $34,825 ($47,836*182/250). In order to make salaries outside of education truly comparable to teaching salaries, one must adjust the comparable salaries downward. However, the appropriate adjustment is not obvious. The third column of Table 5 presents the comparable wages, assuming a 10-month school year, but other adjustments are equally plausible.

As the table illustrates, there is considerable variation in teacher salaries across labor market areas in the state of Washington. Adjusted teacher salaries are highest in the Seattle metropolitan area, and lowest in Asotin, Columbia, Garfield, Walla Walla and Whitman counties.

Despite the significant variation apparent in Table 5, teaching salaries have much less geographic variation than do the salaries of college graduates. On average, teaching salaries are 9.2 percent higher in the Seattle metropolitan area than they are in the Washington labor market with the lowest salaries. In contrast, comparable wages outside of education are 29 percent

[11] There were too few records with complete data to estimate the prevailing wage in Vader School District.

[12] This was the average annual salary and wages for all Census respondents with college degrees in 1999. Alternatively, Allegretto, Corcoran, and Mishel (2004) identified 16 occupations in the Current Population Survey that were particularly comparable to teaching on the basis of an evaluation of the skills required to do the job. If only these industries were used to construct it, the baseline comparable salary would be $45,100 per year.

[13] On average, Census respondents with a college degree reported working 51 weeks per year.

Table 5: Prevailing Teaching Salaries, by Labor Market

	Teaching Salaries	Comparable Non-educator Salaries	10-month Comparable Salaries
Bellingham Metropolitan Area	$54,011	$59,125	$49,271
Bremerton-Silverdale Metropolitan Area	53,734	68,405	57,005
Kennewick-Pasco-Richland Metropolitan Area	53,516	69,888	58,240
Olympia Metropolitan Area	53,027	65,392	54,493
Portland-Vancouver-Beaverton Metropolitan Area	53,687	63,000	52,500
Seattle-Bellevue-Everett Metropolitan Area	56,278	71,132	59,277
Spokane Metropolitan Area	53,436	59,412	49,510
Tacoma Metropolitan Area	54,656	66,779	55,649
Yakima Metropolitan Area	53,466	64,435	53,696
Island, San Juan and Skagit	53,185	59,460	49,550
Chelan, Douglas, Kittitas and Okanogan	51,775	55,011	45,843
Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens	51,719	55,920	46,600
Asotin, Columbia, Garfield, Walla Walla and Whitman	51,538	54,964	45,803
Cowlitz, Klickitat, Skamania and Wahkiakum	52,179	62,857	52,380
Grays Harbor, Lewis and Pacific	51,541	58,216	48,514
Clallam, Jefferson and Mason	52,168	56,494	47,079
State average	$54,329	$67,257	$56,048

higher in Seattle than in the labor market area with the lowest wages. The greater variation in wages outside of education implies that teaching salaries are much more competitive in some markets than they are in others.

The relative teaching salary is one measure of the competitiveness of teacher salaries. It is defined as the ratio of teaching salaries to 12-month salaries for comparable non-educators. A relative salary greater than one indicates that teachers are paid better than comparable non-educators, while a relative salary less than one indicates that teachers are paid less than comparable non-educators.

Figure 3 illustrates the relative teaching salary in each Washington labor market. As the figure illustrates, teaching salaries are more than 90 percent of the 12-month salaries for comparable non-educators in Bellingham and most of rural eastern Washington. Relative teaching salaries are less than 80 percent in the Seattle, Bremerton and Kennewick metropolitan areas. Although teaching salaries are higher in the Seattle metropolitan area than elsewhere in the state, so are salaries for comparable non-educators. As a result, Seattle is one of the areas with the lowest relative pay for teachers.

Figure 3: Relative Teaching Salaries, 2007

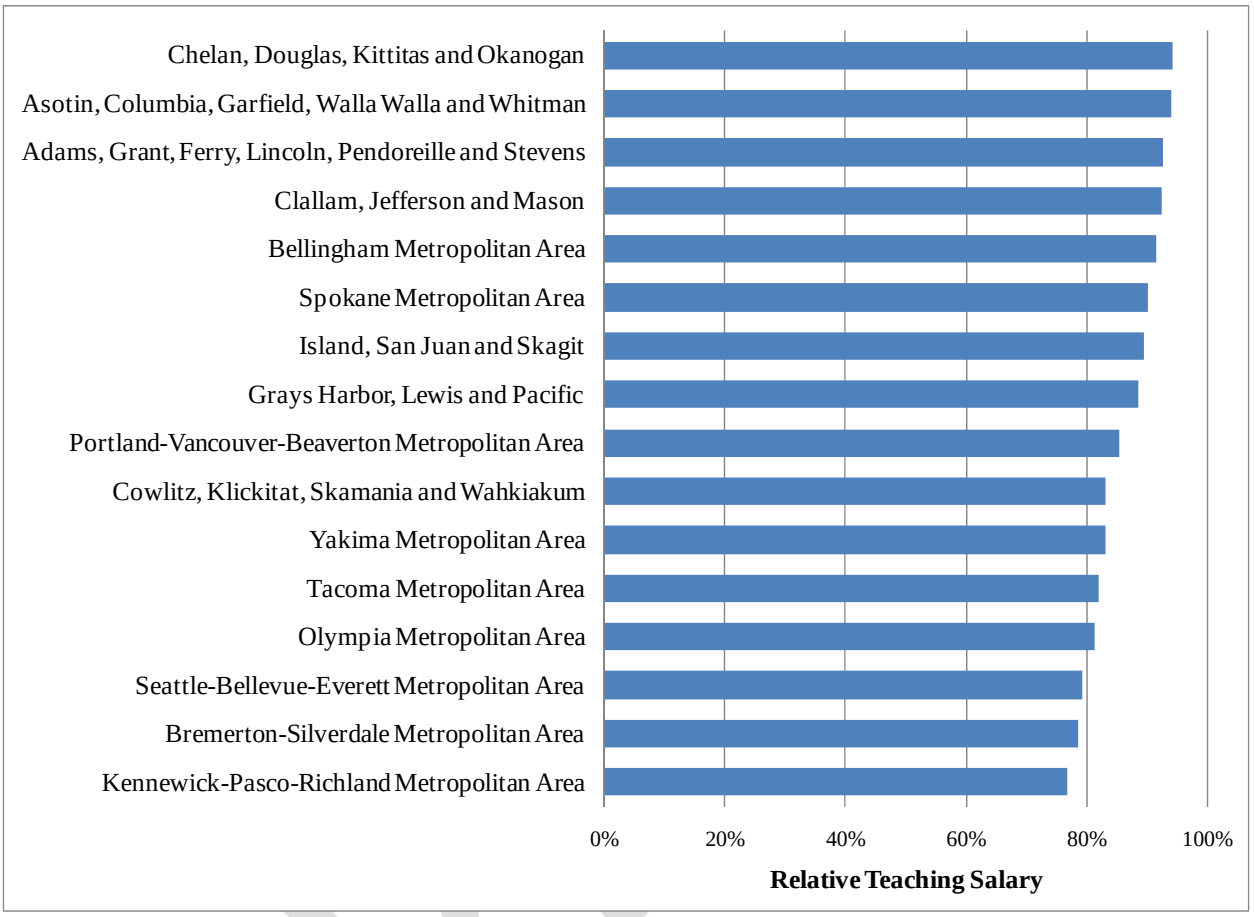


Figure 4 illustrates the prevailing salary for teaching in each Washington school district.[14] As the figure shows, there is substantial variation in wages within each labor market area. Within the Seattle metropolitan area, for example, the prevailing wage for teachers ranges from $50,624 in Index School District, to $61,625 in Everett School District. Statewide, teaching salaries are highest in Everett School District, and lowest in Dixie School District.

As in the labor market analysis, I calculated relative salaries in each school district as the ratio of teaching salaries to the 12-month comparable non-educator salary. On average, teaching salaries were 86.4 percent of the 12-month comparable salaries. Relative salaries were lowest in the in Index School District, where teacher were paid only 71.2 percent of the comparable salary, and highest in the Evaline School District, where teachers were paid 99.5 percent of the comparable salary. The relative salary in the Seattle school district, the largest school district in the state, was 79.5 percent in 2007-08. At 88.5 percent and 86.6 percent, respectively, relative teacher salaries were higher in the district with the lowest teaching salaries in the state—Dixie School District—than they were in the district with the highest teaching salaries in the state—Everett School District.

[14] Prevailing salaries and comparable wages by school district are presented in Appendix 2.

Figure 4: Teaching Salaries in Washington School Districts, 2007

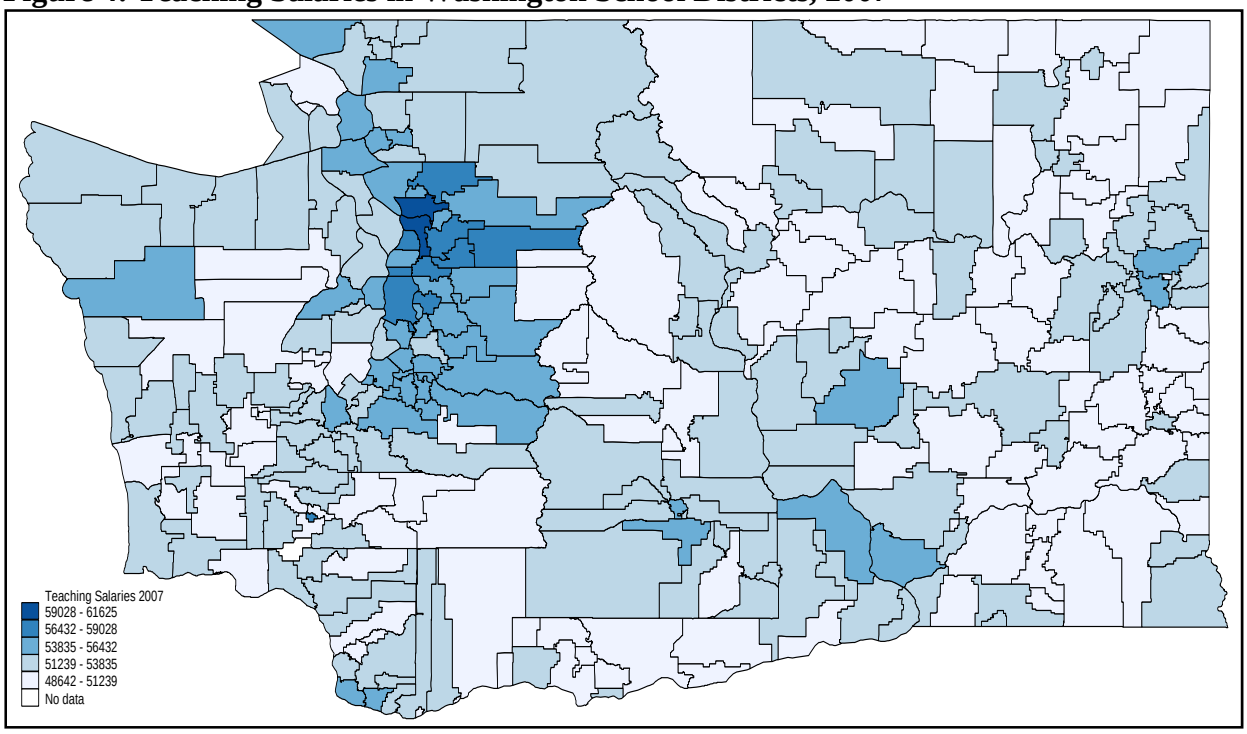


Figure 5 maps the relative teaching salaries. Darker colors indicate higher relative salaries. As the figure illustrates, relative salaries are lowest for school districts in the Seattle and Kennewick labor market areas, and highest in the eastern and northern parts of the state.

Figure 5: Relative Teaching Salaries in Washington School Districts, 2007

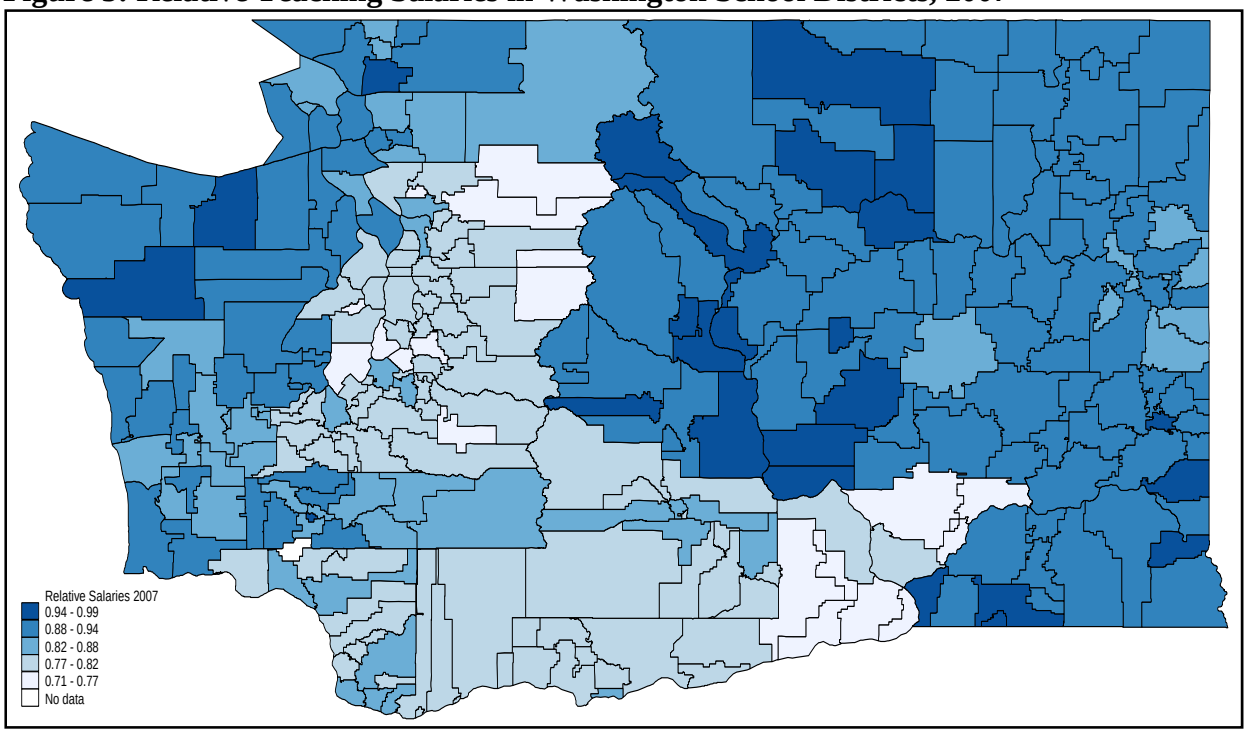
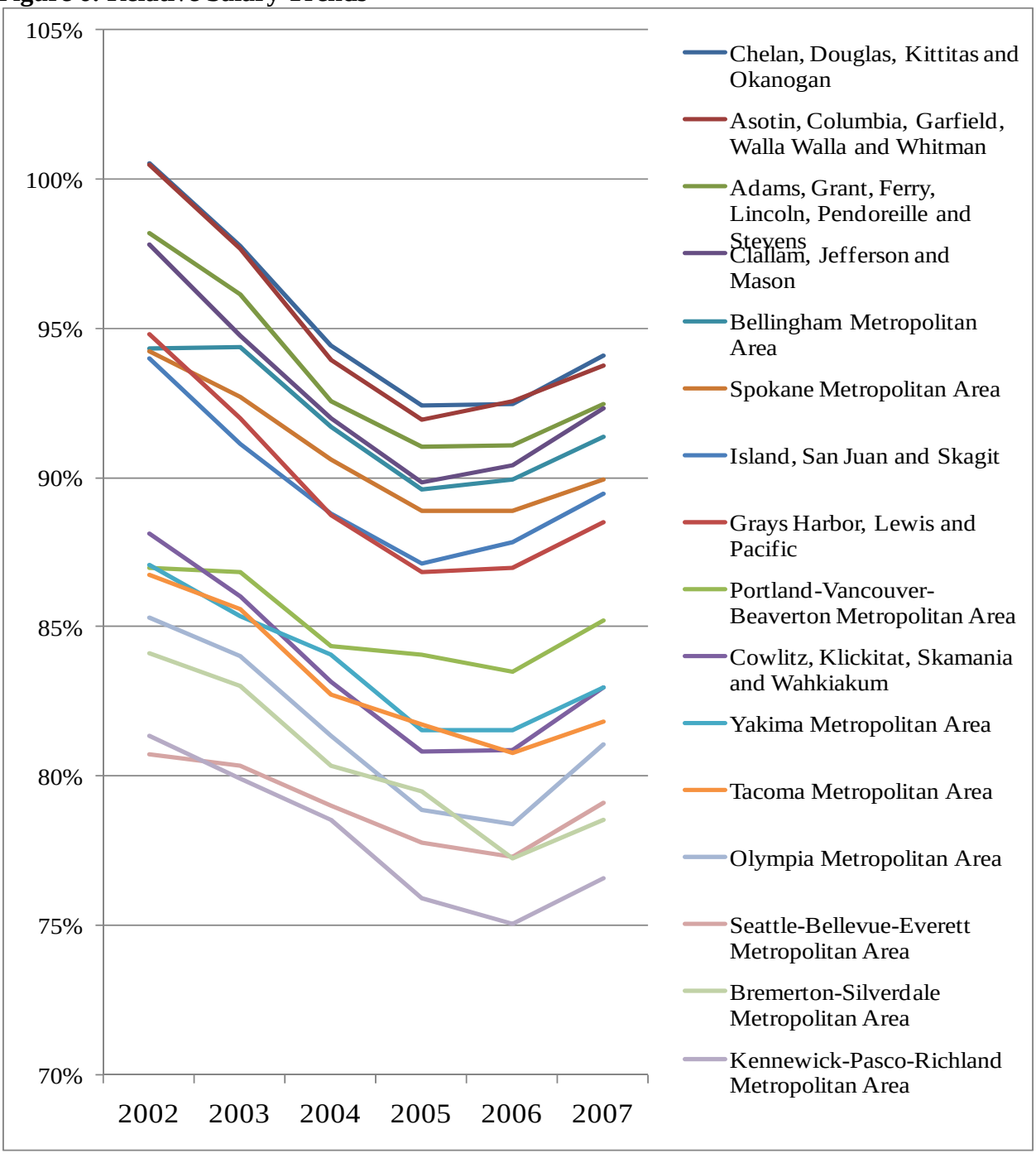


Figure 6 illustrates the change in relative teaching salaries over time. Each line in the figure represents a different labor market area, and each point on the line represents the prevailing teaching salaries as a share of the 12-month salary for comparable non-educators for that year. Teaching salaries for each year were estimated using the same hedonic model as in the baseline analysis, and OSPI data for the corresponding academic year. Coefficient estimates and standard errors are presented in Appendix tables A.2 through A.6.

Figure 6: Relative Salary Trends



As the figure illustrates, relative teaching salaries fell sharply between the 2002-03 school year and the 2005-06 school year. In 2002-03, there were four Washington labor markets where teaching salaries were more than 95 percent of the 12-month salary for comparable non-educators. In 2005-06 no labor markets had average teaching wages above 93 percent of the 12-month salary for comparable non-educators. In the last two years, relative teacher salaries have risen in all Washington labor markets except Bremerton. However, relative salaries remain below their 2002-03 levels in all markets.

The Prevailing Salaries for Beginning Teachers

To estimate the prevailing teaching salary among beginning teachers, I applied the hedonic salary model described above to data on teachers with less than four years of experience during the 2007-08 school year.[15] Complete data were available for 10,661 individual teachers from 269 school districts. (There were no records with complete data for the remaining school districts.) Appendix table A.7 presents the coefficient estimates and standard errors from the salary model. Again, the dependent variable is the log of each individual's full-time-equivalent teaching salary. The model explains 83.3 percent of the variation in beginning teacher salaries.

For comparison, I used the NCES comparable wage model to predict the baseline salary for 25-year-old college graduates. This baseline salary was $34,765 per year, in 1999. As before, multiplying this baseline by the CWI yields the comparable beginning salary for non-educators.

Table 6 presents the beginning teacher salaries and the beginning comparable wages for each Washington labor market. As the table illustrates, beginning teacher salaries vary significantly from one labor market to another. Beginning teacher salaries are highest in the Seattle metropolitan area, and lowest in Grays Harbor, Lewis and Pacific counties.

[15] Because there were many school buildings with only a single beginning teacher, the analysis of beginning teacher salaries does not include fixed effects for school buildings.

Table 6: Prevailing Salaries for Beginning Teachers, 2007

	Beginning Teaching Salaries	Beginning Comparable Salaries	10-month Beginning Comparable Salaries
Bellingham Metropolitan Area	$41,312	$42,970	$35,808
Bremerton-Silverdale Metropolitan Area	41,401	49,714	41,429
Kennewick-Pasco-Richland Metropolitan Area	41,279	50,792	42,327
Olympia Metropolitan Area	40,791	47,524	39,603
Portland-Vancouver-Beaverton Metropolitan Area	41,935	45,786	38,155
Seattle-Bellevue-Everett Metropolitan Area	42,374	51,696	43,080
Spokane Metropolitan Area	40,935	43,178	35,982
Tacoma Metropolitan Area	41,625	48,532	40,444
Yakima Metropolitan Area	41,130	46,829	39,024
Island, San Juan and Skagit	41,213	43,213	36,011
Chelan, Douglas, Kittitas and Okanogan	40,032	39,980	33,317
Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens	39,835	40,641	33,867
Asotin, Columbia, Garfield, Walla Walla and Whitman	39,720	39,945	33,288
Cowlitz, Klickitat, Skamania and Wahkiakum	39,993	45,681	38,068
Grays Harbor, Lewis and Pacific	39,636	42,309	35,258
Clallam, Jefferson and Mason	40,143	41,058	34,215
State average	$41,597	$48,880	$40,733

Figure 7 indicates the relative salaries for beginning teachers in all 16 Washington labor markets. The relative salary for a labor market is the ratio of the beginning teaching salary to the 12-month comparable wage for beginning workers.

As the figure illustrates, beginning teachers are paid at least 80 percent of beginning 12-month salaries in all Washington labor markets. Relative beginning teacher salaries are highest in eastern Washington, and lowest in the Kennewick metropolitan area. Despite the shorter academic year, beginning teacher salaries are as high as comparable beginning salaries in Chelan, Douglas, Kittitas and Okanogan counties.

The relative salary in each labor market is a weighted average of the relative salaries in its constituent school districts. On average, beginning teaching salaries in 2007-08 were 91.3 percent of the 12-month comparable, beginning salaries. Relative salaries were lowest in the Index School District, where beginning teachers were paid only 75 percent of the comparable beginning wages, and highest in the Keller School District, where teachers were paid 110.5 percent of the comparable wage. The prevailing wage for beginning teachers was higher than the 12-month, comparable beginning wage in 30 school districts, none of which were located in major metropolitan areas.

Figure 7: Relative Beginning Salaries, 2007

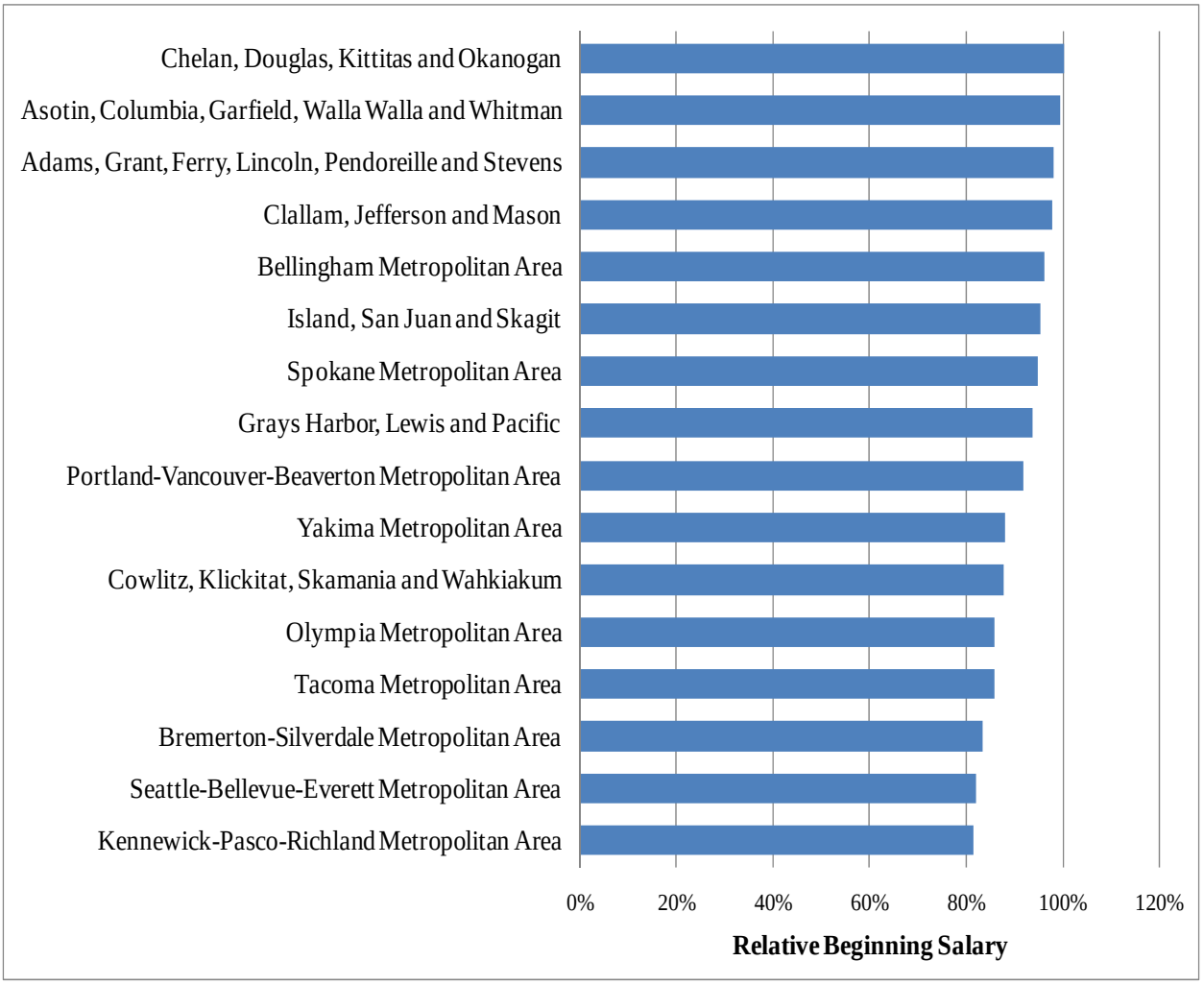
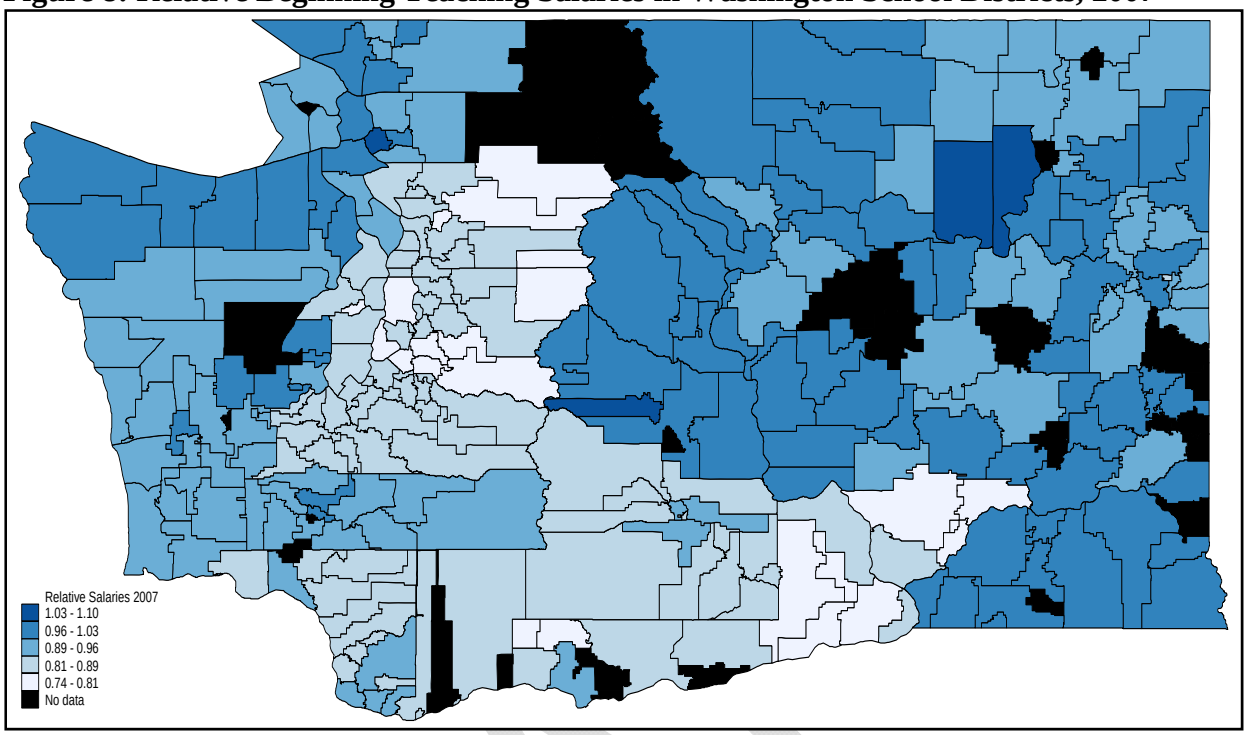


Figure 8 maps the relative beginning teacher salaries for all Washington school districts with available data. The 27 school districts with no data for beginning teachers are denoted in black. The districts with the lowest relative salary are lightly shaded, while the districts with the highest relative wage are shaded dark blue.

As the figure illustrates, relative beginning salaries for teachers vary significantly within labor markets. For example, among the 11 school districts with estimates in the Portland metropolitan area, relative beginning salaries range from less than 85 percent in the Stevenson-Carson and Mt. Pleasant School Districts, to more than 95 percent in the Vancouver School District. Relative salaries in the rural labor market comprising Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens counties range from 89.8 percent of the comparable beginning salaries in Odessa School District to 110.5 percent of the comparable beginning salaries in Keller School District.

Figure 8: Relative Beginning Teaching Salaries in Washington School Districts, 2007



The Prevailing Salaries for Math and Science Teachers

To estimate the prevailing teaching salary among math and science teachers, I applied the hedonic salary model described above to data on teachers holding a current endorsement in a math or science subject.[16] Complete data for 2007-08 were available for 6,125 individual teachers from 263 school districts. (There were no records with complete data for the remaining school districts.) Appendix table A.8 presents the coefficient estimates and standard errors from the salary model. Again, the dependent variable is the log of each individual's full-time-equivalent teaching salary. The model explains 93.4 percent of the variation in salaries among math and science teachers.

For comparison, I used the NCES comparable wage model to predict the baseline salary for science, technology, and mathematics occupations. Those occupations include all census occupations classified as financial specialist occupations, computer and mathematical occupations, architecture and engineering occupations, and life and physical science occupations.[17] This baseline salary was $54,196 per year, in 1999. As before, multiplying this

[16] Because there were many school buildings with only a single math or science teacher, the analysis of math and science teacher salaries does not include fixed effects for school buildings. Appendix B lists the endorsements used to identify math and science teachers.

[17] The science, technology and mathematics occupations include all Census occupation codes from 80 through 179. Appendix C lists the occupations designated as science, technology and mathematics occupations.

baseline by the CWI yields the comparable salary for non-educators in math and science occupations.

Table 7 presents the math and science teacher salaries and the math and science comparable wages for each Washington labor market. As the table illustrates, math and science teacher salaries vary significantly from one labor market to another. Math and science teacher salaries are highest in the Seattle metropolitan area, and lowest in Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens counties. The state average salary for math and science teachers, $54,568, is only 72 percent of the state average salary for workers in math and science occupations.

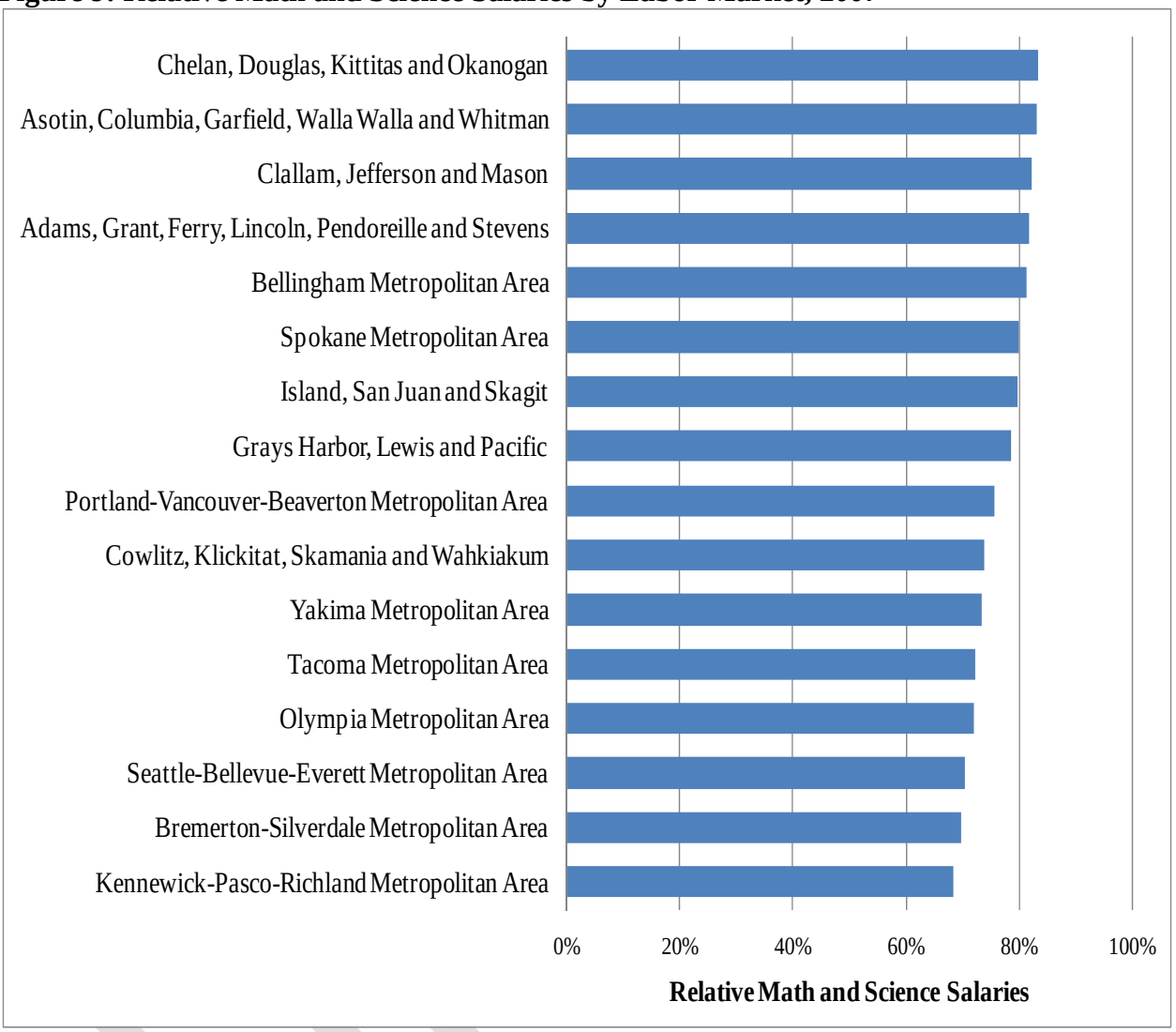
Figure 9 illustrates the relative salaries for math and science teachers in all 16 Washington labor markets. The relative salary for a labor market is the ratio of the prevailing salary for math and science teachers to the prevailing annual salary for workers in science, technology and mathematics occupations.

As expected, figure 9 indicates that the relative wage for math and science teachers is highest in rural, eastern Washington, and lowest in the Kennewick metropolitan area. Math and science teachers are paid less than 85 percent of the prevailing wage for comparable workers in all Washington metropolitan areas.

Table 7: Prevailing Salaries for Math and Science Teachers by Labor Market, 2007

	Math and Science Teaching Salaries	Math and Science Comparable Salaries	10-month Math and Science Comparable Salaries
Bellingham Metropolitan Area	$54,335	$66,986	$55,822
Bremerton-Silverdale Metropolitan Area	54,004	77,500	64,583
Kennewick-Pasco-Richland Metropolitan Area	54,128	79,180	65,983
Olympia Metropolitan Area	53,222	74,086	61,738
Portland-Vancouver-Beaverton Metropolitan Area	53,846	71,376	59,480
Seattle-Bellevue-Everett Metropolitan Area	56,702	80,589	67,158
Spokane Metropolitan Area	53,659	67,311	56,093
Tacoma Metropolitan Area	54,553	75,657	63,048
Yakima Metropolitan Area	53,447	73,002	60,835
Island, San Juan and Skagit	53,567	67,365	56,138
Chelan, Douglas, Kittitas and Okanogan	51,890	62,325	51,938
Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens	51,661	63,355	52,796
Asotin, Columbia, Garfield, Walla Walla and Whitman	51,692	62,271	51,892
Cowlitz, Klickitat, Skamania and Wahkiakum	52,409	71,213	59,344
Grays Harbor, Lewis and Pacific	51,694	65,956	54,964
Clallam, Jefferson and Mason	52,606	64,005	53,338
State average	$54,568	$76,199	$63,499

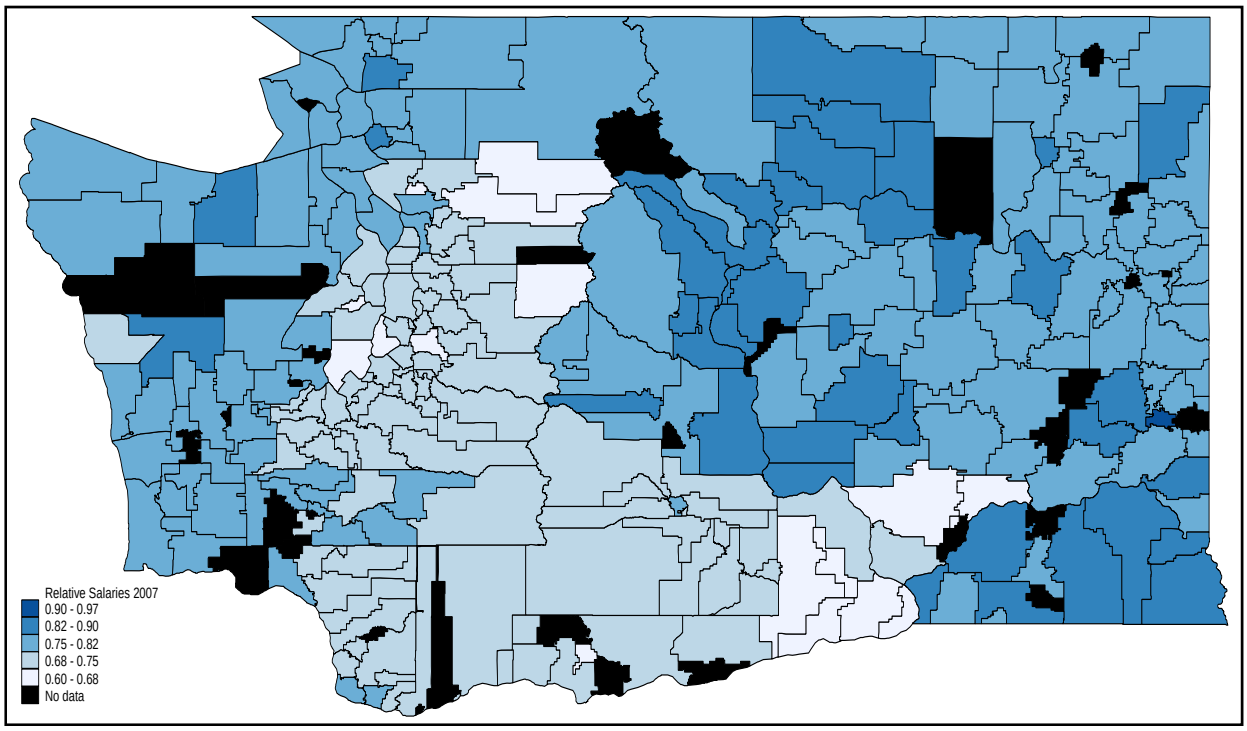
Figure 9: Relative Math and Science Salaries by Labor Market, 2007



The relative salary in each labor market is a weighted average of the relative salaries in its constituent school districts. Figure 10 maps the relative salaries for math and science teachers by school district. The 33 school districts with no data for math or science teachers are denoted in black. The districts with the lowest relative salaries are lightly shaded, while the districts with the highest relative salaries are shaded dark blue.

As the map demonstrates, there is a greater range in relative salaries across school districts than there is across labor market areas. Relative salaries in 2007-08 were lowest in the Skykomish School District, where math and science teachers were paid only 60.4 percent of the comparable 12-month salary, and highest in the Steptoe School District, where math and science teachers were paid 97.1 percent of the comparable 12-month salary.

Figure 10: Relative Math and Science Salaries by School District, 2007



The Prevailing Salaries for Classified Staff

To estimate the prevailing wage for classified staff, the basic hedonic model must be modified slightly. There are a number of activities that are relevant to classified staff (such as food service or grounds maintenance) that were not included in the hedonic teacher models. Indicator variables for these additional activities have been added.[18] Because most classified staff do not hold endorsements in math or social science, the indicators for certification endorsements have been dropped, as have the variables for additional credit hours. To reflect the lack of detail in the data, the demographic controls have been streamlined.[19]

I applied this modified hedonic model to data on all aides and other classified staff in the state of Washington during the 2007-08 school year.[20] Complete data were available for 16,846 teacher aides and 25,176 other classified workers. Appendix tables A.11 and A.12 present the coefficient estimates and standard errors from the two salary models—one for teacher aides and one for other classified staff. In each model, the dependent variable is the log of each

[18] The activity indicators added to the model are: Food Services; General Supervision; Operations (Pupil Transportation); Maintenance (Pupil Transportation); Grounds Maintenance; Operation of Buildings; Maintenance; Utilities; Building and Property Security; Information Systems; Printing; Warehousing and Distribution; Motor Pool; and Public Activities.

[19] For example, the multiple indicators for educational attainment have been consolidated into a single indicator for whether or not the data indicate that the individual holds a college degree.

[20] Duty root code '96' designates professionals with at least a bachelor's degree. These classified workers are not included in the analysis of classified workers.

individual's full-time-equivalent total final salary.[21] The hedonic model for aides explains 46.8 percent of the variation in aide salaries in 2007-08 while the hedonic model for other classified workers explains 56.2 percent of the variation in their salaries.

Table 8 presents the prevailing classified and educational associate salaries for each labor market and compares them with the average high school graduate salary implied by the HS CWI. The baseline national salary used to construct the HS CWI was $27,626.[22] Multiplying the local CWI by $27,626 yields the comparable salary for high school graduates in each labor market.

As the table illustrates, annualized salaries for classified staff vary significantly from one labor market to another. Where prevailing teaching salaries varied by no more than 10 percent from one labor market to the next, salaries for classified staff vary by more than 20 percent from the labor markets with the lowest salaries to the labor market with the highest salaries—Seattle.

Table 8: Prevailing Salaries for Aides and Other Classified Staff by Labor Market, 2007

	Aides	Other Classified Staff	High School Graduates
Bellingham Metropolitan Area	$28,955	$36,310	$36,162
Bremerton-Silverdale Metropolitan Area	31,143	38,019	40,472
Kennewick-Pasco-Richland Metropolitan Area	28,221	36,021	37,626
Olympia Metropolitan Area	28,952	37,438	38,593
Portland-Vancouver-Beaverton Metropolitan Area	29,594	38,496	37,102
Seattle-Bellevue-Everett Metropolitan Area	33,444	41,059	42,654
Spokane Metropolitan Area	28,918	37,163	34,063
Tacoma Metropolitan Area	32,017	39,360	39,174
Yakima Metropolitan Area	28,899	37,173	35,858
Island, San Juan and Skagit	30,130	36,981	36,991
Chelan, Douglas, Kittitas and Okanogan	28,528	36,002	34,422
Adams, Grant, Ferry, Lincoln, Pendoreille and Stevens	27,734	34,226	33,759
Asotin, Columbia, Garfield, Walla Walla and Whitman	28,065	33,941	33,372
Cowlitz, Klickitat, Skamania and Wahkiakum	27,936	35,922	36,963
Grays Harbor, Lewis and Pacific	27,506	34,385	35,886
Clallam, Jefferson and Mason	28,615	35,395	36,079
State average	$30,557	$38,408	$39,091

[21] Following the method in OSPI's school district personnel summary report, I calculated classified workers hourly salaries as their total final salaries divided by their total hours worked per year, and their annualized salary as their hourly salary times 2,080 hours. I exclude any personnel records where classified FTE plus certified FTE was greater than 1.5 on the grounds that such values must represent a coding error of some sort. I also exclude as erroneous any records where the worker's annualized salary was less than $10,000 or more than $150,000.

[22] This was the average annual salary and wages for all Census respondents with college degrees in 1999. Alternatively, Allegretto, Corcoran, and Mishel (2004) identified 16 occupations in the Current Population Survey that were particularly comparable to teaching on the basis of an evaluation of the skills required to do the job. If only these industries were used to construct it, the baseline comparable salary would be $45,100 per year.

Figure 11: Relative Classified salaries by Labor Market, 2007

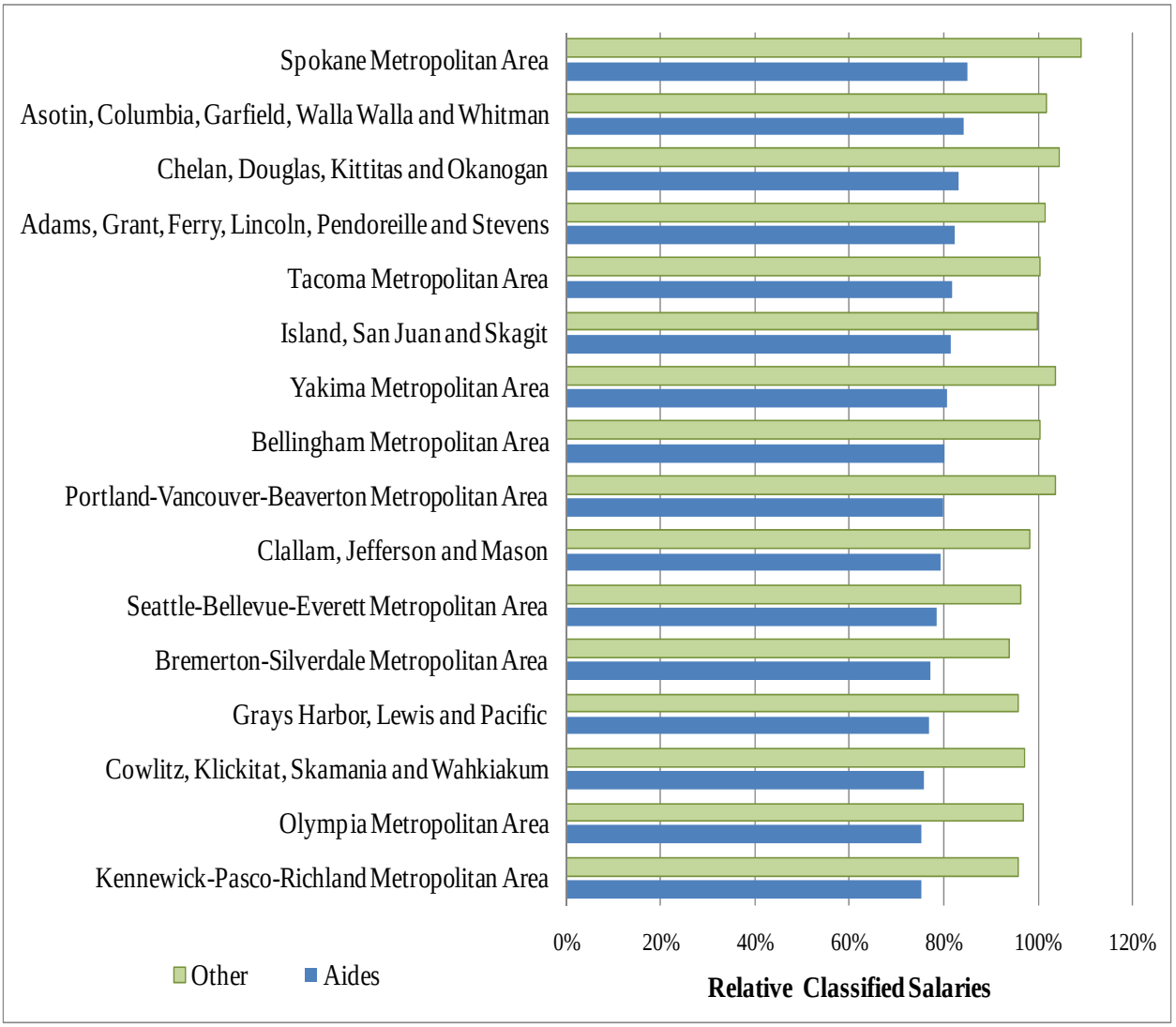


Figure 11 illustrates the relative salaries for aides and other classified staff. As the figure demonstrates, teacher aides earn substantially less than the typical high school graduate in all Washington labor markets. On the other hand, the earnings of other classified staff are very similar to those of high school graduates outside the education sector. The average relative salary for classified staff is 98 percent.

The pattern of relative classified salaries is also very different from the pattern of relative teacher salaries. Where relative salaries for teachers were highest in rural areas, relative salaries for classified staff are higher in urban areas like Spokane, Yakima and Portland. Consistent with the pattern for teaching salaries, relative salaries for aides and other classified staff are lowest in the Kennewick metropolitan area.

Another difference in pattern comes from the variation in wages. For teachers, relative salaries are more dispersed than prevailing salaries. Relative salaries for teachers are almost 23 percent higher in the highest salary market than they are in the lowest salary market, while prevailing salaries for teachers are only 9.2 percent higher in the highest salary market than they are in the lowest salary market.

For classified staff, on the other hand, there is substantially less variation in relative salaries than there is in the prevailing salaries. Relative salaries for aides are 13 percent higher in the highest salary market than they are in the lowest salary market, while prevailing salaries for aides are almost 22 percent higher in the highest salary market than they are in the lowest salary market. Similarly, relative salaries for other classified staff are 16 percent higher in the highest salary market than they are in the lowest salary market, while prevailing salaries for other classified staff are 21 percent higher in the highest salary market than they are in the lowest salary market. The smaller degree of dispersion in relative salaries suggests that classified staff salaries are more responsive to market conditions than are teaching salaries.

Figures 12 and 13 map the relative salaries for aides and other classified staff in each Washington school district. The school districts with no data are denoted in black. The districts with the lowest relative salaries are lightly shaded, while the districts with the highest relative salaries are shaded dark blue.

What is most striking about both of these maps is the lack of geographic pattern. High relative wages and low relative wages are both found in rural areas. High and low relative wages are also found in most metropolitan areas. There is a hint that aide relative salaries may be higher in the Eastern third of the state than in the western third, but the difference is not dramatic. The lack of pattern in relative salaries provides further evidence that salaries for classified personnel are responsive to local labor market conditions.

Figure 12: Relative Salaries for Aides by School District, 2007

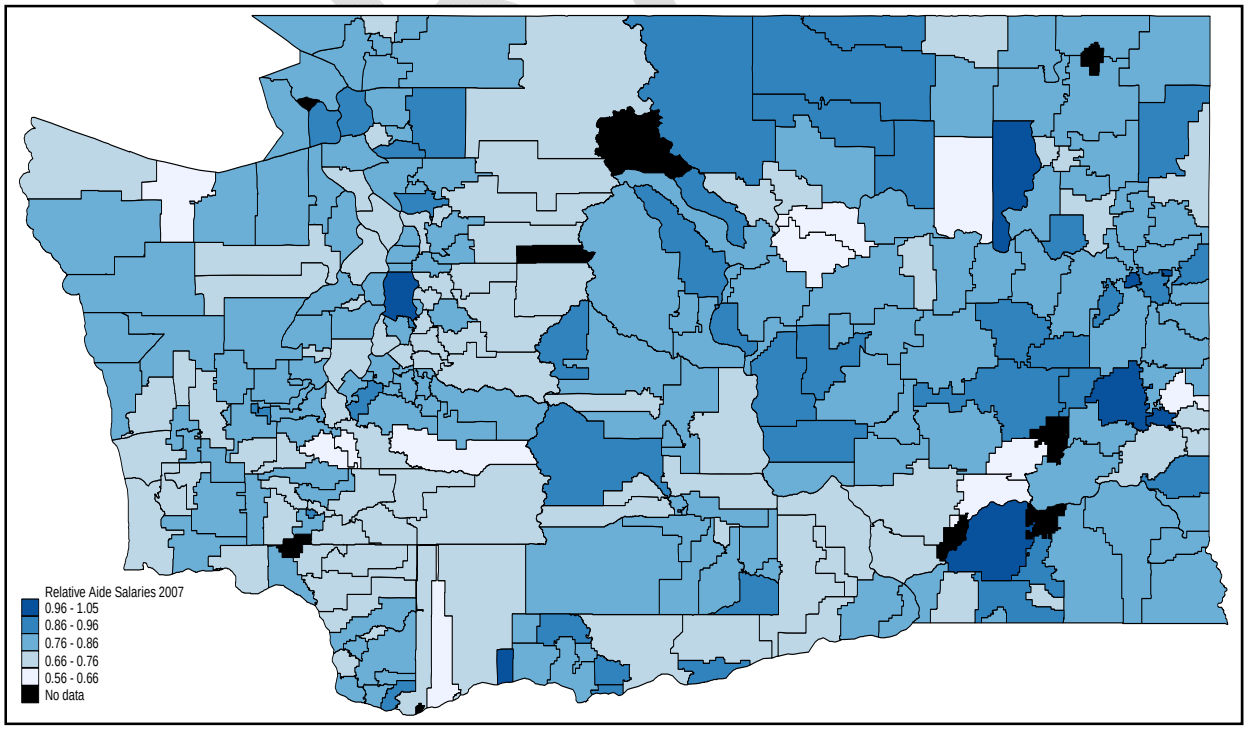
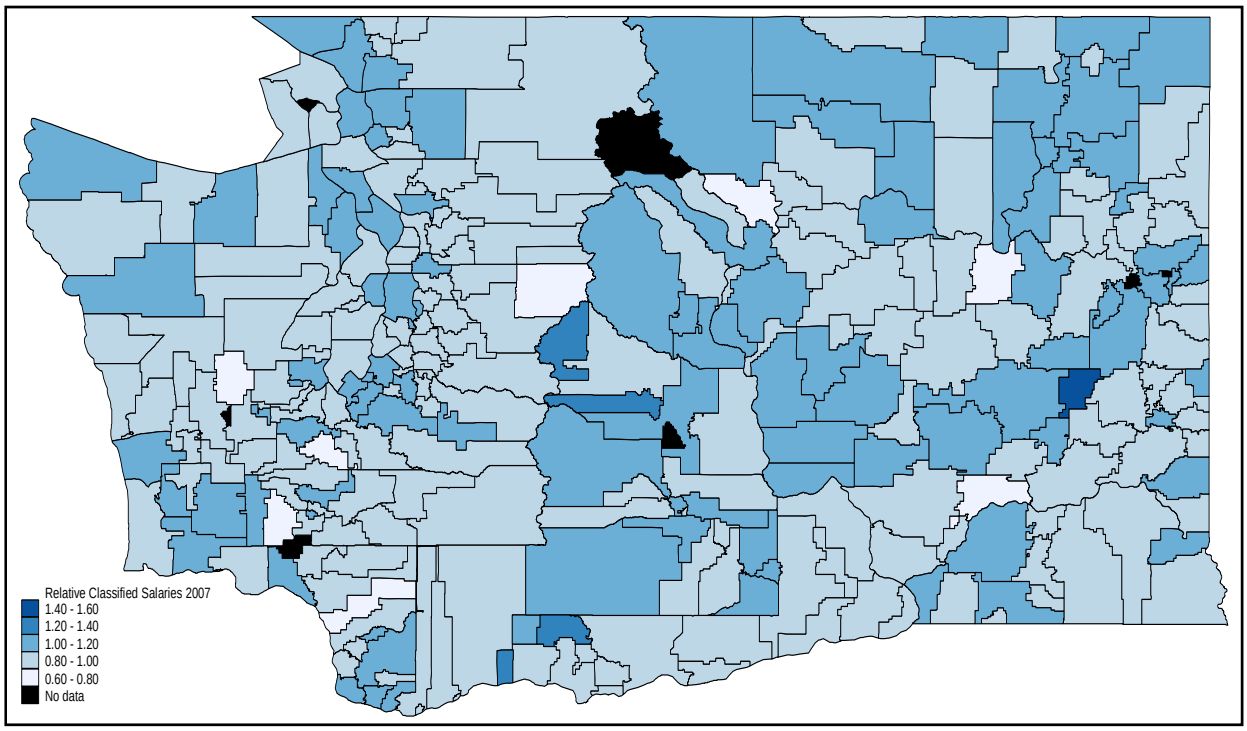


Figure 13: Relative Salaries for Other Classified Staff by School District, 2007



Conclusions

This report examines salary differentials for cities and school districts in the state of Washington. In order to compare teacher and classified staff salaries with those outside the education sector, I have updated the NCES CWI through 2007, and developed a new comparable wage index for high school graduates, the HS CWI.

Using these two indexes, I have demonstrated that teaching salaries in Washington average 81 percent of the annual wage of comparable non-teachers, or about 2.5 percent less than ten-twelfths of the earnings of comparable non-teachers. Beginning teachers earn more than ten-twelfths of the salaries for beginning non-teachers, while math and science teachers earn significantly less than ten-twelfths of the salaries for workers in math and science occupations. Given the differences in the length of the working year between teaching and non-teaching professions, the analysis suggests that the average gap between teaching and non-teaching wages is not large, and is narrower for beginning teachers than for more experienced teachers. The gap is clearly largest for math and science teachers.

The analysis also demonstrates that there is substantial variation in relative teacher salaries from one labor market area to another. As a general rule, teaching is more competitive with non-teaching occupations in rural and eastern Washington, and much less competitive with non-teaching occupations in the Kennewick, Bremmerton and Seattle labor market areas. The

gap between teaching salaries and non-teaching salaries exceeds 20 percent in those three markets.

Relative salaries for classified staff have no such geographic pattern. Aides are paid substantially less than comparable high school graduates in all Washington labor markets, while the annualized earnings of classified staff are generally comparable to those of high school graduates in all markets.

Acknowledgements

Special thanks to Irene Ngugi and Ross Bunda for information and advice.

Bibliography

Allegretto, S.A., Corcoran, S.P., & Mishel, L. (2004). How does teacher pay compare? Methodological challenges and answers. Washington, DC, Economic Policy Institute.

Chambers, J.G. "Measuring Geographic Differences in Public School Costs." Washington, DC: U.S. Department of Education, National Center for Education Statistics (working paper, 1997a).

Chambers, J.G. "Volume III - The Measurement of School Input Price Differences: A Technical Report on Geographic and Inflationary Differences in the Prices of Public School Inputs." Washington DC: U.S. Department of Education, National Center for Education Statistics (1997b).

Chambers, J.G. "Cost and price level adjustments to state aid for education: A theoretical and empirical review." In K. Forbis Jordan (Ed.), *Perspectives in state school support programs* (2nd annual yearbook of the American Educational Finance Association). Cambridge, MA: Ballinger Publishing Co. (1981a).

Chambers, J.G. "The hedonic wage technique as a tool for estimating the costs of school personnel: A theoretical exposition with implications for empirical analysis." *Journal of Education Finance* (Winter, 1981b).

Bureau of Labor Statistics. (2003). Technical Notes for the May 2003 OES Estimates. Retrieved May 19, 2005, from http://stats.bls.gov/oes/2003/may/oes_tec.htm.

Ruggles, S., Sobek, M., Alexander, T., Fitch, C., Goeken, R., Hall, P., King, M., and Ronnander, C. (2003). Integrated Public Use Microdata Series: Version 3.0 (machine-readable database). Minneapolis, MN: Minnesota Population Center. Retrieved October 29, 2004, from http://www.ipums.org.

Taylor, L.L. 2008. Comparing Teacher Salaries: Insights from the U.S. Census. *Economics of Education Review*, 27(1): 48-57.

Taylor, L.L. 2006. Comparable Wages, Inflation and School Finance Equity. *Education Finance and Policy*. 1(3): 349-71.

Taylor, L.L., and W.J. Fowler, Jr.. 2006. A Comparable Wage Approach to Geographic Cost Adjustment NCES 2006–321. Washington, D.C.: National Center for Education Statistics.

Table A.1: The Hedonic Salary Model for All Teachers, 2007-08

Parameter	Estimate	Standard Error	P-value
Intercept	10.0566	0.0216	0.0000
Salary mix factor	0.5045	0.0035	0.0000
Years of experience	0.0087	0.0002	0.0000
Experience, squared	-0.0002	0.0000	0.0000
Percent teaching	-0.0554	0.0089	0.0000
Continuing teacher	0.0065	0.0008	0.0000
Female	-0.0151	0.0005	0.0000
Asian	0.0019	0.0014	0.1712
Black	0.0035	0.0019	0.0712
Hispanic	0.0002	0.0014	0.8801
American Indian/Alaska Native	0.0015	0.0026	0.5510
BA	-0.0570	0.0132	0.0000
MA	-0.0141	0.0132	0.2843
PhD	0.0157	0.0135	0.2450
V	-0.0129	0.0138	0.3511
H	0.0226	0.0218	0.2998
G	-0.0471	0.0133	0.0004
S	0.0000		
Academic credit hours	0.0004	0.0000	0.0000
Other credit hours	0.0002	0.0000	0.0000
In service credit hours	0.0005	0.0000	0.0000
Non-credit hours	0.0001	0.0000	0.0022
Special Ed	-0.0002	0.0011	0.8656
Vocational Ed	0.0215	0.0012	0.0000
Compensatory Ed	0.0086	0.0007	0.0000
Bilingual Ed	0.0066	0.0019	0.0006
Community Service	0.0127	0.0048	0.0084
Support	0.1008	0.0165	0.0000
Board of Directors	0.0000		
Superintendants Office	0.0048	0.0247	0.8455
Business Office	-0.0823	0.0195	0.0000
Human Resources	-0.0858	0.0181	0.0000
Public Relations	-0.0297	0.0246	0.2271
Supervision Instruction	0.0235	0.0022	0.0000
Learning Resources	0.0000	0.0053	0.9985
Principals Office	0.0313	0.0028	0.0000
Guidance and Counsel	0.0040	0.0051	0.4375
Pupil Management and Safety	-0.0041	0.0052	0.4330
Health Related Services	0.0060	0.0082	0.4633
Teaching	0.0000		

Extracurricular	0.0416	0.0006	0.0000
Information Systems	-0.0609	0.0183	0.0009
Emergency certification	0.0054	0.0157	0.7333
English	-0.0018	0.0006	0.0041
Administration	0.0003	0.0016	0.8274
Health and Physical Ed	0.0080	0.0010	0.0000
Social science	0.0027	0.0007	0.0001
Special education	0.0004	0.0009	0.6404
Math	0.0016	0.0010	0.0997
Science	-0.0020	0.0009	0.0320
Elementary	-0.0002	0.0006	0.7671
Arts	-0.0008	0.0009	0.3912
Early childhood	-0.0009	0.0008	0.2968
Bilingual/ESL	-0.0001	0.0013	0.9258
Elementary teacher	-0.0027	0.0011	0.0171
Secondary teacher	0.0001	0.0012	0.9115
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		55,500	
R-square		0.9416	

Table A.2: The Hedonic Salary Model for All Teachers, 2006-07

	Estimate	Standard Error	P-value
Intercept	10.0243	0.0221	0.0000
Salary mix factor	0.5050	0.0035	0.0000
Years of experience	0.0085	0.0002	0.0000
Experience, squared	-0.0002	0.0000	0.0000
Percent teaching	-0.0615	0.0092	0.0000
Continuing teacher	0.0056	0.0009	0.0000
Female	-0.0156	0.0005	0.0000
Asian	0.0022	0.0014	0.1281
Black	0.0055	0.0020	0.0052
Hispanic	0.0030	0.0015	0.0415
American Indian/Alaska Native	-0.0008	0.0026	0.7446
BA	-0.0500	0.0137	0.0003
MA	-0.0083	0.0138	0.5459
PhD	0.0190	0.0141	0.1774
V	-0.0070	0.0144	0.6275
H	-0.0019	0.0232	0.9355
G	-0.0408	0.0138	0.0032
S	0.0000		
Academic credit hours	0.0004	0.0000	0.0000
Other credit hours	0.0002	0.0000	0.0000
In service credit hours	0.0005	0.0000	0.0000
Non-credit hours	0.0000	0.0000	0.0175
Special Ed	0.0002	0.0011	0.8691
Vocational Ed	0.0226	0.0012	0.0000
Compensatory Ed	0.0068	0.0007	0.0000
Bilingual Ed	0.0133	0.0019	0.0000
Community Service	0.0204	0.0051	0.0001
Support	0.0183	0.0087	0.0352
Board of Directors	-0.0088	0.0532	0.8681
Superintendants Office	0.0576	0.0169	0.0007
Business Office	-0.0244	0.0204	0.2310
Human Resources	-0.0044	0.0138	0.7500
Public Relations	-0.0167	0.0549	0.7613
Supervision Instruction	0.0239	0.0022	0.0000
Learning Resources	0.0047	0.0046	0.3027
Principals Office	0.0350	0.0028	0.0000
Guidance and Counsel	-0.0061	0.0062	0.3219
Pupil Management and Safety	0.0083	0.0055	0.1331
Health Related Services	-0.0191	0.0143	0.1819
Teaching	0.0000		

Extracurricular	0.0418	0.0006	0.0000
Information Systems	0.0045	0.0110	0.6823
Emergency certification	-0.0043	0.0190	0.8217
English	-0.0010	0.0006	0.0990
Administration	0.0056	0.0015	0.0003
Health and Physical Ed	0.0088	0.0010	0.0000
Social science	0.0023	0.0007	0.0010
Special education	0.0010	0.0009	0.2817
Math	0.0036	0.0010	0.0005
Science	-0.0029	0.0009	0.0021
Elementary	0.0005	0.0006	0.3827
Arts	-0.0020	0.0009	0.0269
Early childhood	0.0002	0.0009	0.7965
Bilingual/ESL	-0.0020	0.0013	0.1139
Elementary teacher	-0.0024	0.0011	0.0353
Secondary teacher	0.0001	0.0012	0.9440
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		55,243	
R-square		0.9399	

Table A.3: The Hedonic Salary Model for All Teachers, 2005-06

	Estimate	Standard Error	P-value
Intercept	10.0115	0.0218	0.0000
Salary mix factor	0.5071	0.0035	0.0000
Years of experience	0.0083	0.0002	0.0000
Experience, squared	-0.0001	0.0000	0.0000
Percent teaching	-0.0802	0.0088	0.0000
Continuing teacher	0.0058	0.0009	0.0000
Female	-0.0155	0.0005	0.0000
Asian	0.0002	0.0014	0.8977
Black	0.0036	0.0019	0.0595
Hispanic	0.0014	0.0015	0.3398
American Indian/Alaska Native	0.0025	0.0025	0.3234
BA	-0.0563	0.0136	0.0000
MA	-0.0154	0.0136	0.2558
PhD	0.0108	0.0139	0.4361
V	-0.0146	0.0142	0.3043
H	-0.0223	0.0256	0.3841
G	-0.0467	0.0137	0.0006
S	0.0000		
Academic credit hours	0.0004	0.0000	0.0000
Other credit hours	0.0002	0.0000	0.0000
In service credit hours	0.0005	0.0000	0.0000
Non-credit hours	0.0001	0.0000	0.0022
Special Ed	-0.0023	0.0011	0.0384
Vocational Ed	0.0216	0.0012	0.0000
Compensatory Ed	0.0063	0.0007	0.0000
Bilingual Ed	0.0100	0.0018	0.0000
Community Service	0.0170	0.0048	0.0004
Support	0.0172	0.0125	0.1703
Board of Directors	-0.0163	0.0538	0.7613
Superintendants Office	0.0575	0.0229	0.0120
Business Office	0.0057	0.0152	0.7072
Human Resources	0.0539	0.0289	0.0625
Public Relations	0.0000		
Supervision Instruction	0.0260	0.0021	0.0000
Learning Resources	0.0007	0.0051	0.8910
Principals Office	0.0342	0.0028	0.0000
Guidance and Counsel	-0.0084	0.0049	0.0883
Pupil Management and Safety	0.0182	0.0057	0.0013
Health Related Services	-0.0147	0.0097	0.1285
Teaching	0.0000		

Extracurricular	0.0423	0.0006	0.0000
Information Systems	0.0098	0.0148	0.5111
Emergency certification	0.0042	0.0299	0.8881
English	-0.0010	0.0006	0.0936
Administration	0.0023	0.0015	0.1299
Health and Physical Ed	0.0115	0.0010	0.0000
Social science	0.0030	0.0007	0.0000
Special education	0.0003	0.0009	0.7519
Math	0.0037	0.0010	0.0003
Science	-0.0039	0.0009	0.0000
Elementary	0.0003	0.0006	0.5944
Arts	-0.0009	0.0009	0.3182
Early childhood	0.0009	0.0008	0.3007
Bilingual/ESL	-0.0011	0.0013	0.3992
Elementary teacher	-0.0056	0.0011	0.0000
Secondary teacher	-0.0015	0.0012	0.2007
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		55,057	
R-square		0.9394	

Table A.4: The Hedonic Salary Model for All Teachers, 2004--05

	Estimate	Standard Error	P-value
Intercept	9.9633	0.0198	0.0000
Salary mix factor	0.5025	0.0036	0.0000
Years of experience	0.0088	0.0002	0.0000
Experience, squared	-0.0002	0.0000	0.0000
Percent teaching	-0.0609	0.0086	0.0000
Continuing teacher	0.0065	0.0009	0.0000
Female	-0.0156	0.0006	0.0000
Asian	0.0002	0.0015	0.8893
Black	0.0051	0.0020	0.0093
Hispanic	0.0009	0.0016	0.5750
American Indian/Alaska Native	0.0015	0.0026	0.5656
BA	-0.0565	0.0113	0.0000
MA	-0.0149	0.0114	0.1897
PhD	0.0178	0.0118	0.1298
V	-0.0123	0.0121	0.3105
H	-0.0660	0.0265	0.0126
G	-0.0482	0.0114	0.0000
S	0.0000		
Academic credit hours	0.0004	0.0000	0.0000
Other credit hours	0.0002	0.0000	0.0000
In service credit hours	0.0005	0.0000	0.0000
Non-credit hours	0.0001	0.0000	0.0096
Special Ed	-0.0015	0.0011	0.1643
Vocational Ed	0.0231	0.0012	0.0000
Compensatory Ed	0.0072	0.0007	0.0000
Bilingual Ed	0.0067	0.0018	0.0002
Community Service	0.0091	0.0050	0.0666
Support	0.0326	0.0094	0.0005
Board of Directors	0.0000		
Superintendants Office	0.0646	0.0229	0.0049
Business Office	-0.0088	0.0144	0.5424
Human Resources	-0.0353	0.0254	0.1640
Public Relations	0.0000		
Supervision Instruction	0.0275	0.0021	0.0000
Learning Resources	0.0033	0.0053	0.5312
Principals Office	0.0321	0.0029	0.0000
Guidance and Counsel	0.0047	0.0053	0.3797
Pupil Management and Safety	0.0107	0.0064	0.0938
Health Related Services	0.0273	0.0149	0.0661

Teaching	0.0000		
Extracurricular	0.0422	0.0006	0.0000
Information Systems	-0.0114	0.0111	0.3015
Emergency certification	-0.0201	0.0199	0.3112
English	-0.0008	0.0006	0.1957
Administration	0.0072	0.0016	0.0000
Health and Physical Ed	0.0127	0.0010	0.0000
Social science	0.0025	0.0007	0.0002
Special education	0.0009	0.0009	0.3276
Math	0.0013	0.0011	0.2083
Science	-0.0022	0.0010	0.0231
Elementary	0.0011	0.0006	0.0722
Arts	-0.0013	0.0009	0.1682
Early childhood	-0.0005	0.0009	0.5624
Bilingual/ESL	-0.0006	0.0014	0.6418
Elementary teacher	-0.0047	0.0011	0.0000
Secondary teacher	-0.0003	0.0012	0.8189
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		54,688	
R-square		0.9382	

Table A.5: The Hedonic Salary Model for All Teachers, 2003--04

	Estimate	Standard Error	P-value
Intercept	9.9601	0.0194	0.0000
Salary mix factor	0.4688	0.0036	0.0000
Years of experience	0.0106	0.0002	0.0000
Experience, squared	-0.0002	0.0000	0.0000
Percent teaching	-0.0700	0.0085	0.0000
Continuing teacher	0.0036	0.0009	0.0001
Female	-0.0154	0.0006	0.0000
Asian	-0.0012	0.0015	0.3988
Black	0.0038	0.0019	0.0519
Hispanic	0.0007	0.0016	0.6535
American Indian/Alaska Native	0.0035	0.0027	0.1852
BA	-0.0198	0.0112	0.0771
MA	0.0263	0.0112	0.0193
PhD	0.0562	0.0116	0.0000
V	0.0431	0.0120	0.0003
H	0.0083	0.0212	0.6963
G	-0.0113	0.0113	0.3168
S	0.0000		
Academic credit hours	0.0004	0.0000	0.0000
Other credit hours	0.0002	0.0000	0.0000
In service credit hours	0.0006	0.0000	0.0000
Non-credit hours	0.0000	0.0000	0.7976
Special Ed	-0.0001	0.0011	0.9343
Vocational Ed	0.0222	0.0012	0.0000
Compensatory Ed	0.0073	0.0007	0.0000
Bilingual Ed	0.0070	0.0020	0.0004
Community Service	0.0019	0.0047	0.6844
Support	0.0140	0.0102	0.1691
Board of Directors	0.0000		
Superintendants Office	0.0574	0.0273	0.0354
Business Office	0.0100	0.0141	0.4770
Human Resources	-0.0350	0.0184	0.0578
Public Relations	0.0000		
Supervision Instruction	0.0256	0.0020	0.0000
Learning Resources	0.0063	0.0052	0.2220
Principals Office	0.0314	0.0029	0.0000
Guidance and Counsel	-0.0117	0.0052	0.0253
Pupil Management and Safety	0.0098	0.0060	0.1006
Health Related Services	0.0248	0.0136	0.0680

Teaching	0.0000		
Extracurricular	0.0406	0.0006	0.0000
Information Systems	0.0036	0.0120	0.7624
Emergency certification	0.0400	0.0232	0.0847
English	0.0005	0.0006	0.4698
Administration	0.0048	0.0016	0.0024
Health and Physical Ed	0.0135	0.0010	0.0000
Social science	0.0033	0.0007	0.0000
Special education	0.0010	0.0009	0.2475
Math	0.0011	0.0011	0.3202
Science	-0.0007	0.0010	0.4803
Elementary	0.0002	0.0006	0.7161
Arts	-0.0001	0.0009	0.9264
Early childhood	-0.0014	0.0009	0.1028
Bilingual/ESL	-0.0003	0.0014	0.8479
Elementary teacher	-0.0028	0.0011	0.0135
Secondary teacher	-0.0006	0.0012	0.6454
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		54,272	
R-square		0.9428	

Table A.6: The Hedonic Salary Model for All Teachers, 2002--03

	Estimate	Standard Error	P-value
Intercept	9.9479	0.0192	0.0000
Salary mix factor	0.4761	0.0036	0.0000
Years of experience	0.0064	0.0002	0.0000
Experience, squared	-0.0001	0.0000	0.0000
Percent teaching	-0.0502	0.0084	0.0000
Continuing teacher	0.0036	0.0008	0.0000
Female	-0.0151	0.0005	0.0000
Asian	-0.0006	0.0015	0.6817
Black	0.0076	0.0019	0.0001
Hispanic	-0.0004	0.0016	0.7958
American Indian/Alaska Native	0.0029	0.0025	0.2608
BA	-0.0579	0.0105	0.0000
MA	-0.0197	0.0105	0.0607
PhD	0.0066	0.0109	0.5452
V	-0.0160	0.0113	0.1578
H	-0.0377	0.0213	0.0766
G	-0.0510	0.0105	0.0000
S	0.0000		
Academic credit hours	0.0004	0.0000	0.0000
Other credit hours	0.0002	0.0000	0.0000
In service credit hours	0.0005	0.0000	0.0000
Non-credit hours	0.0000	0.0000	0.2107
Special Ed	-0.0008	0.0011	0.4691
Vocational Ed	0.0215	0.0012	0.0000
Compensatory Ed	0.0061	0.0007	0.0000
Bilingual Ed	0.0060	0.0020	0.0028
Community Service	0.0024	0.0046	0.6041
Support	0.0387	0.0113	0.0006
Board of Directors	0.0000		
Superintendants Office	-0.0297	0.0126	0.0183
Business Office	-0.0256	0.0141	0.0691
Human Resources	-0.0298	0.0320	0.3508
Public Relations	0.0000		
Supervision Instruction	0.0307	0.0018	0.0000
Learning Resources	0.0074	0.0053	0.1603
Principals Office	0.0340	0.0030	0.0000
Guidance and Counsel	0.0018	0.0048	0.7048
Pupil Management and Safety	0.0186	0.0061	0.0021
Health Related Services	-0.0029	0.0084	0.7303
Teaching	0.0000		

Extracurricular	0.0388	0.0006	0.0000
Information Systems	-0.0156	0.0118	0.1875
Emergency certification	-0.0015	0.0232	0.9499
English	-0.0013	0.0006	0.0424
Administration	-0.0002	0.0017	0.8980
Health and Physical Ed	0.0113	0.0010	0.0000
Social science	0.0020	0.0007	0.0032
Special education	0.0004	0.0009	0.6656
Math	0.0015	0.0011	0.1751
Science	-0.0018	0.0010	0.0595
Elementary	-0.0005	0.0006	0.3919
Arts	-0.0028	0.0009	0.0018
Early childhood	-0.0032	0.0009	0.0002
Bilingual/ESL	-0.0028	0.0014	0.0506
Elementary teacher	-0.0015	0.0011	0.1824
Secondary teacher	0.0004	0.0012	0.7601
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		54,389	
R-square		0.9480	

Table A.7: Hedonic Salary Model for Beginning Teachers

	Estimate	Standard Error	P-value
Intercept	9.7913	0.0544	0.0000
Salary mix factor	0.7647	0.0215	0.0000
Years of experience	-0.0014	0.0018	0.4493
Experience, squared	0.0005	0.0004	0.2141
Percent teaching	-0.0298	0.0290	0.3049
Continuing teacher	0.0040	0.0015	0.0066
Female	-0.0155	0.0012	0.0000
Asian	0.0029	0.0028	0.2947
Black	0.0123	0.0040	0.0019
Hispanic	0.0074	0.0026	0.0053
American Indian/Alaska Native	-0.0062	0.0061	0.3077
BA	-0.0729	0.0204	0.0004
MA	-0.0564	0.0208	0.0066
PhD	-0.0660	0.0227	0.0037
V	-0.0867	0.0217	0.0001
H	0.0000		
G	0.0000		
S	0.0000		
Academic credit hours	0.0001	0.0000	0.0452
Other credit hours	-0.0002	0.0000	0.0003
In service credit hours	0.0003	0.0001	0.0005
Non-credit hours	0.0001	0.0001	0.3855
Special Ed	-0.0005	0.0029	0.8645
Vocational Ed	0.0296	0.0028	0.0000
Compensatory Ed	0.0079	0.0015	0.0000
Bilingual Ed	0.0117	0.0040	0.0034
Community Service	0.0193	0.0092	0.0355
Support	0.1004	0.0297	0.0007
Board of Directors	0.0000		
Superintendants Office	0.0000		
Business Office	-0.0785	0.0387	0.0425
Human Resources	-0.0978	0.0425	0.0216
Public Relations	0.0509	0.0544	0.3497
Supervision Instruction	0.0088	0.0061	0.1506
Learning Resources	-0.0178	0.0184	0.3328
Principals Office	0.0317	0.0073	0.0000
Guidance and Counsel	0.0247	0.0111	0.0265
Pupil Management and Safety	-0.0103	0.0140	0.4632
Health Related Services	-0.0068	0.0130	0.6036
Teaching	0.0000		

Extracurricular	0.0438	0.0013	0.0000
Information Systems	-0.0702	0.0356	0.0487
Emergency certification	-0.0028	0.0208	0.8934
English	-0.0049	0.0014	0.0006
Administration	0.0460	0.0207	0.0263
Health and Physical Ed	0.0104	0.0027	0.0001
Social science	0.0058	0.0020	0.0036
Special education	0.0009	0.0026	0.7319
Math	-0.0002	0.0021	0.9113
Science	-0.0032	0.0020	0.1098
Elementary	0.0001	0.0013	0.9485
Arts	0.0010	0.0023	0.6738
Early childhood	-0.0027	0.0021	0.1929
Bilingual/ESL	0.0014	0.0026	0.6041
Elementary teacher	-0.0100	0.0026	0.0001
Secondary teacher	0.0036	0.0026	0.1652
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		No	
Number of observations		10,661	
R-square		0.8327	

Table A.8: Certification Endorsements in Math and Science

Mathematics	Designated Science: Earth Science
Mathematics-Primary	Designated Science: Physics
Mathematics-Supporting	Earth Science
Middle Level Math/Science	Earth Science-Primary
Middle Level Mathematics	Earth Science-Supporting
Middle School Math	Environmental Science
Agriculture Science & Technology	General Science
Biological Science	Geology
Biology	Middle Level Science
Biology-Primary	Middle School Science
Biology-Supporting	Natural Science
Chemistry	Natural Sciences
Chemistry-Primary	Physical Science
Chemistry-Supporting	Physics
Computer Applications & Related	Physics-Primary
Computer Science	Physics-Supporting
Computer Technology	Science
Designated Science: Biology	Science-Primary
Designated Science: Chemistry	Secondary Education: Bioscience
Designated Science: Earth And Space Science	

Table A.9: Science, Technology and Mathematics Occupations

Financial Specialists
Accountants and Auditors
Appraisers and Assessors of Real Estate
Budget Analysts
Credit Analysts
Financial Analysts
Personal Financial Advisors
Insurance Underwriters
Financial Examiners
Loan Counselors and Officers
Tax Examiners, Collectors, and Revenue Agents
Tax Preparers
Financial Specialists, All Other

Mathematical Occupations
Computer Scientists and Systems Analysts
Computer Programmers
Computer Software Engineers
Computer Support Specialists
Database Administrators
Network and Computer Systems Administrators
Network Systems and Data Communication Analysts
Actuaries
Mathematicians
Operations Research Analysts
Statisticians
Misc. Mathematics Occupations

Architecture and Engineering
Architects, Except Naval
Surveyors, Cartographers, etc.
Aerospace Engineers
Agricultural Engineers
Biomedical Engineers
Chemical Engineers
Civil Engineers
Computer Hardware Engineers
Electrical and Electronics Engineers
Environmental Engineers
Industrial Engineers
Marine Engineers
Materials Engineers
Mechanical Engineers
Mining and Geological Engineers
Nuclear Engineers
Petroleum, Mining and Geological Engineers,
Miscellaneous Engineers, Including Agricultural and Biomedical
Drafters
Engineering Technicians, Except Drafters
Surveying and Mapping Technicians

Physical and Life Sciences
Agricultural and Food Scientists
Biological Scientists
Conservation Scientists and Foresters
Medical Scientists
Astronomers and Physicists
Atmospheric and Space Scientists
Chemists and Materials Scientists
Environmental Scientists and Geoscientists
Physical Scientists, All Other

Table A.10: Hedonic Salary Model for Math and Science Teachers

	Estimate	Standard Error	P-value
Intercept	10.0100	0.0348	0.0000
Salary mix factor	0.4960	0.0108	0.0000
Years of experience	0.0111	0.0006	0.0000
Experience, squared	-0.0002	0.0000	0.0000
Percent teaching	-0.0219	0.0307	0.4767
Continuing teacher	0.0052	0.0024	0.0311
Female	-0.0137	0.0014	0.0000
Asian	-0.0018	0.0037	0.6288
Black	0.0023	0.0069	0.7394
Hispanic	-0.0031	0.0050	0.5392
American Indian/Alaska Native	-0.0107	0.0075	0.1518
BA	-0.0117	0.0075	0.1198
MA	0.0333	0.0078	0.0000
PhD	0.0543	0.0103	0.0000
V	-0.6329	0.5230	0.2263
H	0.0000		
G	0.0000		
S	0.0000		
Academic credit hours	0.0002	0.0000	0.0000
Other credit hours	0.0001	0.0000	0.0000
In service credit hours	0.0004	0.0000	0.0000
Non-credit hours	0.0048	0.0036	0.1837
Special Ed	0.0000	0.0061	0.9977
Vocational Ed	0.0316	0.0036	0.0000
Compensatory Ed	0.0145	0.0020	0.0000
Bilingual Ed	0.0094	0.0084	0.2653
Community Service	0.0226	0.0160	0.1579
Support	0.1506	0.0363	0.0000
Board of Directors	0.0000		
Superintendants Office	-0.0552	0.0643	0.3903
Business Office	-0.0917	0.0627	0.1440
Human Resources	-0.1344	0.0427	0.0016
Public Relations	0.0396	0.0572	0.4882
Supervision Instruction	0.0167	0.0056	0.0027
Learning Resources	0.0011	0.0209	0.9590
Principals Office	0.0214	0.0070	0.0021
Guidance and Counsel	0.0030	0.0220	0.8931
Pupil Management and Safety	0.0050	0.0148	0.7358
Health Related Services	-0.0175	0.0298	0.5570
Teaching	0.0000		
Extracurricular	0.0457	0.0016	0.0000

Information Systems	-0.0782	0.0449	0.0816
Emergency certification	-0.0123	0.0365	0.7353
English	-0.0034	0.0025	0.1654
Administration	0.0007	0.0046	0.8773
Health and Physical Ed	0.0149	0.0024	0.0000
Social science	0.0019	0.0021	0.3632
Special education	-0.0040	0.0041	0.3350
Math	0.0025	0.0018	0.1655
Science	-0.0009	0.0019	0.6479
Elementary	-0.0002	0.0018	0.9256
Arts	-0.0012	0.0038	0.7506
Early childhood	-0.0010	0.0048	0.8294
Bilingual/ESL	-0.0052	0.0050	0.2973
Elementary teacher	-0.0192	0.0047	0.0000
Secondary teacher	-0.0072	0.0044	0.1055
Other teacher	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		No	
Number of observations		6,125	
R-square		0.9340	

Table A.11: The Hedonic Salary Model for Classified Workers, Excluding Aides and Professionals, 2007-08

	Estimate	Standard Error	P-value
Intercept	11.1681	0.0995	0.0000
Years of certified experience	0.0092	0.0015	0.0000
Continuing teacher	0.1047	0.0052	0.0000
Female	-0.0575	0.0040	0.0000
Asian	-0.0235	0.0067	0.0005
Black	-0.0468	0.0087	0.0000
Hispanic	-0.0288	0.0069	0.0000
American Indian/Alaska Native	-0.0199	0.0122	0.1047
College Degree	0.2444	0.1091	0.0250
Special Ed	-0.0306	0.0098	0.0018
Vocational Ed	-0.0104	0.0125	0.4022
Compensatory Ed	-0.0215	0.0108	0.0471
Bilingual Ed	-0.0184	0.0210	0.3802
Community Service	-0.1119	0.0200	0.0000
Support	-0.0776	0.0099	0.0000
Board of Directors	0.3273	0.0571	0.0000
Superintendants Office	0.2152	0.0127	0.0000
Business Office	0.1903	0.0097	0.0000
Human Resources	0.1823	0.0111	0.0000
Public Relations	0.1976	0.0228	0.0000
Supervision Instruction	0.0230	0.0087	0.0081
Learning Resources	-0.0676	0.0095	0.0000
Principals Office	-0.0011	0.0071	0.8831
Guidance and Counsel	-0.0237	0.0108	0.0281
Pupil Management and Safety	-0.0288	0.0083	0.0005
Health Related Services	-0.0623	0.0122	0.0000
Teaching	-0.0236	0.0082	0.0040
Extracurricular	0.0547	0.0090	0.0000
Information Systems	0.1485	0.0116	0.0000
Food Services	-0.1558	0.0090	0.0000
General Supervision	0.0614	0.0093	0.0000
Operations (Pupil Transportation)	-0.0335	0.0131	0.0104
Maintenance (Pupil Transport)	-0.0170	0.0124	0.1708
Grounds Maintenance	-0.0643	0.0112	0.0000
Operation of Buildings	-0.0557	0.0089	0.0000
Maintenance	0.0540	0.0102	0.0000
Utilities	0.0978	0.0404	0.0156
Building and Property Security	0.0596	0.0196	0.0023
Printing	-0.1236	0.0189	0.0000
Warehousing and Distribution	0.0220	0.0138	0.1091

Motor Pool	-0.0086	0.0311	0.7824
Public Activities	0.0023	0.0273	0.9322
Crafts/Trades	-0.3827	0.0121	0.0000
Laborer	-0.4696	0.0192	0.0000
Office/Clerical	-0.5810	0.0071	0.0000
Operator	-0.4425	0.0139	0.0000
Service worker	-0.5240	0.0099	0.0000
Technical	-0.3505	0.0088	0.0000
Director/Supervisor	0.0000		
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		25,176	
R-square		0.5615	

Table A.12: The Hedonic Salary Model for Aides, 2007-08

	Estimate	Standard Error	P-value
Intercept	10.2146	0.0708	0.0000
Years of certified experience	0.0074	0.0016	0.0000
Continuing teacher	0.1025	0.0043	0.0000
Female	-0.0212	0.0052	0.0001
Asian	-0.0062	0.0080	0.4368
Black	-0.0125	0.0082	0.1262
Hispanic	-0.0122	0.0057	0.0326
American Indian/Alaska Native	0.0081	0.0125	0.5175
College Degree	0.1461	0.0520	0.0049
Special Ed	-0.0095	0.0037	0.0099
Vocational Ed	0.0074	0.0107	0.4889
Compensatory Ed	0.0212	0.0042	0.0000
Bilingual Ed	-0.0060	0.0060	0.3169
Community Service	-0.0207	0.0175	0.2377
Support	-0.0999	0.0169	0.0000
Board of Directors	0.0000		
Superintendants Office	0.1565	0.0539	0.0037
Business Office	-0.0164	0.0642	0.7979
Human Resources	0.1558	0.0777	0.0451
Public Relations	0.0000		
Supervision Instruction	0.0160	0.0233	0.4932
Learning Resources	0.0040	0.0081	0.6178
Principals Office	0.0006	0.0082	0.9376
Guidance and Counsel	0.0666	0.0111	0.0000
Pupil Management and Safety	-0.0236	0.0048	0.0000
Health Related Services	0.0492	0.0081	0.0000
Teaching	-0.0344	0.0068	0.0000
Extracurricular	0.1246	0.0073	0.0000
Information Systems	0.0693	0.0820	0.3984
Food Services	0.0872	0.0192	0.0000
General Supervision	0.1387	0.0394	0.0004
Operations (Pupil Transportation)	0.1746	0.0274	0.0000
Maintenance (Pupil Transport)	0.0000		
Grounds Maintenance	0.1354	0.1176	0.2499
Operation of Buildings	0.1014	0.0469	0.0306
Maintenance	0.0432	0.0981	0.6592
Utilities	0.0000		
Building and Property Security	0.5182	0.1620	0.0014
Printing	0.2339	0.1173	0.0462
Warehousing and Distribution	0.3227	0.1685	0.0556

Motor Pool	0.2218	0.2224	0.3186
Public Activities	-0.0291	0.0226	0.1983
Labor market fixed effects		Yes	
School district fixed effects		Yes	
School building fixed effects		Yes	
Number of observations		16,846	
R-square		0.4678	