Methodological Documentation for Occupational Employment Statistics (OES)

Employment and Wage Summary Tables for Wyoming's Teacher Compensation Study

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Overview

Purpose. Wyoming's Legislative Service Office (LSO), pursuant to legislature direction enacted March 2012, requested the Department of Workforce Services, Research & Planning Section (R&P) to analyze wage and employment data of school district employees and compare them to private and other public-sector workers in Wyoming, adjacent states, and nationally. The purpose was to understand relative competitiveness of occupations based on annual wages in other ownerships and occupations in the state as well as surrounding states and nationally. R&P developed this documentation for other entities (e.g., states) to replicate the tables developed for this research or adapt the approach to other issues (e.g., wage competitiveness for state employees or custom industries/ownerships). This documentation gives instructions on what steps are needed to obtain the data from the Occupational Employment Statistics (OES) program and how the tables were compiled.

The Bureau of Labor Statistics (BLS) publishes OES estimates which are based on responses from six semiannual panels collected over a 3-year period. Please note that the OES estimates presented in the tables accompanying this narrative are not official BLS estimates but instead represent only one instance of the publication of occupational staffing patterns and wage rates for public education in local government at a subnational level. Analysis of these files was first presented to the Joint Appropriations and Education committees of the Wyoming legislature in October 2012. A revised report (Monitoring School District Human Resource Cost Pressures) is scheduled for presentation in October 2013. These reports can be accessed at this link: http://doe.state.wy.us/LMI/education_costs.htm.

Obtaining the Data. Wyoming obtained permission to use OES estimate files containing confidential data from the following states: Colorado, Idaho, Montana, Nebraska, South Dakota,

and Utah. Wyoming sent an email to each state's Labor Market Information (LMI) director requesting permission to use their state's estimates. BLS regional office provided Wyoming's R&P with state estimates once permission was obtained.

Data Files. R&P received the state estimate files for the May 2012 and May 2010 BLS estimates from the BLS Regional Office. R&P downloaded national OES estimates from the BLS website in Microsoft Excel format which was then loaded into a secure server. Fourteen files for each of the states were received (see Attachment A) and used in this analysis. Each filename has specific naming conventions associated with it (see Attachment B). The original files were delivered in .dbf format and R&P staff uploaded the data into a secure Microsoft SQL Server©. The file format for the files is located in Attachment C.

Table Methodology Overview. The methodology R&P used to create the tables involved several steps. BLS imposes several suppression techniques on the data to ensure confidentiality. BLS flags certain estimates based on the standard error of sampling and reporting. For example, if employment patterns or wages for an occupation in a certain state varies significantly over the course of several years, the standard error is such that the estimates may be biased. In order to maintain confidence in the estimates, BLS does not allow employment and/or wages to be published for estimates with a high standard error or where the estimate would release confidential data. Further, if states deem their estimates to be biased, they can request that the data not be released. In the files obtained, BLS indicated which occupations in which states data could not be released.

Suppression. R&P imposed further suppression techniques to ensure confidentiality and to eliminate potential secondary disclosure. R&P suppression techniques were applied in the following order:

1. If employment in the North American Industry Classification System (NAICS) 611100 (Educational Services) within local government was less than 10 for any state then all state rows were suppressed within that occupation.

2. If wages or employment for any state were suppressed due to BLS requirements both wages and employment were suppressed for that state within that occupation.

3. If one state for a given occupation had data suppressed, at least one other state's data were also suppressed. This suppression technique was applied to maintain confidentiality and eliminate secondary disclosure as the sum of all states are presented and could be used to calculate non-releasable estimates. In order to compare Wyoming to similar surrounding states, R&P developed an algorithm to determine which additional state data would be suppressed. Based upon a subjective list of surrounding states, the algorithm chose the state based upon a selection hierarchy. R&P used U.S. Census Bureau migration data to select the order in which states migration occurs most with Wyoming. The list was as follows (in order of migration with Wyoming): Colorado, South Dakota, Montana, Nebraska, Idaho, and Utah.

4. State level data for federal government employment were suppressed.

5. For local government, state government, federal government, and private industries, any cell within the tables with employment less than 10 was suppressed.

The above suppression techniques applied by R&P will be discussed in further detail using a specific example in the tables.

     Aggregation. R&P used the six-digit Standard Occupational Classification (SOC) system to calculate aggregations. This aggregation was done because BLS does not publish estimates at the three-digit SOC at the state level. R&P aggregated Wyoming and surrounding states data for

an overall comparison (labeled in the tables as "WY & Surrounding States"). R&P designed the

tables to display the following occupational levels:

1. Two digit SOC groupings (e.g., 11-23)
   a. 11-23 – Administrative Activities
   b. 25 – Direct Instruction
   c. 27-31 – Support for Direct Instruction
   d. 33-53 – All Other Support

2. Two digit SOC Major Group (e.g., 11-0000)

3. Three digit SOC Minor Group (e.g., 11-1000)

4. Six digit SOC Detailed Occupation (e.g., 11-1011)

Building the Tables: Step-by-Step

R&P developed four distinct tables to assist in answering the proposed research question:

How competitive are Wyoming's public school employees wages when compared to other public

sector, private sector, and those employed in surrounding states? In this section, each table will

be discussed and specific direction given in order to produce the tables with the necessary

suppressions.

Table 1. R&P used BLS estimates for the 2012 May panel to display employment and

mean annual wages for all occupations that were found in local government (ownership 3)

schools NAICS 611100. BLS estimated that 1,856 individuals were employed in Wyoming as

Secondary School Teachers, Except Special and Vocational (SOC 25-2031) with an average

annual wage of $60,480 in NAICS 611100. BLS estimated that Colorado had a total of 15,005

employed as Secondary School Teachers, Except Special and Vocational (SOC 25-2031) with an

average annual wage of $51,800 in NAICS 611100. R&P developed this table to assist in

comparing Wyoming to surrounding states and nationally in a given point in time.

Table 2. R&P calculated the relative wage ratio within each occupation compared to Wyoming's local government schools (NAICS 611100). This table was an extension of Table 1 which R&P developed to specifically compare wages in Wyoming public schools to other states and ownerships. BLS estimated that those employed as Secondary School Teachers, Except Special and Vocational (SOC 25-2031) in Colorado were earning approximately 14.4% less than those employed in Wyoming. Further, those employed as Secondary School Teachers, Except Special and Vocational (SOC 25-2031) in private industry in Wyoming were earning approximately 11.1% less than those working in Wyoming public schools.

Table 3. R&P calculated the Employment and Annual Mean wage change from 2010 estimates to 2012 estimates. As requested by LSO, R&P developed this table to show specific trends in employment and wages across two time periods. BLS estimates indicated that for the occupation Secondary School Teachers, Except Special and Vocational (SOC 25-2031) in Wyoming public schools, there was a decrease in employment of 174 and an increase in average annual wage of $2,616 from 2010 to 2012. Comparatively, Nebraska and South Dakota were the only states that saw an increase in both employment and wages in public schools, although relatively small.

Table 4. For comparability to the 2012 estimates, R&P used BLS estimates for the May 2010 panel which is displayed in Table 4. BLS estimates showed that the employment for Secondary School Teachers, Except Special and Vocational (SOC 25-2031) in 2010 was 2,030 with an average annual wage of $57,864 in Wyoming public schools. Compared to 2012 estimates, this occupation and industry saw a decrease from 2010 to 2012 which is also displayed in Table 3.

Data Conversion. The tables included only SOC codes that appeared in NAICS 611100 with an ownership of local government. Any SOC code that appeared in any state that met the criteria was included in the table list. Due to changes in 2010 SOC coding structure, R&P rolled certain occupations in the 2012 data to the corresponding SOC 2000 coding structure. A list of these occupational classification conversions can be found in Figure 1. As seen in Figure 1, Nursing Assistants were coded as 31-1014 in the 2010 coding structure which corresponds to 31-1012 SOC code in the SOC 2000 coding structure. In order to provide for comparability across years, R&P recoded all occupations that appeared in 2010 SOC but not 2000 SOC to the 2000 SOC. For example, 2010 SOC codes 31-1014 (Nursing Assistants), and 31-1015 (Orderlies) were recoded to the 2000 SOC code 31-1012 (Nursing Aides, Orderlies, and Attendants).

Secondary Suppression. After employment and wage data were calculated for the major, minor, and detailed occupations, R&P applied the secondary suppression techniques discussed earlier. To illustrate the secondary suppression techniques SOC 25-2041 (page 22 of Table 1) will be discussed. R&P applied the following suppression techniques:

1. Data for NAICS 611100 were suppressed for Idaho, Montana, South Dakota and Utah. R&P applied this suppression due to the states or BLS not allowing the data to be released.

2. For total employment and wages for 25-2041, Utah's employment and wages were suppressed by BLS or the state which required R&P to suppress an additional state (Idaho) based on the migration selection hierarchy.

3. No individual state data could be released for state government or private industry due to BLS or state confidentiality.

4. R&P does not publish individual state federal government data, so all state federal government data were suppressed.

5. Due to BLS confidentiality suppression, federal government aggregation was not included (e.g., national and state aggregates).

R&P utilized the suppression techniques outlined above for all four tables created.

BLS and State Confidentiality Review. After the tables were completed, they were sent to the BLS Regional Office and all surrounding states for review of confidentiality and suppression. The methodology of the tables was discussed and BLS determined the tables contained no confidential data.

Applicability. This section gives a specific overview of the varying applications interested parties can use the data presented in the tables for employment and wage analyses. As can be seen on page 22 of Table 1 for the SOC code 25-2053 (Special Education Teachers, Middle School), Wyoming's wage ($62,690) for this occupation was higher than surrounding states and nationally regardless of ownership (Total), in NAICS 611100 (Schools), and local government. The competition for labor (in terms of wage) in Wyoming for this occupation was mainly between school districts within the state instead of with surrounding states. To compare with Special Education Teachers, Middle School, page 31 of Table 1 presents ownership data on SOC code 29-1111 (Registered Nurses). Wyoming's registered nurses who work in NAICS 611100 (Education Services) had a lower average wage ($54,520) compared to registered nurses in Colorado and Montana but a higher annual wage than those working in South Dakota. However, compared to registered nurses in the private sector, registered nurses working in schools are generally making a higher wage. This result indicates schools must compete with a wider job market for registered nurses both within and outside the state.

Patrick Harris – R&P Draft   9/16/2013

Programming Code Availability. All of the programming was completed using SQL.

The code is available upon request.

BLS FILES UTILIZED

Estimates set	OES full name	File description
8	TOSXX_ST11M_allsupp	Statewide area, Cross-industry, Total occupation, Cross-ownership
8	SOSXX_ST11M_allsupp	Statewide area, Cross-industry, Major group SOC occupation, Cross-ownership
8	INSXX_ST11M_allsupp	Statewide area, Cross-industry, Internet(detail) occupation, Cross-ownership
10	SOS4X_ST11M_allsupp	Statewide area, 4-digit NAICS industry, Major group SOC occupation, Cross-ownership
10	INS4X_ST11M_allsupp	Statewide area, 4-digit NAICS industry, Internet(detail) occupation, Cross-ownership
13	TOSXO_ST11M_allsupp	Statewide area, Cross-industry, Total occupation, By ownership
13	SOSXO_ST11M_allsupp	Statewide area, Cross-industry, Major group SOC occupation, By ownership
13	INSXO_ST11M_allsupp	Statewide area, Cross-industry, Internet(detail) occupation, By ownership
13	SOS4O_ST11M_allsupp	Statewide area, 4-digit NAICS industry, Major group SOC occupation, By ownership
13	INS4O_ST11M_allsupp	Statewide area, 4-digit NAICS industry, Internet(detail) occupation, By ownership
13	TOMXO_ST11M_allsupp	MSA area, Cross-industry, Total occupation, By ownership
13	SOMXO_ST11M_allsupp	MSA area, Cross-industry, Major group SOC occupation, By ownership
13	INMXO_ST11M_allsupp	MSA area, Cross-industry, Internet(detail) occupation, By ownership
13	INM4O_ST11M_allsupp	MSA area, 4-digit NAICS industry, Internet(detail) occupation, By ownership

FILE NAMING CONVENTION

First Two Characters Indicate Rollup

IN = Internet
FL = FLC cross industry, which uses same rollup as Internet files
ED = Education (NAICS 611200 AND 611300) rollup for FLC
SO = SOC major group
PW = Projections rollup
TO = All occupations

Third Character Indicates Geographic Level

N = National
S = State
M = MSA
C = combined areas for FLC files

Fourth Character Indicates Industry Level

D = Industry sector
3 = 3-digit NAICS
4 = 4-digit NAICS
5 = 5-digit NAICS
X = Cross-industry

Fifth Character Indicates the Estimates Year

Y = Last digit of year, except for the ALMIS wage database, for which Y indicates the last two digits of the year

Sixth and Seventh Characters

ST = State abbreviation

Eighth Character Indicates Reference Month

M = May
N = November

FILE FORMAT FOR INTERNET AND ROLL-UP FILES

	Field Name	Type	Width	Decimal	Explanation
1.	AREA	Character	7		State FIPS or MSA and BOS
2.	NAICS	Character	6		Industry code
3.	FRAME_N	Numeric	10	1	Units in sample frame
4.	SAMPLE_N	Numeric	8		Units in sample
5.	RESPND_N	Numeric	8		Number of responding units
6.	TOTOCC_N	Numeric	8		Number of units reporting occupation, including imputation
7.	RSPOCC_N	Numeric	8		Number of units reporting occupation, not including imputation
8.	OCC_CODE	Character	7		Occupation Code
9.	OCC_TITL	Character	150		Occupation title
10.	RAW_EMP	Numeric	12	1	Raw employment- do not release
11.	ROUNDEMP	Numeric	12		Rounded employment for release
12.	MEANWAGE	Numeric	7	2	Mean wage, hourly
13.	MN_THRD	Numeric	7	2	Mean of the lower third of wage distribution, hourly
14.	MN_2THD	Numeric	7	2	Mean of upper two thirds of distribution, hourly
15.	WPCT10	Numeric	7	2	10th percentile hourly wage
16.	WPCT25	Numeric	7	2	25th percentile hourly wage
17.	WPCT50	Numeric	7	2	Median hourly wage
18.	WPCT75	Numeric	7	2	75th percentile hourly wage
19.	WPCT90	Numeric	7	2	90th percentile hourly wage
20.	A_MEAN	Numeric	9		Annual mean wage
21.	A_MNTHRD	Numeric	9		Annual mean of lower third of wage distribution
22.	A_MN2THD	Numeric	9		Annual mean of upper two thirds of distribution
23.	A_WPCT10	Numeric	9		10th percentile annual wage
24.	A_WPCT25	Numeric	9		25th percentile hourly wage
25.	A_WPCT50	Numeric	9		Median annual wage
26.	A_WPCT75	Numeric	9		75th percentile hourly wage
27.	A_WPCT90	Numeric	9		90th percentile hourly wage
28.	PCTE_IMP	Numeric	6	1	Percent of employment imputed
29.	PCTW_IMP	Numeric	6	1	Percent of wage imputed
30.	WMU_PRSE	Numeric	6	1	Mean wage percent relative standard error
31.	EMP_PRSE	Numeric	6	1	Employment percent relative standard error
32.	CONFFLAG	Character	1		Confidentiality flag. If flag= 0, The entire record cannot be released due to confidentiality
33.	QUALFLAG	Character	1		Quality flag; If =0 the entire record cannot be released
34.	RSE_FLAG	Character	1		Wage relative standard error flag; If =0 the entire record cannot be released.
35.	ROLLUP	Character	8		File name, including rollup
36.	RELEASE	Character	9		If = "no", the record contains confidential data and should not be released. If "wage", only wages can be released. If = "emp", only employment can be released.

Figure 1. SOC 2010 Conversion to SOC Code 2000 for Comparison Across Years

SOC Code 2010	SOC Title 2010	SOC Code 2000	SOC Title 2000
13-1071	Employment, Recruitment, and Placement Specialists	13-1078	Human resources, labor relations, and training specialists, all other
13-1075	Labor Relations Specialists		
15-1151	Computer Support Specialists	15-1150	Computer Support Specialists
15-1152	Computer Network Support Specialists		
15-1122	Information Security Analysts	15-1179	Information Security Analysts, Web Developers, and Computer Network Architects
15-1134	Web Developers		
15-1143	Computer Network Architects		
15-1199	Computer Occupations, All Other	15-1179	Information Security Analysts, Web Developers, and Computer Network
15-1799	Computer Occupations, All Other*		
21-1094	Community Health Workers	21-1798	Community and Social Service Specialists, All Other*
21-1099	Community and Social Service Specialists, All Other		
25-2051	Special Education Teachers, Preschool	25-2041	Special Education Teachers, Preschool, Kindergarten, and Elementary School
25-2052	Special Education Teachers, Kindergarten, and Elementary School		
25-2054	Special Education Teachers, Secondary School	25-2054	Special Education Teachers, Secondary School
25-2059	Special Education Teachers, All Other		
25-3098	Substitute teachers	25-3999	All Other Teachers, Primary, Secondary, and Adult
25-3099	Teachers and Instructors, All Other		
29-1141	Registered Nurses	29-1111	Registered Nurses
29-1151	Nurse Anesthetists		
29-1161	Nurse Midwives		
29-1171	Nurse Practitioners		
29-1129	Therapists, All Other	29-1128	Exercise Physiologists
29-2034	Radiologic Technologists and Technicians	29-2037	Radiologic Technologists and Technicians*
29-2035	Magnetic Resonance Imaging Technologists		
29-2099	Health Technologists and Technicians, All Other	29-2799	Health Technologists and Technicians, All Other*
29-2057	Ophthalmic Medical Technicians		
29-2092	Hearing Aid Specialists		
29-9099	Healthcare Practitioners and Technical Workers, All Other		
29-9799	Healthcare Practitioners and Technical Workers, All Other*		
31-1014	Nursing Assistants	31-1012	Nursing Aides, Orderlies, and Attendants
31-1015	Orderlies		
31-9097	Phlebotomists	31-9799	Healthcare Support Workers, All Other*
31-9099	Healthcare Support Workers, All Other		
11-9061	Funeral Service Managers	39-4831	Funeral service managers, directors, morticians, and undertakers
39-4031	Morticians, Undertakers, and Funeral Directors		
13-1131	Fundraisers	41-9799	Sales and Related Workers, All Other*
41-9099	Sales and Related Workers, All Other		
43-3099	Financial Clerks, All Other	43-4199	Information and Record Clerks, All Other
43-9199	Office and Administrative Support Workers, All Other	43-9799	Office and Administrative Support Workers, All Other*

Figure 1. SOC 2010 Conversion to SOC Code 2000 for Comparison Across Years

47-4099	Construction and Related Workers, All Other	47-4799	Construction and Related Workers, All Other*
49-9081 49-9099	Wind Turbine Service Technicians Installation, Maintenance, and Repair Workers, All Other	49-9799	Installation, Maintenance, and Repair Workers, All Other*
51-3099 51-9199	Food Processing Workers, All Other Production Workers, All Other	51-9399	Production Workers, All Other*