Notes on Regression Goals for WIA Performance Measures

Summary

- This project is in response to the need for an objective data driven set of area goals for common measures and objective data driven measures for comparison with Colorado's goals set by the Federal Government.
- The universe is subjects who have an Exit Date and a 1st Date of Core Services.
- Goals were produced for Adult, Dislocated Worker, and Youth measures.
- Adult and Dislocated Worker measures are Entered Employment, Employment Retention, and Average Earnings.
- The only Youth measure is Youth Placement in Employment or Education.
- Goals were produced using independent, or driver, variables derived from the Local Area Unemployment Statistics (LAUS) and the Quarterly Census of Employment and Wages (QCEW) data.
- In the model the economic conditions were measured as the supply of labor – the LAUS data; and the demand for labor – the QCEW data.
- The goals are the result of separate regression equations for each measure.
- Every WIA region's data for their actual performance and each region's driver variables were used in the construction of the models.
- WIA data from calendar years 2005 through 2012 and LAUS and QCEW data from 2004 through 2013 were used in the regression models.
- The data encompasses both good and bad employment years.
- The regions were weighted using the weighted regional average from all 8 years of data.
- These weights are used in the calculation of region Goals that, when achieved, will allow Colorado to reach its Federal Goals.
- Adult and Dislocated Workers Entered Employment; and Youth Placement used the quarterly weighted average LAUS Unemployment Rate and the QCEW over the year change for the quarter after exit as the driver variables in the model.
- Adult and Dislocated Worker Retention used the weighted average of the 2nd and 3rd quarter after exit data from LAUS Unemployment Rate and QCEW over the year change data as driver variables.
- Adult and Dislocated Worker Average Earnings used the same 2nd and 3rd quarter data as above along with the 2nd and 3rd quarter average Total Covered Wage from QCEW as driver variables.
- Thus the driver variables are region specific and were used to take into account that region's economic conditions in relation to the actual region performance.

The Basic Model

Model requirements were that the data be available at least quarterly (the WIA performance data is in quarter form) and available at the county level (the regions are single or collections of counties). These requirements as well as the need for objective model drivers are satisfied by LAUS and QCEW data. The following is a breakdown of the Entered Employment and Youth Placement model. Modifications to this basic approach provide the models for the other measures.

In simple form for the model for Entered Employment for Adult and Dislocated Workers, as well as Youth Placement is as follows:

Performance = *ƒ* (Supply of Labor Q1 after exit; Demand for Labor Q1 after exit)

Read as: Performance is a function of Supply of Labor and Demand for Labor in the first quarter after a subject exits the program. Where:

Performance = the number of area subjects with non-zero earnings one quarter after exit divided by the total number of subjects who have an actual exit date from the program and have an actual 1st Core Services Date. Thus Performance is measured as a percentage, based on quarterly exit data. Percentage is the key as it allows the comparison of areas with very different population sizes and puts performance measures in the same terms as the Colorado Goals set by the Federal Government.

The Supply of Labor = the total number of unemployed in a region by quarter divided by the total number of people in the active workforce in that region in that quarter. To be counted as unemployed you need to be actively seeking and available for full time employment. To be active in the workforce you must be employed or actively seeking employment. The resulting ratio is the percentage of the workforce that is actively seeking employment thus it can be used to represent the Supply of Labor.

The Demand for Labor = the over the year change in the quarterly covered employment for an area. This is calculated by the given quarter total employment divided by the previous year's same quarter employment. If this ratio is less than 1, the area has had a loss of employment over the year; if it is equal to 1 there has been no net employment growth over the year; if it is greater than one there

is net employment growth. Thus this ratio can represent the Demand for Labor in terms that allow for comparisons of differently populated areas.

The general form of the regression equation is as follows:

Quarter Performance = (βo) + (β1*QuarterlyUR) + (β2*QuarterlyQCEWΔoty)

Read as: Quarter Performance is equal to a constant _ βo; plus a coefficient times the quarter after exit Unemployment Rate_ β1*QuarterlyUR; plus a coefficient times the quarter after exit QCEW change over the year_ β2*QuarterlyQCEWΔoty.

The above equation is calculated in statistical software and is calculated on all available data from each region. Thus the State of Colorado is modeled from the regions up to state. The model is applied to each measure in turn, so there are separate equations for Adult, Dislocated Worker and Youth Placement. This model is applied to all quarters and produces a Regression Result by region by quarter. The average regional result of the four quarters of a PY of this Regression Result is then weighted to produce an area Goal for a given PY.

Weights and Goals

Region weights are simply the weighted average over all 8 years of actual work load by region for the program being measured. It is the total of a given region's subjects who exited a given program during all quarters, all years, divided by grand total of all who have exited that given program. Thus:

Region Weight = ∑ region program subjects of who have exited / ∑ all program subjects statewide who have exited

This results in the most stable weight across all regions. The Goals are calculated using these region weights in combination with the Regression Results for a given PY. The following equation produces a PY Goal level for a given area:

PY Goal = (PY R Result)*[(State Goal) / (∑ [(Region Weight)*(PY R Result)]

Where:

PY Goal = the percentage those who have Entered Employment needed by the region in order for Colorado to reach its Federal Goal for a given PY.

PY R Result = the weighted average of 4 quarters of regression results for the PY.

State Goal = the Goal set for Colorado by the Federal Government.

∑ [(Region Weight)*(PY R Result)] = the sum of each Region Weight multiplied by each region's Regression Result for the given PY.

The Goal per region is then a product that, when summed with all other region Goals, will allow Colorado to hit the State Goal set by the Federal Government. The region's Goal accounts for the projected performance of the region based on its own past performance, economic conditions, and the needed contribution from that region to reach the State Goal.

Note: The R Results can be weighted by region, but not adjusted to the Federal Goal for Colorado. When summed, the percentage that is expressed can be used as the basis for argument with the Federal Goal. This weighting is:

Expected Colorado Performance = ∑ (Region Weight)*(PY R Result)

Read as: The Expected Colorado Performance is equal to the sum of each region's weight multiplied by each region's Regression Result for a given PY. This produces a data driven alternative Goal for comparison with the Federal Goal.

Model Modifications

The LAUS Unemployment Rate and QCEW over the year change are calculated for the 2nd and 3rd quarter after exit for the drivers for the Adult and Dislocated Worker Employment Retention model. Thus the basic model is:

Employment Retention = *ƒ* (Supply of Labor Q2,3 after exit; Demand for Labor Q2,3 after exit)

Read as: Employment Retention is a function of the Supply of Labor and the Demand for Labor in the 2nd and 3rd quarter after exit. Where:

Employment Retention = the number of exiting subjects with non-zero earnings in Q1,2, and 3 after exit; divided by the number of exiting subjects with non-zero earnings in Q1 after exit.

Supply of Labor = the weighted average area Unemployment Rate for the 2nd and 3rd quarters after exit.

Demand for Labor = the over the year change in the weighted average 2nd and 3rd quarter covered employment for an area.

This model is the same as the first, with the driver variables adjusted for the retention timeframe. The weighting and goal procedures are the same, using as the universe the subjects who have non-zero Q1 earnings.

This Employment Retention model is modified for Average Earnings measures. The dependent variable is the 2 quarter average earnings by area and quarter, not a percentage. The driver variables are the same as in the Employment Retention model with the addition of the area's average QCEW total covered wage level. Thus the differences in wage levels between areas as well as the Supply and Demand for Labor are used to inform the model. Thus the basic model is:

Average Earnings = *ƒ* (Supply of Labor Q2,3 after exit; Demand for Labor Q2,3 after exit; Average Covered Wages Q2,3 after exit)

Read as: the Average Earnings is a function of Supply of Labor; Demand for Labor; and the Average Covered Wages, all from the 2nd and 3rd quarter after exit.

The weighting is based on the actual dollar averages for each area multiplied by the work load weight which is calculated the same way as it is for Employment Retention above. The unadjusted for Federal Goal weighting procedure can be applied to both the Employment Retention and Average Earnings models to inform Colorado's comparisons with proposed Federal Goals.