New Estimates of Compensation Rate Elasticities for U.S. Models

This report updates the estimates of Compensation Rate Elasticities for U.S. models from the previous set of estimates, done in 2001. The current research has been expanded to include estimates of wage rate and earnings rate elasticities.

The Regression Equation

$$\Delta WD = \alpha_1 \left[\left\{E/LF \div EA/LFA\right\} -1\right] + \alpha_2\left[\left\{EO/EOA\right\} -1\right]$$

ΔWD	change in compensation rate
α_1	compensation rate elasticity with respect to relative employment opportunity
α_2	compensation rate elasticity with respect to occupational employment demand
E	employment
LF	labor force
EA	employment moving average
LFA	labor force moving average
EO	occupational employment
EOA	occupational employment moving average

Data & Sources

The input to the regression equation consisted of a panel data of 50 states and the District of Columbia and 1999 through 2007. The use of such panel data gives the advantage of more data points for estimating the parameters.

The time series of earnings by place of work, compensation of employees, wage and salary disbursements and wage and salary employment for the fifty states and the District of Columbia were downloaded from the BEA website and the corresponding time series of labor force data came from the BLS website. The input to the left-hand side of the regression equation was calculated alternatively from earnings by place of work, compensation of employees and from the wage and salary disbursements as the numerator and wage and salary employment as the denominator while the input to the first term of the right-hand side was derived from wage and salary employment and the labor force.

Deriving the input to the second term of the right-hand side of the regression equation presented a problem. The data on employment cross-classified by occupation and by industry are available from the BLS website only at the national level whereas what is needed is data at the state level. The state-level data was derived using the RAS procedure given the availability of the marginal totals, i.e., state level employment separately by occupation and by industry. The national data

for 22 major occupational groups and 19 industries were used as there are a lot of missing data at the more detailed occupation and industry levels.

Regression Models

Three regression models provided three separate sets of parameter estimates. One is a time fixed effects model, the second is a region fixed effects model, and the third is a model using the time effects and region effects together. Such models tend to remove the influence of factors that are not explicitly stated in the regression function, but they have different assumptions. The region fixed effects model assumes that such factors vary over regions but not over time. The time fixed effects model assumes these factors vary over time but not over regions as, for instance, inflation. All three models were implemented by using dummy variables.

Results

	α_1	Standard Error	t	α_2	Standard Error	t	Adjusted R^2	N
USING EARNINGS[1]								
Time fixed effects model	0.0852	0.0369	2.31	0.0146	0.0309	0.47	87.1%	408
Region fixed effects model	0.1970	0.0479	4.11	0.0172	0.0064	2.66	85.4%	408
Combined fixed effects model	0.1986	0.0480	4.14	0.0173	0.0064	2.71	85.5%	408
USING COMPENSATION[2]								
Time fixed effects model	0.0645	0.0257	2.51	0.0388	0.0216	1.80	93.0%	408
Region fixed effects model	0.1244	0.0326	3.82	0.0084	0.0044	1.92	92.4%	408
Combined fixed effects model	0.1290	0.0329	3.92	0.0084	0.0044	1.92	92.4%	408
USING WAGES & SALARIES								
Time fixed effects model	0.0819	0.0249	3.29	0.0364	0.0209	1.74	92.5%	408
Region fixed effects model	0.1584	0.0296	5.34	0.0328	0.0048	6.90	90.0%	408
Combined fixed effects model	0.2103	0.0351	5.99	0.0325	0.0047	6.93	90.1%	408
Parameters currently in use (produced by time fixed effects model, 1986-1998)	0.11			0[3]				

Note: Values of the dummy variables are not shown as they are not essential.

[1] Compensation + proprietors' income.

[2] Wages and salaries + employer contributions to pension and insurance funds + employer contributions to government social insurance.

[3] This elasticity was originally estimated to be a negative value, and was set to zero in order to fit the model equation.

Conclusion

The use of compensation of employees produces lower values of α_1, the rate of change in the compensation rate induced by a unit rate of change in employment opportunity, compared to the use of wages and salaries. This is true for both the time fixed effects and the region fixed effects models. For α_2, the similar impact on the dynamic change of the compensation rate caused by a unit rate of change in occupational employment demand, the use of compensation in the region fixed effects model produces the lowest value. The lower α_1 for the compensation rate equation compared to the wage rate equation suggests that employers adjust take-home pay more based on employment opportunity (labor market conditions) than benefit pay. The α_2 has a similar value for both the compensation rate and wage rate equations, suggesting employers adjust both take-home and benefit pay approximately the same amount based on occupational employment demand. The α_1 for the earnings rate equation is higher than that of both the compensation and wage rate equations, and the α_2 is much lower. The higher α_1 suggests that proprietors' (the self-employed) adjust their earnings more given the labor market conditions than the occupational employment demand.

Under the current economic conditions with decreasing employment and income, the time fixed effects model results may be more realistic.

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