Insights into Wage Distributions

How Many Make How Much?

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Background

- We now have accumulated 25 years (100 quarters) of wage microdata.
- The Texas LMCI department has maintained its own private copy of this microdata in its data warehouse for internal analysis.
- That is > 1 billion rows of wage data, linked relationally to our employer-level records.
- This presentation is based on analysis of that raw data, focusing mostly on the private sector.
Wage Distributions

• The distribution of wages (a subset of income) have always been a core issue for economists to study.
• The underlying data we study here include wages, salaries and bonuses – not capital gains or other forms of income or wealth.
• Simple arithmetic distributions – and arithmetic averages – are not very useful.
• These data naturally scale logarithmically – they grow by multiplying, not by adding.
Texas Private Sector Jobs, 2014 Q1
Distributed by Quarterly Wages Logarithmically

- Geometric mean $5,152
- Median $6,529
- Arithmetic mean $12,121
Quarterly Wages for All Texas Private-Sector Jobs vs Stable Jobs 2014 Q1

Stable median $8,840
Stable geometric mean $8,341
Stable arithmetic mean $14,986
Compare to Census QWI published $15,054

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All Jobs
Stable Jobs
Distribution of Stable Private Jobs vs Lognormal Curve
Wage Inequality

• It exists.
• It may be more meaningful to use the entire universe, not just Stable jobs, for these macroeconomic calculations. So hereafter that is what I am analyzing.
• The most popular metrics for income inequality generally are the Lorenz Curve, and its corresponding Gini Coefficient.
• Those metrics can be calculated for our wage microdata.
• These calculations are computationally expensive.
Lorenz Curve for All Texas Private Sector Wages, 2014 Q1

Gini Coefficient = .60

Top 1 percent earn 18 percent of total wages.
Wage Inequality as a Time Series

• I looked to see how relative wage inequality varied over time – the 25 years of our data.

• The inequality data do not exhibit a secular trend toward greater or less inequality.

• The data do exhibit strong seasonal and cyclical swings.
Alternate Metrics for Quarterly Wages, All Texas Private Jobs, 4-Qtr Moving Averages

Geometric Mean
Arithmetic Mean
Median
QCEW Avg
Another Metric for Inequality

• The arithmetic mean is dominated by high-earners.
• The geometric mean is dominated by rank-and-file earners.
• Compute the ratio of these two means, yielding a coefficient between 0 and 1.
• Following D.G. Champernowne (1973), subtract this ratio from 1 to yield an index of inequality.
• This correlates highly with the Gini Coefficient, but is much more easily computable.
Champernowne Index of Inequality as a Quarterly Time Series

1 - Geom/Arith Ratio
Champernowne Index with seasonality removed = the Business Cycle

Jobs Dot-com Recession begins 2001 Q1
Jobs Great Recession begins 2008 Q1

1 - Geom/Arith MA Ratio