



Estimation of Disability Unemployment Statistics

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Florida's estimated unemployment statistics for persons with a disability are calculated as a weighted average of multiple estimators, all benchmarked to the statewide Local Area Unemployment Statistics (LAUS) population size estimates. The goal is to provide a version of the underlying Current Population Survey (CPS) data that is comparable to LAUS and stabilized as far as possible without losing responsiveness to changes over time or artificially smoothing real underlying volatility.

Each data source listed below provides an estimate of the total numbers of persons with a disability in Florida who are employed, unemployed, and not in the labor force. These component estimates are calculated by taking the ratio of the relevant disabled population to the relevant total population in the sample, then multiplying it by the LAUS estimate of the size of Florida's total population in the component category, to generate a statewide estimate.

These estimates are then adjusted to account for systematic differences between the CPS-FL estimates and the national CPS and American Community Survey (ACS) estimates, which result from geographic variation and sampling frame differences respectively. This adjustment is a simple bias correction by subtracting a constant term μ (the difference between the mean of a CPS-FL estimate and the mean of the alternate estimator), from the respective alternate estimates. The adjustment is applied only in cases where the difference between μ and zero is statistically significant.

Finally, we average these estimates from each source into a composite estimate for each count, which can be used to derive the unemployment and labor force participation rates for persons with a disability in Florida.

Data inputs:

The following sources each provide a component estimator for employed, unemployed, and not in labor force populations:

- ACS-FL – Population 16 years and over, civilian employed and unemployed, disabled or not, not seasonally adjusted, yearly. *Note: ACS data is annual; the most recent ACS value is used for each month.*
- CPS-FL – Civilian noninstitutionalized population 16 years and over, employed and unemployed, disabled or not, not seasonally adjusted, monthly.
- CPS-US – Civilian noninstitutionalized population 16 years and over, employed and unemployed, disabled or not, not seasonally adjusted, monthly.
- CPS-FL 12 Month Moving Average of the disability ratio (the proportion of each component group that reports having at least one disability). This is the sum of a given month's ratio with its previous 11 months and then divided by 12. Added as a component of the index to dampen volatility.

- 1 Month Lag – the previous month’s estimate, added as a component of the index due to autocorrelation.

Additional data inputs are:

- LAUS-FL – used as a baseline for generalizing disability ratio numbers to population-scale estimates, since the disabled population in the labor force is a subset of the entire labor force. Seasonally adjusted, monthly.
- w_i – weights between zero and one; they should all sum to one. *Note: for the time being, all components are weighted equally in this experimental version of the measure.*
- μ – the difference between the mean of CPS-FL estimate and the mean of the component estimate, used to adjust the component estimate for bias. *Note: this is only used when its difference from zero is statistically significant, which is only true of the ACS-FL and CPS-US estimates.*

Formula for Total Employment Among Persons with Disabilities:

(The equivalent formula is also used to estimate Total Unemployment and Total Not in Labor Force.)

$$\text{Disability Employment} = \sum_{i=1}^4 \left(w_i * \text{LAUS Employed} * \frac{\text{Employed, with disability}_i}{\text{Employed}_i} \right) + w_5 * \text{Lag},$$

$$\sum_{i=1}^5 w_i = 1 \text{ and } 1 \geq w_i \geq 0$$

Note that the formula allows the weights of the estimators to vary. However, diagnostic tests do not indicate any significant difference in precision between the estimators. As a result, this experimental series employs a simple average with equal weights.

Numeric Example:

For a case where one of the sources for a given month contains:

4,100 employed respondents, **215** of whom report having disabilities
260 unemployed respondents, **35** of whom report having disabilities

And the LAUS labor force estimate for Florida for that month is:

9,550,000 employed individuals
530,000 unemployed individuals

Then the estimated number of *employed people with a disability* in FL from that source, for that month would be:

$$\frac{\text{Employed, with a disability (in sample)}}{\text{Total Employed (in sample)}} * \text{LAUS Employed} =$$

$$\frac{215}{4,100} * 9,550,000 = 0.05244 * 9,550,000 = \mathbf{500,793}$$

And the estimated number of *unemployed people with a disability* would be:

$$\frac{\text{Unemployed, with a disability (in sample)}}{\text{Total Unemployed (in sample)}} * \text{LAUS Unemployed} =$$

$$\frac{35}{260} * 530,000 = 0.13462 * 530,000 = \mathbf{71,346}$$

The implied *unemployment rate among people with a disability* would then be:

$$\frac{\text{Unemployed}}{\text{Employed+Unem}} = \frac{71,346}{(500,793+71,346)} = \frac{71,346}{572,139} = 0.1247 \text{ (or } \mathbf{12.5\%})$$

However, in the composite index the component employed and unemployed counts from each data source are first averaged to produce a single estimate of each, prior to combining them to derive an unemployment rate. Furthermore, if the components are from ACS-FL or CPS-US, the employed and unemployed estimates will be adjusted by μ_e and μ_u respectively—the differences between the mean of the CPS-FL estimates and the mean of the component estimates.

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