This note describes a method for constructing a demographically adjusted labor force participation rate using the method of Shimer (1998).

We first partition the civilian noninstitutional population into 14 age-sex cells: ages 16-19, 20-24, 25-34, 35-44, 45-54, 55-64 and 65+ for both male and females. The BLS publishes monthly civilian population and labor force levels for each of these groups back to 1948. For each cell, the labor force participation rate (LFPR) is defined as the ratio of the labor force to population. Unfortunately the female age 55-64 and male/female age 65+ LFPRs are not seasonally adjusted. We seasonally adjust them with the Bank of Spain’s TRAMO-SEATS software. For each of these cells, the seasonally adjusted labor force level is defined as the seasonally adjusted LFPR times the non-seasonally adjusted population level.

Next we perform a rebalancing so that, for both males and females, the sum of the seasonally adjusted labor force levels across age groups is equal to the total seasonally adjusted labor force level for the sex group. These rebalances are generally quite small. Letting \( \theta_i^t \) denote the population share of cell \( i \) in month \( t \) [defined as the cell’s population divided by the total age 16+ civilian noninstitutional population] and \( LFPR_i^t \) denote the labor force participation rate for cell \( i \) in month \( t \), the change in the aggregate labor force participation rate due to demographics from \( t-1 \) to time \( t \) is defined as

\[
(1) \Delta_{t,t-1} = \sum_{i=1}^{14} \left[ \theta_i^t - \theta_i^{t-1} \right] \left[ \frac{LFPR_i^t + LFPR_i^{t-1}}{2} \right]
\]

We define the following recursion (assuming for expositional clarity that the employment data ends in April 2012)

\[
(2) Cum\Delta_{Apr12,Apr12} = 0
\]

\[
(3) Cum\Delta_{Apr12,Apr12-k} = Cum\Delta_{Apr12,Apr12-(k-1)} - \Delta_{Apr12-(k-1),Apr12-k} (k > 0)
\]

Demographically adjusted LFPR is then

\footnote{To see why this step is needed, see http://www.bls.gov/cps/eetech_seas.pdf.}
(4) \( \text{AdjLFPR}_h = LFPR_h - \text{Cum}\Delta_{Aug11,h} \)

where \( LFPR_h \) is the aggregate labor force participation rate. Demographically adjusted LFPR is indexed so that it equals actual LFPR in April 2012. To reindex it so that it equals actual LFPR in, say, January 2000, we use the formula

(5) \( \text{AdjLFPR}^*_h = \text{AdjLFPR}_h + (LFPR_{Jan2000} - \text{AdjLFPR}_{Jan2000}) \)

where \( \text{AdjLFPR}^*_h \) is the reindexed demographically-adjusted LFPR.

References