

Weekly Coal Production Estimation Methodology

Step 1 (Estimate total amount of weekly U.S. coal production)

U.S. coal production for the current week is estimated using a ratio estimation from the given equation below;

$$\widehat{P}_{w(t)} = C_{w(t)} \times \mu_{pc_q} \times \left\{ 1 + \frac{2}{3} (\delta_{pc_q} - 1) \right\} \quad (1)$$

where

$\widehat{P}_{w(t)}$ = Estimated total U.S. coal production for the current week

$C_{w(t)}$ = Total number of U.S. railcar loadings of coal for the current week

μ_{pc_q} = A weighted average of the ratio of production over railcar loadings.

A three-quarter average is used to lessen quarter-to-quarter changes in the estimated ratio. More weight is given to the quarter one year earlier to account for any seasonal fluctuations.

$$i. e. \mu_{pc_q} = \frac{1}{4} \left(\frac{P_{q(t-3)}}{C_{q(t-3)}} \right) + \frac{1}{2} \left(\frac{P_{q(t-4)}}{C_{q(t-4)}} \right) + \frac{1}{4} \left(\frac{P_{q(t-5)}}{C_{q(t-5)}} \right)$$

where

$P_{q(t)}$ = Total coal production for the current quarter (U.S.Total)

$C_{q(t)}$ = Total railcar loadings of coal for the current quarter (U.S.Total)

δ_{pc_q} = A growth rate to allow for change in the ratio of production tons per railcar loading of coal. This computes the change in a three-quarter average over the course of one year. This is multiplied by 2/3 to moderate extreme values.

Unlike μ_{pc_q} , this is computed using the most recent data available from MSHA, which is usually a two-quarter lag, although it may be a one-quarter lag for the last few weeks of a quarter.

$$i. e. \delta_{pc_q} = \left(\frac{\frac{\Sigma(P_{q(j)} + P_{q(j-1)} + P_{q(j-2)})}{\Sigma(C_{q(j)} + C_{q(j-1)} + C_{q(j-2)})}}{\frac{\Sigma(P_{q(j-4)} + P_{q(j-5)} + P_{q(j-6)})}{\Sigma(C_{q(j-4)} + C_{q(j-5)} + C_{q(j-6)})}} \right), \quad \delta_{pc_q} \in [0.95, 1.05]$$

where

$P_{q(j)}$ = Most recently available quarterly coal production (U.S.Total)

$C_{q(j)}$ = Total railcar loadings of coal for quarter j (U.S.Total)

Step 2 (Allocate to state level)

Allocate weekly U.S. coal production estimated in **Step 1** above to the state level by using state production share of the latest available quarterly coal production data from MSHA. Aggregate state level data to get coal basin and other regional level totals.

The estimated U.S. coal production for the current week in **Step 1** is allocated to the state level by using the following formula;

$$\widehat{SP}_{w(t)} = \widehat{P}_{w(t)} \times \mu_{sps_q} \times \left\{ \mathbf{1} + \frac{2}{3} \left(\delta_{sps_q} - \mathbf{1} \right) \right\} \quad (2)$$

where

$\widehat{SP}_{w(t)}$ = Estimated coal production of a specific state for the current week

$\widehat{P}_{w(t)}$ = Estimated total U.S. coal production for the current week

μ_{sps_q} = A weighted average of the coal production share for a state

$$i. e. \mu_{sps_q} = \frac{1}{4} \left(\frac{SP_{q(t-3)}}{P_{q(t-3)}} \right) + \frac{1}{2} \left(\frac{SP_{q(t-4)}}{P_{q(t-4)}} \right) + \frac{1}{4} \left(\frac{SP_{q(t-5)}}{P_{q(t-5)}} \right)$$

where

$SP_{q(t)}$ = Total coal production for the current quarter (State Total)

$P_{q(t)}$ = Total coal production for the current quarter (U.S.Total)

δ_{sps_q} = A growth rate of the coal production share for a state

$$i. e. \delta_{sps_q} = \left(\frac{\frac{\Sigma(SP_{q(j)} + SP_{q(j-1)} + SP_{q(j-2)})}{\Sigma(P_{q(j)} + P_{q(j-1)} + P_{q(j-2)})}}{\frac{\Sigma(SP_{q(j-4)} + SP_{q(j-5)} + SP_{q(j-6)})}{\Sigma(P_{q(j-4)} + P_{q(j-5)} + P_{q(j-6)})}} \right), \quad \delta_{sps_q} \in [0.71, 1.41]$$

where

$SP_{q(j)}$ = Most recently available quarterly coal production (State Total)

$P_{q(j)}$ = Most recently available quarterly coal production (U.S.Total)

The subsequent remainder (if any) of the estimated U.S. weekly coal production amount is allocated proportionally to each state using the same methodology as equation (2) above.

These estimates rely on the most recent MSHA data, which is usually a two-quarter lag, with only a one-quarter lag the last few weeks of a quarter. Because of this lag, significant industry changes may not be accurately reflected in the estimation process. Estimates are revised with actual data once it is available from MSHA.