Answer on Question #88467 – Math – Algebra

Question

1. In $ln\,Y = b_1 + b_2 ln(L) + b_3 ln(K)$, where $b_2 + b_3 = 1$, $b_2 + b_3 - 1 = 0$. Defining $c = b_2 + b_3 - 1$, $b_2 = c - b_3 + 1$, how is $ln\left(\frac{Y}{L}\right) = b_1 + cln(L) + b_3 ln\left(\frac{K}{L}\right)$ derived from $ln(Y) = b_1 + (c - b_3 + 1)ln(L) + b_3 ln(K)$.

Solution

$$ln(Y) = b_1 + (c - b_3 + 1)ln(L) + b_3\,ln(K)$$

$$= b_1 + c\,ln(L) - b_3\,ln(L) + ln(L) + b_3 ln(K)$$

$$= b_1 + c\,ln(L) + ln(L) + b_3\big(ln(K) - ln(L)\big)$$

$$ln(Y) - ln(L) = b_1 + c\,ln(L) + b_3\big(ln(K) - ln(L)\big)$$

By using the property of logarithms, $ln\left(\frac{p}{q}\right) = ln(p) - ln(q)$, we get

$$ln\left(\frac{Y}{L}\right) = b_1 + cln(L) + b_3 ln\left(\frac{K}{L}\right).$$

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