

$$\begin{aligned}
b_2^{\text{MHK}} &= \frac{\sum_{i=1}^n (p_i - \bar{p})(w_i - \bar{w})}{\sum_{i=1}^n (w_i - \bar{w})^2} = \frac{\sum_{i=1}^n ([\beta_1 + \beta_2 w_i + u_{pi}] - [\beta_1 + \beta_2 \bar{w} + \bar{u}_p])(w_i - \bar{w})}{\sum_{i=1}^n (w_i - \bar{w})^2} = \\
&= \frac{\sum_{i=1}^n (\beta_2 (w_i - \bar{w})(w_i - \bar{w}) + (u_{pi} - \bar{u}_p)(w_i - \bar{w}))}{\sum_{i=1}^n (w_i - \bar{w})^2} = \beta_2 + \frac{\sum_{i=1}^n (u_{pi} - \bar{u}_p)(w_i - \bar{w})}{\sum_{i=1}^n (w_i - \bar{w})^2}.
\end{aligned}
\tag{Y}$$