

Microeconometrics: **Clarification** page 15 Chapter 5 Instrumental Variables Estimation.

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The simple case

The following two slides explains the intention of the page 15 slide. Slide 15 in lecture slides are no revised by simply removing this confusing intention.

Replacing the population covariances with the sample covariances gives us the so-called instrumental variables estimator for the simple regression model:

$$\hat{\beta}_{1,IV} = \beta_1 + \frac{n^{-1} \sum_{i=1}^n (z_i - \bar{z}) u_i}{n^{-1} \sum_{i=1}^n (z_i - \bar{z})(w_i - \bar{w})}$$

The simple case

As w is in the denominator we can only show unbiasedness of the IV estimator when it is not needed, that is, when w is independent with u .

If $E(u|w, z) = 0$ then, by random sampling,

$$E(u_i | \mathbf{W}, \mathbf{Z}) = 0 \quad \forall i.$$

and then $E(\beta_{1,IV}) = \beta_1$