# Errata for “MPhil Econometrics – Limited Dependent Variables and Selection”

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This document contains errata for my lecture slides. The times and dates given below refer to the *most recent version* of the document that contained the error. Subsequent versions have been corrected.

**Version: 2020-02-04 at 21:02:39**

- Lecture 3
  - Slide 11: In the left column of the slide two instances of $G(\mathbf{x}'\boldsymbol{\beta})$ have been corrected to $G(\mathbf{x}_i'\boldsymbol{\beta})$.
  - Slide 15: $\frac{\partial \mathbf{s}_i}{\partial \boldsymbol{\beta}'} = \frac{\partial}{\partial \boldsymbol{\beta}}(\text{stuff})$ has been corrected to $\frac{\partial \mathbf{s}_i}{\partial \boldsymbol{\beta}'} = \frac{\partial}{\partial \boldsymbol{\beta}'}(\text{stuff})$, i.e. a missing transpose has been added.
- Lecture 4
  - Slide 6: The first equality for the choice probabilities at the bottom of the slide has been corrected from $P_{ni} = \mathbb{P}(U_{nj} > U_{ni} \quad \forall j \neq i)$ to $P_{ni} = \mathbb{P}(U_{ni} > U_{nj} \quad \forall j \neq i)$.
  - Slide 9: In the expression for $P_{\text{car}}$, the difference of representative utilities $V_{\text{bus}} - V_{\text{car}}$ has been corrected to $V_{\text{car}} - V_{\text{bus}}$.
  - Slide 9: In the expression for $P_{\text{bus}}$, the difference of representative utilities $V_{\text{car}} - V_{\text{bus}}$ has been corrected to $V_{\text{bus}} - V_{\text{car}}$.
  - Slide 15: In the rightmost boxed equation near the bottom of the slide, $(\mathbf{x}_{nj}^*)'(\boldsymbol{\beta}/\sigma)$ has been corrected to $\mathbf{x}_{nj}'(\boldsymbol{\beta}/\sigma)$
  - Slide 19: At the bottom of the slide, $\mathbf{s}_n'\boldsymbol{\gamma}$ has been corrected to $\mathbf{s}_n\boldsymbol{\gamma}_j$
  - Slide 20: Under the heading “Likelihood” $f(y_i|\mathbf{z}_i, \boldsymbol{\theta})$ has been corrected to $f(y_n|\mathbf{z}_n, \boldsymbol{\theta})$

**Version: 2020-02-02 at 17:11:59**

- Lecture 3
  - Slides 6–7: I originally forgot to include the limits at infinity and minus infinity as assumptions of the index model. These have been added to slide 6, and slide 7 now refers back to them.
  - Slide 9: At the bottom-left of the slide, the partial effect for Probit was incorrect: $\exp\{-\mathbf{x}'\boldsymbol{\beta}/2\}$ has been corrected to $\exp\left\{-(\mathbf{x}'\boldsymbol{\beta})^2/2\right\}$
  - Slide 16: In Step 4, the original expression forgot to condition on $\mathbf{x}_i$. I've added "$|\mathbf{x}_i$" to the inner expectation to correct this.
  - Slide 19: Added a sentence about why I don't like pseudo R-squared. You'll learn more on the problem set!

**Version: 2020-01-30 at 12:34:30** One of these typos is arguably major.

- Lecture 2
  - Slide 4: In the first order condition at the bottom of the slide, two instances of $\mathbf{x}'y$ have been changed to $\mathbf{x}y$.
  - Slide 9: Under the heading "Sample" in the left column, $\boldsymbol{\theta}_o$ has been changed to $\widehat{\boldsymbol{\theta}}$.
  - Slide 19: In the expression for $\mathbf{K}$, $\mathbf{x}_i\mathbf{x}_i'$ was missing from the third equality. It has been added.
  - Slide 20: The inequality for Underdispersion ran the wrong way: $\sigma^2 > 1$ has been corrected to $\sigma^2 < 1$.

**Version: 2020-01-29 at 12:10:36**

- Lecture 1
  - The definition of $s_y^2$ on slide 20 was incorrect: $(y_i - \bar{y})$ has been corrected to $(y_i - \bar{y})^2$.

**Version: 2020-01-28 at 12:10:09** Major errors are indicated in red and a "meta-erratum," i.e. something that I *said* was an error in lecture but is in fact correct, is indicated in blue.

- Lecture 1

- Slide 15: "$\boldsymbol{\theta}_o$ is consistent for $\boldsymbol{\theta}_o$" has been corrected to "$\widehat{\boldsymbol{\theta}}$ is consistent for $\boldsymbol{\theta}_o$"

- Lecture 2
  - Slide 2: In the bottom-most displayed equation there is a $\boldsymbol{\beta}$. In class I said that this should be a $\boldsymbol{\theta}$ but I was wrong. Here $\boldsymbol{\theta}$ is being used to indicate a vector of *arbitrary* parameter values while $\boldsymbol{\beta}$ is being used to indicate a *particular* vector of parameter values: the solution to the population least-squares problem.
  - Slide 4: in the middle displayed equation, $(\mathbf{A} + \mathbf{A}')\mathbf{x}$ has been corrected to $(\mathbf{A} + \mathbf{A}')\mathbf{z}$
  - Slide 4: in the bottom-most displayed equation $\boldsymbol{\theta}$ has been corrected to $\boldsymbol{\beta}$. See my "meta-erratum" above.
  - Slide 5: At the bottom of the slide I wrote that $\log(0)$ equals $\infty$. This has been corrected to $-\infty$.
  - Slide 7: Just under the heading "Assumption:" I wrote $\beta_o$ and $\beta$. These have been changed to **boldface**: $\boldsymbol{\beta}_o$ and $\boldsymbol{\beta}$.
  - Slide 10: In the final displayed equation of the slide $\exp(\mathbf{x}_i\boldsymbol{\beta})$ has been corrected to $\exp(\mathbf{x}_i'\boldsymbol{\beta})$
  - Slide 15: in the FOC at the bottom of the slide $\{\mathbb{E}[y_i|\mathbf{x}_i] - \exp(\mathbf{x}_i'\boldsymbol{\beta})\}\,\boldsymbol{\beta}$ has been correct to$\{\mathbb{E}[y_i|\mathbf{x}_i] - \exp(\mathbf{x}_i'\boldsymbol{\beta})\}\,\mathbf{x}_i$.
  - Slide 16: in the FOC at the *top* of the slide $\{\mathbb{E}[y_i|\mathbf{x}_i] - \exp(\mathbf{x}_i'\boldsymbol{\beta})\}\,\boldsymbol{\beta}$ has been corrected to$\{\mathbb{E}[y_i|\mathbf{x}_i] - \exp(\mathbf{x}_i'\boldsymbol{\beta})\}\,\mathbf{x}_i$.

**Version: 2020-01-26 at 22:50:29** All of these are "minor errors"

- Lecture 1
  - Slide 8: "What parameter value $\theta_0$" should be "What parameter value $\theta_o$"
  - Slide 11: the denominator of the definition of $\mathbf{J}$ at the bottom of the slides contains a $\partial^2$ that should be simply $\partial$
  - Slide 13: $\mathbf{y}$ in the definitions of $\mathbf{J}$ and $\mathbf{K}$ should be $\mathbf{y}_i$ to be consistent with the rest of the slide
  - Slide 14: at the bottom of the slide $\widehat{\mathbf{J}}^{-1}\mathbf{K}\widehat{\mathbf{J}}^{-1}$ should be $\widehat{\mathbf{J}}^{-1}\widehat{\mathbf{K}}\widehat{\mathbf{J}}^{-1}$, i.e. the $\mathbf{K}$ should have a "hat" over it

- Slide 16: the left hand side of the second to last displayed equation on the slide reads $\mathbb{E}\left[\frac{\partial \log f(\mathbf{y}|\boldsymbol{\theta}_o)}{\partial \theta}\right]'$ but the $'$ should be deleted
- Slide 21: At the bottom left of the slide $y_n$ should be $y_N$
- Slide 21: Two instances of $y_n$ should be $y_N$