Errata for Principles of Econometrics, 3e

Second and Third Printing

Page	Date	Correction
Inside cover, formula page on right	7-Oct-08	The formula for the least squares estimator should have $\left(y_i - \bar{y}\right)$ in the numerator, <u>not</u> $\left(y_i - \bar{x}\right)$. That is $b_2 = \frac{\sum\left(x_i - \bar{x}\right)\left(y_i - \bar{y}\right)}{\sum\left(x_i - \bar{x}\right)^2}$. Thanks to Andrew Keenan, LSU.
18	9 Sept 09	In Table 2.1, the Std. Dev. Of Food Expenditure, in summary statistics, should be 112.6752 [Thanks to Gawon Yoon]
26	27 Feb 09	In line 6: "…refer to Table A.2 and Figure **A.3** often…" James Hurley, Louisiana State University
60	22 Apr 08	8^{th} line from bottom of page, change "at least" to "more than". This reduces ambiguity. Chris Skeels (University of Melbourne)
79	1 Feb 09	1^{st} line: "…sample mean $\bar{x}$ …" Filip Van den Bossche (Hogeschool-Universiteit (HU)Brussel, Belgium)
98	1 Feb 09	Exercise 4.8: To be consistent with the remainder of the book, the parameters in the first equations could be β_1 (intercept) and β_2 (slope). Similarly in the parameters of the second equation could be α_1 and α_2, and in the third equation γ_1 and γ_2. Filip Van den Bossche (HUBrussel, Belgium)
99	22 Sept 09	Exercise 4.11 (b): last sentence should read "Is it larger or smaller than the error computed in part **(a)**
99	28 Mar 10	Exercise 4.11 (d) should read "… that the **incumbent** party (Democrats) …" This is actually the year the Democrats won the popular vote but lost the election due to the U.S. Electoral College system. Jonathan Powell (Manchester)

104	3 June 09	2nd line from bottom: In the formula for the rate of return estimator there should be a minus (−) rather than a plus (+) in the exponential term. That is, the rate of return estimator should be $\hat{r} = e^{\widehat{b_2 - \text{var}(b_2)/2}} - 1$ The explanation is that the "natural" estimator of the return $r = \exp(\beta_2) - 1$ is $\hat{r}_n = \exp(b_2) - 1$. This estimator has expected value $E(\hat{r}_n) = \exp(\beta_2) \times \exp[\text{var}(b_2)/2] - 1$ We can correct the natural estimator as $\hat{r}_c = \exp(b_2) \times \exp[-\text{var}(b_2)/2] - 1 = \exp[b_2 - \text{var}(b_2)/2] - 1$ so that $E(\hat{r}_c) = r$. Mike Rabbitt (John Deere)
122	22 Sept 09	3rd line from bottom should read "$\beta_2 \geq 0$ a decrease in price leads to a decrease in sales revenue (demand is **unit elastic or** price inelastic), or Filip Van den Bossche (HUBrussel, Belgium)
150	27 Mar 08	5th line below Eqn (6.23) "… first note that $\beta_3 > 0$ because **wife's** education …" Genevieve Briand (Eastern Washington)
155	1 Feb 09	5th line of text "… additional cylinder reduces miles per gallon of gasoline by 3.6 miles per gallon, …" Filip Van den Bossche (HUBrussel, Belgium)
171	1 Feb 09	Line 14 is better presented as "…parameter δ is that it is a **location premium**, the difference …" Filip Van den Bossche (HUBrussel, Belgium)
175	1 Feb 09	Line 2 Based on one-tail *t*-tests of significance at the $\alpha = 0.05$ …." After the word "significance" insert the footnote [Recall that the *p*-value for a one-tail test is half of the reported two-tail *p*-value] Filip Van den Bossche (HUBrussel, Belgium)
185	1 Feb 09	In section 7.5.1a, in the 6th line of text, the reference should be to Table A.3 and not Table A.2. Filip Van den Bossche (HUBrussel, Belgium)

202	20 Aug 08	The White standard error of 1.81 for the slope coefficient is computed using the White variance estimator $\widehat{\text{var}(b_2)} = \dfrac{N}{N-2}\sum_{i=1}^{N} w_i^2 \hat{e}_i^2 = \dfrac{N}{N-2} \dfrac{\sum_{i=1}^{N}\left[(x_i-\bar{x})^2 \hat{e}_i^2\right]}{\left[\sum_{i=1}^{N}(x_i-\bar{x})^2\right]^2}$. This modification of equation (8.9) includes a multiplicative factor *N/*(*N*−2). The source of this adjustment follows from the discussion on pages 33 and 34 of POE/3e. Namely, the expected value of the sum of squared regression errors is $E\left[\sum e_i^2\right] = N\sigma^2$. However the expected value of the sum of the squared least squares residuals is $E\left[\sum \hat{e}_i^2\right] = \left(N-2\right)\sigma^2$. The squared least squares residuals are smaller, on average, than the true regression errors. The adjustment is to offset this fact. The White standard error using equation (8.9) is 1.76327. Thanks to Genevieve Briand (Eastern Washington University)
211	2 Feb 09	Lines 15-16: "…we plotted the estimated least squares function and the residuals and reported them in Figure 8.2." Actually Figure 8.2 does not show the residuals explicitly, but it does show them implicitly, because the residuals are the (vertical) distance between the observed values and the fitted least squares line. Filip Van den Bossche (HUBrussel, Belgium)
227	1 Feb 09	Lines 8-9 may be better worded as "The level of income observed in the Smith's household, for example, does not affect, nor is it affected by, the level of income in the Jones' household." Filip Van den Bossche (HUBrussel, Belgium)

234	24 Mar 09	The value for r_1 given by equation (9.18) should be $$r_1 = \frac{\sum_{t=2}^{T} \hat{e}_t \hat{e}_{t-1}}{\sum_{t=2}^{T} \hat{e}_{t-1}^2} = \frac{1.196874}{2.997871} = 0.399$$ instead of the reported value of $r_1 = 0.404$. The discrepancy arises because of the way in which the means of the series $\hat{e}_t$ and $\hat{e}_{t-1}$ are treated. If these means are taken as zero, we get $r_1 = 0.399$. If we recognize that the least squares residuals will no longer have zero means when the first or the last observation is omitted, we obtain $$r_1 = \frac{\sum_{t=2}^{T}\left(\hat{e}_t - \bar{\hat{e}}_{[-1]}\right)\left(\hat{e}_{t-1} - \bar{\hat{e}}_{[-T]}\right)}{\sum_{t=2}^{T}\left(\hat{e}_{t-1} - \bar{\hat{e}}_{[-T]}\right)^2} = 0.404$$ where $\bar{\hat{e}}_{[-1]}$ is the sample mean of the $\hat{e}_t$, with the first observation excluded and $\bar{\hat{e}}_{[-T]}$ is the sample mean of the $\hat{e}_t$, with the last observation excluded. In general the difference between the two alternative formulas will be slight and it disappears as the sample size gets larger. Some software calculates a third estimator $$r_1 = \frac{\sum_{t=2}^{T} \hat{e}_t \hat{e}_{t-1}}{\sum_{t=1}^{T} \hat{e}_t^2} = \frac{1.196874}{3.031571} = 0.395$$ In this case the summation in the denominator includes the extra term $\hat{e}_1^2$. In large samples the difference between the 3 alternatives will be negligible.

<table>
<tr><td>240</td><td>24 Mar 09</td><td>The above issue arises again when the correlations $r_1, r_2, \ldots, r_6$ are presented. The alternative values are:
<table>
<tr><th>Correlation</th><th>Not mean corrected</th><th>Mean corrected</th><th>T observations in denominator</th></tr>
<tr><td>r_1</td><td>0.399</td><td>0.404</td><td>0.395</td></tr>
<tr><td>r_2</td><td>0.120</td><td>0.122</td><td>0.117</td></tr>
<tr><td>r_3</td><td>0.083</td><td>0.084</td><td>0.081</td></tr>
<tr><td>r_4</td><td>–0.327</td><td>–0.353</td><td>–0.320</td></tr>
<tr><td>r_5</td><td>–0.381</td><td>–0.420</td><td>–0.371</td></tr>
<tr><td>r_6</td><td>–0.143</td><td>–0.161</td><td>–0.138</td></tr>
</table></td></tr>
<tr><td>248</td><td>1 Feb 09</td><td>Below eqn (9.44), after "$\text{cov}(v_t, v_s) = 0$", add "$(t \neq s)$" Filip Van den Bossche (HUBrussel, Belgium)</td></tr>
<tr><td>291</td><td>4 Nov 08</td><td>In Table 10.2 the coefficient and t-statistic for VHAT should have a positive sign. Thanks to Genevieve Briand (Eastern Washington University).</td></tr>
<tr><td>293</td><td>27 Feb 09</td><td>In the data files, the variables y= INFLATION, x=MONEY GROWTH and z=OUTPUT GROWTH</td></tr>
<tr><td>321</td><td>1 Feb 09</td><td>For Exercise 11.9, parts (e) and (f), the value for PF is missing for 2000. Use the 1999 value for PF (0.61765) in its place. In part (g), subpart (i) should end with a period (.) rather than a question mark (?). Filip Van den Bossche (HUBrussel, Belgium)</td></tr>
<tr><td>344</td><td>22 Sept 09</td><td>Exercise 12.6(b) should end with a question mark "?"</td></tr>
<tr><td>345</td><td>1 Feb 09</td><td>Exercise 12.10. "… from the first quarter of 1980 to the third quarter of 2006. Filip Van den Bossche (HUBrussel, Belgium)</td></tr>
<tr><td>350</td><td>28 Nov 08</td><td>In equation (13.7) the value of R^2 is computed by the EViews software as 1−SSE/SST. This is sometimes called the "centered" R^2 because $SST = \sum (y_i - \bar{y})^2$. When no intercept is included in a regression an alternative definition of $R^2 = 1 - SSE / \sum y_i^2$. This "uncentered" R^2 is computed by SAS, Stata and Excel in the no-intercept model. For equation (13.7) this value is 0.99965. A better policy when a model does not include an intercept is to not report an R^2 at all</td></tr>
</table>

369	22 Dec 08	The *LM* statistic value (reported 9 lines from bottom) is $LM = (T-1)R^2 = 499 \times 0.124 = 61.876$. This calculation is correct. Computer software reports $R^2 = 0.124568$, and using this value for the calculation results in $LM = (T-1)R^2 = 499 \times 0.124568 = 62.1595$
380	1 Feb 09	There is an error in *gold.def*. Obs: 200, daily (12.13.2003-9.19.2006) should be Obs: 200, daily (12.13.2005-9.19.2006). Filip Van den Bossche (HUBrussel, Belgium)
384	1 Feb 09	Christian Kleiber (Universität Basel) and Achim Zeileis (Wirtschaftsuniversität Wein) have discovered that the Grunfeld data used in our book *POE3* (and others as well!) differ from Grunfeld's original data. These authors have documented the differences (some might call them errors!) at http://statmath.wu-wien.ac.at/~zeileis/grunfeld/ We will correct our errors, which cause only minor changes in estimates, in the next edition of *POE*.
392	1 Feb 09	In equation (15.12): remove indices 2 and 3 from V_{2it} and K_{3it}. Filip Van den Bossche (HUBrussel, Belgium)
398	24 Dec 08	In line 7 the $F_{(0.99,715,2858)}$ critical value is given as 1.0. That is the limit of accuracy using Table 5 F-critical values (page 576). Using statistical software we can compute the "exact" critical value, 1.14463.
401	3 June 08	In equation (15.28), the term in curly braces should be squared. Thanks to Marcel Priebsch, Stanford University
401	1 Feb 09	Below equation (15.28) the text should read: "The test works because the numerator will contain terms like $2\hat{e}_{i1}\hat{e}_{i2} + 2\hat{e}_{i2}\hat{e}_{i3} + \cdots$ whose sum …" Filip Van den Bossche (HUBrussel, Belgium)
402	16 Feb 08	Delete equation number (15.31). The last sentence before Section 15.5.4 should read "Then, least squares is applied to (15.29) with σ_e^2 and σ_u^2 replaced by $\hat{\sigma}_e^2$ and $\hat{\sigma}_u^2$ in the parameter α". Thanks to Vera Tabakova (East Carolina).
403	26 Oct 09	The next to last sentence in Section 15.5.5 should read "These differences are **not** picked up by the fixed effects." Thanks to Silvia Golem.
411	28 Mar 10	The solution to 4.11 (b) should be −2.91. Jonathan Powell (Manchester)

413	22 Sept 09	In Exercise 15.12, parts (a) and (b) are mislabeled. The item labeled (b) (starting "Consider a model …") should be labeled (a) and should appear first. The item labeled (a) (starting "What signs …") should be labeled (b) and appear second.
413	1 Feb 09	In Exercise 15.12, part (d): "…test whether the country level effects are all equal, or not." Filip Van den Bossche (HUBrussel, Belgium)
430	16 July 08	The 5th percentile value of *GRADES* is given as 2.635 which is halfway between observations 50 and 51 in this 1000 observation data set. While this is a common way to calculate the 5th percentile, it is not the only way. Since .05x1000=50, some software will report the 50th value, after sorting according to increasing value, 2.63. Others may take a weighted average of the 50th and 51st values, such as .95x2.63 + .05*2.64=2.6305. Thanks to Tom Doan (Estima) for noting this. Estima develops and sells RATS (Regression Analysis of Time Series), a leading econometrics and time-series analysis software package
464	1 Feb 09	When using summation operations, parentheses should be used to indicate items to be summed together. For example, $\sum_{i=1}^{n}(x_i+5)=\left(\sum_{i=1}^{n}x_i\right)+5n$ whereas $\sum_{i=1}^{n}x_i+5=\left(\sum_{i=1}^{n}x_i\right)+5$. The summation operation extends only to the term immediately to its right. Rafaella Cuff (Louisiana State University)
476	27 Aug 08	In Exercise A.4, the last term $n\overline{xy}$ on the line should be read as $n\times\bar{x}\times\bar{y}$. Thanks to Greg Upton (Louisiana State University)
557	27 Dec 07	Exercise 6.18(c): Change "10% significance level" to "5% significance level".
Rear inside cover, left side	13 April 09	The definition of the forecast error, to be consistent with equation (4.3) should be $f=y_0-\hat{y}_0$. Juan Steer Nunes, LSU.