Econometric Methods with Applications in Business and Economics

ERRATA LIST JANUARY 2010 (applies to books printed after mid 2005)

Chapter 2

Page	**Now is**	**Should be**
97 (-5/4)	The least squares estimators a and b given in (2.6) and (2.8) are linear expressions in $y_1, \ldots, y_n$. Such estimators are …	The least squares estimators a and b given in (2.6) and (2.8) are linear expressions in $y_1, \ldots, y_n$. This can be verified from (2.20), which shows that $b = \sum c_i y_i$, and (2.22), which implies that $a = \sum d_i y_i$, where the coefficients c_i and d_i do not depend on $y_1, \ldots, y_n$. Such estimators are …
107 (+11)	… $x_{21} = 10$ is in the middle …	… $x_{21} = 10$ is near the middle …

Chapter 3

Page	**Now is**	**Should be**
126 (+5)	If in addition Assumption 7 is satisfied, then …	If in addition Assumptions 2 and 7 are satisfied, then …
139 (+2)	… Exhibit 3.7 show that $X'_1 e = 0$ (Panel 3), …	… Exhibit 3.7 show that $X'_1 e = 0$ and $X'_2 e = 0$ (Panel 3), …
159 (-6)	… 0.47 (shown in Panel 2), …	… 0.47 (shown in Panel 2 of Exhibit 3.13), …
168 (+7)	F(1, 469) distribution is 3.84, so …	F(1, 469) distribution is 3.86, so …
181 (+18)	<<in 3.6>> 3.6 (☞ Section 3.1.6)	3.6 (☞ Sections 3.1.6, 3.4.1)
181 (+25)	<<in 3.6, just before a.>> add text	Assume that all considered models contain a constant term.
182 (-16)	<<in 3.11>> … $y_1 = X_1\beta + \varepsilon$ with least squares …	… $y_1 = X_1\beta + \varepsilon_1$ with least squares …

Chapter 4

Page	**Now is**	**Should be**
221 (-8)	$\beta_2(\log(d))^2$	$\frac{1}{2}\beta_2(\log(d))^2$
224 (+1)	… distribution and of the $t(5)$ distribution …	… distribution and, as an example, of the $t(5)$ distribution …
246-249	<<The standard errors of the non-	<<If ML standard errors are used,

	linear model reported in Panels 2 and 4 of Exhibit 4.19 are obtained from the NLS formulas on p. 206, see (4.12), instead of the ML formulas on p. 228 and p. 243, see (4.57). As ML uses the normal distribution, these two standard errors are asymptotically the same, but they differ in finite samples. Here, the sample size of 12 is very small.>>	then this has also consequences for the t-statistics and Probability values in Panel 2 and Panel 4 of Exhibit 4.19 on p. 248. For comparison, the ML results are reported in two tables at the end of these errata of Chapter 4.>>
247 (+6/7)	This corresponds to non-linear least squares.	This corresponds to non-linear least squares estimation of the coefficients, but the ML standard errors are based on (4.35) and (4.57) instead of the NLS standard errors that are based on (4.12).
247-249	<<The results of the Wald test are based on the NLS standard errors. The results shown on the right are obtained by using the ML standard errors. The outcomes differ quite substantially, which is due to the small number of 12 observations.>>	$t_1 = -1.119$ and $t_2 = -0.911$, and $W_1 = 2.225$ and $W_2 = 1.107$; none of these test outcomes is significant at the 5 per cent significance level
256 (-11)	<<reduce spacing>> … larger errors for …	… larger errors for …
263 (+15)	$\hat{\sigma}^2 = 4.49$	$\hat{\sigma} = 4.49$
264 (+3)	$P_{ML}^{GMM} = 0.30$	$P_{ML}^{GMM} = 0.29$
264 (+4)	$P_{ML}^{GMM} = 0.003$	$P_{ML}^{GMM} = 0.004$
264	<<In Exhibit 4.21, Panel 4, standard errors>> 0.334 & 0.066	0.339 & 0.067

Exhibit 4.19, Panel 2 and Panel 4, p. 249

Panel 2: Dependent Variable: LOGQ1 (brand 1)
Method: Maximum Likelihood
Included observations: 12
Convergence achieved after 61 iterations

LOGQ1 = C(1) + (C(2)/C(3)) * (D1^C(3)-1)

Parameter	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	5.807116	0.038795	149.6884	0.0000
C(2)	10.29759	3.546852	2.903304	0.0037
C(3)	-13.42942	12.00512	-1.118641	0.2633
Log likelihood	12.52991			

Panel 4: Dependent Variable: LOGQ2 (brand 2) Method: Maximum Likelihood Included observations: 12 Convergence achieved after 42 iterations				
LOGQ2 = C(1) + (C(2)/C(3)) * (D2^C(3)-1)				
Parameter	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	4.377873	0.039047	112.1195	0.0000
C(2)	10.27539	2.912369	3.528189	0.0004
C(3)	-8.574115	9.411835	-0.910993	0.3623
Log likelihood	11.64128			

Chapter 5

Page	**Now is**	**Should be**
304 (+16)	… that $\alpha_1 - \alpha_2$. The latter …	… that $\alpha_2 = \alpha_1$. The latter …
329 (-6)	<<at end of displayed formula>> $x_i\ b_*)^2$.	$x_i'\ b_*)^2$.
330 (-12)	Formulate the model regression model …	Formulate the regression model …
344 (-7/6)	(obtained by a regression over the n_j observations in this group).	(where e_j is the sub-vector of e containing the n_j residuals in this group).
348 (+10/21)	The Likelihood Ratio test (5.39) … P = 0.000, so that homoskedasticity is again rejected.	The Likelihood Ratio test (5.39) is based on four sums of squared residuals (*SSR*), that is, for the full sample (with n = 474 employees) and also for the three job categories separately (with sample sizes n_1 = 363, n_2 = 27, and n_3 = 84). The full sample has *SSR* = 17.864 so that $s^2_{ML} = SSR / n$ = 0.0377. For the three job categories, we get SSR_1 = 12.765 with $s^2_{1,ML} = SSR_1 / n_1$ = 0.0352, SSR_2 = 0.456 with $s^2_{2,ML} = SSR_2 / n_2$ = 0.0169, and SSR_3 = 4.643 with $s^2_{3,ML} = SSR_3 / n_3$ = 0.0553. With these values, the *LR*-test is computed as *LR* = 474 log(0.0377) – 363 log(0.0352) – 27 log(0.0169) – 84 log(0.0553) = 14.39. With the (asymptotic) $\chi^2(2)$ distribution, the P-value is 0.001, so that homoskedasticity is again rejected.

360 (+15)	<<both terms $(X'X)^{-1}$ in displayed formula>>	$\left(\frac{1}{n}X'X\right)^{-1}$ (two times)
393 (+9)	… $w_i = g(e_i)$ and estimate …	… $w_i = g(e_i) / e_i$ and estimate …
411 (-13)	Hausman text …	Hausman test …
429 (-7/6)	<<in 5.11>> … terms η_i are homoskedastic and uncorrelated. By *b* we denote …	… terms η_i are IID$(0, \sigma_\eta^2)$. By *b* we denote …

Chapter 6

Page	**Now is**	**Should be**
458 (+1/2)	outcomes provide some evidence for the presence of heteroskedasticity (P = 0.01).	outcomes do not indicate the presence of any heteroskedasticity.
458	<<In Panel 1 of Exhibit 6.4, the line with Heteroskedasticity LM test value (df = 1), 6.237 & 6.186, and the line with corresponding P-value, 0.0125 & 0.0129>>	<<Delete these two lines from Panel 1 of Exhibit 6.4>>

Chapter 7

Page	**Now is**	**Should be**
570 (-10/8)	… success equal to $\frac{1}{2}$. The first model is preferred if *B* is significantly larger than $\frac{1}{2}$, and the second model is better if if *B* is significantly smaller than $\frac{1}{2}$. One can test the hypothesis …	… success equal to $\frac{1}{2}$. The first model is preferred if *B* is significantly larger than $\frac{m}{2}$, and the second model is better if if *B* is significantly smaller than $\frac{m}{2}$. One can test the hypothesis …
592(-2/1)	… over time, and the forecast variance is constant for all horizons.	… over time, the forecast variance is constant for all horizons if the model contains no ARMA terms, and this variance converges to a finite limit for larger horizons if the model contains ARMA terms.
593 (+2)	… variance increases for larger horizons.	… variance increases without bound for larger horizons.

<u>Econometric Methods with Applications in Business and Economics</u>

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<u>Chapter 2</u>

Page	**Now is**	**Should be**
76 (-9)	y_i is denoted by RENDMARK and x_i by RENDCYCO	x_i is denoted by RENDMARK and y_i by RENDCYCO
82 (+8/9)	first and second sample moments	first and second (non-centred) sample moments
84 (+1)	between y and x	between x and y
96 (-7)	$e_i = y - a - bx_i$	$e_i = y_i - a - bx_i$
98 (+7+9)	<<replace symbol d by g (5 times)>> (+7) $d_i\ y_i$ (+7) $d_1 ,\ldots, d_n$ (+9) $w_i = d_i - c_i$ (+9) $d_i = c_i + w_i$	 $g_i\ y_i$ $g_1 ,\ldots, g_n$ $w_i = g_i - c_i$ $g_i = c_i + w_i$

<u>Chapter 3</u>

Page	**Now is**	**Should be**
118 (+14)	half of the variance can be explained	half of the variability (as measured by the variance) can be explained
127 (-5)	sample mean	sample average
152 (+3)	Sections 1.4.1, 1.4.2.	Sections 1.2.3, 1.4.1, 1.4.2.
152 (-6)	(p. 31-5)	(p. 32 and 34-5)
156 (+20)	(3.31)). For	(3.31) and (3.32)). For

<u>Chapter 4</u>

Page	**Now is**	**Should be**
194 (-6)	first term	first expression in the last line
194 (-5)	fourth term	fourth expression
211 (-4/2)	, so that … we get <<NOTE: Reshuffle formulas and text parts, but do not change formulas! The formulas in the book are correct, whereas those shown here in the right column suffer	, and using the fact that $z_h = e_h + X_h\hat{\beta}_h$ it follows that $\hat{\beta}_{h+1} = (X_h'X_h)^{-1}X_h'z_h = (X_h'X_h)^{-1}X_h'(e_h + X_h\hat{\beta}_h)$ and hence

	from Word inconveniences>>	
215 (+19)	null hypothesis β_0 holds true	null hypothesis $\beta_2 = 0$ holds true
217 (+12)	$e_i = y_i - f(x_i, \beta_1, \beta_2)$	$e_i = y_i - f(x_i, b_1, b_2)$
222 (+16)	great variety of models, and applications models of special interest	large variety of models, and applications for models of special interest
268 (+15)	<<add text in Exercise 4.4, directly above part (a); do not use new paragraph for this text>>	For simplicity, assume that x^*, ε_x and ε_y are all IID (identically and independently distributed).
269 (+23)	<<add ‘prime’ in Exercise 4.9.d>> $\beta = (0, 1, 0)$	$\beta = (0, 1, 0)'$
271 (-8)	<<add text in Exercise 4.14, directly above part (a); do not use new paragraph for this text; NOTE: normal size italic ‘sigma’ and capital roman NID (not italic!) >>	It is assumed that the error terms ε are NID(0, σ^2).

Chapter 5

Page	**Now is**	**Should be**
370 (+24)	between the residuals. Panel 5	between the residuals (see p. 362 and Exercise 5.11). Panel 5
410 (+3)	var(d) ≈ var(…)	var(d) = var(…) <<NOTE: the ≈ in lines 2, 4 and 5 are correct and should not be changed>>
410 (-15)	<<reduce space between parameter and restriction>> parameter restriction	parameter restriction
433 (-15)	<<in 5.25 (b)>> Sort the data with increasing values of x_i.	Check that the data in the data file are sorted with increasing values of x_i.

Chapter 6

Page	**Now is**	**Should be**
485 (+4)	<<numerator>> $P[\varepsilon_i \le t]$	$P[-x_i'\beta/\sigma < \varepsilon_i \le t]$
485 (+4)	<<numerator>> $F(t)$	$F(t) - F(-x_i'\beta/\sigma)$
485 (-7)	<<numerator>> $F((t - x_i'\beta)/\sigma)$	$F((t - x_i'\beta)/\sigma) - F(-x_i'\beta/\sigma)$
485 (-5)		<<at end formula (6.26) add, after some open space and directly before the closing dot, within parentheses as shown>>

		$(y_i > 0)$
493 (+15)	<<displayed formula>> $E[\eta_i] = ... = \ldots + \lambda_i$	 $E[\eta_i] = ...= \ldots + \varphi_i$ <<SO: replace λ_i by φ_i>>
493 (+17)	<<formula>> $\omega_i = ...= \ldots - \lambda_i$	$\omega_i = ...= \ldots - \varphi_i$ <<SO: replace λ_i by φ_i>>
493 (+19)	<<displayed formula>> $y_i = ...=$ $\ldots + \sigma\varphi(x_i'\beta/\sigma) / \Phi(x_i'\beta/\sigma) + \sigma\omega_i$	 $y_i = ...=$ $\ldots + \sigma\varphi(x_i'\beta/\sigma) + \sigma\omega_i$ <<SO: delete the denominator term $\Phi(x_i'\beta/\sigma)$ of the fraction and also the fraction line itself, and keep the numerator term, now displayed on normal line level>>
527 (-14)	<<Exercise 6.9 (d)>> (6.34) that implies	 (6.35) that implies (see p. 494)

Chapter 7

Page	**Now is**	**Should be**
582 (+14)	$E[y_t \mid y_1] = (t-1)\alpha$	$E[y_t \mid y_1] = y_1 + (t-1)\alpha$
713 (+13)	<<left column>> all the roots $\varphi(z) = 0$ lie outside	all the solutions of $\varphi(z) = 0$ lie outside