A list of suggested errata to Acemoglu's book

The list below refers to what looks like typos or logical errors (at least as I see it) in Acemoglu's *Introduction to Modern Economic Growth*, Princeton 2009.

Symbol glossary: "l." means "line"; "f.b." means "from below"; "eq." means "equation"; "n" means footnote. In the third column, a " * " means that a comment will follow.

page	*reads*	*should read (and/or my remark)*
7, Fig. 1.5		* Reduce numbers on vertical axis by $\ln 100$, see Comment 1 (to §1.2) below.
17, l. 2 f.b.	as economies below	as economies below or above
17, l. 2 f.b.	grow toward	adjust toward
18, title of figure	and average growth of investments to GDP ratio	and average investment to GDP ratio
29, l. 23-24	diminishing returns to capital distinguishes the Solow growth model from its antecedent, the Harrod-Domar model	* Misleading. In the Harrod-Domar model the production function is Leontief (there is no substitutability between capital and labor, iso-quants are of L-form, so extreme degree of diminishing returns). It is in the opposite case − the case of *perfect* substitutability − that diminishing returns to capital is absent.
33, l. 3 f.b.	Moreover, $F(0, L, A) = 0$ for all L and A.	* This is *implied,* and thus not an additional assumption, as soon as the other part of Assumption 2 is assumed together with Assumption 1.
49, l. 8		* the third argument in the F-function should be deleted.
52, figure	$-(\delta + g + n)$	$-(\delta + n)$
53, l. 12 f.b.	In addition, k^* is increasing in α,	* This is true only if $sA/(n + \delta) > 1$
54, l. 1 f.b.	$\min\{\gamma A_K(t)K(t); (1-\gamma)A_L(t)L(t)\}$	$\min\{A_K(t)K(t); A_L(t)L(t)\}$
56, figure	$(A - \delta - n)k(t)$	$\frac{sA+1-\delta}{1+n}k(t)$ * Remark: since $k(t + 1)$ is on the vertical axis, the figure must be about the discrete time case.
57, l. 2 f.b.	This estimate ignores the share of land;	* The estimate 1/3 represents the income share of physical capital and land; calling it "income share of capital" is a kind of shortening of "income share of non-human wealth".
65, line 10 ff.	$k(t) \equiv K(t)/(A(t)L(t))$	See Comment 2 (to §2.7.4 ff.) below.
68, line 7	arrows until t'.	arrows until t''.
78, l. 19 f.b.	as "total factor productivity"	as "growth in total factor productivity"
79, l. 4	$g_{t,t+1}$	$g_{t+1,t}$
80, several equations	g	* here g is rate of technology growth as in (2.46), not output growth as in (3.3).

page	*reads*	*should read (or remark)*
81, l. 12	around $\log k^*(t)$	around $\log k^*$
100, l. 3	TFP difference	difference in TFP growth
148„ eq. (5.1)	$U^h(c^h(1),$	$U^h(c^h(0), c^h(1),$
303, l. 1 f.b.	consumption would reach zero in finite time, and thus	* Delete - it is wrong.
312, l. 11 f.b.	$\theta \leq 1$	$\theta = 1$
313, l. 12	$r(t) = (1-\tau)(f'(k(t) - \delta),$	* To avoid confusion, note that this $r(t)$ is the after-tax interest rate, which in the standard notation of this course would be written $(1-\tau)r(t)$.
331, l. 16	Total savings in the economy	Total saving by the young
336, l. 16	with log preferences	with CRRA preferences
362, l. 13-11 f.b.	Integrating both sides of this equation ...	* Integration is not meaningful here since, generally, the first-order con- (10.10) is valid only at $S = S^*$, not dition in an interval around S^*; see Ch. 8 of Lecture Notes.
366, l. 8 f.b.	is always increasing	is increasing if $h(0) < h^*$
387, l. 10	neoclassical model as well.	neoclassical model with $g = 0$ as well.
394, l. 6-9	there are no constraints on human and physical capital investments .... and physical capital.	* Wrong. Negative gross investment in human capital is impossible; (11.25) is conditional on an *interior* solution.
394, l. 23	$\rho + \delta_k > (1-\theta)(f'(k^*) - \delta) + \delta_k.$	$\rho + \delta_k > (1-\theta)(f'(k^*) - \delta_k)/\theta + \delta_k.$
401, l. 13-14	(with output reaching infinity in finite time ...transversality condition).	* Delete.
402, l. 9 f.b.	will not be possible.	will not be possible without technical progress.
434, eq. (13.2)		* See Comment 3 (to §13.3.1) below.
434, l. 14	though the results are identical without this assumption;	* Delete.
436, l. 10 f.b.	Let us normalize the marginal costs	Let us assume that the marginal costs
437, l. 15	recall that one unit	recall that on average one unit
439, l. 6	and the transversality condition is satisfied.	and provides scope for satisfaction of the transversality condition.
439, l. 16-5 f.b.		* See Comment 4 (to §13.1.4) below.

Continued next page.

page	*reads*	*should read (or remark)*
440, l. 5 f.b.	Maximization gives	In the special case $\psi = 1 - \beta$, maximization gives
441, l. 13 f.b.	Hamiltonian is strictly concave and satisfies the conditions of Theorem 7.14.	* The truth is that the Hamiltonian is concave in $(N(t), c(t))$, which is enough to ensure that the FOCs together with the TVC are *sufficient* conditions for optimality; the Hamiltonian is *not* strictly concave; moreover, the *maximized* Hamiltonian is concave in $N(t)$, but not strictly concave; so the conditions of Theorem 7.14 are *not* satisfied.
442, l. 13 f.b.	and the Pareto optimal allocation,	and the social planner's optimal allocation, * Remark: "*the* Pareto optimal allocation" is misleading - there are infinitely many Pareto optimal allocations even if households are all alike.
444-445		* (13.26) and (13.27) presuppose $\psi = 1 - \beta$.
445, eq. (13.31)		See Comment 5 (to §13.2) below.
445, l. 6 f.b.	(see Exercise 13.17).	(see Exercise 13.16).
446, l. 20	, and output per capita would reach infinity in finite time ("explode")	* Delete. Indeed, "reach infinity in finite time" is wrong.
447, eq. (13.38)	$g_C^* = g_N^*$	$g_c^* = g_N^*$
448, l. 12-13	It is not clear whether the data supports these types of scale effects either.	* See Lecture Notes, Ch. 13, §13.5.3.
448, l. 18-21	"semi-endogenous growth" models ... not respond to taxes or other policies.	* Note that "semi-endogenous growth" is defined differently than in the lectures and in Lecture Notes.

Comment 1 (to §1.2, Figure 1.5, p. 7) Johannes Pfeifer, University of Tübingen, has kindly sent me this information concerning Figure 1.5 (The association between income per capita and consumption per capita in 2000): Consumption in the figure is larger than output for all countries. The reason seems to be that the Penn World Table measures the consumption share as a number between 0 and 100 instead of 0 and 1. Hence, consumption is erroneously shifted upwards by $\ln 100 = 4.6052$. Overleaf is a corrected graph.

The corrected graph:

Comment 2 (to §2.7.4, to p. 65 ff.) Given a production function $Y = F(K, AL)$, in the lectures and exercises we use the notation $y \equiv Y/L$, $k \equiv K/L$, $\tilde{y} \equiv Y/(AL)$, and $\tilde{k} \equiv K/(AL)$. Acemoglu (2009) uses y and k (p. 36) in the same way. At p. 65 ff., however, Acemoglu asymmetrically introduces $\hat{y}$ for $Y/(AL)$ while $K/(AL)$ is just denoted k. In the lectures and exercises we stick to the latter in combination with $\tilde{y} \equiv Y/(AL)$ and $\tilde{k} \equiv K/(AL)$.

Comment 3 (to §13.1.1, p. 434) There is an implicit parameter link involved in eq. (13.2), namely the link between total factor productivity, $1/(1-\beta)$, and the output elasticity w.r.t. labor, β. In fact, there are two, more hidden, additional parameter links involved, see Exercise problem VII.5. Parameter links may be convenient because they simplify some of the subsequent formulas. Parameter links are also dangerous because they may veil the true causal relationships.

Comment 4 (to §13.1.4, p. 439) It is true that in general equilibrium with positive R&D, there is no transitional dynamics. In my view, however, Acemoglu does not provide a valid proof. In connection with one of the exercise problems about this model, we show that the relevant approach is analogue to that applied for the simple AK model (pp. 390-391).

A related error in Acemoglu is the claim p. 439, l. 6, that the last inequality in (13.21) ensures that the transversality condition (TVC) is satisfied. The point is that (13.21) only *opens up for the possibility* that the TVC can be satisfied. What then *ensures* satisfaction of the TVC is that $c(0)$ is at a certain level determined by $N(0)$. This level in turn ensures balanced growth from the beginning, i.e., absence of transitional dynamics.

Comment 5 (to §13.2, p. 445) Consider the formula (13.31), p. 445. Let us ask: Replacing the expression for total factor productivity, $1/(1-\beta)$, in (13.2), p. 434, with a general $A > 0$, and allowing a general $\psi > 0$ rather than just the special case, $\psi = 1 - \beta$, assumed on p. 434 and p. 436, is the formula (13.31) still valid?

The answer is that the formula, fortunately, is valid also in this general case as are (13.29) and (13.30). In fact ψ cancels out anyway in these formulas. But when stating (13.26), (13.27), and (13.29), the special case, $A = 1/(1-\beta)$ and $\psi = 1 - \beta$, is presupposed.

This illustrates that the simplifying assumption that $A = 1/(1-\beta)$ and $\psi = 1 - \beta$ may lead to confusion.

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