Errata

DCF – A Theory of Firm Valuation

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(some errors were corrected in the reprinted version)

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Contents

List of symbols

A symbol is missing:
$\widetilde{A}_t$ is the amount of retained earnings

p. 19, Problem 1.6

"…Three movements are possible: 'up', 'middle' and 'down'. They occur with the same probability and furthermore (using u, d and m as in Figure 1.7), …"

p. 21, last line

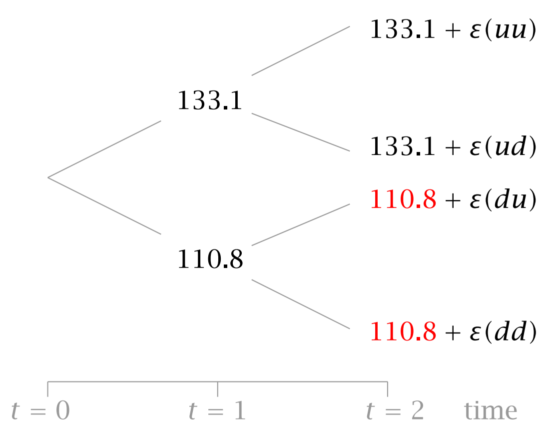
"…and one would come to the same result using the relevant numbers here with a risk premium of $z \approx 0.264\%$ as with the certainty equivalent method…"

p. 34 (reprinted edition)

"…Now we come to the proof that the noise terms are uncorrelated. We look at two points in time $s < t$ and have to show that the covariance…"

p. 43, Problem 2.2

Figure 2.2 should read



=	Earnings before taxes	$\widetilde{EBT}$
+	Interest	$\widetilde{I}$
=	Earnings before interest and taxes	$\widetilde{EBIT}$

p. 48, Figure 2.3

should read

p. 61, Problem 2.10

Prove that from (2.10) it follows that

$$\widetilde{V}^l_t = \widetilde{V}^u_t + \tau \widetilde{D}_t + \sum_{s=t+1}^{T} \frac{\tau\, \mathrm{E}_Q\left[\widetilde{D}_s - \widetilde{D}_{s-1}|\mathcal{F}_t\right]}{(1+r_f)^{s-t}}.$$

p. 64, Problem 2.11

"…Let debt be riskless. Assume that the cash flows of the unlevered firm are weak …"

p. 70, last equation

It should read

$$\begin{aligned}\left(1+\widetilde{WACC}_t\right)\widetilde{V}^l_t &= \mathrm{E}\Big[\widetilde{E}_{t+1} + \widetilde{FCF}^l_{t+1} - \widetilde{I}_{t+1} - \widetilde{R}_{t+1} + \\ &\qquad + (1-\tau)\left(\widetilde{D}_{t+1} + \widetilde{I}_{t+1} + \widetilde{R}_{t+1}\right) + \tau\widetilde{D}_t|\mathcal{F}_t\Big] \\ &= \left(1+k^{E,l}_t\right)\widetilde{E}_t + \left(\left(1+\tilde{k}^D_t\right)(1-\tau)+\tau\right)\widetilde{D}_t.\end{aligned}$$

pp. 74-75, Proof of Theorem 2.12

"…The following then applies

$$\begin{aligned}\left(1-\tau\tilde{l}_t\right)\underbrace{\sum_{s=t+1}^{T}\frac{(1+g_t)\dots(1+g_{s-1})\widetilde{FCF}^u_t}{(1+WACC_t)\dots(1+WACC_{s-1})}}_{=\widetilde{V}^l_t} &= \\ &= \underbrace{\sum_{s=t+1}^{T}\frac{(1+g_t)\dots(1+g_{s-1})\widetilde{FCF}^u_t}{\left(1+k^{E,u}_t\right)\dots\left(1+k^{E,u}_{s-1}\right)}}_{=\widetilde{V}^u_t}.\end{aligned}$$

If we shorten $\widetilde{FCF}_t^u$, there remains

$$\left(1-\tau\tilde{l}_t\right)\sum_{s=t+1}^{T}\frac{(1+g_t)\dots(1+g_{s-1})}{(1+WACC_t)\dots(1+WACC_{s-1})}=$$
$$=\sum_{s=t+1}^{T}\frac{(1+g_t)\dots(1+g_{s-1})}{\left(1+k_t^{E,u}\right)\dots\left(1+k_{s-1}^{E,u}\right)}.$$

Besides the debt ratio $\tilde{l}_t$ we only find ..."

p. 83

"...Equation (2.22) shows that a full distribution is being looked at exactly when these investments are being financed by debt, thus when

$$\widetilde{Inv}_{t+1}-\widetilde{Accr}_{t+1}=-\left(\underline{\tilde{D}}_t-\underline{\tilde{D}}_{t+1}\right)$$

..."

p. 83, Theorem 2.14 (Market value with full distribution)

$$\tilde{V}_t^l=\tilde{V}_t^u+\sum_{s=t+1}^{T}\frac{\tau r_f \underline{L}_{s-1}\left(\underline{E}_0^l+\underline{e}_{0,s-1}^l\right)}{(1+r_f)^{s-t}}.$$

p. 84, very bottom

"It follows from this..."

p. 85, Theorem 2.15 (Market value with replacement investments)

$$\tilde{V}_t^l=\tilde{V}_t^u+\sum_{s=t+1}^{T}\frac{\tau r_f \underline{l}_{s-1}\left(\underline{V}_0^l+\underline{e}_{0,s-1}^l\right)}{(1+r_f)^{s-t}}.$$

p. 86, second equation

$$\widetilde{Inv}_t=\frac{\beta_t}{1-\beta_t}\widetilde{FCF}_t^u$$

p. 93, second equation

...in which consideration is better given to the gross cash flow after taxes:

$$\widetilde{Inv}_t = \beta_t(\widetilde{GCF}_t - \tau\widetilde{EBT}_t).$$

But from equation (2.21) there results after a little reformulating for the unlevered firm ...

pp. 93-94, Theorem 2.21 and the finite case

The formula in Theorem 2.21 should read

$$V_0^l = \left(1 - \gamma^n \left(1 - \tau\left(1 - \frac{1}{(1+r_f)^{T-n}}\right)\right)\right) D_0 +$$
$$+ \left(1 - \gamma^n \left(1 - \tau\left(1 - \frac{1}{(1+r_f)^{T-n}}\right)\right) - \tau\left(1 - \frac{1}{(1+r_f)^{T}}\right)\right) \frac{Div}{r_f(1-\tau)} +$$
$$+ \left(\delta^n - \delta^T + \frac{\gamma^n - \delta^n}{\frac{\gamma}{\delta} - 1} \frac{k^{E,u} - g}{1+g} \left(1 - \tau\left(1 - \frac{1}{(1+r_f)^{T-n}}\right)\right)\right) \frac{V_0^u}{1-\delta^T},$$

where ...

The value of the company in the finite example now changes. It results from the equation

$$V_0^l = \left(1 - \gamma \left(1 - \tau\left(1 - \frac{1}{(1+r_f)^{2}}\right)\right)\right) D_0 +$$
$$+ \left(1 - \gamma \left(1 - \tau\left(1 - \frac{1}{(1+r_f)^{2}}\right)\right) - \tau\left(1 - \frac{1}{(1+r_f)^{3}}\right)\right) \frac{Div}{r_f(1-\tau)} +$$
$$+ \left(\delta - \delta^3 + \frac{\gamma - \delta}{\frac{\gamma}{\delta} - 1} \frac{k^{E,u} - g}{1+g} \left(1 - \tau\left(1 - \frac{1}{(1+r_f)^{2}}\right)\right)\right) \frac{V_0^u}{1-\delta^3}.$$

Entering all values known to us results in

$$V_0^l \approx 237.498 .$$

p. 96, finite example

"...This gives

$$V_0^l = 229.75 + 100\left(\frac{0.5\cdot 0.1}{1+0.1} + \left(\frac{0.5\cdot 0.1}{1+0.1}\right)^2 + \left(\frac{0.5\cdot 0.1}{1+0.1}\right)^3\right) +$$
$$+ \left(\frac{0.5\cdot 0.1}{1+0.1} + \left(\frac{0.5\cdot 0.1}{1+0.1}\right)^2\right)\frac{100}{1+0.2} + \frac{0.5\cdot 0.1}{1+0.1}\frac{110}{(1+0.2)^2}$$
$$\approx 241.94$$

for the value of the levered firm..."

p. 107

"Figure 3.1 describes how to get from the pre-tax gross cash flows of a firm to the levered taxable income ."

p. 111, Theorem 3.2

Theorem 3.2 should read

$$\tilde{V}_t = \frac{\mathrm{E}_Q\left[\widetilde{FCF}^{\text{post-tax}}_{t+1} + \tilde{V}_{t+1}|\mathcal{F}_t\right]}{1 + r_f\left(1 - \tau^I\right)}.$$

p. 117

"

$$\begin{aligned} n_B &:= \frac{\tilde{V}'_t}{B_t}\,\frac{(u-u')(1+k'(1-\tau))}{u(1+r_f(1-\tau))} \\ n_V &:= \frac{\tilde{V}'_t}{\tilde{V}_t}\,\frac{u'(1+k'(1-\tau))}{u(1+k(1-\tau))}. \end{aligned}$$

All variables are uncertain. They depend upon the firm value in t."

p. 120

The statement "Notice that the value of the levered company does not depend on the tax rate." is literally wrong, since the tax rate appears in Theorem 3.5. What does not depend from the tax rate is the value of the tax shield in Theorem 3.6 if $\tau^D = \tau^I$.

"With that we get

$$V_0^l = V_0^u + (1-\tau)A_0 + \ldots$$

"In order to establish the value of the levered firm in the infinite example, assuming $A = 10$ and using the statement from theorem 3.6 we get"

p. 121

$$\begin{aligned} \tilde{V}^l_t &= \ldots \\ &= \ldots \\ &\quad + \frac{\tau^I r_f\left(1-\tau^D\right)}{1+r_f\left(1-\tau^I\right)}\left(\frac{\mathrm{E}_Q\left[\alpha_{t+1}\widetilde{FCF}^u_{t+1}|\mathcal{F}_t\right]}{1+r_f\left(1-\tau^I\right)} + \ldots + \frac{\mathrm{E}_Q\left[\alpha_{T-1}\widetilde{FCF}^u_{T-1}|\mathcal{F}_t\right]}{\left(1+r_f\left(1-\tau^I\right)\right)^{T-t-1}}\right). \end{aligned}$$

p. 123

Let us work on the basis that the firm will pay the following pre-tax dividend:

p. 130

Our intention consists in evaluating the tax advantages of the levered company, especially compared with those of the unlevered company.

p. 131, equation (4.2)

$$\begin{aligned}\widetilde{FCF}_t^l &= \widetilde{FCF}_t^u - \tilde{I}_t + \tilde{D}_t - \tilde{D}_{t-1} - \tilde{A}_t + (1+\tilde{r}_{t-1})\tilde{A}_{t-1} \\ &\quad + \widetilde{Tax}_t^{C,u} - \widetilde{Tax}_t^{C,l} + \widetilde{Tax}_t^{P,u} - \widetilde{Tax}_t^{P,l}. \end{aligned} \tag{0.1}$$

p. 135

The first three lines should read

$$\begin{aligned}\tilde{V}_t^u &= \sum_{s=t+1}^{T} \frac{\mathrm{E}\left[\widetilde{FCF}_s^u | \mathcal{F}_t\right]}{\left(1+k_t^{E,u}\right)\dots\left(1+k_{s-1}^{E,u}\right)} \\ &= \sum_{s=t+1}^{T} \frac{(1+g_t)\dots(1+g_{s-1})\widetilde{FCF}_t^u}{\left(1+k_t^{E,u}\right)\dots\left(1+k_{s-1}^{E,u}\right)} \\ &= \widetilde{FCF}_t^u \underbrace{\sum_{s=t+1}^{T} \frac{(1+g_t)\dots(1+g_{s-1})}{\left(1+k_t^{E,u}\right)\dots\left(1+k_{s-1}^{E,u}\right)}}_{=\frac{1}{d_t^u}}. \end{aligned}$$

pp. 146-147, including (A.16)

(A.16) should read

$$\begin{aligned} V_0^l &= \left(1-\gamma^n\left(1-\tau\left(1-\frac{1}{(1+r_f)^{T-n}}\right)\right)\right) D_0 + \\ &+ \left(1-\gamma^n\left(1-\tau\left(1-\frac{1}{(1+r_f)^{T-n}}\right)\right) - \tau\left(1-\frac{1}{(1+r_f)^{T}}\right)\right)\frac{Div}{r_f(1-\tau)} + \\ &+ \left(\delta^n - \delta^T + \frac{\gamma^n-\delta^n}{\frac{\gamma}{\delta}-1}\,\frac{k^{E,u}-g}{1+g}\left(1-\tau\left(1-\frac{1}{(1+r_f)^{T-n}}\right)\right)\right)\frac{\mathrm{E}\left[\widetilde{FCF}_1^u\right]}{k^{E,u}-g}. \end{aligned}$$

Also, the formula on the next page after “This into (A.16) gives” changes

$$V_0^l = \left(1 - \gamma^n \left(1 - \tau \left(1 - \frac{1}{(1+r_f)^{T-n}}\right)\right)\right) D_0 +$$
$$+ \left(1 - \gamma^n \left(1 - \tau \left(1 - \frac{1}{(1+r_f)^{T-n}}\right)\right) - \tau \left(1 - \frac{1}{(1+r_f)^{T}}\right)\right) \frac{Div}{r_f(1-\tau)} +$$
$$+ \left(\delta^n - \delta^T + \frac{\gamma^n - \delta^n}{\frac{\gamma}{\delta} - 1} \frac{k^{E,u} - g}{1+g} \left(1 - \tau \left(1 - \frac{1}{(1+r_f)^{T-n}}\right)\right)\right) \frac{V_0^u}{1 - \delta^T}.$$

pp. 150, Assumption A.2

(No arbitrage with taxes) There exists...