Financial Statement Analysis – E2200100 Class quiz 13.3.2019

Our simple example considers a firm that engages in business for five periods. In each period, the firm makes an initial investment of $100. This investment generates sales in the next period, and nothing thereafter. The proceeds from these sales are assumed to be collected in cash, and the firm also is assumed to incur additional cash operating costs in generating these sales. Cash sales are assumed to be 165 percent of the prior period's real investment and cash operating costs are assumed to be 55 percent of the prior period's real investment. These are the only consequences of the investment. Thus, the firm invests $100 in each period in order to generate a net cash inflow of $110 (=$165 – $55) in the next period. The economic income on this investment is therefore $110 – $100 = $10 and the economic rate of return is $10/$100 = 10%. We will assume that the firm invests $100 in each of the first four periods, and then ceases to make any further investments in period five and beyond. We also assume that any surplus cash is immediately distributed to the owners of the firm (i.e. $10 in periods 2–5).

Panel A. Perfect Accounting (all investment is capitalized in all years)						
		Period				
		1	2	3	4	5
Accounting Assumptions						
	Capitalized investment costs	100	100	100	100	0
+	Capitalized operating costs	0	0	0	0	0
End. Balance Sheet:						
	Assets = Equity	100	100	100	100	0
	Accruals (change in assets)	100	0	0	0	–100
Measurement Error (ε)						
	Beginning ε	0	0	0	0	0
	Ending in ε	0	0	0	0	0
	Change in ε	0	0	0	0	0
Income Statement						
	Sales	0	165	165	165	165
–	Operating expense	0	–55	–55	–55	–55
–	Depreciation expense	0	–100	–100	–100	–100
–	Investment expense	0	0	0	0	0
=	Operating income	0	10	10	10	10
Return on equity			10.0%	10.0%	10.0%	10.0%

Panel A presents the "perfect" accrual accounting scheme that exactly matches the cost of investment to the benefits generated.

Panel B. Temporarily Aggressive Accounting (perfect accounting, except that $20 operating costs are capitalized in period 3)						
		Period				
		1	2	3	4	5
Accounting Assumptions						
	Capitalized investment costs	100	100	100	100	0
+	Capitalized operating costs	0	0	20	0	0
End. Balance Sheet:						
	Assets = Equity	100	100	120	100	0
	Accruals (change in assets)	100	0	20	–20	–100
Measurement Error (ε)						
	Beginning ε	0	0	0	20	0
	Ending ε	0	0	20	0	0
	Change in ε	0	0	20	–20	0
Income Statement						
	Sales	0	165	165	165	165
–	Operating expense	0	–55	–35	–55	–55
–	Depreciation expense	0	–100	–100	–120	–100
–	Investment expense	0	0	0	0	0
=	Operating income	0	10	30	–10	10
Return on equity			10.0%	30.0%	–8.3%	10.0%

Recall that ROE = (Economic Income + Increase in ε)/(Beginning Investment + Beginning ε). You can get the correct Economic Income and Beginning Investment amounts from Panel A. For example, the period four ROE of –8.3% can be computed as (10 + (–20))/(100+20)= –10/120=–8.3% .

In Panel B, we will do perfect accounting in periods one and two. Then, in period three, we will do some aggressive accounting. We will then revert back to perfect accounting in periods four and five. To engage in aggressive accounting in our simple example, we will capitalize some of the operating costs incurred in period three. Recall that these costs all relate to the revenues generated in period three, and so a perfect accounting system should expense them all in period three. For the purposes of this example, we will capitalize an amount of these costs equal to 20 percent of the current period investment. Thus, we will be overstating our assets by 20 percent. Moving down to the income statement, operating expenses are understated by $20, causing operating income to be overstated by $20. This overstatement in operating income causes ROE to be 30 percent, overstating the economic rate of return of only 10 percent. Note that even though we return to perfect accounting in period four, operating income and ROE understate their “perfect” levels in period four. This is because we have to amortize an extra $20 worth of capitalized operating costs in period four.

Panel C. Temporarily Conservative Accounting (perfect accounting, except that 80% of investment costs are capitalized in period 3)						
		Period				
		1	2	3	4	5
Accounting Assumptions						
	Capitalized investment costs	100	100	80	100	0
+	Capitalized operating costs	0	0	0	0	0
End. Balance Sheet:						
	Assets = Equity	100	100	80	100	0
	Accruals (change in assets)	100	0	–20	20	–100
Measurement Error (ε)						
	Beginning ε	0	0	0	–20	0
	Ending ε	0	0	–20	0	0
	Change in ε	0	0	–20	20	0
Income Statement						
	Sales	0	165	165	165	165
–	Operating expense	0	–55	–55	–55	–55
–	Depreciation expense	0	–100	–100	–80	–100
–	Investment expense	0	0	–20	0	0
=	Operating income	0	10	–10	30	10
Return on equity			10.0%	–10.0%	37.5%	10.0%

It is possible that a company can engage in permanently conservative in a manner that is allowed or even required by GAAP. A good example is the GAAP requirement that research and development expenditures be immediately expensed. In Panel C, we will expense an amount equal to 20 percent of the current period investment in period three. Thus, we will be understating our period three assets by 20 percent. The accounting assumptions shown at the top of panel C reflect reflects this temporarily conservative accounting, with only $80 of the period three investment being capitalized. The period three balance sheet is understated by $20, showing total assets and equity of only $80. The period three ε is –20, and the change in ε for period three is –20.Moving down the income statement, we have an additional investment expense of $20, causing operating income to be understated by $20. The understatement of operating income causes return on equity to be –10 percent, understating the economic rate of return of 10 percent. We turn to perfect accounting in period four, but operating income and return on equity overstate their "perfect" levels in period four. This is because depreciation is only $80 in period four. The period three ε is –20 and the period four ε is 0, so the change in ε is 20. Since the numerator of return on equity is overstated and the denominator is understated, ROE must be overstated. Thus, temporarily conservative accounting causes operating income and ROE to be understated in the period it originates and overstated in the period in which is reverses.

Panel D. Permanently Aggressive Accounting (perfect accounting, except that $20 of operating costs are capitalized in all periods)						
		Period				
		1	2	3	4	5
Accounting Assumptions						
	Capitalized investment costs	100	100	100	100	0
+	Capitalized operating costs	20	20	20	20	0
End. Balance Sheet:						
	Assets = Equity	120	120	120	120	0
	Accruals (change in assets)	120	0	0	0	–120
Measurement Error (ε)						
	Beginning ε	0	20	20	20	20
	Ending in ε	20	20	20	20	0
	Change in ε	20	0	0	0	–20
Income Statement						
	Sales	0	165	165	165	165
–	Operating expense	20	–35	–35	–35	–55
–	Depreciation expense	0	–120	–120	–120	–120
–	Investment expense	0	0	0	0	0
=	Operating income	20	10	10	10	–10
Return on equity			8.3%	8.3%	8.3%	–8.3%

Panel D illustrates permanently aggressive accounting. This is achieved by capitalizing operating costs equal to 20 percent of investment in all periods. Consequently, assets and equity are equal to $120 for all but period five (when investment ceases and both are equal to zero). Accruals are $120 in period one (when investment commences), –$120 in period five (when investment ceases), and zero in the intervening periods. Measurement error is 20 in periods one through four and 0 in period five, so the change in measurement error is 20 in period one, –20 in period five, and 0 in the intervening periods. Moving to the income statement, operating expenses are understated by $20 in the first four periods and depreciation expense is overstated by $20 in the final four periods. The net result is that operating income is overstated by $20 in period one and understated by $20 in period five. In periods two through four, the understatement of operating expenses is exactly offset by the overstatement of depreciation expense. For periods two through four, the level of measurement error is 20 and the change in measurement error is 0, so operating income is correctly stated and equity is overstated, resulting in the understatement of ROE.

Panel E. Permanently Conservative Accounting (perfect accounting, except that 80% of investment costs are capitalized in all periods)						
		Period				
		1	2	3	4	5
Accounting Assumptions						
	Capitalized investment costs	80	80	80	80	0
+	Capitalized operating costs	0	0	0	0	0
End. Balance Sheet:						
	Assets = Equity	80	80	80	80	0
	Accruals (change in assets)	80	0	0	0	–80
Measurement Error (ε)						
	Beginning ε	0	–20	–20	–20	–20
	Ending in ε	–20	–20	–20	–20	0
	Change in ε	–20	0	0	0	20
Income Statement						
	Sales	0	165	165	165	165
–	Operating expense	0	–55	–55	–55	–55
–	Depreciation expense	0	–80	–80	–80	–80
–	Investment expense	–20	–20	–20	–20	0
=	Operating income	–20	10	10	10	30
Return on equity			12.5%	12.5%	12.5%	37.5%

Panel E illustrates permanently conservative accounting. This is achieved by capitalizing only 80 percent of investment in all periods. Consequently, assets and equity are equal to $80 for all periods except period five (when investment ceases and both are equal to zero). Measurement error is –20 in periods one through four and 0 in period five, so the change in measurement error is –20 in period one, 20 in period five, and 0 in all of the intervening periods. Moving to the income statement, investment expense is overstated by $20 in the first four periods and depreciation expense is understated by $20 in the final four periods. The net result is that operating income is understated by $20 in period one and overstated by $20 in period five. In periods two through four, the overstatement of investment expense is exactly offset by the understatement of depreciation expense. The final row of panel E lists the return on equity, which is 12.5 percent in periods two through four and 37.5 percent in period five. For periods two through four, the level of measurement error is –20 and the change in measurement error is 0, so operating is correctly stated and equity is understated, resulting in the overstatement of ROE. For period five, the level of measurement error from prior period is still –20, but the change in the measurement error is 20, causing an even more severe overstatement of ROE.