Ralph's Scale[1]

Ralph knows cash flows for an asset at $t = 0$ are equal to -0.5, at $t = 4$ cash flows (net dividends) are equal to D (D={0,1}), and for every time in between cash flows are zero. Also, the interest rate is zero (for simplicity), $pr(D=1) = 0.5$, and the binary information signals (g, b) are independent conditional on D with $pr(y=g|D=1) = pr(y=b|D=0) = 0.9$. See the timeline in exhibit 11 (CD ch. 10 appendix).

Required:

1)   Replicate exhibits 12 (joint and marginal probabilities), 13 (economic value at $t = 0, 1, 2$ and 3), and 14 (change in economic value at $t = 1, 2$, and 3).

2)   Assume accounting is released at $t = 3$ and is either fair value or myopic (a highly restricted version of fair value that ignores the information released at $t = 1$ and $t = 2$ and only considers information at $t = 3$). Fair value accounting records accounting book value as the present value of expected continuation cash flows conditional all information to date. Myopic accounting records accounting book value as the present value of expected continuation cash flows conditional on only information observed at date $t = 3$. Replicate exhibit 16 (fair value accounting), and exhibit 17 (myopic or highly restricted version of fair value). Compare the information content of the two accounting methods. How does this compare to the information content of cash accounting (reporting only cash flows)?

3)   Replicate the fan diagram of exhibit 18. News in the accounting report is identified as "good" if reported income is positive and "bad" if reported income is negative. Identify the cumulative change in value for ("good" news, fair value accounting), ("good" news, myopic accounting), ("bad" news, fair value accounting), and ("bad" news, myopic accounting) at time $t = 0, 1, 2$, and 3. How would the fan diagram

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[1] This example is based on Christensen and Demski's ch. 10 simulation of Ball and Brown's seminal study regarding the relation between accounting reports and market values. When thinking of scale, it may be useful to think of Fahrenheit, Celsius, or Kelvin temperature scales. Is the information different or simply its encoding?

differ if news in the accounting report is identified by earnings surprise rather than as above?

4)   Are the differences between the fan diagrams for myopic versus fair value accounting more indicative of differences in information content or scaling?