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In the Summer 2001 issue of Contemporary Accounting Research we published a paper arguing that, given a full set of forecasted financial statements, the value estimates from a residual income model and a discounted cash flow model should yield identical results. The reason prior empirical studies (Penman and Sougiannis 1998 and Francis, Olsson, and Oswald 2000) found differences between the models is because of subtle errors in the implementation of the models. Penman (2001) understandably takes issue with our paper, claiming that we are wrong on three points. We feel quite confident in our original paper and will rebut each of Penman’s claims. Penman repeatedly states that he is interested in practical issues surrounding valuation. We share this interest; in fact, we were motivated to write our paper because of the common question raised by students and faculty: “Why do I get a different answer from my discounted cash flow valuation than from my residual income valuation?” We still maintain that, if carefully done, there will be no difference in the valuations from these theoretically equivalent models. Our paper shows exactly how to do this and illustrates commonly made mistakes. Further, any practical attempt to value a firm begins with forecasting future financial statements — earnings and book values at a minimum — and then constructs from these estimates the valuation attributes of interest. All the empirical papers discussed in our original paper started with a complete set of pro forma financial statements. We continue with the maintained assumption that these forecasts are available to both the cash flow and the residual income models.

In section 3 of Penman’s paper he gives three criticisms of our claim that cash flow and residual income models should yield the same valuation in all cases. His first criticism is that practical considerations require that forecasts are only made up to a finite horizon, and that this introduces an error in the practical implementation of the theoretical model that is worthy of empirical study. We agree that explicit forecasts for each year can be made only for a finite number of years, but we show in our original paper that this constraint will not create a difference between cash flow and residual income model estimates if treated properly. An inconsistency will arise between the models, and with the forecasted financial

* Accepted by Gordon Richardson. The authors wish to thank Sarah McVay and Richard Sloan for helpful comments. We also thank Arthur Andersen and Ehrman V. Giustina for financial support.
statements, if one assumes that both cash flows and residual income are zero after the finite horizon. In particular, if residual income is assumed to be zero after year $T$, then the present value of net dividends after year $T$ is not zero; rather, it is equal to the book value in year $T$ discounted back $T$ years (as shown in endnote 3 of our paper). Penman assumes that forecasts of dividends beyond the finite horizon can be based only on dividends forecasted before the finite horizon. His version of the dividend discount model is not allowed to use the book value in year $T$ to forecast dividends beyond year $T$ and therefore, for some unexplained reason, inserts the value zero. Nothing in the specification of either the dividend discount model or the residual income model limits the conditioning set of information used to arrive at the forecasted amounts. The residual income model is allowed to use both net income and book value in its estimates of the future, so why is the dividend discount model not allowed access to the same data?

Penman uses a five-year example labeled “Savings Account with No Payout” in section 4 to illustrate this argument, and we can use this exact same example to illustrate our arguments. In this example, the savings account starts with 100 in book value, earns 10 percent of the beginning book value each year, and pays no dividends in the first five years, and the valuation models use a discount rate of 10 percent. Penman computes the value of this savings account as 100 (because residual income is zero in each of the first five years and, presumably, zero thereafter). He then argues that, because forecasted dividend payments are zero over the five years, the dividend discount model cannot possibly arrive at a valuation of 100. But why must the dividend discount model use only dividends forecasted in the forecasting horizon to forecast future dividends? Since we are interested in the practical problem of constructing a valuation, why can’t we use all the information in the pro forma financial statements to forecast future dividends? Assuming that residual income is zero after year 5, as in the residual income model’s calculation, the present value of dividends after year 5 equals the present value of the book value in year 5. Book value in year 5 is 161.05 in Penman’s example, so discounting this back five years produces a valuation of 100, just as in the residual income model. If we are studying the practical problem of valuing a firm, why would we force ourselves to ignore the book value of the firm when forecasting future dividends?

Penman states in his abstract that “choosing a valuation model is an issue of specifying pro forma accounting”. But why? Why isn’t it more natural to separate the process of preparing pro forma financial statements from the valuation exercise? And, more importantly, why does Penman implicitly include in the definition of cash flow models the constraint that the model’s forecasts cannot use the entire set of pro forma financials, while the residual income model is allowed to use all these data? Without access to the pro forma financial statements it is impossible, in general, to construct terminal values that are theoretically consistent across the two valuation models. In the spirit of a practical valuation exercise, shouldn’t the entire pro forma financial statements be available to both models? If so, then the documented differences in the value estimates in Penman and Sougiannis 1998 provide no evidence about the superiority of the residual income model over discounted cash flow models from a practical point of view.

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Penman’s remaining criticisms about our original paper also concern the terminal value. We disagree with Penman about the purpose of the terminal value. He sees it as an ad hoc amount (using this phrase four different times), seemingly no longer bound by the theory underlying the valuation models. But we prefer to think of the terminal value as a succinct way of representing the infinite series of future forecasted values. And the most common way to make this representation is with the formula for a growing perpetuity. For example, one could assume that after year 10 earnings and book values grow at 3 percent in perpetuity. The terminal value constructed from this assumption is not ad hoc; it is a precise statement about an infinite series of forecasted future values. The observation in our original paper was that one must exercise care in the construction of this terminal value. Taking the last forecasted residual income and last forecasted dividend, and growing each at 3 percent thereafter, as is done in the empirical papers, will typically result in different valuations, as the previous empirical papers amply demonstrate, and as discussed in the “inconsistent forecasts error” section of our original paper. But this isn’t because one model is better than the other; rather, it is because, in general, each model has ignored information in the forecasted financial statements. In fact, both valuations will be wrong relative to the theoretically correct intrinsic value based on the pro forma financial statements to the forecast horizon. As shown in our paper, if one is careful to use all the available information, no inconsistencies arise and the resulting value estimates are equal for both models.

Penman’s second criticism is that determining the right growth rate in the terminal period, and determining whether it should be applied to cash flows or residual income flows, are empirical questions. We agree that finding the best terminal growth rate is an empirical question, but we disagree with the assertion that the answer also depends on whether the rate is applied to cash flows or residual income flows. If the terminal growth rate is correctly applied to the valuation fundamentals — earnings and book values — then the valuation attributes derived from these values, cash flows or residual income, will be internally consistent and the resulting value estimates will be equal.

Penman’s third criticism is that our results hold only when “all attributes are in ‘steady state’”. Assuming that by “steady state” Penman means that the values beyond some year $T$ can be succinctly represented, typically by the formula for a growing perpetuity, then we agree. But we fail to see how any of the papers discussed in our original paper considered a world more general than this. Each paper made a terminal value assumption, either that the amounts are zero or that they behave as a growing perpetuity after some year $T$. A valid empirical question might be “when is the assumption of a growing perpetuity an accurate representation?” but the answer to this question will not depend on the specific valuation model being used to discount the flows. If one makes a ridiculous assumption about when the firm’s future earning and book values can be described by the perpetuity formula, it will lead to inaccurate value estimates, but the inaccuracies will be exactly the same for all models. See our paper for proof.

Penman claims that the Lundholm/O’Keefe viewpoint is cynical about the value of accounting, while in his world good accounting is paramount. All valua-
tion models rely on forecasts, and good forecasts rely on an accurate understanding of the past, so we believe that good accounting has a substantial role to play. A more accurate statement would be that we are cynical about the ability of algebra to create new information. Absent the errors discussed in our original paper, any claim that the residual income model is superior to the cash flow model must presume that the two models do not make full use of the same forecasted financial statements. However, as is likely in practice, if the full pro forma financials are used by both models, then that argument is akin to claiming that the Celsius thermometer is more accurate than the Fahrenheit thermometer. The Lundholm/O’Keefe paper shows how to read each thermometer correctly.

Endnote
1. This procedure for creating terminal values implicitly creates different pro forma financial statements for the two models in the terminal period. As shown in our paper, the difference is driven by the implicit use of an incorrect book value when computing the terminal value, which differs from the actual book value implied by the pro forma financial statements in the finite horizon.

References