

Chapter 1 Income Approach

Discounted Cash Flow Model: Terminal Year and Mid-Year Convention

Question: What period should you use for purposes of determining the present value of the terminal year value when using a mid-year convention discounted cash flow model?

Answer: We have been dealing with this for decades and the answer is always the same. The terminal year value is present valued back at the mid-year, not the end of the year.¹ For example, assume that you have a five-year projection and you decide to use the mid-year convention because cash flows come in steadily during the year and not all at the end of the year. As stated in *Financial Valuation Applications and Models*, "It is important to note that the terminal year begins at 4.5, not 5."² The mid-year convention formula applied to net cash flow (NCF) is shown below (this includes the use of the Gordon Growth Model in the terminal year).

Mid-Year Convention Discounted Cash Flow (DCF) Model³

Present Value of NCF's during Explicit Period

$$PV = \frac{NCF_1}{(1+k)^{n=0.5}} + \frac{NCF_2}{(1+k)^{n=1.5}} + \dots + \frac{NCF_n}{(1+k)^{n=4.5}} + \frac{NCF_n \times (1+g)}{(1+k)^{n=4.5} \times (k-g)}$$

Terminal Value

$$\frac{NCF_n \times (1+g)}{(1+k)^{n=4.5} \times (k-g)}$$

Let's calculate a value using the above formula, a 20% discount rate, and a 4% long-term growth rate.

Discount Rate 20%
Long-term Growth Rate 4%

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Terminal Year*</u>
Cash Flow	\$1,000	\$1,150	\$1,228	\$1,417	\$1,516	\$9,854
Period	0.5	1.5	2.5	3.5	4.5	4.5
PV Factor	0.9129	0.7607	0.6339	0.5283	0.4402	0.4402
PV of Cash Flow	\$913	\$875	\$778	\$749	\$667	\$4,338

Sum \$8,320

*The terminal year value is $(1,516 \times 1.04) \div (.20 - .04) = 9,854$.

¹ Note: Some valuation analysts assume end-of-year periods because, while cash flows may come in during the year, they are not distributed to shareholders until the end of the year. The example here presents mid-year cash flows in the interim period and the terminal year period.

² James R. Hitchner, editor and coauthor, *Financial Valuation Applications and Models*, third edition, 2011 (Wiley: Hoboken, NJ), p. 147.

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Now, let's calculate the value with the interim cash flows at mid-year and the terminal year at end of Year 5.

Discount Rate 20%
Long-term Growth Rate 4%

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Terminal Year*</u>
Cash Flow	\$1,000	\$1,150	\$1,228	\$1,417	\$1,516	\$9,854
Period	0.5	1.5	2.5	3.5	4.5	5.0
PV Factor	0.9129	0.7607	0.6339	0.5283	0.4402	0.4019
PV of Cash Flow	\$913	\$875	\$778	\$749	\$667	\$3,960
Sum	\$7,942					

*The terminal year value is $(1,516 \times 1.04) / (.20 - .04) = 9,854$.

Chapter 2 Cost of Capital/Rates of Return

Duff & Phelps Valuation Handbook - Guide to Cost of Capital Size Premium Regression Line and Small Companies

Question: I have heard that the extrapolation beyond the regression line (the lower end) when using Duff & Phelps size premium data should not be used for smaller companies. What is your stance on using the extrapolation? What do you do when the subject company you're valuing is smaller than the smallest company in the 25th portfolio of the Duff & Phelps Risk Premium Report data?

Answer: This is an important question that Duff & Phelps addresses at some length in the *2015 Valuation Handbook – Guide to Cost of Capital*:

The short answer is "Yes." It may be appropriate to extrapolate the risk premium for companies whose size characteristics are less than the average characteristics of the companies comprising the bottom half of Portfolio 25 using the regression equation method. While extrapolating a statistical relationship far beyond the range of data used in analysis is generally not recommended, in cost of capital analyses (or any analysis for that matter), there is always the question of "compared to what?" Put simply, while it may not be ideal to extrapolate a statistical relationship beyond a certain range, one may be confronted with a situation in which no better measure is available.

Specifically, in cases where the size characteristic of the subject company is significantly less than that of the average company included in Portfolio 25 for any given size measure, the valuation analyst may report the individual, average and the median premia (and corresponding cost of equity capital estimates) using both the guideline portfolio method and the regression equation method (using all of the subject company size characteristics that are available). However, we recommend that the valuation analyst consider disclosing that the subject company's selected size metric is less than, for instance, the smallest of companies included in Portfolio 25 of a particular size measure. Once again, reporting all of the information in a transparent way is preferable to not reporting it at all, especially in cases where no better alternative is available.⁴

⁴ Duff & Phelps *2015 Valuation Handbook – Guide to Cost of Capital* (Wiley: Hoboken, NJ), p. 9-10.

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The *2015 Valuation Handbook – Guide to Cost of Capital* does provide information about the largest and smallest companies in the 25th portfolio for each of the eight size measures (the 25th portfolio is comprised of the smallest companies).⁵ The size characteristics of the smallest companies comprising the 25th portfolio can be used as a guide that the size premia is supported for companies that small.

In summary, while Duff & Phelps says “it may be appropriate” to extrapolate beyond the last point in the regression line, we believe that you should be cautious about extrapolating too far beyond that last point because you may be going into untested territory. Often we deal with smaller companies by adjusting for company-specific risk as opposed to going beyond the last point in the regression line. If you do extrapolate beyond the regression line, we also agree that you should compare it to your results using a company-specific risk adjustment.

The Build-Up Model, Combined ERP and Size Risk, and IRPs

Question: Is it correct to apply an industry risk premium in a build-up model when using the Duff & Phelps Risk Premium Report data from the A exhibits where the equity risk premium and the size premium are combined?

Answer: This is not recommended. If you add an industry risk premium (IRP) to the combined equity risk premium (ERP) and the size premium from the Duff & Phelps A exhibits (A-1 through A-8), this could result in some double counting of the beta effect. The risk premiums from the A exhibits already include a beta risk based on size, but across all industries. The preferred method would be to use the size data from the B exhibits (B-1 through B-8) and a separate ERP and IRP. Let’s take an example.

Assume that the appropriate size premium (risk premium in excess of the CAPM expected return) derived from the B exhibits for the subject company is 6%. One can then use this size premium in conjunction with the recalculated IRP. For this illustration, we will assume a normalized risk-free rate, the Duff & Phelps recommended ERP of 5.0%, and the IRP based on the ERP of 5.0%.⁶

Risk-free rate	4.0%
Plus: ERP estimate	5.0%
Plus: IRP adjusted	1.4%
Plus: Size premium	6.0%
Indicated cost of equity capital (before consideration of RPC, if any)	16.4%

This use of the IRP and the B exhibits eliminates any double counting of beta risk that might be included in the size premiums in the A exhibits.

⁵ Ibid., Exhibit 10.3, “Size Characteristics of the Companies that Comprise Portfolio 25, by Percentile,” p. 10-7.

⁶ The IRP is based on a CAPM-type formula that is sensitive to the ERP that is used, whether the CRSP historical ERP, the CRSP supply-side ERP, or the Duff & Phelps recommended ERP. These three types of IRPs are also calculated and presented in Exhibit 5.7 of the *2015 Valuation Handbook – Guide to Cost of Capital*.

Chapter 3 Discounts and Premiums

Minority Cash Flows = Control Cash Flows

Question: I understand that minority or control value is dealt with in the cash flows of the subject company. What if the cash flows need no adjustment (i.e., minority and control cash flows are the same)? Is the value the same for minority and control?

Answer: Yes, assuming that the control owner(s) are expected to continue running the company to the benefit of all the owners regardless of the size of the holding. However, when valuing businesses into perpetuity, there is always some risk that the policy of running the business to the equal benefit of all investors could change in the future. As such, when valuing a minority interest, some analysts will apply a small discount to the value to reflect this risk, often by increasing the discount rate.

This addresses the issue of discount for lack of control/minority interest. It does not account for the marketability differences between a controlling interest and a minority interest. So while there may not be any adjustment for control, there may still be adjustment for their respective lack of marketability.

Mergerstat Industry Concentration

Question: Is there any industry concentration in the *Mergerstat Review* control premium information?

Answer: Yes. There is a high level of industry concentration. From 2008 to 2012, over 40% of the transactions occur in five industries (out of 50 industries total).⁷ The five industries are:

1. Banking and Finance
2. Brokerage, Investment and Management Consulting
3. Computer Software, Supplies and Services
4. Drugs, Medical Supplies and Equipment
5. Miscellaneous Services

Only 10% of the identified industry groups generated over 40% of the transactions. Analysts who rely on the average control premiums for transactions in all industries are overweighting their reliance on a handful of industries that are likely dissimilar to the subject company. Analysts should reconsider the supportability of relying on high-level averages of all the data.

⁷ *Mergerstat Review*, 2013, Factset Mergerstat, LLC, Newark, New Jersey, p. 81.

Chapter 4 Business Valuation Standards and Ethics

ASA Calculations and Compliance with USPAP

Question: Can a member of the American Society of Appraisers perform a calculation engagement in compliance with the *Uniform Standards of Professional Appraisal Practice*?

Answer: Yes, a member of the American Society of Appraisers (ASA) can perform a calculation engagement in compliance with the *Uniform Standards of Professional Appraisal Practice* (USPAP). The article “The Question of Calculations and USPAP – Another Round,” written by Carla Glass, CFA, FASA, deals with this issue concisely.⁸

A calculation engagement can be performed in compliance with USPAP. In USPAP terms, it is simply called an appraisal with a lesser *scope of work*. The most important differences are that, under USPAP, the reduced *scope of work* must be appropriate for the intended use (purpose) of the assignment and the responsibility for this decision rests with the appraiser. A *calculation report* can, with relatively few changes, be made compliant with USPAP.

ASA, USPAP, and Reporting Exemptions for Dispute Engagements

Question: Do ASA and USPAP allow a reporting exemption in dispute matters like the standards of the AICPA, NACVA, and the IBA?

Answer: No. While the American Institute of Certified Public Accountants (AICPA), National Association of Certified Valuers and Analysts (NACVA), and The Institute of Business Appraisers (IBA) allow a reporting exemption for valuation/appraisal practice and services within dispute engagements, the ASA and USPAP have no such exemption. They are silent on this issue. As such, reports are required to be in compliance with ASA and USPAP reporting standards when performing an appraisal as an appraiser. Obviously this assumes you are a member of the ASA, which requires its members to follow USPAP.

While some attorneys request reports in litigation, some attorneys do not want a report. However, both ASA BV Standards and USPAP allow the appraiser to provide oral reports. USPAP Standards Rule 10-4 is helpful here.

To the extent that it is both possible and appropriate, an oral appraisal report for an interest in a business enterprise or intangible asset must address the substantive matters set forth in Standards Rule 10-2(a).⁹

The critical language here is “To the extent it is both possible and appropriate...” This gives the analyst great flexibility in delivering an oral report in a litigation setting.

⁸ Carla Glass, CFA, FASA, “The Question of Calculations and USPAP – Another Round,” *Financial Valuation and Litigation Expert*, Issue 47, February/March 2014, Valuation Products and Services, LLC, pp. 7-10. Note: These are Carla Glass’s personal views and are not the official position of any firm, board, society, or foundation.

⁹ *Uniform Standards of Professional Appraisal Practice*, 2016/2017 edition, The Appraisal Standards Board, The Appraisal Foundation, p. 71.

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