

# Financial Valuation *and* Litigation Expert

IEWS AND TOOLS FROM LEADING EXPERTS ON VALUATION, FORENSIC/FRAUD AND LITIGATION SERVICES



## Editor's Outlook

**Jim Hitchner**

jhitchner@  
valuationproducts.com

Welcome to an issue that we hope has enticed you with an interesting headline! Read on to learn how analysts may “rig” a valuation and how you can detect it.

Gary Trugman’s article is a nice follow up to this, as Gary explains the absolute necessity of remaining an objective professional when performing business valuations. Not only is this important for the client’s sake, it is imperative for the reputation of the valuation analyst.

Ray Rath next takes a look at the Distributor Method and applauds the Appraisal Foundation for its recent discussion draft, which provides appropriate language describing and explaining the method. He believes intangible asset appraisers will find this document especially helpful

Next up, Tom Hilton takes a serious look at calculation reports and helps us to understand when and why they are sometimes a good or bad choice.

Rounding out this issue, Mike Mard, Don Wisheart and Seph Mard deliver an in-depth examination of the limitations of the Black-Scholes Option Pricing Model as used in the discount for lack of marketability. The authors advise us to “get with the times” and recommend that you take a look at the GARCH Option Pricing Model.

## How to ‘Rig’ a Valuation: The Discount Rate

First off, we at VPS do not believe in or perform “rigged” valuations. However, many of us have been involved in valuations where another so-called expert rigged his or her valuation. We’re not talking about unintentional biases here; we’re talking about intentional biases (see *FVLE* Issue 31, June/July 2011, “Expert Ethics: Bias and Plagiarism, The Dark Side of Business Valuation”).

Unfortunately, users of valuation services often can’t tell the difference between an unbiased valuation and a biased one. What makes matters even worse is that one side will do an unbiased, balanced and fair valuation. The other side is biased and comes up with a much higher value. From a trier of fact’s perspective, there is a low value and a high value, indicating pos-

sible bias from both experts. It doesn’t appear as an unbiased and fair value on one side and a biased and unfairly high value on the other side. What’s a trier of fact to do? That’s what this article will explore— by exposing the tricks of the trade in biased valuations— in particular here, the discount rate.

Let’s assume we are valuing a small- to medium-sized company that is smaller than the average companies in the Duff & Phelps 25th category, the Ibbotson 10th decile and the Ibbotson 10z decile category.<sup>1</sup> Again, this article will focus on the calculation of a discount rate used in the income approach. We may expand this into a series in the future, where other areas of rigged valuations will be analyzed.

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# Financial Valuation and Litigation Expert

**Publisher** Valuation Products & Services  
**Editor in Chief** James R. Hitchner, CPA/ABV/CFF, ASA  
**Managing Editor** Karen Warner, M.A., Valuation Products & Services  
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Subscription and/or delivery questions can be addressed to Janet Kern, business manager, at [jkern@valuationproducts.com](mailto:jkern@valuationproducts.com) or (609) 289-8341.

Editorial questions/comments or article submissions may be addressed to Karen Warner, managing editor, at [kwamer@valuation-products.com](mailto:kwamer@valuation-products.com) or (609) 289-8341.

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**THE DISCOUNT RATE**

The income approach has a multitude of places to rig a valuation, especially the equity discount rate. Let's focus here on the buildup method.<sup>2</sup>

$$ke = Rf + RPm + RPs + RPi + RPu$$

Where:

- ke = The cost of equity
- Rf = The risk-free rate
- RPm = The risk premium for the market (equity risk premium)
- RPs = The risk premium for small size
- RPi = The risk premium for industry risk (if appropriate)
- RPu = The risk premium for unsystematic risk (specific company risk)

**Risk-Free Rate**

The risk-free rate is hard to rig. Most valuation analysts (analysts) rely upon a 20-year Treasury bond. There are two primary reasons: (1) That's the security that has the longest investment horizon over a long period of time, and (2) Morningstar/Ibbotson and Duff & Phelps both use this to compute their equity risk premiums (ERP).

There is some discussion about whether you should normalize the risk-free rate but our experience is that many analysts do not do this. If they do adjust it, it is usually less than 1.5 percent, so it may not be a big issue when valuing small- to medium-sized businesses. It can make a difference in the valuation of very large companies which generally have much lower discount rates. Now, on to the ERP.

**Equity Risk Premium**

In our recent experience, the general range is somewhere between approximately 4 percent and 7 percent. Around 5 percent to 6 percent seems to be the sweet spot. This is based on our comparisons of the following ERP sources: Ibbotson historical, Ibbotson supply side, Duff & Phelps historical, Duff & Phelps recommended<sup>3</sup> and Dr. Aswath Damodaran.<sup>4</sup>

Two observations are that (1) the Ibbotson supply side and the Duff & Phelps recommended ERPs are usually in a fairly tight range, and (2) the

Ibbotson historical is always the highest ERP, and the D&P historical and Damodaran are the lowest ERPs. A future article will present an updated comparison in more detail.<sup>5</sup> For the ERP, if an analyst chooses greater than 7 percent or lower than 4 percent, we would call them out on that. Now on to the risk premium for size (size premium).

**Size Premium**

There is plenty of room for abuse here. For Ibbotson, the choices are between or include the micro-cap (9th and 10th deciles) category and decile category 10z. The 2012 reported data range (for years 1926 up to and including 2011) is 3.9 percent to 11.8 percent, respectively. So, pick a number— any number you want. In VPS's February 13, 2013 webinar, "Valuation of Small Businesses, Solutions to Key Issues in Valuing Businesses Worth Less than \$5 Million," we asked the following poll question to hundreds of participants:

Which of the following Ibbotson size premium data do you use the most when valuing a small business (pick one):

- a) Micro-cap
- b) 10th decile
- c) 10b
- d) 10z
- e) Other or I don't use Ibbotson data

The responses were as follows:

- a) Micro-cap — 5%
- b) 10th decile — 62%
- c) 10b — 9%
- d) 10z — 9%
- e) Other or I don't use Ibbotson data — 15%

In our experience, we have seen Ibbotson decile 10 used the most. The webinar poll responses reflect this. Some analysts use the micro-cap. The 2012 reported size premium is 3.9 percent for the micro-cap and 6.1 percent for the 10th decile. We think both of these size premiums are supportable. However, these two categories have significantly different profiles. See **Chart 1** below.<sup>6</sup>

The micro-cap number of companies is 1.4 times higher than the 10th decile. However, the entire market capitalization is 2.4 times higher for the micro-cap category vs. the 10th decile (\$268 million vs. \$111 million). You get a broader group of companies along with a very large bump in size. This may require a larger specific company risk premium for the micro-cap category vs. the 10th decile.

Now, on to Ibbotson decile categories 10b, 10y and 10z in the *2012 Valuation Yearbook*,<sup>7</sup> shown in **Chart 2** on the next page. The market capitalization size ranges are for the most recent year.

*Continued on next page*

**CHART 1**

	<u>10th Decile</u>	<u>Micro-Cap</u>
Recent number of companies (2011)	1,212	1,662
Estimated initial number of companies (1926)	52	N/A
Average recent market capitalization	\$92 million	\$161 million
Smallest single company market capitalization	\$1 million	\$1 million
Largest single company market capitalization	\$207 million	\$423 million
Beta	1.41	1.36

**CHART 2**

	<u>Return</u>	<u>Size Premium</u>
Decile 10 (\$1 million - \$207 million)	20.56%	6.10%
Decile category 10b (\$1 million - \$129 million)	24.05%	9.81%
Decile category 10y (\$87 million - \$129 million)	23.34%	8.93%
Decile category 10z (\$1 million - \$87 million)	25.80%	11.77%

It's important to note that 80 percent of the companies in decile category 10b are from 10z. As such, let's focus on 10z. At the 50th percentile of 10z the operating margin is -1.11 percent. Yes, on average, these companies are losing money. At the 25th percentile the operating margin is -21.27 percent. Furthermore, 62 percent of the companies in 10z are from only three industry sectors: financial services, technology and healthcare.<sup>8</sup> So, if the company you are valuing is a bank, healthcare provider or high-tech company that is losing money, then maybe 10z will work. However, if you are valuing a widget manufacturer or service provider that has income, 10z doesn't work. That is why the following quotes from Ibbotson are puzzling.<sup>9</sup>

There is a noticeable increase in size premium from 10a to 10b and the portfolio made up of the smallest companies, 10z, has the largest size premium. This can be useful information in valuing companies that are extremely small.

The more stocks included in a sample, the more significance can be placed on the results. The 10th decile gets as small as 49 companies back in March of 1926. This is still significant.

All things considered, size premia developed for these portfolios are significant and can be used in cost of capital analysis. These size premia should greatly enhance the development of cost of capital analysis for very small companies.

We do not agree with these views given the makeup of the companies in 10z. We do agree that more companies are better than lesser numbers of companies. We also recognize that 10z companies are also included in 10b, 10 and even the micro-cap category. However, their effect on these larger categories is diminished due to the larger number of companies. We also understand that we are looking at the makeup of 10z companies in the last quarter of 2011.

If you see decile category 10b, 10y or 10z used with a healthy amount of specific company risk, this could be cause for a large under-valuation.

For those of you who use the Duff & Phelps Risk Premium Reports, particularly the smallest category 25, there are some differences when compared to Ibbotson, particularly the smallest category 10z. Let's make a comparison of significant variables, as shown in **Chart 3** below.

Remember, the Ibbotson size premium and return data goes back to 1926; Duff & Phelps goes back to 1963.

Also, the number of companies and size of the category are for 2011. The operating margin for Ibbotson is also for 2011. The Duff & Phelps average operating margin is for the five most recent years ending in 2011.

**Industry Risk Premium**

The industry risk premium (IRP) is less about rigging a value than difficulty in supporting the value. We think it is difficult to reject the guideline public company method (GPCM) because there are no companies that can be legitimately used, but then use those rejected companies as part of the IRP. Why are those public companies supportable in the IRP component of the equity discount rate but unsupported in the GPCM? Some analysts reply that, well, that's all we have. Okay, if that's all we have then use those public companies in the GPCM. We may be old fashioned here, but what's good for the goose is good for the gander, and you don't want to have your goose (or gander) cooked.

If an analyst uses an IRP to inflate or lower a value, check the following items:

1. How many digits are there in the SIC code? Four is good and two is bad. Three may or may not be any good, depending on the number of companies.
2. How many companies are in the SIC code IRP analysis? The minimum reported is five. In the Ibbotson 2012 Valuation Edition, the maximum is 874 (SIC 73 business services).

*Continued on next page*

**CHART 3**

	<u>Ibbotson 10z<sup>10</sup></u>	<u>D&amp;P 25th<sup>11</sup></u>
Number of companies	957	304
Size of category	\$1 million - \$87 million	\$95 million average
Return	25.8%	22.8%
Size premium	11.7%	7.7%
Operating margin	-1.1%	6.1%

3. How different is the IRP in previous years? Let's take SIC 5812, eating places (62 companies 2012) and SIC 872, accounting, auditing and book-keeping services (5 companies 2012).

	<u>SIC</u>	
	<u>5812</u>	<u>872</u>
2012 Valuation Edition	-1.66%	-0.93%
2011 Valuation Edition	-1.99%	N/A
2010 Valuation Edition	-0.65%	-1.65%
2009 Valuation Edition	-0.57%	-3.06%
2008 Valuation Edition	1.72%	-0.98%

The number of companies in SIC 5812 has been fairly steady over the five-year period. However, the IRP has ranged from -1.99 percent to 1.72 percent, a swing of 3.71 percent. The number of transactions in SIC 872 has ranged from five to 12 with no IRP in 2011, most likely due to not having the required five companies. The IRP range was -3.06 percent to -0.93 percent, a swing of 2.13 percent.

4. Were the actual public companies downloaded and checked for comparability (see number 5 below)?
5. Does the IRP make sense? In the *Ibbotson 2012 Valuation Edition*, SIC 5812, eating places, had an IRP of -1.66 percent for the 62 public companies within that SIC. That means that eating and drinking places are less risky than the market as a whole. If you have ever valued restaurants, particularly smaller independent ones, that number is ridiculous. However, if you are valuing McDonald's, Cheesecake Factory, Cracker Barrel, Denny's, P.F. Chang's, Starbucks, Wendy's, Benihana or Papa John's as a whole company, maybe you are okay. Those are some of the public companies that make up SIC 5812. For SIC 872, the companies included CBIZ, Paychex, FTI Consulting, Manpower, and Robert Half. You could never support an IRP here if you were valuing a small- to medium-size accounting firm.

**Specific Company Risk**

This is where you can really rig a valuation. The specific company risk pre-

mium (SCRIP) is not based on any formulas, algorithms or databases.<sup>12</sup> It is based on reviewing the available information and applying informed, unbiased judgment. Unfortunately, it can also be based on doing very little and choosing a number that helps the client. Let's take an example. Let's calculate the equity discount rate as of December 31, 2012. Let's also assume a profitable company that we know is worth between \$10 million and \$20 million. Let's assume average risk. The discount rate is as follows:

$$k_e = R_f + R_{Pm} + R_{Ps} + R_{Pi} + R_{Pu}^{13}$$

$$k_e = 2.5\% + 6.1\% + 6.1\% + 0 + 4\% = 18.7\%, \text{ say } 19\%$$

Let's now "rig" the discount rate as follows:

$$k_e = 2.5\% + 6.1\% + 6.1\% + 0 + 8\% = 22.7\%, \text{ say } 23\%$$


Assume a long-term growth rate of 5 percent. This results in a 22 percent reduction in value, just by adding on to the specific company risk.

**CONCLUSION**

Let's rig most of the data inputs to an equity discount rate as follows:

$$k_e = 2.5\% + 6.1\% + 11.8\% + 2.5\% + 4\% = 26.9\%, \text{ say } 27\%$$

Assume a long-term growth rate of 5 percent. This results in a 36 percent reduction in value, just by going with an IRP and Ibbotson decile category 10z.

As a sanity check on discount rates and to see whether a discount rate is "rigged," see **Chart 4** below and **Chart 5** on page 7 that provide some boundaries and benchmarks. 

(Endnotes on next page).

**CHART 4**

**Easy Sanity Check on Discount and Capitalization Rates**

As of December 31, 2012

U.S. 30-day treasury bill <sup>14</sup>	0.02%
U.S. five-year treasury note <sup>15</sup>	0.72%
U.S. 20-year treasury bond <sup>16</sup>	2.54%
30-year conventional mortgage <sup>17</sup>	3.35%
Aaa corporate bond <sup>18</sup>	3.67%
Baa corporate bond <sup>19</sup>	4.63%
Decile 1 (\$54 billion average) <sup>20</sup>	10.82%
Micro-cap stock (\$161 million average) <sup>21</sup>	18.04%
Decile 10 (\$92 million average) <sup>22</sup>	20.56%
D&P category 25 (\$95 million average) <sup>23</sup>	22.82%
Decile 10 (\$1 million - \$207 million) <sup>24</sup>	20.56%
Decile category 10b (\$1 million - \$129 million) <sup>25</sup>	24.05%
Decile category 10z (\$1 million - \$87 million) <sup>26</sup>	25.80%
VC Bridge/IPO <sup>27</sup>	20%-35%
VC second stage/expansion <sup>28</sup>	30%-50%
VC first stage/early development <sup>29</sup>	40%-60%
<i>Ibbotson Cost of Capital Yearbook/Quarterly</i> <sup>30</sup>	Varies

**CHART 5**

**Easy Sanity Check on Discount and Capitalization Rates  
Venture Capital Rates of Return**

**Stage of Development**

	<u>Plummer</u> <sup>31</sup>	<u>Scherlis and Sahlman</u> <sup>32</sup>	<u>Sahlman, Stevenson, and Bhide</u> <sup>33</sup>
Startup <sup>34</sup>	50%–70%	50%–70%	50%–100%
First stage or “early development” <sup>35</sup>	40%–60%	40%–60%	40%–60%
Second stage or “expansion” <sup>36</sup>	35%–50%	30%–50%	30%–40%
Bridge/Initial Public Offering (IPO) <sup>37</sup>	25%–35%	20%–35%	20%–30%

<sup>1</sup> Ibbotson SBBi 2012 Valuation Yearbook, Morningstar, Inc., Chicago, IL and Duff & Phelps Risk Premium Report 2012, Duff & Phelps, LLC, Chicago, IL.

<sup>2</sup> Note: This discussion would be the same if we addressed the modified capital asset pricing model “MCAPM” with the exception of beta.

<sup>3</sup> www.duffandphelps.com/costofcapital

<sup>4</sup> Dr. Aswath Damodaran, “Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2012 Edition,” Updated: March 2012, Stern School of Business, NYU adamodar@stern.nyu.edu .

<sup>5</sup> See FVLE Issue 29, February/March 2011 for earlier comparisons of this data (Ibbotson and Duff & Phelps only).

<sup>6</sup> Ibbotson SBBi 2012 Valuation Yearbook, Morningstar, Inc., Chicago, IL, pp. 86, 89 and 93.

<sup>7</sup> Ibid, pp. 86, 88, 89 and 90.

<sup>8</sup> Ibid, pp. 90-91.

<sup>9</sup> Ibid, pp. 90-91.

<sup>10</sup> Ibid, pp. 90-92.

<sup>11</sup> Duff & Phelps Risk Premium Report 2012, Duff & Phelps, LLC, Chicago, IL, Exhibits B-1 and C-1.

<sup>12</sup> Some analysts argue that “Total Beta” is one such method. We’ll leave that discussion for another day.

<sup>13</sup> For simplicity we assume a spot rate for the risk free rate, Ibbotson’s supply side ERP, Ibbotson 10th decile size premium, zero IRP due to lack of comparability and that specific company risk includes additional industry risk as well as risk specific to the subject company.

<sup>14</sup> http://www.federalreserve.gov/releases/h15/current/default.htm.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid.

<sup>20</sup> Ibbotson SBBi 2012 Valuation Yearbook, Morningstar, Inc., pp. 86,89, all data from 1926 to 2011.

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Duff and Phelps Risk Premium Report, 2012, Exhibit A-1, all data from 1963 to 2011.

<sup>24</sup> Ibbotson SBBi 2012 Valuation Yearbook, Morningstar, Inc., pp. 86, 89, 92, all data from 1926 to 2011.

<sup>25</sup> Ibid.

<sup>26</sup> Ibid.

<sup>27</sup> Valuation of Privately Held Company Equity Securities Issued as Compensation, Practice Aid, Working Draft, 2012, American Institute of Certified Public Accountants, p. 114.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> http://corporate.morningstar.com/ib/asp/subject.aspx?xmlfile=1420.xml.

<sup>31</sup> James L. Plummer, QED Report on Venture Capital Financial Analysis (Palo Alto: QED Research, Inc., 1987).

<sup>32</sup> Daniel R. Scherlis and William A. Sahlman, “A Method for Valuing High-Risk, Long-Term Investments: The Venture Capital Method,” Harvard Business School Teaching Note 9-288-006 (Boston: Harvard Business School Publishing, 1989).

<sup>33</sup> William A. Sahlman, Howard H. Stevenson, Amar V. Bhide, et al., “Financing Entrepreneurial Ventures,” Business Fundamental Series (Boston: Harvard Business School Publishing, 1998).

<sup>34</sup> As described in the publications referenced in this table, startup-stage investments typically are made in enterprises that are less than a year old. The venture funding is to be used substantially for product development, prototype testing, and test marketing.

<sup>35</sup> As described in the publications referenced in this table, early development-stage investments are made in enterprises that have developed prototypes that appear viable and for which further technical risk is deemed minimal, although commercial risk may be significant.

<sup>36</sup> As described in the publications referenced in this table, enterprises in the expansion stage usually have shipped some product to consumers (including beta versions).

<sup>37</sup> As described in the publications referenced in this table, bridge/IPO-stage financing covers such activities as pilot plant construction, production design, and production testing, as well as bridge financing in anticipation of a later IPO.

If you enjoyed this article, check out “How to Rig a Valuation, Part Two, Long-Term Growth Rates” in Issue 42.



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