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SPECIAL REPORTS

Determining the Discount Rate in a U.S. Cost-Sharing Agreement

by Stuart Webber

Stuart Webber is a professor and head of the Business Leadership and Management department at Trinity Lutheran College in Everett, Washington. He is also a member of the Copenhagen Research Group on International Taxation (CORIT).

The Treasury Department's regulations governing cost-sharing agreements (CSAs) require firms to determine a discount rate to calculate an investment's present value. The discount rate has a major impact upon the CSA's valuation, and therefore on the compensation one related entity may owe another for the value of intangible assets contributed to a CSA. Thus the discount rate can determine a firm's tax obligations, its worldwide tax rate, and government tax revenue. In a prior article I showed an example based on Treasury regulations in which increasing a discount rate by less than 3 percentage points would decrease the present value of total profits (PVTP) by 23 percent, or $178 million.[1]

Despite the importance of the discount rate, the final cost-sharing regulations provide little guidance concerning how this figure should be determined. An IRS economist acknowledged that the temporary regulations provided little direction on discount rates,[2] and the final regulations offer little additional guidance. When the IRS first proposed its investor model, the Tax Executives Institute thought determining the discount rate would be a significant problem with these regulations,[3] and those concerns appear equally valid today.

Both taxpayers and tax authorities would benefit from improved discount rate guidance. Firms may not want to form IRS-qualified CSAs in the absence of more direction, over concerns the IRS will challenge the discount rate. Also, inadequate guidance increases the likelihood these disputes may be settled in court, which may not be the best forum to determine a discount rate. For example, in the *Veritas*[4] case the IRS contended that firm's future profits should be discounted by 13.5 percent, while Veritas used a 20.47 percent rate. A difference of almost 7 points creates an enormous difference in present value calculations. In that case, the court sided with Veritas and ruled that its discount rate was correct. Nonetheless, asking courts to rule on discount rates is a costly, time-consuming, and inefficient process. Both taxpayers and the IRS could benefit from more direction on this important issue.

The purpose of this article is to review the IRS's cost-sharing regulations and to analyze the factors

[1] Stuart Webber, ''Financial Assumptions Regarding the Sensitivity of IRS Cost-Sharing Regulations,'' *Tax Notes Int'l*, Nov. 26, 2012, p. 855.

[2] *See* D. Stewart, ''Lack of Guidance on Cost Sharing Regs Is Good, Official Says,'' *Tax Notes Int'l*, Aug. 1, 2011, p. 337.

[3] ''TEI Comments on Proposed Cost Sharing Regulations,'' *Tax Executive*, Nov./Dec. 2005, Vol. 57(6), 628-638.

[4] *Veritas Software Corporation v. Commissioner of Internal Revenue Service*, 133 T.C. 297 (Dec. 10, 2009).

firms should consider when determining a CSA's discount rate. I will also look at financial and academic literature to determine what guidance those sources provide concerning discount rates. Finally, I will make recommendations concerning the approach firms may want to use when calculating a CSA's discount rate.

Background on CSAs

CSAs were first introduced into the Internal Revenue Code in 1968 as a way for related entities to share the costs of developing intangible assets and intellectual property. In a CSA, related entities share intangible asset development costs but profit separately from the assets created. Participants in the CSA need to calculate the reasonably anticipated benefits each expects to earn from the intangible property created. For example, suppose a firm calculated that one participant will earn 60 percent of the CSA's profits, and the other will receive the remaining 40 percent. It should share costs in this same ratio, so that costs are allocated proportionately with profits. This may require entities within an enterprise to make equalizing payments to align expenses and returns.

Further, suppose one of the related entities contributes valuable preexisting intangible assets (patents, trademarks, copyrights, customer lists, and so forth) to the CSA, and the second does not do so. Since the first participant contributed intangible assets to the CSA, it should be compensated by the second entity for the value of assets contributed. This compensation is commonly called the buy-in payment, or what the cost-sharing regulations call a platform contribution transaction (PCT).

For a number of years the IRS has been concerned that buy-in payments are undervalued. In many cases it was the U.S. entity that contributed preexisting intangible assets to the CSA, and the IRS believed the U.S. Treasury was inadequately compensated for the value of assets contributed to the CSA. This prompted the IRS to develop its investor model, announced in 2005 and defined in its Treasury regulations. The cost-sharing regulations were first proposed in 2005, made temporary in 2008, and finalized in December 2011. The final regulations made minor modifications to the temporary regulations, and the key concepts were retained. Immediately after the final regulations were released, the IRS also published new temporary and proposed regulations concerning the relationship between cost-sharing and licensing discount rates, which will also be discussed in this article.

One of the investor model's central ideas is that CSA participants should value investments in the same way third-party investors do, using time value of money principles. Thus, firms need to forecast future financial results and discount profits to calculate an investment's present value. A firm must apportion markets into geographic or other territories, which requires it to forecast results in each of the markets allocated in a CSA and compute the benefits each is expected to receive. Calculating each participant's benefits allows firms to determine how costs should be allocated and the buy-in payment's value. In a departure from financial theory, the final regulations emphasize discounting future profits to value an investment, rather than cash flow. The Treasury Department has suggested it is open to taxing cash flow in the future, but at this time the regulations do not explain how to do this.

The investor model also requires multinational enterprises to evaluate their realistic alternatives available to determine the buy-in payment. Suppose a U.S.-based entity determined that if it exploited the intangible assets on its own it would earn PVTP of $100 million. It could license the products created to related entities for international sale. A second alternative would be to form a CSA with an overseas subsidiary to share the costs of developing intangible property. In this second scenario, the U.S. entity would exploit the products in the United States, and it would earn PVTP of $60 million there. The overseas subsidiary would exploit the intangible assets everywhere but the United States. According to the investor model, the U.S.-based entity should receive the present value of $40 million in compensation from the overseas subsidiary, so its PVTP equals the original $100 million figure. In the IRS's view, if the firm could earn $100 million through licensing the product or service, it should earn that same figure in a CSA. The overseas entity's compensation would be the discount rate it earns on the investment.

The IRS investor model identifies six ways its principles can be applied. These are the income method, the acquisition cost method, the market capitalization method, the residual profit-split method, the comparable uncontrolled transaction method, and an unspecified method, which firms can use as long as it is consistent with investor model principles. The best method rule directs firms to use the methodology that best reflects the facts and circumstances in the CSA, not the most financially advantageous method. The income method is designed for situations in which one entity develops intangible assets, forms a CSA with a related party, and contributes those assets to the CSA. Many of the examples in the Treasury regulations focus on how the income method should be applied, and assume the U.S. entity developed the intangible assets, suggesting that the IRS believes this method should be used in many cases.

Cost-Sharing Regulations on Discount Rates

As noted, the IRS acknowledges that its regulations provide only general guidance on discount rates. This can also be demonstrated by reviewing relevant sections of the 2011 final cost-sharing regulations. A key section of those regulations states:

> A discount rate or rates should be used that most reliably reflect the market-correlated risks of activities or transactions and should be applied to the best estimate of the relevant projected results, based on all the information potentially available

> at the time for which the present value calculation is to be performed. Depending on the particular facts and circumstances, the market-correlated risk involved and thus, the discount rate, may differ among a company's various activities or transactions. Normally, discount rates are most reliably determined by reference to market information.[5]

In other words, firms should evaluate all the facts and circumstances of an investment and determine a discount rate that best reflects the investment's risk. Not all investments within the same firm may merit the same discount rate, as risks may differ. Market measures of discount rates are the most reliable. As noted, the investor model emphasizes discounting future profits, not cash flow, as tax laws have generally taxed profits. But beyond this, the regulations focus on general principles and appear to be consistent with financial theory.

The term ''market-correlated risk'' appears to be significant and deserves further discussion. Financial theory identifies two very different types of risk. One is market risk, which is the risk a diversified investor assumes by investing in equity markets. Making equity investments is generally rewarded by rates of return that exceed risk-free investments, at least over long periods of time. However, a second type of risk, which is known as unsystematic risk, can be reduced or eliminated through diversification. Financial theory says this risk is not rewarded by higher return rates. For example, if you take additional risk by investing all your funds in one security, you should not expect a higher rate of return on that investment. By including the words ''market-correlated risk'' in the regulations, it appears that the regulations recognize that not all risks will be rewarded, and are consistent with academic literature on this topic. However, there are times when the regulations seem to contradict this point.

The final regulations argue that developing intangible assets is riskier than licensing these assets, and thus development should earn a higher discount rate than licensing. The regulations state:

> In some circumstances, a party may have less risk as a licensee of intangibles needed in its operations, and so require a lower discount rate, than it would have by entering into a CSA to develop such intangibles, which may involve the party's assumption of additional risk in funding its cost contributions.[6]

Later the regulations say: ''Similarly, self-development of intangibles and licensing out may be riskier for the licensor, and so require a higher discount rate, than entering into a CSA to develop such intangibles, which would relieve the licensor of having to fund a portion of the IDCs [intangible development costs] of the IDA [intangible development activity].''[7]

It seems logical to conclude that developing intangible assets is riskier than licensing products, at least in some situations. For example, developing intangible assets involves risks that products will not be successfully produced or commercially viable. Licensing products that are already developed is clearly a less risky activity. So earning a higher discount rate for developing intangible assets, rather than licensing them, appears logical. However, this is not the point the regulations make. Rather, they emphasize the quantity of money at risk. The regulations seem to say that investors who risk more funds should earn a higher rate of return because they have assumed more financial risk. While more funds are at risk, I don't believe this means the investor should expect to earn a higher rate of return. An investor with a $200,000 portfolio should not expect to earn a higher rate of return than an investor with a $100,000 portfolio, simply because more funds are at risk. Mutual funds do not pay investors different rates of return based on the size of their portfolio, excluding the minor impact of administrative fees and minimum investment requirements. Financial theory does not support the position that investors should expect higher return rates only for risking more funds.

Pratt and Grabowski explain the two risk categories this way:

> [M]arket risk or systematic risk . . . is the uncertainty of future returns owing to the sensitivity of the return on the subject investment to variability in the returns for a composite measure of marketable investments. Unique or unsystematic risk (also known as diversifiable risk, residual risk or specific risk) is a function of the characteristics of the industry, the individual company, and the type of investment and is unrelated to the variation in the market as a whole.[8]

Later they explain that investors should not expect to be rewarded for incurring unsystematic risk. They state:

> Under this assumption, investors will not require compensation (i.e., a higher return) for the unsystematic risk because they can easily diversify it away. Therefore the only risk pertinent to study of capital asset pricing model theory is market risk.[9]

Brigham and Ehrhardt make the same point. They say:

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[5]Treas. reg. section 1.482-7(g)(2)(v)(A).

[6]Treas. reg. section 1.482-7(g)(2)(v)(B)(1).

[7]*Id.*

[8]S. Pratt and R. Grabowski, *Cost of Capital in Litigation*, Wiley, New Jersey (2011), p. 33.

[9]*Id.* at 34.

> The primary conclusion of CAPM is this: The relevant risk of an individual stock is its contribution to the risk of a well-diversified portfolio. A stock might be quite risky if held by itself, but if half its risk can be eliminated by diversification, then its relevant risk, which is its contribution to the portfolio's risk, is much smaller than its stand-alone risk.[10]

At several points the final Treasury regulations appear to state that risking more funds merits a higher rate of return. The regulations do not specifically discuss diversification, but they do state that risking more funds should be rewarded with a higher rate of return. At one point, the regulations state:

> In evaluating the cost sharing alternative, FS (Foreign Subsidiary) concludes that the cost sharing alternative represents a riskier alternative for FS than the licensing alternative because, in cost sharing, FS will take on the additional risks associated with cost contributions.[11]

The regulations then state the discount rate for cost sharing is 15 percent, and 13 percent for licensing. While the regulations state that these figures were determined by referencing market rates, they seem to say that a discount should be for the size of the investment, which is not accurate.

I would advise companies to disregard those sections of the regulations that state cost sharing merits a higher discount rate than licensing simply because more funds are at risk. I agree that cost sharing may be riskier for other reasons, particularly if the products have not been developed or if a product's demand is unproven. But the quantity of funds invested is not the key issue. To support this position, I would emphasize those portions of the regulations that are consistent with financial theory, which state that only market (or systematic) risk is rewarded through higher rates of return. The business practices of mutual fund companies, which pay all investors the same percentage returns, also support this position.

On another topic, the final regulations provide additional guidance concerning how buy-in payments should be adjusted for taxes. The preamble to the regulations states, ''While PCT Payments must be determined on a pretax basis, in general, the financial projections and discount rates used to apply the income method are post-tax measures.''[12] Further, the preamble states:

> The Treasury Department and the IRS believe the requirement that PCT Payments be determined on a pretax basis is fundamental to the determination of an arm's length result, and, while no changes were made to the regulations in this regard, examples were added to illustrate this concept. Under the income method, the operative rule in all cases is to derive the pretax PCT Payments that set the post-tax present value of the cost sharing alternative to the post-tax present value of the licensing alternative.[13]

The final regulations provide several examples that explain how firms should calculate pretax buy-in payments under the income method. In short, firms must gross-up the post-tax results to calculate a pretax PCT payment.[14]

The final regulations also identify risks that firms should consider that are not associated with the inherent risks of the project, but are a function of the CSA's payment terms. Specifically, the final regulations state that the form in which payments are made between related entities is also a risk to be considered, and which should affect discount rates. The final regulations state that ''ordinarily, a royalty computed on a profits base would be more volatile, and so require a higher discount rate to discount projected payments to present value, than a royalty computed on a sales base.''[15] In other words, sales are not likely to fluctuate as widely as profits, and thus they are a more stable figure upon which royalties can be calculated.

In short, the final regulations provide general guidance concerning how firms should determine discount rates. Discount rates should reflect the market-correlated risks of an investment. To determine the risk of an investment, it is best to rely upon market measures of risk. Firms should use post-tax discount rates, but in general they need to make pretax payments, and the regulations show how those calculations should be made under the income method. Royalties based on income are riskier than royalties based on sales, so they merit a higher discount rate. But beyond this, the final regulations do not provide much guidance concerning how a discount rate should be calculated. As noted, I believe the regulations could be improved by making a clear distinction between market (or systematic) risk, and unsystematic (or diversifiable) risk, which would make them consistent with financial theory on this topic.

2011 Regs on Discount Rates

Shortly after the final cost-sharing regulations were released in December 2011, the Treasury Department released new proposed and temporary regulations focusing on the relationship between cost-sharing and licensing discount rates firms use to calculate buy-in

[10]E. Brigham and M. Ehrhardt, *Financial Management: Theory and Practice*, 12th ed. (2008), Thomson South-Western, p. 217.

[11]Treas. reg. section 1.482-7(g)(4)(vi)(F).

[12]*Fed. Reg.*, Vol. 76, No. 246, Dec. 22, 2011, p. 80085.

[13]*Id.*

[14]Treas. reg. section 1.482-7(g)(4)(viii), Examples 4-6.

[15]Treas. reg. section 1.482-7(g)(2)(v)(B)(3).

payments. The Treasury Department said it was concerned that firms were using discount rates that undervalued buy-in payments. The preamble to the temporary regulations states:

> The Treasury Department and the IRS are aware that some taxpayers are taking unreasonable positions in applying the income method by using relatively low licensing discount rates, and relatively high cost sharing discount rates, without sufficiently considering the appropriate interrelationship of the discount rates and financial projections, thus deriving PCT Payments that are not in accordance with the arm's length standard.[16]

Because firms must evaluate realistic alternatives to a CSA, they need to determine both a cost-sharing and licensing discount rate; the IRS believes the risk associated with these alternatives may differ. The difference between these two discount rates can have a major impact upon the buy-in payment.

To explain this, it is useful to begin with Example 1 in the final regulations.[17] The regulations include an example in which a firm analyzes the financial impact of cost sharing versus licensing, and it determines that the PCT payer, which in this case is an overseas entity, needs to make a payment of $464 million to its U.S. parent. Profits under the cost-sharing alternative are discounted at 15 percent, and by 13 percent under the licensing option. According to my calculations, the PVTP is $889 million under the cost-sharing alternative and $425 million under the licensing scenario. These figures are consistent with the $464 million PCT payment mentioned in the final regulations, which is the difference between $889 million and $425 million.

The temporary regulations change the discount rates to demonstrate what the IRS believes would be an unreasonable taxpayer position. They increase the cost-sharing discount rate to 20 percent and reduce the licensing discount rate to 10 percent.[18] According to my calculations, this decreases the PVTP under the cost-sharing alternative to $655 million and increases the PVTP under the licensing alternative to $509 million. Thus, the PCT payment decreases to $146 million, which is the figure cited in the temporary regulations ($655 million less $509 million).

The temporary and proposed regulations propose an interesting approach to test the relationship between the two discount rates. The regulations provide:

> additional guidance relating to analysis of the interrelationship between the discount rate for the cost sharing alternative and the discount rate for the licensing alternative, and evaluation of the reasonableness of the implied discount rate that may be derived from the differential income stream between the licensing alternative and the cost sharing alternative. The differential income stream is the difference between the PCT Payor's undiscounted operating income under the cost sharing alternative (before PCT Payments) and the PCT Payor's undiscounted operating income under the licensing alternative. The difference equals the licensing payments to be made under the licensing alternative minus the PCT Payor's cost contributions to be made under the cost sharing alternative. The differential income stream should be discounted at an appropriate rate in order to evaluate the reliability of a determination of the arm's length charge for the PCT Payment.[19]

In other words, the value of the buy-in payment can be tested by determining the discount rate implied by comparing the licensing and cost-sharing alternative. Firms must compare the differences in income between those alternatives to determine if the buy-in payment is appropriate, given the differences in risk. As noted, based on the 20 percent cost-sharing discount and 10 percent licensing discount, and the firm's financial projections, the firm determines that the buy-in payment should be $146 million. The regulations state:

> Taxpayer's analysis logically implies that the present value of this stream must be $146 million, since only then would FS have the same anticipated value in both cost sharing and licensing alternatives. A present value of $146 million implies that the discount rate applicable to this stream is 34.4 [percent].[20]

In this example, the IRS determines that this discount rate is too high and that the appropriate discount rate for ''switching from the licensing alternative to the cost-sharing alternative''[21] should be 16 percent. Thus, the firm's analysis is not reliable and the buy-in payment is too low.

What would a reasonable discount rate be? The Treasury Department suggests it could be the firm's weighted average cost of capital (WACC). The preamble to the temporary regulations states:

> For these reasons, an appropriate discount rate for the differential income stream might be determined based, for example, on the weighted average cost of capital of uncontrolled companies whose resources, capabilities, or rights are similar to the platform contributions and cost shared intangibles under the CSA.[22]

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[16] *Fed. Reg.*, Vol. 76, No. 247, Dec. 23, 2011, p. 80249.

[17] Treas. reg. section 1.482-7(g)(4)(viii), Example 1.

[18] Treas. reg. section 1.482-7T(g)(4)(viii), Example 8.

[19] *Fed. Reg.,* Vol. 76, No. 247, Dec. 23, 2011, pp. 80249-80250.

[20] Treas. reg. section 1.482-7T(g)(4)(viii), Example 8.

[21] *Id.*

[22] *Fed. Reg.,* Vol. 76, No. 247, Dec. 23, 2011, p. 80250.

The Treasury Department makes an interesting argument. The differences in risk between the licensing and cost-sharing scenario should be reflected in the discount rates, and there should be some way to evaluate these rates. Still, one wonders if the Treasury regulations will survive litigation, should they be challenged. If a firm is able to demonstrate that the cost-sharing and licensing discount rates it uses are consistent with external benchmarks, it might argue that the implied discount rate concept is not consistent with the arm's-length standard. The Treasury regulations specifically state that market measures of discount rates are the most reliable metrics. A firm might argue that discount rates for comparable firms engaged in similar activities are more reliable measures than the implied discount rate discussed in Treasury regulations. While the implied discount rate is a clever and interesting concept, it is not one that has been closely examined in financial literature.

The *Xilinx* case could serve as a relevant precedent that could support taxpayers.[23] It focused on whether CSAs should include stock-based compensation, such as the cost of employee stock options, in those agreements. The 9th Circuit Court of Appeals ruled they did not need to be included in a CSA for that firm during 1997-1999.

The IRS argued stock-based compensation should have been valued and included in the CSA, which would have transferred a portion of those costs to Xilinx's Irish subsidiaries. In its argument the IRS cited a Treasury regulation that said ''all costs'' should be included between CSA participants.[24] Xilinx provided evidence that unrelated parties participating in joint ventures similar to CSAs do not share these costs. The court ruled in favor of Xilinx, stating:

> Purpose is paramount. The purpose of the regulations is parity between taxpayers in uncontrolled transactions and taxpayers in controlled transactions. The regulations are not to be construed to stultify that purpose.[25]

Thus, the court concluded the more general arm's-length standard is more authoritative than the ''all costs'' regulation and decided in favor of Xilinx. If a firm is able to demonstrate that its discount rates are consistent with external benchmarks, I believe it would have a credible case that a court might support.

The Weighted Average Cost of Capital

As mentioned, the Treasury Department has suggested that in some instances firms may want to use the WACC as their discount rate. Financial texts generally maintain that a firm's WACC is the correct way to discount an enterprise's future returns. For example, in their text, *Advanced Corporate Finance*, Ogden, Jen, and O'Connor write: ''A firm's WACC can be interpreted as the implicit discount rate used by the market on the firm's future cash flows to determine the value of the firm's assets under a specified capital structure.''[26] The WACC may be a very useful starting point to determine a CSA's discount rate. After determining the WACC, that figure could be adjusted based on the risks of a CSA and how it differs from the entire enterprise's forward-looking risk.

Financial theory says the WACC should be determined by the costs a firm would incur to raise capital. Capital includes income generating debt and equity instruments that produce returns to their owners. Capital does not include accounts payable and other current liabilities, which do not pay interest or dividends. In general, there are three sources of capital: interest-bearing debt, preferred stock, and common stock. Thus, a firm's WACC should reflect the relative mix of a debt, preferred stock, and common stock, multiplied by each source's cost of capital.

Since interest expenses are, in general, tax deductible, the cost of debt should be calculated net of income taxes. However, preferred and common stock dividend payments are not tax-deductible expenses, so these payments should not be tax-adjusted. Thus, the standard formula to calculate a firm's WACC is:

$$WACC = (W_{debt}(1 - t)(R_{debt})) + (W_{preferred} R_{preferred}) + (W_{common} R_{common})$$

In the above formula:

R = required return for each cost of capital (debt, preferred stock, common stock)

W = weight of each component as a percent of total capital

t = marginal corporate tax rate.

For example, suppose that a firm will be funded through 40 percent debt, 10 percent preferred stock, and 50 percent common stock. Further, suppose the firm's tax rate is 35 percent and that the pretax cost of debt is 5 percent, preferred stock pays 4 percent, and the required return on common stock is 12 percent. Given this, the firm's WACC would be:

$$WACC = (0.40 (1 - 0.35) (0.05)) + (0.10) (0.04) + (0.50) (0.12)$$

$$WACC = 0.013 + 0.004 + 0.060 = 0.077 \text{ or } 7.7\%$$

The cost of capital should be a forward-looking figure. Bruner, Eades, Harris, and Higgins state:

[23] *Xilinx Inc. v. Commissioner*, 598 F.3d 1191, 9th Cir. (Mar. 22, 2010).

[24] Former Treas. reg. section 1.482-7(d)(1).

[25] *Xilinx*, 598 F.3d 1191.

[26] Joseph Ogden, Frank C. Jen, and Philip F. O'Connor, *Advanced Corporate Finance: Policies and Strategies*, Prentice Hall, New Jersey (2003), p. 33.

> First, the capital costs appearing in the equation should be current costs reflecting current financial market conditions, not historical, sunk costs. In essence, the costs should equal the investors' anticipated internal rate of return on future cash flows, associated with each form of capital. Second, the weights appearing in the equation should be market weights, not historical weights based on often arbitrary, out-of-date book values.[27]

In other words, both the rates of return and capital mix should be forward-looking. Brigham and Ehrhardt state that ''the WACC is used primarily to make investment decisions, and those decisions hinge on projects' expected future returns versus the cost of new, or marginal capital.''[28] However, as we will see, determining forward-looking figures can sometimes be difficult.

To determine the cost of long-term debt or preferred stock, a firm could look to recent public offerings of comparable firms that have recently raised capital. Firms should look to find businesses with similar risk profiles, ideally in the same industry, and comparable size. This will admittedly be easier for large, publicly held firms, which may be able to find equivalent firms more easily, since information on public stock and debt offerings is readily available. Smaller firms may find it more difficult to identify comparable firms through public sources, and they may need to retain outside advice to obtain that information. Nonetheless, the costs that larger, publicly held firms pay to raise debt and preferred equity can establish useful benchmarks that smaller firms can use to analyze their cost of debt and preferred stock.

While there may be challenges determining the cost of debt and preferred stock returns, the cost of common equity will be the most challenging figure to calculate. As Bruner, Eades, Harris, and Higgins write, ''As our survey results demonstrate, the most nettlesome component of WACC estimation is the cost of equity capital; for unlike readily observable yields in bond markets, no observable counterpart exists for equities.''[29] Bond and preferred stock returns can be found through public markets, but the required return on common stocks is not easily verified. Also, there are several ways in which a firm can attempt to calculate the cost of equity.

Determining the Cost of Equity

Brigham and Ehrhardt identify three ways to determine the cost of equity.[30] One is the capital asset pricing model (CAPM). A second is a discounted cash flow model, which is frequently called the Gordon growth model. The third is the bond-yield plus risk approach. While I will comment on the second and third methods, this article will concentrate on using CAPM to determine the cost of equity.

One reason I will concentrate on CAPM is that it is employed by industry and academia more frequently than the other two approaches. For example, Brigham and Ehrhardt write:

> Recent surveys found that the CAPM approach is by far the most widely used method. Although most firms use more than one method, almost 74 [percent] of respondents in one survey, and 85 [percent] in the other, used the CAPM. This is in sharp contrast to a 1982 survey, which found that only 30 [percent] of respondents used the CAPM. Approximately 16 [percent] now use the DCF approach, down from 31 [percent] in 1982. The bond yield-plus-risk-premium is used primarily by companies that are not publicly traded.[31]

It appears to be the most popular method in industry, and support for it has grown in recent years.

A second reason I will concentrate on CAPM is that it has been used in a variety of legal cases to determine the cost of equity. As mentioned, both the IRS and Veritas used that approach in a case they recently litigated.[32] The court used CAPM to resolve the issue, siding with Veritas on nearly all issues. CAPM has also been used to determine the cost of equity in a variety of legal disputes, including gift and estate tax issues, intellectual property valuation disputes, and bankruptcy cases.[33]

As noted, Brigham and Ehrhardt identify two other approaches to determine the cost of equity. One is an application of discounted cash flow methodology, and it's often called the Gordon growth model. The formula used to value equity in this model is:

$$P_0 = \frac{D_1}{R_{common} - g}$$

In this equation:

P_0 = the price of a security

[27]R. Bruner, K. Eades, R. Harris, and R. Higgins, ''Best Practices in Estimating the Cost of Capital: Survey and Synthesis,'' *Financial Practice and Education* (Spring/Summer 1998), pp. 13-28, at 14.

[28]Brigham and Ehrhardt, *supra* note 10, at 342.

[29]Bruner, Eades, Harris, and Higgins, *supra* note 27, at 14.

[30]Brigham and Ehrhardt, *supra* note 10, at 346.

[31]*Id*. at 355-356.

[32]*Veritas Software Corporation v. Commissioner of Internal Revenue Service*, 133 T.C. 297 (Dec. 10, 2009).

[33]*See* Pratt and Grabowski, *supra* note 8, for a more complete analysis of how CAPM has been applied in a variety of legal cases.

D_1 = the firm's expected next dividend

R_{common} = the required rate of return for common stock

g = the growth rate of dividends.

Thus, we need a current price for the security, dividends, and an anticipated growth rate for dividends to determine the required return for common stock. This information may not be available or relevant for all firms, as some may not pay dividends, and privately held firms may not have a common stock price. Also, projecting a future growth rate for dividends is inherently difficult to do. For these reasons, Ehrhardt writes, ''I recommend that you use the CAPM to find your cost of equity because it does not require you to make assumptions about the growth rate in dividends.''[34] For our purposes, CAPM seems preferable to the Gordon growth model in nearly all instances.

Concerning the bond-yield plus risk approach, Brigham and Ehrhardt write, ''Some analysts use a subjective, ad hoc procedure to estimate a firm's cost of equity: They simply add a judgmental risk premium of 3 to 5 points to the interest rate on the firm's own long-term debt.''[35] Further, they write, ''Empirical work suggests that the risk premium over a firm's own bond yield has generally ranged from 3 to 5 percentage points, with recent values close to 3 [percent].''[36] Given that this figure is subjective, it may not survive scrutiny from tax authorities or courts. It also presumes the firm has long-term debt that is relevant for comparison purposes. Despite these limitations, this approach may be useful for smaller firms, particularly if they have recently incurred long-term debt and their stock is not publicly traded. In addition to privately held firms, this method might also serve as a useful backup measure, which some firms might want to validate their calculated cost of equity against. In other words, firms might want to use CAPM to value their common stock, and compare these results against the bond-yield plus risk results. If the results are generally consistent, this should be useful evidence to support a CSA's discount rate.

No matter what approach is used, determining the required return for common stocks is inherently difficult. There is no mechanical method available that will produce the correct answer in all cases. Brigham and Ehrhardt write:

> People experienced in estimating the cost of equity recognize that both careful analysis and sound judgment are required. It would be nice to pretend that judgment is unnecessary and to specify an easy, precise way of determining the exact cost of equity capital. Unfortunately, this is not possible — finance is in large part a matter of judgment, and we must simply face that fact.[37]

Given that human judgment is required, this makes it more challenging for taxpayers to convince the IRS they have selected an accurate discount rate. But this is another reason why the Treasury regulations should provide more direction on this topic, rather than leaving those issues to the courts to resolve.

Overview of CAPM

Unlike bonds and preferred stock, there are no fixed returns for common stocks, and this makes it more difficult to determine the required return for common equity. As noted, CAPM is the most popular approach to determine the required return on common stock, and it was used by Veritas, the IRS, and the court to calculate the buy-in payment in that case. Further, it has been used in various other legal cases to value assets.

While CAPM is not without its critics, it appears to be the best approach available to determine the required return on common stock. Pratt and Grabowski write:

> The CAPM is a conceptual cornerstone of modern capital market theory. Its relevance to business valuations and capital budgeting is that businesses, business interests, and business investments are a subset of the investment opportunities available to total capital markets; thus, the determination of the prices of businesses theoretically should be subject to the same economic forces and relationships that determine the prices of other investment assets.[38]

While CAPM has many implications, particularly in modern portfolio theory, my purpose is limited to determining the required rate of return for a common stock.

The standard formula for CAPM is:

$$R_{common} = R_f + \beta (R_m - R_f)$$

Where:

R_{common} = the required return on common stock

R_m = the market return on equity investments

R_f = the risk-free rate of return

β = beta, or the correlation between this stock's return and the market's return.

How firms should determine the risk-free rate of return, the equity market's rate of return, and beta will

[34]Ehrhardt, ''The Search for Value: Measuring the Company's Cost of Capital,'' Harvard Business School Press, Boston, Mass. (1994), p. 81.

[35]Brigham and Ehrhardt, *supra* note 10, at 355.

[36]*Id.*

[37]*Id.* at 356.

[38]Pratt and Grabowski, *supra* note 8, at 33.

be discussed in more detail in the next sections. In general the risk-free rate of return should be the same for investments of the same duration. So should the market's rate of return on equity investments. Thus, it is beta, or the correlation between a stock's rate of return and the market's rate of return, that determines the required return for common stock. If beta is less than one, the stock's value fluctuates less than the entire market. Since this is a less risky investment, the expected return on this stock is lower than it is for the stock with a beta greater than one. If beta is greater than 1.0, the common stock is more volatile than the entire market, and thus its required return should be higher than for a more conservative investment. A beta of exactly one means the stock moves up and down with the entire market.

For example, suppose the risk-free rate of return is 3 percent, the rate of return on all common stock investments is 9 percent, and the beta of stock is 0.8. The 0.8 figure means that the stock is slightly less volatile than the market. In this case, the required rate of return on this stock is:

$$R_{common} = 0.03 + 0.8(0.09 - 0.03)$$

$$R_{common} = 0.03 + 0.048 = 0.078 = 7.8\%$$

If the beta on that stock was higher, perhaps 1.5, we would require a higher required rate of return on that stock, given its riskiness. Applying the same formula:

$$R_{common} = 0.03 + 1.5(0.09 - 0.03)$$

$$R_{common} = 0.03 + 0.09 = 0.12 = 12.0\%$$

In CAPM it is beta that captures the risk of an investment. We expect a higher rate of return on investments with high betas to compensate us for the risk assumed, and a lower rate of return for less risky investments.

The Risk-Free Rate

Financial theory identifies three risks associated with owning fixed-rate securities: default risk, liquidity risk, and maturity risk.[39] Default risk includes the possibility that principal or interest will not be paid when due. Liquidity risk is the chance that a security cannot be converted quickly into cash when needed, generally because the investment is traded infrequently. Maturity risk is the impact of interest rate changes on a fixed income security's value. Interest rate fluctuations have a larger impact upon long-term bonds than they do on short-term securities. As Brigham and Ehrhardt write:

> For bonds with similar coupons, this differential sensitivity to changes in interest rates always holds true — the longer the maturity of the bond, the more its price changes to a given change in interest rates.[40]

Interest rates for U.S. Treasury securities are generally used as the risk-free rate of return in CAPM. The default risk of U.S. Treasury bills and bonds is commonly considered to be nonexistent. Treasury securities are actively traded on a daily basis, so liquidity risk is negligible. However there is disagreement whether short-term Treasury bills or long-term Treasury bond rates should be used as the risk-free rate of return. In the *Veritas* case, the IRS used the 20-year bond yield as the risk-free rate of return, while that company used the 30-day Treasury bill rate.[41]

The difference between short-term Treasury bills and long-term Treasury bonds can be significant. Bruner, Eades, Harris, and Higgins write:

> The difference between realized returns on the 90-day T-bill and the ten-year T-bond rate has averaged 150 basis points over the long-run; so choice of risk-free rate can have a material effect on the cost of equity and WACC.[42]

Short-term Treasury securities have less maturity risk than longer-term Treasury bonds, which is the primary argument for using these securities to measure the risk-free rate of return. As noted, the value of short-term Treasury bills fluctuates less than long-term bonds when interest rates change. Bruner, Eades, Harris, and Higgins say, ''The 90-day T-bill yields are more consistent with the CAPM as originally derived and reflect truly risk-free returns in the sense that T-bill investors avoid material loss in value from interest rate movements.''[43]

While this is a good argument in favor of short-term Treasury bills, the most important issue may be the duration of the investment. In other words, if we are making a long-term investment, the risk-free rate of return should be based on longer-term risk-free alternatives. If we are considering a short-term investment, we should use a short-term Treasury bill as our risk-free rate of return. Bruner, Eades, Harris, and Higgins argue that since most firms are making long-term investments, it makes sense for them to use long-term bonds for the risk-free rate of return. They say, ''However, long-term bond yields more closely reflect the default-free holding period returns available on long lived investments and thus more closely mirror the types of investments made by companies.''[44]

I believe this argument is persuasive. Studies show that most firms prefer to use long-term Treasury bond

[39]Brigham and Ehrhardt, *supra* note 10, at 177.

[40]*Id.* at 184.

[41]L. Greenwald, ''*Veritas v. Comr.*: Tax Court Finds IRS's Section 482 Allocations to be 'Arbitrary, Capricious, and Unreasonable,''' *Tax Mgmt. Int'l J.*, 39(5) (2010), 256-263, at 261.

[42]Bruner, Eades, Harris, and Higgins, *supra* note 27, at 19. In common terminology, 150 basis points means 1.5 percent.

[43]*Id.*

[44]*Id.*

rates for the risk-free rate of return. Brigham and Ehrhardt write, ''A survey of highly regarded companies shows that about two-thirds of the companies use the rate on long-term Treasury bonds. We agree with their choice.''[45] They argue that since most common stock investments are made for long-term objectives, it makes sense to use a long-term risk-free interest rate.

CSAs are generally long-term investments, so in nearly all cases we should use the long-term Treasury bond rate as the risk-free rate of return. Investments in research and development, new products and technologies, and even marketing intangibles generally take years to produce returns, which, if they are successful, may generate rewards long into the future. For example, the cost-sharing regulations provide examples in which firms are generating material rewards from a CSA decades into the future. Thus, it would seem that in nearly all cases a CSA should be viewed as a long-term investment, and the risk-free rate should be based on long-term Treasury bonds. While the court sided with Veritas and used a short-term Treasury bill rate in that decision, I believe the IRS was correct, and the 20-year long-term bond rate was the correct figure to use.

Brigham and Ehrhardt write:

> In theory, the CAPM is supposed to measure the expected return over a particular holding period. When it is used to estimate the cost of equity for a project, the theoretically correct holding period is the life of the project. Since many projects have long lives, the holding period for the CAPM also should be long. Therefore, the rate on a long-term T-bond is a logical choice for the risk-free rate.[46]

Damodaran agrees, stating:

> Some practitioners and a surprising number of academics (and textbooks) use the Treasury bill rate as the riskfree rate, with the alluring logic that there is no price risk in a treasury bill, whereas the price of a treasury bond can be affected by changes in interest rates over time. That argument does make sense, but only if we are interested in a single period equity risk premium (say, for next year). If your time horizon is longer (say 5 or 10 years) it is the treasury bond that provides the more predictable returns. Investing in a 6-month treasury bill may yield a guaranteed return for the next six months, but rolling over this investment for the next five years will create a reinvestment risk. In contrast, investing in a ten-year treasury bond, or better still, a ten-year zero coupon bond will generate a guaranteed return for the next ten years.[47]

Pratt and Grabowski agree, writing: ''Many corporations said they matched the term of the risk-free rate to the tenor of the investment.''[48]

Note that the risk-free rate of return is used twice in the CAPM formula:

$$R_{common} = R_f + \beta (R_m - R_f)$$

When calculating the required return on common stock, it is important to use the same risk-free rate of return both times. This may appear obvious, but this mistake can be made when determining the equity risk premium (ERP), which is $R_m - R_f$. Some texts quote an ERP figure directly, without stating whether the ERP is the premium above long-term Treasury bonds or short-term Treasury bills. Damodaran writes:

> The riskfree rate chosen in computing the premium has to be consistent with the riskfree rate used to compute expected returns. Thus if the treasury bill rate is used as the riskfree rate, the premium has to be the premium earned by stocks over that rate. If the treasury bond rate is used as the riskfree rate, the premium has to be estimated relative to that rate. For the most part, in corporate finance and valuation, the riskfree rate will be the long-term default-free (government) bond rate and not the short-term rate. Thus, the risk premium should be the premium earned by stocks over Treasury bonds.[49]

Equity Risk Premium

As noted, the ERP measures the additional return investors expect to earn for assuming the risk of equity investing. Damodaran writes:

> The equity risk premium reflects fundamental judgments we make about how much risk we see in an economy/market and what price we attach to that risk. In the process, it affects the expected return on every risky investment and the value we estimate for that investment. Consequently, it makes a difference in both how we allocate wealth across different asset classes and which specific assets or securities we invest in within each asset class.[50]

Brigham and Ehrhardt describe two approaches firms can use when determining the ERP.[51] Firms can

[45]Brigham and Ehrhardt, *supra* note 10, at 347.

[46]*Id.*

[47]A. Damodaran, ''Equity Risk Premiums (ERP): Determinants, Estimation, Implications — The 2012 Edition'' (Mar. 2013), *available at* http://people.stern.nyu.edu/adamodar/pdfiles/papers/ERP2012.pdf, at p. 25.

[48]Pratt and Grabowski, *supra* note 8, at 19.

[49]Damodaran, *supra* note 47.

[50]*Id.* at 3.

[51]Brigham and Ehrhardt, *supra* note 10, at 348-350.

calculate an ERP using historical information, or they can develop a forward-looking ERP. The advantage of using historical information is that it is objective and verifiable, and thus more likely to survive challenge from tax authorities. But in theory, the ERP should be forward-looking. It is not difficult to determine a forward-looking risk-free rate of return, but calculating future equity returns is inherently speculative. Future economic conditions, growth rates, profit margins, tax rates, and dividends are virtually impossible to predict. Further, I suspect that any forward-looking discount rate that exceeds historical growth rates and reduces a firm's U.S. tax obligations would be challenged by the IRS as unreliable, and courts may agree with this argument. Since it is unlikely that any forward-looking ERP that exceeds historical returns will be accepted by tax authorities, I believe it makes sense to rely on historical ERP figures. Also, a firm can use independent sources to calculate the ERP, which makes it less suspect. The court used historical information to determine the ERP in the *Veritas* case.

Damodaran says most analysts use historical market returns to calculate the ERP. He writes:

> Most investors and managers, when asked to estimate risk premiums, look at historical data. In fact, the most widely used approach to estimating equity risk premiums is the historical premium approach, where the actual return earned on stocks over a long period of time is estimated, and compared to the actual returns earned on a default-free (usually government) security.[52]

In other words, investors and managers do not use historical equity returns and forward-looking risk-free rates to calculate the ERP.

The *Ibbotson SBBI 2013 Classic Yearbook*, published by Morningstar, is considered the most authoritative source for the ERP. This book was cited by the court to determine the ERP in the *Veritas* decision. The judge in that case wrote that this book is ''the recognized industry standard for historical capital markets data.''[53] Damodaran writes that ''Ibbotson Associates, which is the most widely used estimation service, has stock return data and risk-free rates going back to 1926.''[54] Brigham and Ehrhardt also cite it, writing: ''Historical risk premium data for U.S. securities, updated annually, are available from Ibbotson Associates. Their study includes historical data on stocks, T-bills, T-bonds, and corporate bonds from 1926 through the latest year.''[55] As the *SBBI Yearbook* was cited in the *Veritas* decision and is highly regarded by academicians and financial professionals, I recommend that it be consulted to determine the ERP.

The *SBBI Yearbook* calculates both arithmetic and geometric averages of stock market, long-term Treasury bonds, and short-term Treasury bill returns. The difference between arithmetic and geometric growth rates can be significant, and the arithmetic growth rates are always higher. Ehrhardt explains the difference between arithmetic and geometric growth rates in the following example. He asks:

> Which should you use, a geometric average or an arithmetic average? An example may be instructive. Suppose you start off with $50 and invest it. The investment is worth $100 after one year, which is a 100 [percent] rate of return. You are not so fortunate in the second year, and the value of the investment falls to $50, which is a return of -50 [percent]. Your geometric average return for the two-year period is 0 [percent] (recall that you compute the geometric rate of return by solving this equation for g: $50 (1 + g)^2 = 50$). Your arithmetic average is 25 [percent] (this is [100 - 50] / 2).[56]

In other words, the arithmetic average simply records the return each year, sums the figures, and divides this figure by the number of years. But in the above example, the investor's money did not increase over the two-year period, so the geometric growth rate is zero.

Neither measure is appropriate in all situations, so Ibbotson Associates calculates the returns both ways. Ehrhardt identifies some cases in which the arithmetic average is the correct one to use, and others when the geometric average is a better measure. He writes:

> If you engage in a buy-and-hold strategy, then the geometric average is correct. After all, you began with $50, and ended up with $50, so your return was 0 [percent]. Suppose, however, that you engaged in a rebalancing strategy. After the first year, you cashed in the one-year gain of $50, and left $50 in the investment. At the end of two years, you would have your one-year gain of $50 (ignoring any interest you might have earned during the year), and you would have $25 resulting from your loss during the second year (this is a 50 [percent] loss on your rebalanced loss of $50). Therefore, your value at the end of two years would be $75, which represents a simple two-year rate of return equal to 50 [percent]. Your simple average rate of return would be half of this, which is exactly equal to the previously calculated arithmetic average of 25 [percent].[57]

Ehrhardt concludes the arithmetic average is appropriate when shareholders regularly sell stocks to rebalance their portfolio, and the geometric average is fitting when investors employ a buy-and-hold strategy.

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[52]Damodaran, *supra* note 47, at 22.

[53]*Veritas*, 133 T.C. 297.

[54]Damodaran, *supra* note 47, at 23.

[55]Brigham and Ehrhardt, *supra* note 10, at 348.

[56]Ehrhardt, *supra* note 34, at 62.

[57]*Id.*

Based on this, most firms should use the geometric average returns to determine the ERP. As noted above, CSAs are long-term investments in which related entities within an enterprise pool funds and resources to develop intangible assets and intellectual property. CSA participants do not regularly sell assets and rebalance investment portfolios, so the arithmetic average is not suitable. Creating intangible assets is a long-term investment, so the geometric average should be employed in nearly all situations.

Damodaran agrees that geometric averages should be used when investors are making long-term investments. He writes:

> Arithmetic averages will yield higher risk premiums than geometric averages, but using arithmetic averages to obtain discount rates, which are compounded over time, seems internally inconsistent. In corporate finance and valuation, at least, the argument for using geometric average premiums is strong.[58]

While Damodaran was not specifically addressing CSAs, his argument is applicable to those investments.

While using a historical ERP appears to be the best option available, some analysts note that at times the historical approach appears counterintuitive. When markets are appreciating, the ERP increases, which seems to say that equity investing is more risky. When markets are declining, the calculated ERP decreases, which indicates equity investing is less risky. For example, when the markets plummeted during 2008, investors suffered large losses, and many investors may have concluded equity markets were becoming more risky. But the calculated ERP was decreasing. Damodaran writes:

> In effect, the historical risk premium approach would lead investors to conclude, after one of the worst stock market crises in several decades, that stocks were less risky than they were before the crisis and that investors should therefore demand lower premiums.[59]

Brigham and Ehrhardt state it this way:

> However, most knowledgeable observers believe that the true equity risk premium actually increased during the 2000-2002 period and that the increasing premium contributed to the declining stock market during those years; an increasing risk premium caused higher costs of equity, lower stock prices, and, thus, lower stock returns. As this shows, an increase in the current risk premium causes a decrease in the historical premium, and vice versa.[60]

But despite these limitations, using a historical ERP is arguably the best approach available to determine a discount rate in a CSA.

Not surprisingly, the IRS and Veritas calculated different ERPs in that case, and Veritas's ERP was several points higher. Veritas used an ERP of 8.1 percent, and the IRS's economist determined it should be 5 percent. The judge in that case wrote that the IRS economist:

> erroneously assumed that the long-term yield for the U.S. market was higher than the long-term yield for foreign markets. In fact, the literature upon which Hatch relied establishes that there was no difference between the observed risk premium in the U.S. market and the risk premium in foreign markets. See Brealey & Myers, *Principles of Corporate Finance* 159 (7th ed. 2003).[61]

In other words, the IRS's economist made an error in assuming that the ERP was higher in the United States than overseas.

Regarding this decision, Evans, Marcinkowski, and Grabowski (2011) write:

> The IRS expert chose a 5 [percent] ERP. He believed that the realized risk premiums as published in SBBI for the United States (8.1 [percent] for the years 1926 through 1999) are too high to be used for the ERP because the transferred intangibles were going to be exploited by an Irish subsidiary on products sold outside the United States. He misinterpreted data from the Dimson, Marsh and Staunton study as summarized in a graph shown in Brealey & Myers, *Principles of Corporate Finance,* 7th ed. That source shows the United States was approximately in the middle of the realized risk premiums for the 15 countries for which data was displayed in the graph.[62]

In short, the evidence he cited did not support the conclusion that the ERP in overseas markets is lower than it is in the U.S.

The Veritas ERP figure was calculated as of 1999, during a period in which stock markets had been appreciating significantly. It was also the ERP over short-term Treasury bills. I believe firms should use long-term Treasury bonds as the risk-free rate of return in the CAPM formula, and should also use geometric growth rates. The ERP has decreased since 1999, but there is no universal agreement concerning what this figure should be. Pratt and Grabowski say:

> In the examples in this book, the authors have chosen to use an equity risk premium of 6 [percent]. Other authors have offered alternative

[58]Damodaran, *supra* note 47, at 27.

[59]*Id.* at 29.

[60]Brigham and Ehrhardt, *supra* note 10, at 348.

[61]*Vertas*, 133 T.C. 297.

[62]In: Pratt and Grabowski, *supra* note 8, at 98.

views, but that is the convention we have adopted and we believe it is well supported by the evidence.[63]

Brigham and Ehrhardt say, ''In our consulting, we typically use a risk premium of about 5 [percent], but we would have a hard time arguing with someone who used a premium in the range of 3.5 [percent] to 6.5 [percent].''[64] Damodaran uses an ERP of 4.2 percent.[65] As noted, I believe the best approach is to use the most recent edition of the *SBBI Yearbook*, and to use the difference between the geometric growth rate of stocks less the geometric growth rate of long-term Treasury bonds. In the 2013 edition of the *SBBI Yearbook* the geometric growth rate for large company stocks was 9.8 percent, and the geometric growth rate for long-term government bonds was 5.7 percent. If we subtract the long-term bond rate from the growth rate for large company stocks, we arrive at an ERP of 4.1 percent, which is very close to Damodaran's figure.

Beta

While financial analysts may differ over how the risk-free rate of return and the ERP should be determined, a firm's beta is probably the most debatable figure. Firms can determine the risk-free rate of return by reviewing recent Treasury bond auctions, and the figure should be the same for all investments of similar duration. Similarly, firms can use sources such as the *SBBI Yearbook* to determine the ERP, and I would again expect the figure to be the same for all firms. However, each firm has its own beta, and there is no consensus concerning how this figure should be calculated. There are differences over how many years of history should be used to calculate a beta and whether it is better to use daily, weekly, or monthly figures to determine it. These differences can have a material impact on that figure, and thus the buy-in payment to a CSA.

From a conceptual perspective, beta is relatively easy to understand, assuming familiarity with statistics. Ehrhardt explains it this way:

> Beta is the covariance between the security's return and the market's return, divided by the variance of the market's return. In other words, beta measures a company's volatility relative to the entire market. If a company has a beta exactly equal to one, the company has the same risk as the market itself. If the market goes up, the company's stock will probably go up; if the market goes down, the company's stock will probably go down. If a company has a beta that is greater than one, its stock will probably go up higher than the market; it will also go down farther than the market, if the market is falling. The reverse is true for a company with a beta less than one. A low beta firm is less sensitive to swings in the market.[66]

The purpose of calculating beta is to determine a security's risk, which is used to value that investment. Damodaran writes: ''In the capital asset pricing model (CAPM), the market risk is measured with a beta, which when multiplied by the ERP yields the total risk premium for a risky asset.''[67]

While there may be conceptual agreement over beta's function, the methodology used can lead to significant differences in a calculated beta. For example, in *Veritas*, the IRS argued that a firm's beta should be 1.42, while Veritas contended it was 1.935.[68] A difference of this magnitude can have a large impact on the discount rate, and thus a firm's tax obligations in various jurisdictions. In that case, the court determined the firm's figure was correct.

A key issue in *Veritas* was whether beta should be determined by analyzing that firm's performance against the market, or whether it should be based on the industry's performance against the market. The IRS's economist used a beta for the software industry, arguing that firm-specific betas were too volatile and that industry-specific betas were more stable and reliable. Veritas contended that its beta was relatively stable over time and that the IRS's industry-specific beta was skewed by Microsoft's inclusion in the software industry's figure. Microsoft is a much larger and more stable firm than Veritas, and Veritas argued that including Microsoft in the software industry beta undervalued that firm's risk. The court sided with Veritas, lending support for the argument that a firm-specific beta is a superior approach.

Evans, Marcinkowski, and Grabowski summarize the court's decision this way:

> Finally, the petitioner's expert used a company-specific beta for Veritas, a publicly traded company, while the IRS expert used an industry beta estimate. The industry beta included Microsoft, a company that had dominated the personal computer operating system software market and had different risks than Veritas. The Court found that the company-specific beta estimate was stable and more appropriate for Veritas than the lower industry beta (skewed low by the size and risk of Microsoft).[69]

While the court ruled that a company-specific beta was a better figure in that case, there is still no standard way a firm's beta should be determined. While

[63]Pratt and Grabowski, *supra* note 8, at 29.

[64]Brigham and Ehrhardt, *supra* note 10 at 350.

[65]Damodaran, *supra* note 47 at 29.

[66]Ehrhardt, *supra* note 34 at 52.

[67]Damodaran, *supra* note 47 at 4.

[68]*Id*.

[69]In: Pratt and Grabowski, *supra* note 8 at 100.

beta measures the relationship between a firm's stock market performance and equity markets in general, the frequency and duration of these calculations is debatable. Brigham and Ehrhardt write:

> there is no theoretical guidance as to the correct holding period over which to measure returns. The returns for a company can be calculated using daily, weekly, or monthly time periods, and the resulting estimates of beta will differ. Beta is also sensitive to the number of observations used in the regression. With too few observations, the regression loses statistical power, but with too many, the ''true'' beta may have changed during the sample period. In practice, it is common to use either 4 to 5 years of monthly returns or 1 to 2 years of weekly returns.[70]

A historical beta that extends many years into the past may have more data points and thus appear more reliable. But if the firm's products, markets, strategy, and competition have changed, those historical data points are unlikely to reflect the firm's current risks.

Bruner, Eades, Harris, and Higgins write:

> For instance, increasing the number of time periods used in the estimation may improve the statistical reliability of the estimate but risks the inclusion of stale, irrelevant information. Similarly, shortening the observation period from monthly to weekly, or even daily, increases the size of the sample but may yield observations that are not normally distributed and may introduce unwanted random noise.[71]

The method used to calculate beta can often result in large differences in that figure. In one study, Bruner, Eades, Harris, and Higgins reviewed published beta estimates from Bloomberg, Value Line, and Standard & Poor's. Bloomberg used weekly data for two years to calculate a mean beta of 1.03, Value Line used weekly data for five years to calculate a mean beta of 1.24, and S&P used monthly data for five years to calculate a mean beta of 1.18.[72] For some firms the differences were quite large. For example, the estimate of Whirlpool's beta ranged from 0.90 to 1.58, Union Carbide's beta ranged from 0.94 to 1.51, and Black & Decker's beta ranged from 1.06 to 1.78.[73] Bloomberg, Value Line, and S&P are all highly respected sources for financial information, but their approaches produced very different betas.

For this reason, Pratt and Grabowski believe an analyst should not rely exclusively upon public sources to determine beta. It is important to review the underlying data and a firm's history to develop a reliable figure. These published sources may not consider whether mergers, divestitures, or changes in business strategy have changed the firm's risks, and thus its forward-looking beta. They write:

> An analyst also may not get a meaningful beta estimate if the guideline public company went through an acquisition within the prior, say 60 months, as the data sources likely did not adjust their beta estimates for the combined post-acquisition company's characteristics over the entire look-back estimation period. One may need to ignore completely a published beta as it simply may be unrepresentative of the guideline public company's risk.[74]

In short, an analyst should not rely upon a beta calculation simply because it has been published by a well-known, reputable firm. Pratt and Grabowski say:

> The goal is not to blindly use a beta estimate just because it comes from a well-known data source. The mass data providers cannot analyze the actual underlying data to ensure that their mass-produced estimate is meaningful. Do not assume that the beta adjustments made by Bloomberg and Morningstar compensate for poor underlying data.[75]

Ehrhardt says an analyst may want to review the betas produced by public sources and use them, if they are all arriving at very similar figures. An analyst may want to determine his own figure if these published beta estimates vary widely. He writes:

> You should try to find several published sources for your beta. If they are similar to one another, you should use them as an estimate of your beta. If they are very different from one another, or if you have reason to believe that they don't accurately measure your company's beta, you should estimate beta.[76]

Given the importance of the figure, I believe that in nearly all instances it is well worth a firm's time to calculate its own best estimate of its beta. It may be very helpful to use information from reputable sources to validate a firm's estimate, but Pratt and Grabowski's point is well taken: Just because a beta has been published by a reputable organization does not mean it reflects current risks.

If a firm calculates its own beta, it should give some thought to how much history it will use to determine the figure. While more data points may appear to make the estimate more reliable, a firm should discard older figures if there have been major changes to the firm's business strategy or industry environment. Ehrhardt makes some suggestions concerning the time

[70]Brigham and Ehrhardt, *supra* note 10 at 351.

[71]Bruner, Eades, Harris, and Higgins, *supra* note 27 at 20.

[72]*Id.*

[73]*Id.* at 21.

[74]Pratt and Grabowski, *supra* note 8 at 37.

[75]*Id.* at 37.

[76]Ehrhardt, *supra* note 34 at 59.

frame and the number of data points for organizations that derive their own beta. He writes:

> Daves, Ehrhardt, and Kunkel (1992) examine a large sample of stocks and find that using two to three years of daily returns is a reasonable choice. The combination of return interval (daily) and estimation period (two to three years) provides a large number of observations without incurring a high risk of a change in beta. If you decide to use monthly returns, you should use three to four years of data.[77]

Pratt and Grabowski emphasize that deriving beta is not a mechanical exercise and that human judgment is necessary to determine the figure. They write:

> Ultimately, the goal is to conclude on a beta estimate that makes economic sense. Correct valuation requires applying value drivers reflective of today's market pricing of risk. The entire valuation process is based on applying reasoned judgment to the evidence derived from economic, financial, and other information and arriving at a well-reasoned opinion of value. It is not an excuse for mechanical application of formulas. Estimating beta is no different.[78]

But since it is not a mechanical exercise and requires judgment, it seems inevitable that there will be disputes between taxpayers and the IRS over the beta selected to value a CSA buy-in payment.

Other Issues to Consider

In this article I have attempted to identify many of the key issues associated with determining the discount rate in a CSA. Many of these matters were litigated in *Veritas*. It may be impossible to discuss every potential discount rate issue in one article, but I believe there are several other issues some firms should consider.

First, if a firm has made major changes to its business strategy, or its risks have changed materially, it might want to focus on external benchmarks to determine its discount rate, rather than use its own historical information. Brigham and Ehrhardt write that ''if a firm invests in an entirely new line of business, its marginal cost of capital should reflect the risk of that new business.''[79] In those situations, historical information may no longer be relevant and a firm may want to employ the ''pure-play'' method. Ehrhardt explains the pure-play method this way:

> The idea behind the pure-play approach is straightforward. First, you find a sample of publicly traded firms that compete in a single line of business of your division. This is where the pure-play approach gets its name: the firms in the comparison group are ''pure-plays'' in the sense that they compete in a single line of business. Second, you use the stock returns to determine the beta of each pure-play firm. Third, you use these market-determined betas to estimate the beta of your division.[80]

In other words, firms should use the betas of firms in similar industries to calculate the firm's beta.

Further, Ehrhardt provides additional suggestions concerning how a firm should use the pure-play method. He writes:

> If you find more than one firm that is a matching pure play, you can use either the average beta or the median beta of these pure-play firms. There is no clear-cut guide as to whether you should use the average beta or the median beta. Usually the average and the median will be similar, but if they are not, you should view both of them with some caution. The only reason that the average and median would differ significantly is that the sample contains some outliers whose betas are very different from the betas of the other firms in the sample. If this is the case, you might consider deleting the outliers from your sample.[81]

As Pratt and Grabowski note, determining beta is not a mechanical activity, and human judgment is essential, particularly when determining figures to discard.

I believe the pure-play method is superior to using an industry beta, which the IRS employed in the *Veritas* case. As discussed, Microsoft's inclusion in the software industry's beta reduced that figure, and the firm successfully argued that its risks were higher than Microsoft's. The advantage of the pure-play method is that a firm can use the betas of firms that most closely represent its own risks. An industry-specific beta may include firms that do not reflect a firm's risks.

Second, small companies might want to consider whether their ERP should be increased. Several studies have concluded that the ERP for small firms is higher than it is for larger firms. The *SBBI Yearbook* calculates two different market return figures, one for larger firms and one for smaller firms.[82] The returns for small firms have consistently exceeded those of larger businesses.

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[77] *Id.* at 55.

[78] Pratt and Grabowski, *supra* note 8 at 37.

[79] Brigham and Ehrhardt, *supra* note 10 at 361.

[80] Ehrhardt, *supra* note 34 at 104.

[81] *Id.*

[82] For a discussion of small company equity returns and a definition of small companies, *see Ibbotson SBBI 2013 Classic Yearbook: Market Results for Stocks, Bonds, Bills and Inflation, 1926-2012* (Morningstar 2013). Chapter Seven focuses on the equity returns of small firms.

In its 2013 edition, the risk premium for large firms was 9.8 percent, while for small firms it was 11.9 percent.[83]

Pratt and Grabowski write:

> Many empirical studies performed since CAPM was originally developed have found that realized total returns on smaller companies have been substantially greater over a long period of time than the original formulation of the CAPM . . . would have predicted.[84]

Brealey, Myers, and Marcus agree that the performance of small firms has exceeded the growth of larger firms, writing:

> You can see that small-cap stocks did not always do well, but over the long haul their owners have made substantially higher returns. Since the end of 1926 the average annual difference between the returns on the two groups of stocks has been 3.8 [percent].[85]

Damodaran agrees studies indicate that smaller firms do have higher returns than larger firms.[86] He estimates an ERP for small firms of 4.41 percent,[87] slightly higher than Brealey, Myers, and Marcus. However, he is ''wary about adjusting costs of equity for small cap effect.''[88] Damodaran says recent studies have cast some doubt on the validity and causes of the small-firm ERP, so he is not confident higher returns will be repeated in the future. He writes:

> In summary, while the empirical evidence supports the notion that small cap stocks have earned higher returns after adjusting for beta risk than large cap stocks, it is not as conclusive, nor as clean as it was initially thought to be. The argument that there is, in fact, no small cap premium and that we have observed over time is just an artifact of history cannot be rejected out of hand.[89]

Nonetheless, if I were advising a small firm, I would certainly consider adding a small-company risk premium, as a number of studies support this concept. The *SBBI Yearbook* devotes an entire chapter to this topic, so firms do have evidence to support adding a small-firm ERP. I expect the small-cap premium will be studied in the future, so analysts should be attentive to new research on this topic.

Conclusions/Recommendations

Taxpayers and the IRS both would benefit from more definitive guidance concerning how they should determine a CSA's discount rate. The IRS's ''choose the appropriate discount rate'' approach creates too much uncertainty for all parties. Beyond this, as the *Veritas* case demonstrates, courts will not always rule in the IRS's favor. But in the absence of improved guidance from the IRS, the following are my conclusions and recommendations.

The final regulations should be improved by making a clear distinction between systematic and unsystematic risk, and they should state that only systematic (or market) risk should be rewarded in markets through higher discount rates. Those sections of the regulations that seem to state an investor should earn a higher discount rate simply by investing more funds are not consistent with financial theory and may not survive challenge. Nonetheless, there are situations in which investing in a CSA is riskier than licensing a product, and thus merits a higher discount rate. In particular, investing in a CSA to develop new technologies and market new, unproven products is riskier than licensing products that have already been developed.

Firms should evaluate the difference between cost-sharing and licensing discount rates to ensure the spread is appropriate. While the Treasury Department's implied discount rate concept has not been thoroughly examined in financial literature, firms should review the temporary and proposed Treasury regulations on this topic and calculate this figure. If the implied discount rate appears to be too high, firms should determine whether those discount rates can be supported by external benchmarks. If the implied discount rate cannot be supported by referencing market measures, firms should be prepared to revise their discount rates to narrow the difference between cost-sharing and licensing discount rates.

Firms should calculate their WACC and consider using it as their discount rate. To the extent possible, the WACC should be a forward-looking figure. Firms should use current bond interest rates and preferred stock dividend yields in their WACC, and the capital structure should be forward-looking.

The most difficult figure to determine in the WACC is the cost of common equity. To determine this figure I would use the capital asset pricing model, which Veritas, the IRS, and the court used to settle that case.

I would use a long-term Treasury bond rate, such as the 20-year bond, as the risk-free rate of return. CSAs are generally long-term investments, so a long-term risk-free rate of return is correct.

To calculate the ERP, I would use the latest information available in the *SBBI Yearbook*, published by Morningstar. The market rate of return and the long-term risk-free rate of return is correct. I would also use

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[83] *Id.* at 34.

[84] Pratt and Grabowski, *supra* note 8 at 40.

[85] R. Brealey, S. Myers, and A. Marcus, *Fundamentals of Corporate Finance*, 7th edition, McGraw-Hill Irwin (2011), p. 358.

[86] Damodaran, *supra* note 47 at 34-35.

[87] *Id.* at 38.

[88] *Id.* at 39.

[89] *Id.* at 37.

the geometric growth rates from that book, as they are the correct figure for long-term investments, such as CSAs.

Calculating a firm's beta is difficult to do, and it requires considerable thought and judgment. More historical information may appear to make a beta calculation reliable, but older data points may not reflect a firm's current risks. Firm-specific betas are better measures than industrywide betas, as they measure a firm's risks more accurately.

If a firm's business strategy and risks have changed materially, it may want to determine its beta through external benchmarks, rather than rely on its historical information. The pure-play method is a superior approach to employing an industrywide beta. The pure-play method allows firms to identify other businesses with similar risk profiles, while an industrywide beta may include firms with very different risks.

Finally, given the importance of the discount rate, firms should carefully document the approach and assumptions they have used to determine their discount rate and be prepared to defend this figure if it is challenged by tax authorities. ◆