

Checkpoint Contents

State Tax Library

Journal of Multistate Taxation and Incentives (WG&L)

Journal of Multistate Taxation and Incentives

2021

Volume 30, Number 09, January 2021

Articles

Benchmarks to Estimate the Property-specific Risk Premium in Unit Principle Valuations, Journal of Multistate Taxation and Incentives, Jan 2021

PROPERTY TAX

Benchmarks to Estimate the Property-specific Risk Premium in Unit Principle Valuations

This is the second in a two-part discussion summarizing the market-derived, empirical data sources that an analyst may consider as a proxy in the quantitative estimate of a PSRP. It also summarizes one procedure that impacts both the qualitative and quantitative assessment of the PSRP: the functional analysis of the taxpayer property considered in the unit principle valuation.

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Introduction

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Estimating the cost of capital is one component of every taxpayer unit valuation performed for property tax compliance, appeal, or litigation purposes. The cost of capital directly impacts every income approach property valuation analysis. The cost of capital indirectly impacts every market approach and cost approach property valuation analysis.

This discussion is the second part of a two-part series. The first part of the series described the generally accepted cost of capital measurement models. That article focused on the property-specific risk premium (“PSRP”) component of the cost of capital. It summarized the reasons for including a PSRP in the cost of capital measurement used in a taxpayer unit valuation prepared for property tax compliance, appeal, or litigation purposes. Also, that discussion described the qualitative factors that analysts consider in the PSRP estimate.

This second part of the series describes the various empirical data sources that analysts may consider as proxies—or benchmarks—or approximations—in the PSRP estimate. While this discussion focuses on unit principle property tax valuations, the data sources and analytical procedures described also generally apply to summation principle property tax valuations.

Proxies for the property-specific risk premium

The final PSRP estimate is supported by the analyst's professional judgment. Such professional judgment is based on consideration of (1) the qualitative factors that may affect the property-specific risk of the taxpayer unit and (2) any market-derived empirical data that may provide a benchmark or approximation of a supportable PSRP.

There are various data sources that analysts may consider that provide guidance as a proxy or benchmark in the PSRP estimate. Unlike the data sources that analysts may consider for measuring the size-related risk premium (“ S_p ”) component of the cost of equity capital (“ K_e ”), these proxy data sources do not directly measure the PSRP.

Rather, these data sources may be considered by analysts to estimate the PSRP. These data sources represent proxies for, or substitutes for, the PSRP estimate. They are not databases

or formulas that provide specific empirical evidence to directly measure the PSRP.

Ultimately, the PSRP estimate is supported by the analyst's professional judgment and by the analyst's functional analysis of the taxpayer unit. The data sources described below provide an empirically based, quantitative test of the reasonableness of the analyst's PSRP estimate.

The following discussion summarizes four empirically based, quantitative proxy data sources that analysts may consider to provide guidance in the PSRP estimate. These proxy data source analyses are as follows:

- (1) Quantum of risk in the modified capital asset pricing model (“MCAPM”) and the build-up model (“BUM”).
- (2) Quartile analysis of the Duff & Phelps/Ibbotson 10th size decile.
- (3) Analysis of relative corporate bond ratings and yields.
- (4) Analysis of illiquidity studies (i.e., pre-initial public offering and restricted stock studies).

Quantum of risk in the MCAPM

Analysts may consider the different levels (or components) of risk within a K_e measurement model such as the MCAPM or BUM to provide indications of the PSRP estimate. That is, each component of the MCAPM (i.e., risk-free rate of return [R_f], beta-adjusted equity risk premium [ERP], and S_p) represent a quantifiable level—or quantum—of risk applicable to the taxpayer unit. These quantum of risk levels may be described as follows:

- The R_f is the rate of return that an investor would expect on an investment with no risk. Typically, the R_f sets the minimum rate of return that an investor will expect on any investment. The R_f measures the first quantum of risk in the K_e measurement model.
- The beta-adjusted ERP (in the MCAPM) or the combination of the ERP and the industry-related risk premium (“IRP”) (in the BUM) measure a second quantum of the expected rate of return on an investment in the taxpayer property ownership

interest. That is, typically this second risk level is the quantum of expected return that motivates investors to forego the riskless investment.

- The S_p is the expected rate of return that an investor expects for investing in small-capitalized taxpayer companies. For many reasons (in addition to size), small-capitalized companies tend to be riskier investments than large-capitalized taxpayer companies. The S_p provides the third quantum of the risk levels related to the taxpayer unit.

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The analyst now must estimate the quantum for the fourth level of risk, the PSRP, associated with the taxpayer unit investment. Analysts have empirically based, quantifiable evidence for the first three quanta of risk associated with an investment in the taxpayer unit. Analysts can consider that empirically based, quantitative evidence in the PSRP estimate.

Presented in Exhibit 1 is a hypothetical K_e measurement. This illustrative K_e measurement considers the first three empirically based measurable quanta of risk levels in the estimation of the fourth judgment-based quantum of risk level (i.e., the PSRP).

The guideline quanta of risk levels presented in Exhibit 1 are based on illustrative data as of December 31, 2018. Specifically, (1) the R_f is based on the 20-year Treasury bond available as of December 31, 2018, (2) the ERP is the “ex post” ERP provided by the Duff & Phelps Cost of Capital Navigator, (3) the industry beta is based on hypothetical guideline publicly traded companies' betas as reported by Bloomberg, (4) the IRP is provided by the Duff & Phelps Cost of Capital Navigator for general contractors – nonresidential buildings (presented solely as an illustrative industry group), and (5) the S_p is provided by the Duff & Phelps Cost of Capital Navigator for size decile 10.

Based on the empirically based quantum of risk data for each of the first three levels of investment risk included in Exhibit 1, an analyst may conclude that 4 percent is a supportable PSRP estimate (i.e., the fourth quantum of risk of the K_e). That analyst conclusion is based on the consideration that the 4 percent PSRP estimate falls within the range of the other empirically based quantum of risk indications.

The average quantum of risk in the Exhibit 1 MCAPM cost of capital analysis (before consideration of the PSRP quantum of risk) is 4.8 percent. Also, the average quantum of risk in the Exhibit 1 BUM cost of capital analysis (before consideration of the PSRP quantum of risk) is 5.0 percent. An analyst may consider the average size of the quantum of risk measured in each of the first three K_e model components in order to indicate a supportable quantum of the PSRP risk level.

The PSRP quantum of risk level estimate may not be constant over time. Like all components of the K_e , the PSRP is subject to the prevailing economic conditions. Such prevailing economic conditions may upwardly or downwardly affect the various quanta of risk related to the various risk factors.

For example, if the R_f were to decrease from 2.9 percent in December 2018 to 1.9 percent in December 2019, it is likely that corresponding ERPs would decrease (all else being equal). If the expected return on a risk-free investment decreases, then the relative expected return needed to encourage an investor to forego the risk-free investment may also decrease.

The investor would not expect as much of a rate of return premium for investing in generally risky equity investments. This is because the alternative investment (i.e., a risk-free 20-year Treasury bond) now provides a lower rate of return. The quantum of a PSRP risk level indication based (at least in part) on the R_f and the general ERP components of the K_e may be correspondingly decreased.

Quartile analysis of the CRSP Deciles Size Premia Studies 10^{t h} Decile

The analyst may consider the University of Chicago Center for Research in

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Security Prices (“CRSP”) Deciles Size Premia Studies 10^{t h} decile data (now presented in the Cost of Capital Navigator) to provide some empirical guidance as to a supportable PSRP estimate. While the CRSP Deciles Size Premia Studies data are typically relied on

to quantify S_p , these data may also provide some guidance with regard to a supportable PSRP range.

The following discussion summarizes (1) the background on the CRSP Deciles Size Premia Studies data and (2) how the CRSP Deciles Size Premia Studies data may be considered in the estimation of the PSRP estimate.

Background of the CRSP Deciles Size Premia Studies Data.

The first comprehensive study of the size effect (i.e., the relationship of the size of a public company and the rate of return that investors expect on an investment in that company's stock) was performed by Rolf Banz in 1981. Banz examined and compared the returns of small capitalized NYSE companies to the returns of large capitalized NYSE companies. The study was performed over the time horizon of 1926 to 1975.

In that study, Banz segmented all NYSE publicly traded companies into 10 deciles, the 1st decile being the largest capitalized public companies and the 10th decile being the smallest capitalized public companies.

Banz concluded that there was an observable negative relationship between (1) the size of a public company and (2) the historical equity investment returns.¹ That is, the Banz study concluded that as the public company size decreases, historical equity investment returns tend to increase, and vice versa. The so called “size effect,” however, was not linear. Rather, the “size effect” was most pronounced in the smallest capitalized public companies.

Furthermore, as the investment holding period increased, the small-capitalized public companies tended to outperform the large-capitalized public companies, in terms of providing a higher rate of return to their investors.

Many of the risk attributes that generally define small-capitalized public companies provide possible explanations for this empirically based relationship between (1) company size and (2) equity return on investment. In general, small-capitalized public company stocks are less liquid, harder to diversify, and tend to have less available investor

information (due to limited security analyst coverage). Small-capitalized companies have fewer financial resources, operational resources, human resources, and strategic resources. These limited resources (compared to larger public companies) limit the smaller public company's ability to prevent larger companies from entering its market and taking its market share.

Due to having better access to capital, large-capitalized public companies tend to have greater ability (1) to hire better quality employees, (2) to spend more on advertising and on research and development, and (3) to endure economic downturns. Additionally, when compared to small public companies, large public companies have a relatively high volume of customers, decreasing their reliance on a few key customers.

The functional and operational differences listed above (and this is not a comprehensive list) increase the risk associated with investing in a small public company compared with investing in a large company. Therefore, investors expect smaller public companies to provide a higher return on equity investment relative to larger public companies. Investors expect to be compensated for assuming the greater level of investment risk in a smaller public company compared to the level of investment risk in a larger public company.

The S_p quantifies the increased rate of return that investors expect in order to compensate them for assuming the risk associated with small company investments.

A significant relationship between size of a company and historical equity returns was observed in the Banz study. However, the study concluded that it is not clear whether the relationship is due to company size itself, or to other unknown variables correlated with company size.

Small company size may not cause risk or cause the increased expected investment returns. Rather, the financial and operational disadvantages associated with small company size may be causing the risk and causing investors to expect higher rates of return on their equity investment.

This Banz study conclusion is summarized in the following statement:

It is not known whether size [as measured by market capitalization] per se is responsible for the effect or whether size is just a proxy for one or more true

unknown factors correlated with size.²

As a result of the Banz study, investment professionals began performing their own “size effect” studies. Applying the data

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reported by the CRSP, Roger Ibbotson and Rex Sinquefeld performed a series of “size effect” studies that were published in the Morningstar/Ibbotson annual *Stocks, Bonds, Bills, and Inflation* (“SBI”) *Valuation Yearbook*. Those studies were called the CRSP Deciles Size Premia Studies, and they were summarized annually in the *SBI Valuation Yearbook* from 1999 to 2016.

In 2016, Morningstar announced it would no longer publish the CRSP Deciles Size Premia Study in the *Ibbotson SBI Valuation Yearbook*. Starting with the 2016 edition, the annual study was prepared by Duff & Phelps, and it was published by John Wiley & Sons in the *U.S. Guide to Cost of Capital Valuation Handbook*.

The CRSP Deciles Size Premia Studies continue to segment the NYSE stock returns into deciles by size (as measured by the market capitalization of the publicly traded companies). Based on the NYSE decile breakpoints, the study now includes the entire universe of NYSE/NYSE MKT/Nasdaq-listed securities rather than just the NYSE listed securities. Also, the CRSP deciles are now calculated from 1926 to the present year.

The CRSP deciles data include all publicly traded companies. The CRSP Deciles Size Premia Studies data do not exclude financial services companies (companies in finance, insurance, or real estate) or high-financial-risk companies.

Duff & Phelps calculates the CRSP deciles size premiums as follows:

Size premia represent the difference between historical (observed) excess return, and the excess return predicted by the capital asset pricing model (CAPM)...Excess returns are defined here as portfolio returns over and above the risk-free asset's returns.³

In this study, the CAPM-predicted return is calculated as the product of (1) the beta (“ β ”) for the subject portfolio (i.e., the subject decile) of public stocks and (2) the expected return on the market portfolio of stocks in excess of the R_f times the ERP. The observed difference after the β adjustment demonstrates that the β of smaller companies does not fully explain the perceived risk associated with smaller companies. Therefore, the actual rate of equity return offered by smaller companies is not fully explained by the unadjusted CAPM alone. In other words, the β of small companies is underestimated. Accordingly, the unadjusted CAPM underestimates the K_e of smaller companies.

Empirical evidence indicates that the unadjusted CAPM is imperfect as a measure for the expected returns for smaller companies. As a result, it is a generally accepted procedure for analysts to consider a S_p in the K_e calculation. This S_p consideration is especially relevant for so-called “microcap” companies (i.e., the public companies with equity capitalization in the 9th and 10th deciles), where the S_p is more pronounced. The CRSP deciles size premium data can be used in the application of the MCAPM and of the BUM to estimate a K_e for a smaller size property ownership interest.

The CRSP Deciles Size Premia Study provides the size premiums data and other valuation data previously published in (1) the *SBBI Valuation Yearbook* and (2) the *Duff & Phelps Valuation Handbook – U.S. Guide to Cost of Capital*.

All size premiums provided by Duff & Phelps are “beta-adjusted.” This means that the size premiums are adjusted to remove the portion of the excess return (above the unadjusted CAPM estimate) that is attributable to beta alone. The concluded size premium data by Duff & Phelps measure only the contribution of the size effect to the excess return (above the unadjusted CAPM estimate).

In the application of the MCAPM and the BUM, analysts often apply the CRSP data to estimate the specific S_p for a subject ownership interest. In consideration of a supportable S_p , analysts may (1) first estimate the equity component of the subject property value by applying a market approach or a cost approach property valuation method and (2) then select the applicable Duff & Phelps decile and S_p indication.

When applying the S_p and the IRP provided by Duff & Phelps, adding both an S_p and an IRP to the BUM analysis is not considered to be “double-counting” these risk premiums.

This is because (1) the S_p is “beta-adjusted” and (2) the IRP is the measurement of the beta risk. In other words, these two different risk premiums were designed to account for two different types of risk.⁴

Considering the CRSP Deciles Size Premia Studies data as a proxy for PSRP.

Analysts may consider an analysis of the CRSP Deciles Size Premia Study 10th decile as an empirically based proxy (or benchmark) in the PSRP estimation. The 10th decile is comprised of the

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smallest-capitalized public companies included in the CRSP Deciles Size Premia Study.

The public companies that comprise the 10th decile may be disaggregated into subcategories 10a and 10b, as presented in Exhibit 2.

The public companies that comprise the 10a subdecile include companies with market capitalizations between \$185.4 million and \$321.6 million, and the reported size premium is 3.71 percent (as of December 31, 2018).

The public companies that comprise the 10b subdecile include companies with market capitalizations between \$2.5 million and \$184.8 million, and the reported size premium is 8.25 percent (as of December 31, 2018).

Within each of the 10a subdecile and 10b subdecile categories of the 10th decile, Duff & Phelps presents two additional subcategories. The 10a subdecile may be disaggregated into 10w and 10x subdeciles, while the subdecile 10b may be disaggregated into 10y and 10z subdeciles.

Companies that are classified in the 10th decile vary considerably in market capitalization and in the applicable S_p . The empirically derived S_p measurements range from 2.89 percent to 11.14 percent, a spread of 8.25 percent, or 825 basis points.

Exhibit 2 presents an analysis of the CRSP Deciles Size Premia Study data for the 10th decile. The Exhibit 2 empirical data were sourced from the Duff & Phelps Cost of Capital Navigator as of December 31, 2018. These empirical data present the disaggregation of the 10th decile, as of that date.

The 10th decile disaggregation presented in Exhibit 2 provides an indication that investment risk that may be related to more than just the S_p examined in the Duff & Phelps and Ibbotson data. For example, subdecile 10y and subdecile 10z are populated by many large (but highly leveraged) public companies with small equity capitalizations. Such large (in terms of revenue and/or assets) public companies with small equity capitalization probably do not match the characteristics of financially healthy but smaller public companies.

As presented in Exhibit 2, as the size of public companies increases, the corresponding S_p decreases. That is why it is important for analysts to correctly interpret and apply the S_p expected return component of the MCAPM (and BUM) measurement of the K_e .

According to Duff & Phelps, “as of December 31, 2018, the reported size premium for the smallest 5 percent of companies by market capitalization as represented by CRSP subdecile 10b is 8.25 percent, and the size premium for the next smallest 5 percent of companies (as represented by CRSP subdecile 10a) is 3.71 percent, a difference of 4.54 percent.”⁵

Further, according to Duff & Phelps, “The CRSP Deciles Size Premia include all companies with no exclusion of speculative (e.g., start-up) or distressed companies whose market capitalization may be small because they are speculative or distressed.”⁶

The distressed company issue may be considered through an analysis of the 10th decile subcategories of 10y and 10z, as presented in Exhibits 3 and 4.

As presented in Exhibit 3, the subdecile 10y public companies report five-year net income ranging from negative \$44.5 million to a positive \$14.7 million. The subdecile 10y public companies significantly smaller than other public companies in the CRSP Deciles Size Premia Study; in addition, more than half of these subdecile 10y companies are unprofitable.

As presented in Exhibit 4, subdecile 10z includes public companies in the 5th percentile that report five-year average earnings before interest, taxes, depreciation, and amortization (“EBITDA”) of negative \$19.3 million. The public companies classified in subdecile 10z at or below the 50th percentile (i.e., the lower quartile) reported negative EBITDA.

Collectively, the data in Exhibits 3 and 4 support the conclusion that the CRSP Deciles Size Premia Study 10th decile is comprised of financially troubled and financially distressed companies.

Moreover, Duff & Phelps presents the following conclusion with regard to subdecile 10y and subdecile 10z:⁷

Subdecile 10y and subdecile 10z are populated by many large (but highly leveraged) companies with small market capitalizations that probably do not match the characteristics of financially healthy but small companies (see “Total Assets,” 95th percentile measures).

According to an article authored by James Hitchner in the journal *Financial Valuation and Litigation Expert*, “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

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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.”⁸

Analysts may consider the S_p data associated with CRSP size categories 10w, 10x, 10y, and 10z to provide guidance for the PSRP estimate for the taxpayer unit. These data are presented in the far right column of Exhibit 2 (as of December 31, 2018).

In particular, analysts may consider (1) the difference between the 10x and the 10w size premiums (e.g., 4.68 percent – 2.89 percent) and (2) the difference between the 10z and the 10y size premiums (e.g., 11.14 percent – 6.85 percent).

These size premiums differences (of approximately 2 percent to 4 percent) may provide an empirically based proxy or benchmark for the PSRP estimate.

Such consideration of the CRSP Deciles Size Premia Study 10^{t h} decile may provide a reasonableness test for the analyst's judgment based PSRP estimate with regard to the particular unsystematic risk profile of the taxpayer unit.

As indicated by the Hitchner article, based on dated information that is still relevant, not only does the CRSP Deciles Size Premia Study 10^{t h} decile include financially troubled companies, it is also skewed by its industry concentration.

As presented above, the actual returns earned in excess of the returns predicted by the CAPM was 6.85 percent for subdecile 10y and 11.14 percent for subdecile 10z (or a difference of 429 basis points) as of December 31, 2018. This 4.29 percent return premium difference may (in part or in whole) be an indication of the quantum of return that is correlated with various types of financial and operational risk, and not just with the size of the taxpayer unit. The delta between (1) subdecile 10y and subdecile 10z or (2) subdecile 10a and subdecile 10b, may provide an indication for the investment return premiums related to the types of risks that are more often associated with the PSRP than with the S_p .

Analysis of Relative Bond Ratings and Bond Yields

The lack of diversification of the business operations of many taxpayer units suggests that the relevant risk measure for investors may be “total risk.” Total risk includes unsystematic risk (i.e., the total risk associated with an investment in any ownership interest includes property-specific risk). That is, for an undiversified equity investment in a taxpayer unit, some form of unsystematic risk likely exists, and should be considered when measuring the K_e .

However, quantifying the property-specific risk is a challenging process. In part, this is because most of the data typically considered to measure the K_e are based on public company information, and public companies tend to be well diversified. Such diversification tends to reduce or eliminate the property-specific risk component of the K_e .

Another procedure that analysts may consider as an empirically based proxy (or benchmark) to provide guidance in the PSRP estimate is an analysis of the high-yield bond spread. A high-yield bond is a bond with a credit rating below investment-grade corporate bonds.

High-yield bonds pay a higher yield than investment-grade bonds. This high yield is typically (1) because of some high-risk factors or (2) because the issuing debtor company is financially distressed.

The yield on a typical corporate bond is comprised of the following components:

- (1) Real rate of return and a return premium for expected inflation. These two rate of return components are included in a government bond yield, also known as the risk-free rate, or the R_f .
- (2) Default risk premium. The default risk premium is measured as the required rate of return in the market in order to compensate investors for the risk of default on a corporate bond. Typically, the default risk premium is measured as the spread between (1) the yields on risky corporate bonds and (2) the yield on a U.S. Treasury bond (the yield that is also known as the R_f).

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The risk of default is one component of investment risk that is likely to be minimized (or diversified away) in a diversified portfolio of debt investments. For example, let's assume an investor's portfolio is made up of a well-diversified portfolio of, say, 100 different corporate bond holdings. The risk that a default of one—or a few—of those debt instrument investments having a significant negative impact on the investor's portfolio return will be low.

The default risk premium in a high-yield bond is significantly higher than the default risk premium for an investment-grade bond. Such a default risk premium reflects the additional risk of a high-yield bond holder being unable to realize the expected cash flow from the issuing debtor company. In this way, the risk profile of the high-yield debt investor in a distressed debtor company is similar to the risk profile of an equity investor in a non-distressed company.

Because a high-yield bond is a bond with a credit rating below an investment-grade corporate bond, a high-yield bond typically pays a higher yield than an investment-grade bond. Of course, investors expect this higher yield because of the high-risk factors associated with the debtor company. The level of risk between the

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observed investment-grade corporate bonds and the high-yield “junk bonds” may provide a proxy to assist the analyst in the PSRP estimate.

As presented in Exhibit 5, the yields on various forms of bonds (and bond indices) vary based on the subject bond, or the subject bond index, risk profile.

The first debt security presented in Exhibit 5 is a six-month Treasury bill. Treasury bills (or T-bills), are sold with maturities ranging from a few days to 52 weeks. T-bills are typically sold at a price discount from the stated par amount (the par amount of a T-bill is also called the face value). Rarely, T-bills have sold at a price equal to the par amount. Such a sale effectively results in a 0 percent yield to the investor. When a T-bill matures, the security holder is paid the par amount. If the T-bill's par amount is greater than the T-bill's purchase price, then the difference is the interest (or the yield) earned by the investor.

The next debt security presented in Exhibit 5 is a 10-year Treasury note. Treasury notes (or T-notes), earn a fixed rate of interest every six months until maturity. T-notes are issued with typical maturities of 2 years to 10 years.

In addition, the U.S. Treasury also issues Treasury bonds. Treasury bonds (or T-bonds) pay a fixed rate of interest every six months until they mature. Treasury bonds are issued with typical maturities of 20 years or 30 years.

All T-bills, T-notes, and T-bonds are issued by the U.S. Department of Treasury and are typically considered to be a risk-free security. As mentioned earlier, for technical data consistency purposes, the 20-year T-bond is typically used as the R_f when the analyst measures the K_e .

The next tranche of debt securities presented in Exhibit 5 is the long-term corporate bond indexes for Aaa, Aa, A, and Baa rated corporate bonds, as rated by Moody's, an

internationally recognized credit rating agency. These rating categories for corporate and institutional bonds (i.e., Aaa through Baa) are typically referred to as “investment grade.”

According to Moody's, “long-term obligation ratings are opinions of the relative credit risk of fixed-income obligations with an original maturity of one year or more. They address the possibility that a financial obligation will not be honored as promised. Such ratings reflect both the likelihood of default and any financial loss suffered in the event of default.”⁹

Aaa-rated corporate debt obligations are considered to be of the highest quality with minimal risk. Aa-rated corporate debt obligations are considered high quality and are subject to very low credit risk. A-rated corporate debt obligations are considered upper-medium-grade and are subject to low credit risk. Baa-rated corporate debt obligations are subject to moderate credit risk. Baa-rated corporate bonds are considered medium-grade and, as such, these bonds may possess speculative characteristics.

As presented in Exhibit 5, the highest rated corporate bond index yield equals 4.0 percent, or 130 basis points above the 10-year T-note yield of 2.7 percent. That is, the incremental level of return required to attract a debt investor away from a risk-free investment to a risky (albeit low risk) investment is about 1.3 percent.

The third tranche of the debt securities presented in Exhibit 5 is considered to be high-yield or “below investment grade.” Such debt instruments are market-capitalization-weighted indices of domestic corporate high-yield bonds. The indices track the performance of high-yield debt securities traded in the U.S. bond market.

The high yield debt securities are considered to be below investment-grade rating (based on an average rating of the Moody's, S&P, and Fitch credit rating agencies). The debt securities included in these indices have at least 18 months to final maturity at the time of issuance, have at least a one year remaining term to final maturity as of the rebalancing date, have a fixed coupon schedule, and have a minimum amount outstanding of \$250 million.

As presented in Exhibit 5, the lowest rated high-yield bond index yield as of the observation date equals 13.7 percent, which is (1) 530 basis points above the BB-rated

index yield of 8.4 percent and (2) 860 basis points above the lowest investment-grade index yield of 5.1 percent.

The lowest rated bonds (i.e., CCC and below) are typically referred to as “junk” bonds. Junk bonds have a high risk of default. Also, like the companies that

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comprise the Duff & Phelps subdecile 10y and subdecile 10z (discussed above), the debtor companies that issue such junk bonds are often financially distressed.

The difference in the level of return on junk bonds and on other “below-investment-grade” bonds may provide guidance to the analyst as a proxy or benchmark for the PSRP estimate.

The incremental return between a junk bond index (13.7 percent from Exhibit 5) and the BB-rated bond index (8.4 percent from Exhibit 5) may provide an indication of the incremental return that debt investors expect as compensation for the factors that pertain to property-specific risk—such as financial distress, liquidity risk, and so forth.

In other words, the analyst may consider the yield differentials presented in Exhibit 5 as one source of empirically based evidence to indicate a supportable PSRP estimate. In particular, the analyst may consider the difference between (1) the B-rated high yield investments (i.e., 8.4 percent on the observation date) and (2) the CCC and below-rated high-yield investments (i.e., 13.7 percent on the observation date). This differential in high-yield bond returns—of approximately 5 percent—may provide analysts with an empirically based reasonableness test for a judgment-based PSRP estimate.

While this analysis of high-yield debt instruments does not directly measure the PSRP, it may provide analysts with a proxy of empirically based data that provides guidance for the PSRP estimate.

Analysis of Illiquidity Studies (Pre-IPO and Restricted Stock Studies)

While typically used to estimate a supportable valuation discount for lack of marketability (“DLOM”), these studies may also provide a proxy, or benchmark, for a reasonableness test of the analyst's judgment-based PSRP estimate. Relevant illiquidity studies that may provide an empirically based proxy for the analyst's PSRP estimate include the following: (1) pre-initial public offering (“IPO”) studies such as the Emory Studies and the Valuation Advisor Studies and (2) a variety of restricted stock studies.

The variety of so-called restricted stock studies all observe the market prices of public company restricted stock sales and include such actual transactional data dating back to the late 1960s. These restricted stock studies indicate an average price discount (compared to the trading price of the same public company stock without the trading restriction) for public company restricted stock of (1) approximately 35 percent for transactions occurring in the 1968 to 1988 period and (2) approximately 20 percent to 25 percent for transactions occurring after 1990. The decrease in the observed price discounts is typically explained by the more recent shortened investment holding period for restricted stocks under Securities and Exchange Commission Rule 144.

The analyst may consider the DLOM measurements indicated by the restricted stock studies as a proxy to assess the reasonableness of a judgment-based PSRP estimate. As a simplified illustrative example, let us assume that the analyst selects a 20 percent DLOM with regard to the valuation of the taxpayer unit. This DLOM recognizes that the taxpayer's operating assets are not as liquid as the stock of publicly traded companies.

The analyst may test the reasonableness of the judgment-based PSRP estimate by reference to this DLOM proxy. Exhibit 6 presents an illustrative example of such a PSRP estimate reasonableness test.

The pre-PSRP indicated K_e presented in Exhibit 6 illustrates a hypothetical MCAPM or BUM measurement of the subject taxpayer K_e , before consideration of the PSRP. The analyst considers the DLOM valuation adjustment to the pre-PSRP indicated K_e (that may be supportable for a public company). Adjusting the pre-PSRP indicated K_e by the selected

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DLOM results in a risk-adjusted K_e after consideration of the PSRP (that may be more supportable for a taxpayer unit).

The 3.3 percent delta between the pre-PSRP indicated K_e (of 13.2 percent) and the risk-adjusted K_e (of 16.5 percent) provides an indication of the illiquidity component of the property-specific risk (expressed as a DLOM) in the K_e . That is, all else being equal, the difference between the K_e of a public company and the K_e of a taxpayer unit of operating assets (in this illustration, the 3.3 percent delta) may be explained as consideration of illiquidity issues that operating assets experience (and that public company securities do not experience).

This consideration of these illiquidity issues may not capture the total quantum of the PSRP for a taxpayer unit. However, this consideration of the DLOM may provide the analyst with an empirically based proxy for the reasonableness test of a judgment-based PSRP estimate.

The following discussion considers (1) a functional analysis of the taxpayer unit, (2) an analysis of quantitative data related to a PSRP of a taxpayer unit, and (3) the analyst's estimate of the PSRP for a taxpayer unit.

The Property-Specific Risk Premium and a Functional Analysis

In the process of identifying and estimating any PSRP component of a K_e , analysts typically perform a functional analysis of a taxpayer unit for property tax valuation purposes. This functional analysis is discussed next.

Description of a Functional Analysis

A functional analysis is one component of the PSRP identification and estimation process. Such an analysis is often applied for purposes of assessing the comparability of the taxpayer unit to selected guideline or benchmark entities. These selected guideline or benchmark entities are typically considered to be comparable (or guideline) companies. The development of a functional analysis is relevant in that context.

As will be described, the regulations related to Internal Revenue Section 482 explain the application of a functional analysis for purposes of determining reliability. Also, the Organisation for Economic Cooperation and Development (“OECD”) regulations describe the application of a functional analysis within the context of an intercompany transfer of

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tangible property, intangible property, or services between two OECD countries.

A functional analysis is certainly relevant to such an intercompany transfer price determination made for purposes of Section 482 compliance (or of OECD regulations compliance). In addition to applicability to a transfer price analysis, a functional analysis is also relevant within the context of a discount rate or capitalization rate development as part of any taxpayer unit valuation.

Many observers initially think of a functional analysis within the context of an intercompany transfer price determination between the controlled entities of a taxpayer (often a multinational taxpayer) for Section 482 (or for OECD) compliance purposes. While there are broader applications of a functional analysis, the Section 482 (and the corresponding OECD) regulations do provide a definition of a functional analysis that is generally applicable for this discount rate and capitalization rate development discussion.

Reg. 1.482-1(d)(3)(i) relates to comparability issues related to the allocation of income and deductions among taxpayers. Specifically, this regulation section deals with the factors for determining comparability of transactions and companies and describes a functional analysis as follows:

- (i) Functional analysis. Determining the degree of comparability between controlled and uncontrolled transactions requires a comparison of the functions performed, and associated resources employed, by the taxpayers in each transaction. This comparison is based on a functional analysis that identifies and compares the economically significant activities undertaken, or to be undertaken, by the taxpayers in both controlled and uncontrolled transactions. A functional analysis should also include consideration of the resources that are employed, or to be employed, in conjunction with the activities undertaken,

including consideration of the type of assets used, such as plant and equipment, or the use of valuable intangibles. A functional analysis is not a pricing method and does not itself determine the arm's length result for the controlled transaction under review. Functions that may need to be accounted for in determining the comparability of two transactions include –

- (1.) Research and development;
- (2.) Product design and engineering;
- (3.) Manufacturing, production, and process engineering;
- (4.) Product fabrication, extraction, and assembly;
- (5.) Purchasing and materials management;
- (6.) Marketing and distribution function, including inventory management, warranty administration, and advertising activities;
- (7.) Transportation and warehousing; and
- (8.) Managerial, legal, accounting and finance, credit and collection, training and personal management services.

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While this regulation section lists eight functions, it does not imply that the eight-item list is exhaustive. Rather, the regulation section indicates that the factors to consider “include” the eight listed functions. In addition, the regulation does not imply that the eight listed factors cannot be disaggregated or rearranged.

Within the context of estimating the PSRP cost of capital component for a taxpayer unit, a functional analysis may consider the following risk and expected return topics:

- What products and services are offered to customers or clients (and how are those products and services designed or developed).
- What is the source of supply of the materials, labor, and overhead that is needed to produce those products and services (including sourcing dependence and sourcing logistics issues).
- How the products and services are manufactured or otherwise produced.

- How the products and services are differentiated, promoted, priced, and sold (including advertising and branding issues).
- How the inventory of products and services (including raw materials, work in process, and finished goods/services) are created, packaged, and stored.
- How the products and services are delivered (including shipping, transportation, and other delivery logistics issues).
- What assets are utilized to perform the functions within the taxpayer unit (including working capital assets, tangible assets, and intangible assets).
- How profits are earned in the taxpayer unit (including the cost/volume/profit relationships with regard to both (1) production/service creation cost of sales and (2) production/service delivery revenue recognition).
- How the accounting, finance, human resources, management information, marketing, sales, and other administrative activities operate within the taxpayer unit.
- How the taxpayer unit is organized, managed, and capitalized (legally and administratively), including both (1) the relationship between the taxpayer company owners and the taxpayer company operators/managers and (2) the relationship between the taxpayer company and its sources of capital.

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There are various financial, competitive, and operational analyses that are components of the functional analysis.

Components of the Functional Analysis

Exhibits 7a through 7d present a listing of the typical considerations in the analyst's development of a functional analysis. These tables serve as a checklist of considerations for any analyst who is considering the PSRP component of a discount rate or direct capitalization rate for purposes of a taxpayer unit valuation.

The functional analysis considerations listed in Exhibits 7a through 7d may be used to develop an understanding of the taxpayer unit. Analysts may apply this understanding in

the estimate of, and the documentation of, the PSRP component of the discount rate or direct capitalization rate.

Risk considerations in a functional analysis.

One reason to conduct a functional analysis is to allow the analyst to identify the risks that are being assumed by the taxpayer unit. A significant portion of the return earned by the taxpayer company's operations is due to the risks assumed by the taxpayer unit.

The functional analysis allows analysts to compare these risks (1) within the taxpayer unit; (2) between the taxpayer unit and the selected comparable (or guideline) companies, transactions, and licenses; and (3) between related party (or associated) entities in a controlled transaction.

The analyst applies these risk considerations in the estimate of, and the documentation of, the PSRP component of the discount rate and direct capitalization rate.

The 12 Steps of the Functional Analysis

In the PSRP estimate, analysts typically group all of the above-listed functional analysis considerations into 12 steps or categories of analyst procedures and investigations. Analysts perform these 12 steps in the estimate of—and the documentation of—the PSRP component of the discount rate or capitalization rate.

These 12 steps, or categories or groupings of analyst procedures, are listed in Exhibit 8.

The first 10 steps in Exhibit 8 primarily relate to the functions performed at the private company. Step 11 in Exhibit 8 primarily relates to the operating assets employed at the taxpayer unit. Step 12 in Exhibit 8 primarily relates to the risks assumed by the taxpayer unit.

Application of the Functional Analysis to Measure the Property-Specific Risk Premium

Based on the discussion above, analysts consider the functional analysis procedures presented in Exhibit 8. Considering these functional analysis procedures, the analyst considers this functional analysis when estimating the PSRP component of the discount rate and direct capitalization rate.

Summary and Conclusion

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Analysts working for tax assessment authorities or for taxpayer property owners are asked to value the taxpayer's taxable property for property tax compliance, appeal, or litigation purposes. These analysts apply generally accepted property valuation approaches and methods to value the taxpayer's total unit (or assemblage) of operating assets. Often, particularly within the context of a unit principle valuation, these analysts apply income approach property valuation methods.

Most of these property valuation analyses involve the analyst's measurement of the taxpayer company's cost of capital. This cost of capital becomes the basis for the analyst's development of the applicable present value discount rate or direct capitalization rate. For most taxpayer unit valuation analyses, the discount rate and direct capitalization rate include the analyst's estimate of a property-specific risk premium. This two-part discussion describes the procedures that analysts apply to estimate the PSRP.

The first part of this discussion explained the reasons why the PSRP should be included in the various cost of capital measurement models. That part of the discussion also described the qualitative factors that the analyst considers in the judgment-based PSRP estimate. This PSRP estimate is one component of what is often called “alpha” in the measurement of a property-specific cost of capital.

The second part of this discussion summarized the market-derived, empirical data sources that the analyst may consider as a proxy, or benchmark, in the quantitative estimate of the PSRP. These empirical data sources do not directly measure the PSRP. That is because the PSRP is unique to each individual taxpayer unit of operating assets. However, these empirical data sources provide general guidance to support the PSRP estimate. Finally, this second part of the discussion summarized one procedure that impacts both the

qualitative and quantitative assessment of the PSRP: the functional analysis of the taxpayer property considered in the unit principle valuation.

Exhibit 1. Analyst's Illustrative Estimate of the PSRP Analyst Guidance Based on a Proxy Risk Measurement; The Quantum of Risk Measurement Procedure

Application of the Modified Capital Asset Pricing Model (ex post equity risk premium)		
Quanta of Risk in the Taxpayer Unit Cost of Equity Capital		Guideline Quantum of the Expected Rate of Return per Risk Level
Risk-Free Rate of Return	2.87%	3%
General Equity Risk Premium	6.91%	
Multiplied by: Industry Beta	<u>0.90</u>	
Industry-Adjusted Risk Premium	6.22%	6%
Size-Related Risk Premium	5.22%	5%
Analyst's Estimated Property-Specific Risk Premium - Based on an Assessment of the Previous Levels of Risk	4%	3% - 6%
Indicated Taxpayer Unit Cost of Equity Capital	18.31%	
Selected Cost of Equity Capital (rounded)	18%	
Application of the Build-Up Model		
Quanta of Risk in the Taxpayer Unit Cost of Equity Capital		Guideline Quantum of the Expected Rate of Return per Risk Level
Risk-Free Rate of Return	2.87%	3%
General Equity Risk Premium	6.91%	
Industry Equity Risk Premium	<u>0.14%</u>	
Industry-Adjusted Risk Premium	<u>7.05%</u>	7%
Size-Related Risk Premium	5.22%	5%
Analyst's Estimated Property-Specific Risk Premium - Based on an Assessment of the Previous Levels of Risk	4%	3% to 7%
Indicated Taxpayer Unit Cost of Equity Capital	19.14%	
Selected Cost of Equity Capital (rounded)	19%	

Exhibit 2. Analysis of the 10th Decile CRSP Deciles Size Premia Studies Data as of December 31, 2018

Disaggregation of the CRSP 10th Decile	Market Capitalization of the Smallest Public Company (\$million)	Market Capitalization of the Largest Public Company (\$million)	Sp - Size Premium (Actual Return in Excess of the Return Predicted by CAPM)
10a	185.418	321.578	3.71%
10w	250.270	321.578	2.89%
10x	185.418	250.248	4.68%
10b	2.455	184.785	8.25%
10y	109.462	184.785	6.85%
10z	2.455	109.406	11.14%

Exhibit 3. Analysis of the 10y Subdecile CRSP Deciles Size Premia Studies Data as of September 30, 2018

CSRP Decile 10y Percentiles	Market Value of Equity (\$MM)	Book Value of Equity (\$MM)	5-Year Average Net Income (\$MM)	Market Value of Invested Capital (\$MM)	Total Assets (\$MM)	5-Year Average EBITDA (\$MM)	Revenue (\$MM)	Return on Book Value of Equity (%)
95th Percentile	180,567	206,050	14,660	596,801	1,480,151	90,734	936,034	34.2
75th Percentile	164,136	120,009	6,538	222,403	794,153	18,455	159,984	8.0
50th Percentile	145,135	73,664	(2,409)	177,823	163,397	-	49,969	(0.4)
25th Percentile	124,566	32,859	(19,152)	142,236	65,786	(12,043)	21,920	(54.7)
5th Percentile	109,977	0,014	(44,510)	115,058	23,418	(27,018)	0,480	(144.8)

Note: The data presented above are sourced as of September, but Duff & Phelps relies on these data for its size decile data as of December.
Source: Duff & Phelps 2019 Cost of Capital: Annual U.S. Guidance and Examples, Cost of Capital Navigator.

Exhibit 4. Analysis of 10z Subdecile CRSP Deciles Size Premia Studies Data as of September 30, 2018

CSRP Decile 10z Percentiles	Market Value of Equity (\$MM)	Book Value of Equity (\$MM)	5-Year Average Net Income (\$MM)	Market Value of Invested Capital (\$MM)	Total Assets (\$MM)	5-Year Average EBITDA (\$MM)	Revenue (\$MM)	Return on Book Value of Equity (%)
95th Percentile	94,613	115,874	5,684	225,088	668,823	23,478	336,341	22.6
75th Percentile	68,696	48,302	0,515	92,630	114,347	3,654	67,537	3.3
50th Percentile	41,957	21,530	(4,484)	56,026	42,808	(1,188)	20,507	(14.1)
25th Percentile	19,913	8,221	(13,786)	25,737	17,667	(8,672)	2,466	(89.7)
5th Percentile	8,086	(0,573)	(25,807)	9,623	5,589	(19,330)	-	(181.1)

Note: The data presented above are sourced as of September, but Duff & Phelps relies on these data for its size decile data as of December.
Source: Duff & Phelps 2019 Cost of Capital: Annual U.S. Guidance and Examples, Cost of Capital Navigator.

Exhibit 5. Bonds and Bond Index Yields

As of December 31, 2018	
6-Month U.S. Treasury Bill	2.5%
10-Year U.S. Treasury Note	2.7%
Moody's Aaa Corporate Bond Index	4.0%
Moody's Aa Corporate Bond Index	4.2%
Moody's A Corporate Bond Index	4.3%
Moody's Baa Corporate Bond Index	5.1%
ICE BofAML BB U.S. High Yield Index	6.3%
ICE BofAML B U.S. High Yield Index	8.4%
ICE BofAML CCC & Below U.S. High Yield Index	13.7%

Source: Bloomberg and ICE BofAML.

Exhibit 6. Consideration of DLOM Empirical Data as a Proxy Data Source to Assess the Reasonableness of the PSRP Estimate

Based on a Restricted Stock Studies Analysis	
MCAPM or BUM Ke Measurement:	
Risk-Free Rate of Return	2.9%
Industry-Adjusted General Risk Premium	6.9%
Size-Related Risk Premium	3.4%
Pre-PSRP Indicated Taxpayer Unit Cost of Equity Capital	13.2%
Analyst-Estimated PSRP	3.0%
Selected Risk-Adjusted Taxpayer Unit Cost of Equity Capital	16.2%
Reasonableness Test of the Analyst's PSRP Estimate:	
Pre-PSRP Indicated Taxpayer Unit Cost of Equity Capital	13.2%
Divided by: (One minus the 20% DLOM Percentage)	80%
Equals: Indicated Taxpayer Unit Risk-Adjusted Cost of Equity Capital	16.5%

Exhibit 7a. Taxable Unit Functional Analysis Considerations Application to the PSRP Estimate in the Discount Rate or Capitalization Rate Development

1 Taxpayer company organization considerations	
A. Type of taxpayer owner/operator entity	
1	Description of whether the subject taxpayer unit is a business entity or other type of business ownership interest
2	Description and documentation of ownership of the subject entity
3	Description of legal structure of the subject entity
4	Description of tax structure of the subject entity
5	Description of any ownership relationships with related parties, applicable parties, or other common ownership
6	Description of corporate governance (e.g., board of directors)
7	Description of operational executive or management structure (e.g., management organization chart)
8	Description of operational functions structure (e.g., departmental organization chart)
9	Description and locations of owned tangible property
10	Description and locations of leased tangible property
11	Description of owned or licensed patents
12	Description of owned or licensed trademarks
13	Description of owned or licensed copyrights
14	Description of owned or licensed trade secrets
15	Description of owned or licensed other types of intangible property
16	Description of owned or licensed intangible value in the nature of goodwill
B. Taxpayer owner/operator entity documents	
1	Organization documents (e.g., articles of the corporation)
2	Operational documents (e.g., shareholders agreements)
3	Entity ownership documents (e.g., shareholder agreements, buy/sell agreements)
4	Asset ownership documents (e.g., deeds, legal descriptions, licenses, leases)
5	Entity transferability documents (e.g., franchise agreement restrictions, regulated industry considerations)
6	Ownership interest transferability considerations (e.g., security puts and calls)
7	Recent board of directors or executive/management committee minutes
8	Copies of any business or operating permits or certificates
9	Copies of any inbound or outbound intellectual property licenses
10	Copies of any joint venture, joint development, joint commercialization, etc., agreements
11	List of registrations of all intellectual property, including domestic and international patents, copyrights, and trademarks
12	Copies of documents that illustrate the taxpayer unit's use of domestic and international patents, copyrights, trademarks, and trade names
13	Copies of documents that illustrate the taxpayer unit's use of other types of intangible property
14	Copies of documents that illustrate the taxpayer unit's use of intangible value in the nature of goodwill

Exhibit 7b. Functional Analysis Considerations Application to the PSRP Estimate in the Discount Rate or Capitalization Rate Development (cont.)

2 Taxpayer unit operations considerations	
A. Taxpayer unit operational functions	
1	Description of products produced and services provided
2	Description of how products and services are designed, developed, or engineered
3	Description of raw materials inputs (sources, costs, and logistics of supply and supply chain risks)
4	Description of labor inputs (sources, costs, and logistics of supply and supply chain risks)
5	Description of overhead (operating expense inputs) (sources, costs, and logistics of supply and supply chain risks)
6	Description of product manufacturing or services production process
7	Description of production scheduling and quality control procedures
8	Description of product warehousing and in-process services storage
9	Description of product warranty and product return risk elements
10	Description of products and services shipping and delivery logistics
11	Description of how intellectual property (patents, copyrights, trademarks, and trade secrets) are developed, documented, and registered
12	Description of how intellectual property (patents, copyrights, trademarks, and trade secrets) are commercialized and protected
13	Description of how other types of intangible property are commercialized and protected
14	Description of how intangible value in the nature of goodwill is commercialized and protected
B. Taxpayer unit administrative functions	
1	Description of accounting functions
2	Description of receivables/cash collection function and payables/cash disbursement function
3	Description of treasury (cash management and banking relationship) function
4	Description of capitalization, capital structure, and financing functions
5	Description of products/services design and engineering function
6	Description of production engineering/services delivery efficiency function
7	Description of advertising and market research function
8	Description of packaging and branding function
9	Description of human resources, recruiting, training, and benefits function
10	Description of general counsel function
11	Description of information technology, management information, and data processing function
12	Description of regulatory compliance and other compliance functions
C. Taxpayer unit competition and competitive position functions	
1	Listing and description of principal competitors
2	Approximate size of principal competitors
3	Ranking of principal competitors by market share and by relative market share
4	Products/services features differentiation with competitors
5	Products/services pricing differentiation with competitors
6	Products/services distribution differentiation with competitors
7	Products/services intellectual property differentiation with competitors
8	Description of total market size
9	Description of total market growth rate
10	Description of how customers use the taxpayer units products/services
D. Taxpayer unit risk/expected return considerations	
1	Description of materials source of supply risk
2	Description of labor source and supply risk
3	Description of operating leverage (fixed costs coverage) risk
4	Description of financing leverage (debt service coverage) risk
5	Description of tangible property risk
6	Description of environmental risk
7	Description of litigation risk
8	Description of intellectual property risk
9	Description of customer concentration risk
10	Description of executive concentration risk
11	Description of regulatory change risk
12	Description of products/services liability risk

Exhibit 7c. Taxpayer Unit Functional Analysis Considerations Application to the PSRP Estimate in the Discount Rate or Capitalization Rate Development (cont.)

3 Taxpayer unit financial considerations	
A. Taxpayer unit accounting principles and financial statements	
1	Descriptions of current accounting principles applied
2	Comparison of owner/operator entity accounting principles to competitor accounting principles
3	Description of recent changes in accounting principles applied
4	Discussion of revenue recognition principles
5	Discussion of expense recognition principles
6	Discussion of taxation accrual and deferred tax principles
7	Discussion of tangible asset capitalization and depreciation principles
8	Discussion of intangible asset recognition principles
9	Discussion of liability recognition principles
10	Discussion of any adjustments to capital accounts
11	Discussion of cash flow statement working capital adjustments
12	Discussion of cash flow statement noncash revenue and expense account
13	Discussion of cash flow statement investment adjustments
14	Discussion of cash flow statement financing adjustments
B. Taxpayer unit financial statement projection considerations	
1	Description of the term (time period) of any financial projections
2	Description of the level of detail included in any financial projections
3	Description of financial projections internal development procedures
4	Description of financial projections internal review procedures
5	Comparison of financial projections to historical financial statements
6	Comparison of financial projections to guideline company financial projections
7	Comparison of financial projections to industry financial projections
8	Comparison of historical financial projections to historical financial statements for prior projection periods
9	Copies of any strategic plans or competitive analyses
10	Copies of any debt service payment projections (including any considerations of liquidity or solvency)
C. Taxpayer unit valuation considerations	
1	Description of the process for selecting guideline public companies
2	Procedures for assessing the taxpayer unit's comparability to selected guideline public companies
3	Procedures for adjusting the financial data of guideline public companies
4	Description of the process for selecting guideline M&A transactions
5	Procedures for assessing the taxpayer unit's comparability to selected guideline M&A transactions
6	Procedures for adjusting the financial data of selected guideline M&A transactions
7	Description of any recent offers to buy the taxpayer unit or the taxpayer unit's securities
8	Description of any recent sales (or other exchanges) of the taxpayer unit or the taxpayer unit's securities
9	Descriptions of any value indications (including historical development costs) of tangible real property and tangible personal property
10	Descriptions of any value indications (including historical development costs) of intellectual property or associated intangible property

Exhibit 7d. Taxpayer Unit Functional Analysis Considerations Application to the PSRP Estimate in the Discount Rate or Capitalization Rate Development (cont.)

4 Taxpayer unit operating assets employed and SWOT/risks assumed considerations	
A. Taxpayer unit assets employed	
1	Description of—and use of—cash and marketable securities
2	Description of—and use of—accounts receivable
3	Description of—and use of—prepaid expenses
4	Description of—and use of—inventory accounts
5	Description of—and use of—other current asset accounts
6	Description of—and use of—land and buildings
7	Description of—and use of—tangible personal property
8	Description of—and use of—other tangible assets
9	Description of—and use of—intellectual property assets
10	Description of—and use of—other identifiable intangible assets
11	Description of—and use of—intangible value in the nature of goodwill
12	Description of—and use of—nonoperating or investment assets
13	Description of—and use of—current liabilities
14	Description of—and use of—long-term interest-bearing debt
15	Description of—and use of—other long-term liabilities
16	Description of—and use of—contingent liabilities
B. Taxpayer unit SWOT and risks assumed considerations	
1	List of the principal competitive strengths
2	Description of how competitive strengths affect the taxpayer unit's operating results
3	Description of how competitive strengths affect the taxpayer unit's risks
4	List of the principal competitive weaknesses
5	Description of how competitive weaknesses affect the taxpayer unit's operating results
6	Description of how competitive weaknesses affect the taxpayer unit's risks
7	List of the principal competitive opportunities
8	Description of how competitive opportunities affect the taxpayer unit's operating results
9	Description of how competitive opportunities affect the taxpayer unit's risks
10	List of the principal competitive threats
11	Description of how the principal competitive threats affect the taxpayer unit's operating results
12	Description of how the principal competitive threats affect the taxpayer unit's risks

Exhibit 8. 12 Steps of the Functional Analysis Considered in the Taxpayer Unit PSRP Estimate

1	Gather and review all relevant taxpayer unit owner/operator legal documents (This step includes documents regarding organization structure, legal firm, tax status, and owners—e.g., shareholder, partnership, LLC member—agreements.)
2	Gather and review all relevant taxpayer unit owner/operator organization charts (This step includes both personnel reporting charts and functional relationship clients and considers both entity governance procedures and quality, quantity, tenure, and experience of entity/function leaders.)
3	Understand and document the products/services design, R&D, and products/services differentiation functions (This step includes the assessment of how the taxpayer unit's products or services are developed and how these products or services are intended to address their competition in the relevant marketplace.)
4	Understand and document the materials, labor, and overhead procurement function (This step includes consideration of how and when the taxpayer unit procures all of its materials, labor, and overhead inputs—for entities in every type of industry or profession.)
5	Understand and document the products/services production function (This step includes the assessment of how the taxpayer unit processes all of its material, labor, and overhead components to produce a product or a service—including the quality control of the product or service production.)
6	Understand and document the inventory and products/services storage function (This step includes both the in-process and finished inventory of goods and the in-process and finished inventory of services.)
7	Understand and document the sales and marketing function (This step includes the assessment of the taxpayer unit products or services pricing, packaging, advertising, promotional, trademark development and protection, and other branding—on a stand-alone basis and in response to competitive products and services.)
8	Understand and document the shipping and distribution logistics function (This step includes consideration of how the taxpayer unit products or services are delivered to the customer or the client—including freight, insurance, returns, warranty and repairs, and other expenses.)
9	Understand and document the accounting, finance, information systems, human resources, legal, and other administration functions (This step includes the assessment of how (a) information is generated and used throughout the taxpayer organization, (b) human resources are developed and administered, (c) financial statements and operational documents are prepared and used, (d) how cash management and treasury operations are performed, and (e) how the taxpayer company is capitalized with debt and equity capital sources.)
10	Assess and document the taxpayer unit owner/operator strategic position in comparison to competitors in the relevant industry or profession (This step includes (a) measurement of the taxpayer unit's market share/selective market share, market size, and market growth rate; (b) evaluation of the taxpayer unit's customer or client needs; and (c) assessment of the entity's competitive strengths, weaknesses, opportunities, and threats.)
11	Describe and document the assets used by the taxpayer unit owner/operator to perform the functions (This step includes a listing, description, and assessment of relative importance/contribution of (a) all working capital accounts, (b) all tangible property types and accounts—owned and leased, (c) all general intangible property types and accounts—owned and licensed, and (d) all intellectual property types and accounts—owned and licensed.)
12	Evaluate and document the risks assumed by the taxpayer unit owner/operator to perform the functions (This step includes a listing, description, and assessment of all products/services liability, operating language, financial leverage, environmental, supply dependence, customer dependence, technology dependence, employee dependence, intellectual property dependence, tax litigation, commercial litigation, credit and collection, inventory control, property and casualty, foreign exchange, market/competitor, and other risks.)

- ¹ Rolf W. Banz, “The Relationship between Return and Market Value of Common Stocks,” *Journal of Financial Economics* (March 1981).
- ² Roger J. Grabowski, “The Size Effect Continues to Be Relevant When Estimating the Cost of Capital,” *Business Valuation Resources* 37, no. 3 (Fall 2018): 94.
- ³ Duff & Phelps *2017 Valuation Handbook - U.S. Guide to Cost of Capital*, 8.
- ⁴ *Ibid.*, 8-1.
- ⁵ Duff & Phelps 2019 *Cost of Capital: Annual U.S. Guidance and Examples*, *Cost of Capital Navigator*, 12.
- ⁶ *Ibid.*
- ⁷ *Ibid.*, 15.
- ⁸ Jim Hitchner, “How to 'Rig' a Valuation: The Discount Rate,” *Financial Valuation and Litigation Expert* (February/March 2013).
- ⁹ Moody's “Rating Scale and Definitions.”

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