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Business Valuation Controversies and Choices: Understand Them and Their Impact on Value

IN THIS ISSUE

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Editors Note:

The following article is a very good summary of key issues encountered on many valuations. Although Issue 7 deals with "S Corporations", a US tax concept, used to avoid double taxation and where generally, earnings are taxed only at the shareholder level, the article is very useful to Canadian practitioners.

It is this author's contention that a substantial percentage of valuation disputes stem from a relatively short list of major issues. These major issues each have a profound influence on value. Some of the issues listed below are typically addressed in advanced course offerings as areas of controversy or concern, but no consensus is offered. The valuation practitioner is called upon to make these decisions without a good compass. This article is designed to identify major issue areas and to increase awareness of the full range of choices available for each issue area.

The litigation arena imposes additional constraints on business valuations. Currently, business valuators must use techniques that comply with the rigors of scientific studies, or must employ techniques consistently used by peers within the valuation profession. This places the business valuator in a particularly difficult position if there is no consensus among valuators or market participants on key valuation issues or if the common practices of the profession are at odds with recent studies.

The objectives of this article are: (1) to identify key issue areas that cause valuations to produce widely different results between equally competent practitioners, (2) to identify the range of choices available to the practitioner for addressing each issue area, and (3) to help practitioners appreciate how substantially these choices influence values.

The areas that influence value greatly and are unresolved are as follows: (1) Discounted Future Returns Issues: Terminal value, Capital expenditures, Working capital, Valuation of start-up companies, (2) Acquisition Data Issues – Marketability of public vs. private controlling interests, Synergy, (3) S corporation Valuation Issues – Selection of hypothetical buyer and tax effecting, (4) Equity Risk Premium Issues – Which investor's viewpoint? Looking Backward or Forward? (5) Size Premium Issues – Which investor's viewpoint? Looking Backward or Forward? Does it exist?, (6) WACC Capital Structure Issues – Existing capital structure or hypothetical buyer's capital structure?

To simplify the discussion, I have focused only on valuation of a 100% controlling interest for purposes of a future sale to an unknown buyer.

Controversy No. 1: Terminal Value

Most practitioners acknowledge that the terminal value is often 50% or more of the fair market value of the business. For start-up businesses, terminal value can approach or even exceed 100% of the fair market value of the business (typically this results from generating several years of losses during most of the holding period, and then becoming profitable prior to the last year of the holding period). In such cases, terminal value is the major issue in the valuation. There does not seem to be a consistent approach to how terminal value is estimated. And the value differences can be profound. I have found that there are at least 5 separate sets of methods being used to estimate terminal value. Let's assume that the holding period (or forecast period) is 10 years. They are as follows:

Terminal value models that work best for mature companies with moderate growth:

Terminal Value: Method 1 - Capitalize terminal year cash flow – Multiply the last year's cash flow by (1 + long term growth rate) and divide by the terminal cap rate. The terminal cap rate is the discount rate minus long term growth rate). Convert the result from a future value to a present value.

Terminal Value: Method 2 - EBITDA multiple – Estimate the EBITDA multiple for the terminal year based on the EBITDA multiple for mature companies only. Multiply the subject company's terminal year EBITDA estimate by a market derived EBITDA multiple to estimate the future value for the terminal value. Convert the result from a future value to a present value. (note: some practitioners use a multiple of EBIT as an alternative to this approach).

Terminal value models that work more effectively for companies in a rapid growth phase. These models assume that the proportion of capital expenditures, working capital requirements and perhaps profitability should be different in a long term stable state than in a short term rapid growth phase:

Terminal Value Method 3 - Make adjustments to cash flow during the year preceeding the terminal year, to accommodate slower long term growth – These adjustments could include changing the proportion of depreciation, capital expenditures, working capital and fixed expense to accommodate slower long term growth. Fixed expense is somewhat of a misnomer. Fixed expense is adjusted less frequently than other expenditures as a company grows, i.e. only when sufficient growth justifies the increase in overhead. After making the adjustments, multiply the last year's cash flow by (1 + long term growth rate) and divide by the terminal cap rate. The terminal cap rate is (Discount rate – long term growth rate). Convert the result from a future value to a present value. This approach is described in *Merger and Acquisition Valuation and Structuring* by Alan D. Gasiorak, MBA, CPA (pages 146 – 185, published 1997 by Corporate Development Institute)

Terminal Value: Method 4 - Make adjustments to the terminal year cash flow to accommodate slower long term growth – These adjustments could include proportion of depreciation, capital expenditures, working capital and fixed expense to accommodate slower long term growth. Fixed expense is somewhat of a misnomer. Fixed expense is adjusted less frequently than other expenditures as a company grows, i.e. only when sufficient growth justifies the increase in overhead. After making the adjustments, then divide the terminal year cash flow by the terminal cap rate. The terminal cap rate is: (Discount rate – long term growth rate). Convert the result from a future value to a present value. This approach is described (for working capital only) in *Investment Valuation* by Aswath Damodaran, (page 296-298, John Wiley & Sons, 1996)

Terminal Value: Method 5 - EBITDA Multiple for rapid growth companies – Estimate the EBITDA multiple for the terminal year based on EBITDA multiples for rapidly growing companies only. Multiply the subject company's terminal year EBITDA estimate by a market derived EBITDA multiple to determine the future value for the terminal value. Convert the result from a future

value to a present value. (note: some practitioners use a multiple of EBIT as an alternative to this approach).

Controversy No. 2: Capital Expenditures

We will look at this issue only in terms of the discounted future returns approach. This section deals only with capital expenditures during the holding period. Capital expenditures, as a component of terminal value, is separately discussed below. The valuation practitioner can take several approaches, which typically can yield dramatically different valuation results. The first 3 approaches are most often used by valuation practitioners:

Capital Expenditures: Method 1: Base capital expenditures on the company's historical expenditures as a percentage of sales – This approach is reasonable for a stable, mature company that does not have substantial obsolescence of equipment. If obsolescence is a problem, then the hypothetical buyer would likely increase the level of expenditures to meet industry norms.

Capital Expenditures: Method 2: Base capital expenditures on typical industry ratios – Estimate the ratio of capital expenditures to sales that is typical for the industry. Use that percentage of sales for the annual estimate of capital expenditures. Again, this approach is most reasonable for a stable, mature company that does not have substantial obsolescence of equipment.

Capital Expenditures: Method 3: Base capital expenditures on the company's plan for such expenditures – This approach is most appropriate if the company is making an adequate investment in capital expenditures compared to the industry. Inadequate investment can ultimately reduce product quality and sales revenues, or cause profit margins to erode because of inefficient use of equipment and labor.

Capital Expenditures: Method 4: Base capital expenditures on a multiple of depreciation dependent on growth expectations – In a stable company with reasonably current equipment, capital expenditures should be slightly higher than depreciation (105% to 110% of depreciation). In a rapidly growing company, that multiple of depreciation should be substantially higher. Depending on the estimated growth rate, the multiple of depreciation can be in the range of 120%to 200% in extreme growth cases. As growth levels off or declines, that multiple should decline.

Capital Expenditures: Method 5: Make more explicit estimates with scheduled replacement of obsolete equipment – The most accurate model is one where specific capital expenditures are delineated based on specific knowledge of obsolete equipment and replacement costs. However, this approach is usually not practical unless (1) equipment is clearly obsolete relative to other companies in the industry, (2) the company's facilities are near full capacity and new investment is necessary to accommodate expansion or (3) a specific buyer is known and their likely capital expenditures are known.

Controversy No. 3: Working Capital

In order to have any company growth, the working capital must grow as revenues grow. However, estimating the working capital needed is subject to considerable variation. Working capital as a component of terminal value is separately discussed below. The valuation practitioner can take several approaches which typically can yield dramatically different valuation results. Methods used include:

Working Capital: Method 1 - Base the estimate of working capital on the company's historical working capital as a percentage of sales – This method assumes that the company has had adequate working capital in the past.

Working Capital: Method 2 - Base the estimate of working capital on typical industry sales to working capital ratios – Estimate the ratio of sales to working capital typical for the industry. Use that percentage of sales for the annual estimate of capital expenditures. The weakness in this method is that the sales to working capital ratio is highly variable from company to

company for some industries. In spite of this weakness, this is a common methodology.

Working Capital: Method 3 - Base year one working capital on either quick ratio (or current ratio), then maintain the same working capital as a percentage of sales for future years – The key difference here is that for some industries have quick ratios (or current ratios) that may have less variation than sales to working capital ratios. Here is a fictitious example: By reviewing the ratios from RMA (or other data sources), you may find a situation where sales to working capital ratios range from 15.3 for the lower quartile to 65.2 for the upper quartile (the upper quartile ratio is 435% of the lower quartile value). In contrast, the quick ratio is in a much tighter range of 1.2 for the lower quartile to 1.5 for the upper quartile (the upper quartile ratio is 125% of the lower quartile value). In this situation, the quick ratio relationship appears more reliable. Base the year one working capital on quick ratio (or current ratio if more appropriate). Then maintain the same working capital as a percentage of sales for future years.

Working Capital: Method 4 - Address current working capital deficits in addition to growing working capital as described above – Any hypothetical buyer would either reduce the value by any existing working capital deficit or assume the contribution of that amount of new working capital as part of the year one cash flow.

Controversy No. 4 Valuation of Start-Up Company Using Discounted Future Returns

Three different methods of discounted cash flow could produce substantially different values. The methods are:

Valuation of Start-up Company using Discounted Future Returns: Method 1 - Multiple scenarios weighted by probability of occurrence – This involves structuring 3 or 4 discounted cash flow analyses, each with different assumptions ranging from worst case (closure/failure in the near term) to best case (strongest revenue growth). The additional risk of closure/failure of a start-up company is addressed through the weighting given to each scenario. Consequently, a market rate weighted average cost of capital is used which does not address the additional risk (i.e. use a weighted average cost of capital appropriate for existing/established companies in the industry). This prevents double counting for the unique risk factors. This methodology sometimes called the Chicago Method comes from two sources: (1) Valuation of Venture Capital Portfolio Companies – And Other Moving Targets (Bradley Fowler, ASA; *Business Valuation Review*, March 1990) and (2) from a presentation titled Valuing Start-Up Firms by Bruce Bingham, ASA at the 16th Annual Advanced Business Valuation Conference, October 23, 1997.

Valuation of Start-up Company using Discounted Future Returns: Method 2 - Single rapid growth scenario, venture capital discount rate – This assumes a venture capitalist is investing in a rapid growth company with a high risk of failure. Typically, the equity discount rate used in these applications is in the range of 30% to 50%. Where it fits in that range is partially dependent on where it fits in the spectrum from a business plan to securing initial sales success. The high equity discount rate incorporates the expectation that each investment has a substantially higher chance of failure/closure than well established companies, with highly diversified customer base and products. This high equity discount rate is factored into the weighted average cost of capital.

Valuation of Start-up Company using Discounted Future Returns: Method 3 - Two step rapid growth scenario, venture capital discount rate – This assumes a venture capitalist is investing in a rapid growth company and the company experiences two separate growth phases. As an example, 30% growth years 1 to 5 and 15% growth years 6 to 10. In the terminal year, growth slows to the long term growth rate. Some practitioners also choose to vary growth rates during years 1 to 5, i.e. higher in year 1 than year 2 and so on.

Valuation of Start-up Company using Discounted Future Returns: Method 4 - Single rapid growth scenario, moderate premium added to discount rate – Up to a 2.5% premium is added to the market rate weighted average cost of capital (i.e. use a base of a weighted average cost of

capital appropriate for existing/established companies in the industry). The assumption is that the higher risk is just for the projection period and not for the long term. The estimated equity discount rate is factored into the weighted average cost of capital. This approach is described in *Merger and Acquisition Valuation and Structuring* by Alan D. Gasiorak, MBA, CPA (pages 75-80 1997 by Corporate Development Institute).

Valuation of Start-up Company using Discounted Future Returns: Method 5 - Option Theory Valuation Model – This is a relatively complex method known as the Black Scholes Model. Basically it assumes that the equity of an emerging growth company acts like a call option with several potential outcomes that can vary widely. Employing this model requires substantial study of similar company stocks to examine measures of volatility. It also requires assumptions and estimates of several other variables.

Controversy No. 5: Marketability of 100% Controlling Interests,Private vs. Public Companies

When valuing a 100% controlling interest in a private company by using comparable size public companies for comparison, should a marketability discount be used? The contrasting viewpoints are as follows:

Marketability of 100% Controlling interests, public vs. private companies: Method 1 - A marketability discount should be used when comparing private vs. public company 100% controlling interests - based on Mergerstat studies of difference in private vs. public company acquisition data – These studies reflect a significant difference in P/E multiple for public companies vs. private companies. In theory, there are differences which could include: (1) level of uncertainty for the time horizon to complete an offering or sale, (2) cost to prepare for sale, (3) risk as to eventual price, (4) form of transactional proceeds and (5) ability to hypothecate stock or interests. This is the traditional view held by valuation practitioners. The assumption of an inherent higher value for a public company is an important reason for incurring the cost of a public offering. Without a substantial difference in value, how do you support a cost of public offering in the range of 10% to 15% of the company's value? During most years the Mergerstat data seem to support a 20% to 30% marketability discount.

Marketability of 100% Controlling interests, public vs. private companies: Method 2 - A marketability discount should not be used when comparing private vs. public company 100% controlling interests - Re-analysis of Mergerstat data by others shows no significant differences in 100% controlling interests in private vs. public companies of similar size – Re-analysis of Mergerstat data show no significant difference between P/E ratios for controlling interests in similar public and private companies – In a March 1999 article in Business Valuation Review (John Phillips, CPA/ABV, CFA and Neill Freeman, CPA), the authors have questioned the above studies. That study and follow-up study by Phillips and Freeman show no significant difference in P/E ratios that is not explained by differences in size or type of industry. The study also found that most of the transactions (41 out of 47) labelled as private company acquisitions during the time period from 1992 - 1994 were either private placements of large minority interest blocks, or the sale of subsidiaries or divisions of public companies.

Controversy No. 6: Synergy and use of Acquisition Data

The business valuator who is charged with estimating fair market value has to consider this issue. Fair market value is considered to be the value to a financial buyer who is gaining a return on the subject company only. Acquisition by an acquiring company or through merger is considered to be investment value. In theory, the difference is the sum of the following benefits flowing to the acquirer: (1) revenue enhancement to the combined entities, (2) cost reductions to the combined entities, (3) tax savings to the combined entities, (4) reduced capital expenditures to the combined entities.

In practice, the valuator is left with the following range of choices, when considering acquisition data:

Synergy and use of acquisition data: Method 1 - Eliminate all acquisitions by companies rather than individuals – Only include acquisitions by financial buyers. However, this may eliminate most transactions for medium to large size companies.

Synergy and use of acquisition data: Method 2 - Eliminate clear outliers from acquisition data – Examine the median of several transactions and assume the highest outliers are paying for synergy.

Synergy and use of acquisition data: Method 3 - Adjust for synergy with all data on acquisitions by companies – Assume that all acquisitions by companies include a degree of synergy. Reduce the sale price by a factor to approximate typical synergy.

Synergy and use of acquisition data: Method 4 - Eliminate any acquisition data where verification of synergy premium is not available – If the amount of the synergy premium cannot be verified from a principal in the transaction then eliminate the sale data from consideration.

Each of these approaches can yield widely different valuation results.

Controversy No. 7: S-Corporation, Assumed Hypothetical Buyer and Tav Effecting

Please note that I am restricting my discussion here to 100% controlling interests. The range of issues is far more complex for minority interests. The valuation of an S corporation can change dramatically based on the assumed hypothetical buyer. Two primary methods are used:

S corporation, assumed hypothetical buyer and tax effecting the income stream: Method 1 - C corp. assumed as hypothetical buyer –- This method assumes the C corporation makes an asset purchase. This method requires that the cash flow which is not currently taxable to the seller be tax affected at the typical corporate rate. This method is most clearly appropriate where the company is a larger company. The size threshold where this method is most applicable is subject to debate.

S corporation, assumed hypothetical buyer and tax effecting the income stream: Method 2 - Individual or non-taxable entity assumed as hypothetical buyer – This method assumes that the buyer would not be subject to taxation. Therefore, the cash flow is not tax affected. This method is most clearly appropriate where the company is a small company. Also, in very small companies, an owner can readily eliminate tax obligations by adjusting owner compensation and other owner benefits. Let's assume that a C corporation is subject to a combined federal and state tax burden of approximately 40%. By not tax affecting the cash flow, the fair market value is increased by 67%. [100%/(100%-40%)] = 67%. The company size threshold where this method is most applicable is subject to debate.

Controversy No. 8: Equity Risk Premium (Which Investor's Viewpoint? Looking Backward or Forward?)

The risk premium that is added to the risk free rate is theoretically a function of the investor's view of the future and their past experience. Conventional wisdom seems to emphasize a very long investor memory (longer than their lifetime). The approaches used to estimate the risk premium are as follows:

Equity Risk Premium (Which investor's viewpoint? Looking back or forward?): Method 1 - Ibbotson data looks back at history from 1926 to present (The viewpoint of the 100 year old investor) – The Ibbotson approach to estimating the equity risk premium includes examination of equity risk premiums from 1926 to the current date. The rationale is that this period of time incorporates virtually all extremes in economic fluctuations, and therefore incorporates the crash of 1929. However, an unstated assumption is that the typical investor (1) either has the experience of a 100 year old investor (age 26 in 1926) or (2) uses the experience base of a 100 year old investor in modeling risk estimates. That methodology inherently assumes that most investors or their trustees (who are between the ages of 30 and 75) are heavily influenced by economic events occurring before they were born. The Ibbotson

analysis produces an equity risk premium in the 7.5% to 8.0% range. This is the traditional equity premium data source used by many valuation practitioners.

Equity Risk Premium (Which investor's viewpoint? Looking back or forward?): Method 2 - Ibbotson data looking backward at the period from 1960 to the present (The viewpoint of the 40 year old investor?) – Ibbotson Data for 1960 to the present shows a smaller equity risk premium. The equity risk premium is at least 4% lower for this period of history. This approach would produce an equity risk premium of under 4%. A change of this magnitude would generate major changes in company values. To illustrate the impact, we assume that the income stream to be capitalized is $100,000 and assume that using the traditional equity premium would generate a cap rate of 25%: Dividing $100,000 by a 25% cap rate would yield a fair market value of $400,000. Decreasing the cap rate by 4% to a 21% cap rate, would increase fair market value to $476,190, which represents a value increase of 19.0%. (Note: A cap rate is used to simplify the illustration).

Equity Risk Premium (Which investor's viewpoint? Looking back or forward?): Method 3 - Contemporary markets generate a much smaller risk premium – In 1996, Burton Malkiel (author of *Random Walk Down Wall Street*) indicated that equity risk premiums during the current market are in the 1% to 2% range (rather than 7.5% to 8.0%). That narrower range reflects greater investor confidence about the risk of investing. Mr. Burton attributes the lower risk premium to structural changes in the economy that increase stability. To illustrate the impact, we assume that the income stream to be capitalized is $100,000 and assume that using the traditional equity premium would generate a cap rate of 25%: Dividing $100,000 by a 25% cap rate would yield a fair market value of $400,000. Decreasing the cap rate by 6% to a 19% cap rate, would increase fair market value to $526,316, which represents a value increase of 31.6%.

Equity Risk Premium (Which investor's viewpoint? Looking back or forward?): Method 4 - Develop equity risk premiums based on surveys of investor's view of the future –- David King, CFA recommended the use of investor surveys as an alternative to the methods above which emphasize historical equity premiums. Instead of a view to the past, he suggests reliance on investor's view of the future. His recommendations were contained in a *Business Valuation Review* article titled ''The Equity Risk Premium for Cost of Capital Studies: Alternatives to Ibbotson,'' September, 1994. Several surveys were cited with future horizons for investor expectations ranging from 1 to 11 years, to infinite. The surveys are from *Merrill Lynch, Kidder Peabody, Value Line, Global Investor's Digest and DRI/McGraw Hill.* These surveys suggested an equity premium in the 4% to 6% range when the Ibbotson estimate was 7.2%. To illustrate the impact, we assume that the income stream to be capitalized is $100,000 and assume that using the traditional equity premium would generate a cap rate of 25%: Dividing $100,000 by a 25% cap rate would yield a fair market value of $400,000. Decreasing the cap rate by 2% to a 19% cap rate, would increase fair market value to $434,783, which represents a value increase of 8.7%.

Controversy No. 9: Size Premium (Which Investor's Viewpoint?)

The size premium is an additional risk premium added after the risk free rate and the equity risk premium. The underlying assumption is that smaller companies generally have higher risks for the following reasons: (1) lack of product, industry or geographic diversification, (2) smaller market share, (3) less access to capital, (4) less management depth and many other potential reasons. The size premium is theoretically a function of the investor's view of the relative risk of smaller companies based on their view of the future and their past experience. The approaches used to estimate the risk premium are as follows:

Size Premium (which investors viewpoint?): Method 1 - Ibbotson viewpoint and methodology (Ibbotson data looks back at history from 1926 to present - viewpoint of the 100

year old investor again?) – The Ibbotson approach to estimating the size premium includes examination of size premiums from 1926 to the current date. The rationale is that this period of time incorporates virtually all extremes in economic fluctuations, and therefore incorporates the crash of 1929. However, an unstated assumption is that the typical investor (1) either has the experience of a 100 year old investor (age 26 in 1926) or (2) uses the experience base of a 100 year old investor in modeling risk estimates. That methodology inherently assumes that most investors or their trustees (who are between the ages of 30 and 75) are heavily influenced by economic events occurring before they were born. The Ibbotson analysis produced a size premium of 7.47% when comparing the microcap segment (deciles 9 and 10) to decile 1 of NYSE companies during 1996. This is the traditional data source used by most valuation practitioners.

Size Premium (which investors viewpoint?): Method 2 - Ibbotson and Price Waterhouse data looking backward at the period from 1963 to the present (The viewpoint of the 40 year old investor) – Ibbotson data for 1963 to the present show a smaller equity risk premium. The equity risk premium is approximately 1.8% lower for this period of history. This approach would produce a size premium of approximately 5.7%. A Price Waterhouse study for the same period produced similar results. A change of this magnitude would generate significant changes in company values. To illustrate the impact, we assume that the income stream to be capitalized is $100,000 and assume that using the traditional equity premium would generate a cap rate of 25%: Dividing $100,000 by a 25% cap rate would yield a fair market value of $400,000. Decreasing the cap rate by 1.8% to a 23.2% cap rate, would increase fair market value to $431,034, which represents a value increase of 7.8%.

Size Premium (which investors viewpoint?): Method 3 - Recent History (17 year lookback) –- In a September 1999 article in *Business Valuation Review* by Brian Becker and Ian Gray, table 3 of their analysis showed that the arithmetic mean for large stocks was virtually identical to that of small stocks during the period from 1980 -- 1997. This data is captured in a article titled ''Does a Small Firm Effect Exist When Using the CAPM? Not since 1980 and Not When Using Geometric Means of Historical Returns.'' This article also referenced other studies generating similar conclusions. A change of this magnitude in estimating size premium would generate major changes in company values. To illustrate the impact, we assume that the income stream to be capitalized is $100,000 and assume that using the traditional small firm premium would generate a cap rate of 25%: Dividing $100,000 by a 25% cap rate would yield a fair market value of $400,000. Decreasing the cap rate by 7.5% (by eliminating the size premium) to generate an 18.5% cap rate, would increase fair market value to $540,541, which represents a value increase of 35.1%. Size Premium (which investors viewpoint?): Method 4 - Recent History (10 year lookback plus 3 to 5 year forecasts) -- In a June 1999 Business Valuation Review article by Jerry O. Peters, CPA, ASA, CBA, table 3 of their analysis showed that the estimated size premium for cap rates for small stocks during the period from 1989 to 1998 was in the approximate range of 1% to 2%. This data is captured in an article titled ''Adjusting Price/Earnings Ratios for Differences in Company Size.'' The methodology for defining company size was somewhat different. Large companies were in the upper quartile of companies exceeding $100 million dollars of value vs. small companies with value of under $100 million dollars. A change of this magnitude in estimating size premium would generate major changes in company values. To illustrate the impact, we assume that the income stream to be capitalized is $100,000 and assume that using the traditional equity premium would generate a cap rate of 25%: Dividing $100,000 by a 25% cap rate would yield a fair market value of $400,000. Decreasing the cap rate by 5.5% to a 19.5% cap rate, would increase value to $512,821, which represents a value increase of 28.2%.

Controversy No. 10: WACC Capital Structure

The Invested Capital Approach is intended to permit valuation of a company by comparison with companies with differing debt structures. There are two methods which can produce dramatically different cost of capital and valuation results. They are as follows:

WACC capital structure: Method 1 - Use of subject company's debt structure – Some practitioners use the existing mix of debt and equity for the subject company to estimate the weighted average cost of capital.

WACC capital structure: Method 2 - Use of hypothetical buyer's capital structure – Some practitioners assume that the real issue is the value to a hypothetical buyer. To a hypothetical buyer, the cost of capital is the buyer's cost of capital which is based on the buyer's capital structure and not the capital structure of the company being acquired. Since the buyer is unknown, a typical industry mix of debt and equity is used.

CONCLUSION:

A valuation practitioner should be aware of each of the issue areas above, the choices available to them and their substantial influence on value.

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BY JOHN J. KANIA, PHd

Evolution of the Discount for Lack of Marketability

Over the past 30 years, numerous studies have conducted a search for the discount due to lack of marketability, and have found it to range from 20 to 50 percent and higher. But, Hertzel and Smith find when unrestricted stock is included in the data sample, the discount for lack of marketability decreases to no more than 13.5 percent. This paper is intended to critically survey these seemingly diverse findings with the ob-jective of bringing together what is known about this important topic on lack of marketability (or marketability) discounts.

Restricted stock data studies

Public firms have the option of issuing new equity in the private placement market that is not registered with the Securities and Exchange Commission (SEC). This option is less costly and quicker than registering the stock with the SEC. It also avoids the 3 percent average price decline that occurs on the existing publicly traded stock with a new public equity offering. [a, 1, 2] Other reasons why public firms choose private placement are for financial distress, desiring confidentiality, or planning a complex business strategy. They find it easier to negotiate privately with a few sophisticated investors instead of a larger public investor group.[3] But the cost of the private placement option is a two year SEC mandated stock resale restriction.[b] To compensate for numerous factors including resale restriction, the selling firm frequently discounts privately placed restricted (letter) stock. Thus, by comparing the discounted restricted stock price to the price of the same unrestricted stock traded in the public equity market, an empirical measure of lack of marketability discount is obtained.

The discussion will turn to marketability discount studies of significance that have used discounts calculated from restricted stock data.

1. Historical studies

The seminal and one of the most thoroughly researched historical studies using restricted stock data was done by the SEC, in 1971, where a 26 percent average marketability discount was found.[4] In addition, the SEC used the simple methodology of pairwise and three way comparisons, and found that the marketability discount increased as causal factor firm size (defined as net sales) decreased. But it was not clear whether the marketability discount increased as net income decreased. Had a statistical regression methodology been used, a clearer picture would have emerged as to the joint predictive power of these two causal factors on the marketability discount.

Another significant finding by the SEC was that discounts ranged widely from a low of -15 percent (premium) to a high of 80 percent. Such a wide variation in marketability discounts should have alerted researchers that observed discounts are determined by factors other than pure stock illiquidity, which can only be investigated by the use of statistical regression methods. But, while subsequent historical studies cited in **Exhibit 1** used more current data, and found higher marketability discounts ranging from 31 to 35 percent, little effort was made to analyze the effect of multiple causal factors on the marketability discount.

2. Silber Study

It was not until 1991 that W. Silber made a significant improvement on the SEC findings. He hypothesized that the total marketability discount is a function of, or can be predicted by, multiple causal factors as illustrated in Model 1 below.

Total marketability discount [c] = a function of (multiple causal factors) (1)

The causal factors included firm size (net sales), size of share block being placed, net income, and whether or not a special relationship existed between investor and selling firm. Silber then applied a statistical regression methodology and found, like the SEC, that the marketability discount increased as the causal factor firm size decreased.

But, firm size was the least important causal factor in his model. A greater increase in the marketability discount occurred for the negative net income causal factor. The greatest increase in the marketability discount occurred for the causal factor size of share block placed.[5]

How the Silber model can be used to predict the marketability discount for a closely held firm is the subject of another paper.[6] However, an illustration as to how the marketability discount is predicted by the interaction of multiple causal factors is presented in **Table 1**. As can be seen,the marketability discount is much more sensitive to the size of the share block placed than firm size. As firm size increases from $20M to $80M for any share block placed, the discount decreases by 4 to 5 percent. However, when share block placed increases from 1 to 6 percent, for any firm size, the discount increases by 23 to 24 percent. If net income is negative, which reflects financial distress, all of the **Table 1** discounts would increase.

Table 1
Silber Model
Predicted Marketability Discounts

	Firm size $20M	Firm size $40M	Firm size $60M	Firm size $80M	Discount change by firm size
Share block placed 1%	-1%	-3%	-5%	-6%	-5%
Share block placed 3%	14%	12%	10%	9%	-5%
Share block placed 6%	22%	20%	19%	18%	-4%
Discount change by share block placed	23%	23%	24%	24%	

3. Hertzel and Smith study

The next significant advance after the Silber and SEC studies was presented by Drs. M. Hertzel and R. Smith in the Journal of Finance. They recognized the effect of information costs on the marketability discount in 1993.[7]

a. The discovery of unrestricted (registered) stock discounts. In 1989, Dr. Wruck at Harvard University reported that unrestricted stock sold in the private placement market, which does not have the problem of illiquidity, is also discounted.[8] The implication is that not all of the observed marketability discount is due simply to stock illiquidity. But, why would a firm sell unrestricted stock at a discount? The firm is small and less well known, or a firm has a complex financing situation and public information is generally unavailable.[9] Investors must intensely evaluate the selling firm's profit potential, and those who possess the expertise are typically large sophisticated institutional investors, venture capitalists, and investment firms. The discount on the stock purchase price is then viewed as the incentive for these sophisticated investors to incur costs of gathering information and monitoring the selling firm after investment. Then an additional discount is incurred for lack of marketability, if the stock transaction is restricted.

Thus, inclusion of unrestricted stock in the sample allows the researcher, with the aid of statistical regression, to separate the restricted stock discount that is due to lack of marketability and that for information cost. Had the historical studies and that by Silber cited in **Exhibit 1** separated out this information cost discount, their reported marketability discounts would have fallen appreciably.

b. The Hertzel and Smith Model. The separation of lack of marketability from the information cost discount was explicitly accounted for by Hertzel and Smith. They hypothesized that the total marketability discount will be a function of, or be predicted by, lack of marketability discount and information cost causal factors as illustrated in the relation below.

Total marketability discount = a function of (lack of marketability discount + other information causal factors) (2)

In the Hertzel and Smith model, the lack of marketability discount is a causal factor in the prediction of the total marketability discount. As such, a dummy causal factor is specified in the statistical regression for lack of marketability. It was assigned a value of

"1" if the transaction involved restricted stock and "0" if it was unrestricted. After the model was estimated for a sample of 106 transactions, the regression coefficient ("Beta") on the lack of marketability causal factor represented a constant pure illiquidity discount. It was found to account for only 13.5 percent of the total marketability discount.[10]

Information costs cannot be directly observed, but were proxied by many of the same causal factors used in other studies. A full discussion of these causal factors is extensive and therefore deferred to another paper, but those that are common to that used by Silber are size of share block placed and net income.[11] Hertzel and Smith found that as the share block placed increases, this causes the total marketability discount to increase. If net income was negative (financial distress), this also caused the total marketability discount to increase. Both of these results concur with that found by Silber. Unfortunately, firm size in respect to net sales was not specified in the Hertzel and Smith model.

4. Johnson study

One of the more recent studies was done by B. Johnson in 1999 where he found that the average lack of marketability discount was 20 percent. But this discount is inflated, since no correction was made for the information cost discount due to private placement found by Hertzel and Smith. Johnson did, however, find an interesting anomaly that "... companies with negative net income did not have a higher discount than companies with net income from $0 to $1 million."[12] This is contrary to the findings of Silber, Hertzel, and Smith. But, such a finding suggests that further research might yield interesting results concerning the effect of negative income on the marketability discount.

5. MPI study

The most recent study was done by Management Planning Inc. (MPI) in 2000 where they found that the average lack of marketability discount was 27 percent.[13] In addition, MPI presented an analysis of stocks with registration rights where the average lack of marketability discount was determined to be 12.8 percent.[14] Now, if it is assumed that this discount is a proxy for the information cost discount, since no resale restrictions are present, then the MPI marketability discount at 27 percent can be reduced by 12.8 percent to 14.2 percent. Such a value is then consistent with that found by Hertzel and Smith at 13.5 percent.

6. Conclusion on marketability discounts based on restricted stock data

The discovery that observed marketability discounts are not entirely due to illiquidity, clearly sets the pace for all future research. Yet, the most recent studies seem to be unaware of the information cost discount for private placement, as well as the innovative multiple causal factor regression methodology introduced by Silber.

IPO stock data studies

During the 80s, researchers began to look at the difference between the pre IPO (initial public offering)private placement stock price and the higher IPO offer price, which represents a marketability discount. The results of numerous studies by Willamette Management Associates (WMA), and J. Emory show lack of marketability discounts escalating upward to 74 percent with the change to IPO data.[15] While these very high discounts have been accepted by some valuation practitioners, there are significant concerns over the usefulness of the discounts based on IPO data.

1. The Lerch critique

J. Emory has published numerous studies of which his 1994 study was selected by M. Lerch for reanalysis. She argued that the IPO stock offer price used by Emory is affected by "new issue hype." This hype

> *"...is the impact on the stock price of the underwriters' and sellers' optimism and marketing efforts to bring a new issue to market successfully. It creates a demand for the security in excess of the supply which temporarily inflates the price..."*[16] *"After the stock is judged to be sufficiently seasoned, the support is withdrawn..., and the stock declines."*[17]

When Lerch compared stock prices just prior to, and four to six months after the IPO when the stocks have stabilized on the market, the marketability discount was only 27 percent which contrasts to Emory's 44 percent.[18] By removing new issue hype, average lack of marketability discounts calculated from IPO data appear to be about the same as the 26 and 27 percent discount found by the SEC and MPI studies based on restricted stock data.

2. The Business Valuation Services critique [19]

While the Lerch critique focused on post IPO stock price transactions, Business Valuation Services (BVS) focused on pre IPO private stock price transactions.

BVS analyzed Emory's study published in December of 1992. Of the 35 transactions in Emory's study, only 3 were actual private sales of stock. Thirty-one transactions were, most likely, related party stock options given to management where no cash is exchanged. Stock options given to management prior to an IPO is common.[20] While the SEC mandates that option exercise price be set at fair market value, it is difficult to know what that value is in the absence of a public market. Thus, with such price ambiguity and since there is no cash exchange, these conditions provide strong incentives for the stock option exercise price to be set below fair market value in order to increase management's financial holding in the company. This is probably not detrimental to third party investors, since the sale of bargain stock to management increases its firm ownership stake thereby making its interest coincide more closely to that of stockholders.[21] But a stock option price below fair market value results in an exaggerated marketability discount.

While Emory observed private share transactions six months prior to the IPO, WMA observed private share transactions up to three years prior to the IPO.[22] But with a such a long holding period, time itself may have some effect on the discount. Also, WMA states that a phone conference was used to verify that stock options and insider transactions kept in their sample were priced at fair market value. But would anyone who is a party to an underpricing of a stock transaction publicly admit to this fact? Such an admission seems unlikely. [23]

3. Conclusion on marketability discounts based on IPO data

If the inflating effect of new issue hype is removed from IPO offer prices, the lack of marketability discount is similar to that found in the historical restricted stock studies. However, in the search for the size of marketability discounts, IPO data is not suitable because of fewness of actual arms length private transactions, and lack of firm data on marketability discount causal factors. Restricted stock data, however, offers much more promise.

Conclusion

Historically, the average lack of marketability discount based on observed restricted stock has been found to range from 26 to 35 percent. However, recent studies suggest that the discount is trending downward to 20 percent, and when the information cost discount for selling in the private placement market is separated out, the discount for lack of marketability is around 14 percent.

Yet, some individuals will argue that a 14 percent lack of marketability discount underestimates the "true" discount for closely held firms, since the one to two year restricted stock period is far less than that for most small private firms. But, consider that investors in stock with long holding periods typically have a high tolerance for illiquidity and are more interested in long term gain. In fact, investors who are highly sensitive to lack of marketability would not even consider a share purchase in a small firm with a high degree of illiquidity. More will be said on this issue in a subsequent paper.[24]

Our knowledge as to causal factors and their effect on the size of the lack of marketability discount has progressed slowly, since many researchers have not used the best available methodology, and have paid little attention to the results of previous studies. In fact, some of the studies cited in this paper might be characterized as simply "reinventing the wheel." The inclusion of

unrestricted private placement stock transactions to separate out information costs from the lack of marketability discount in the multiple causal factor Silber model would be an excellent starting point for future research. In addition to explaining the size of the total marketability discount by multiple causal factors, such a model estimated with a regression methodology has the added benefit of being able to objectively predict a discount for a closely held firm. This predicted discount may even be higher than that obtained by using a benchmark average. Hopefully, the growing dissatisfaction with the low benchmark average discounts will motivate valuation researchers to explore the multiple causal factor approach to determining lack of marketability discounts.

Footnotes

a. This decline has been explained as the market's perception that firm management feels its stock is overvalued and therefore is motivated to issue new registered shares. Additional discussion can be found in Goh, J., M. Gombola, H. Lee, and F. Liu, "Private Placement of Common Equity and Earnings Expectations," The Financial Review, Vol. 34, 1999, pp. 19-20.

b. SEC Rule 144 specifies that after a two year holding period, a limited amount of restricted stock could be sold, and after three years resales become unlimited. However, on April 29, 1997, the SEC reduced these resale restrictions to one year and two years respectively.

c. In the Silber model total marketability discount is synonymous with lack of marketability discount.

Endnotes

1. Wruck, K. H., "Equity Ownership Concentration and Firm Value: Evidence from Private Equity Financings," *Journal of Financial Economics*, Vol. 23, 1989, p. 9. K. Wruck also demonstrated that the price of a firm's publicly traded stock rises, on average, by 4.5 percent after new equity is sold in the private placement market.
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7. Hertzel, M., and R. L. Smith, "Market Discounts and Shareholder Gains for Placing Equity Privately," *The Journal of Finance*, June 1993, pp. 459-485.
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11. Kania, J.J., "Discount for Lack of Marketability is not Just a Function of Illiquidity", In Process.
12. Johnson, B. A., "Quantitative Support for Discounts for Lack of Marketability," Business Valuation Review, December 1999, p. 154.
13. Reilly, R.F., and R.P. Schweihs, The Handbook of Advanced Business Valuation, McGraw-Hill, c. 2000, Chapter 5. (Reilly and Schweihs)
14. Ibid., Reilly and Schweihs, p. 116.

15. Lerch, M. A., "Yet Another Discount for Lack of Marketability Study," Business Valuation Review, June 1997, p. 71. A survey of 12 IPO studies by WMA and Emory is presented with an average marketability discount of 50 percent.

16. Ibid., Lerch, p. 71.

17. Ibid., Lerch, p. 73.

18. Ibid., Lerch, Table 3, p. 77.

19. "Analysis of existing theory and methodology concerning the determination of marketability discounts for closely held firms," White paper prepared by Business Valuation Services, November 10, 1995. Several firm principals including M. Bajaj contributed to this paper. (BVS White Paper)

20. Ibid., BVS White Paper, P. 10 and 11.

21. Ibid., BVS White Paper, p. 11.

22. Pratt S.P., R.F. Reilly, and R.P. Schweihs, Valuing A Business – the Analysis and Appraisal of Closely Held Companies, Third Edition, Irwin C. 1996, pp. 345-346. It is stated that an industry stock price index was used to adjust for differing market conditions between the private transaction date and the IPO offer. But use of industry data to adjust firm stock prices is not adequate.

23. Op cit., BVS White Paper, p. 12, paragraph 2.

24. Kania, J. J., "The Effect Of The Holding Period of Illiquidity On The Marketability Discount," Working paper.

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Exhibit 1
SURVEY OF LACK OF MARKETABILITY DISCOUNT STUDIES[1]

Table 1
Historical empirical studies using restricted stock data

Study	Publication Year	Study Years	Average Marketability Discount	Sample Size
SEC [2]	1971	1966 - 1969	26%	398
Gelman [3]	1972	1968 - 1970	33%	180
Moroney [4]	1973	1971	35%	148
Maher [5]	1976	1969 - 1973	35%	134
Trout [6]	1977	1968 - 1972	34%	60
SRC [7]	1983	1978 - 1982	Not Available	28
WMA [8]	Unpublished	1981 - 1984	31%	33
		Average	29%	

Table 2
Recent empirical studies using restricted stock data

Study	Publication Year	Study Years	Average Marketability Discount	Sample Size
Silber [9]	1991	1981 - 1988	34%	69
Hertzel - Smith [10]	1993	1980 - 1987	20%	106
Hall - Polacek [11]	1994	1979 - 1992	23%	100+
Johnson [12]	1999	1991 - 1995	20%	72
MPI [13]	2000	1980 - 1996	27%	53
		Average	25%	
		Average Excluding Silber As Outlier	23%	

Table 3
Recent empirical studies using restricted and unrestrictedstock data

Study	Publication Year	Study Average Years	Pure Lack of Marketability Discount	Sample Size
Hertzel - Smith [14]	1993	1980 - 1987	14%	106

Exhibit Endnotes

1. Information in Table 2, except for the Hertzel and Smith, Johnson, and MPI study, were taken from two sources: 1) Table 1 of article by Mary Ann Lerch titled "Yet Another Discount for Lack of Marketability Study", Business Valuation Review, June 1997, pp. 70-106. 2) Figure 2-2 and Exhibit 12-1 from Z. C. Mercer, Quantifying Marketability Discounts, Peabody Publishing, c. 1997.
2. "Discounts Involved in Purchases of Common Stock", Institutional Investor Study Report of the Securities and Exchange Commission, H.R. Document Number 92-64, Part 5, 92nd Congress, 1st Session 1971, pp. 2444-2456.
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9. Silber, William L., "Discounts on Restricted Stock: The Impact of Illiquidity on Stock Prices," Financial Analysts Journal, July-August 1991, pp. 60-64.
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11. Hall, Lance S., and Timothy C., "Strategies for Obtaining the Largest Valuation Discounts", Estate Planning, January - February, 1994, pp. 38-44. Note: this article presents only summary results of a study called FMV. The location of the FMV study is unknown.
12. Johnson, Bruce A., "Quantitative Support for Discounts for Lack of Marketability," Business Valuation Review, December 1999, pp. 152-155.
13. Oliver, Robert P., and Roy H. Meyers, The Management Planning Inc. (MPI) study was published as Chapter 5 in R.F. Reilly and R.P. Schweihs text: The Handbook of Advanced Business Valuation, McGraw-Hill, c. 2000. The same study without 1996 (1980 - 1995) was published as Chapter 12 in Z. Christopher Mercer's text: Quantifying Marketability Discounts, Peabody Publishing, c. 1997. The lack of marketability discount was 1 point higher at 28 percent.
14. Op cit., Hertzel and Smith, pp. 459-485.

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BY LEE DRANIKOFF, TIM KOLLER, AND ANTOON SCHNEIDER

Divesture: Strategy's Missing Link

Smart apple farmers routinely saw off dead and weakened branches to keep their trees healthy. Every year, they also cut back a number of vigorous limbs – those that are blocking light from the rest of the tree or otherwise hampering its growth. And, as the growing season progresses, they pick and discard some perfectly good apples, ensuring that the remaining fruit gets the energy needed to reach its full size and ripeness. Only through such careful, systematic pruning does an orchard produce its highest possible yield.

There's an important lesson here for managers. Although most companies dedicate considerable time and attention to acquiring and creating new businesses, not to mention refining their existing operations, few devote much effort to divestitures. But like the annual pruning of apple trees, regularly divesting businesses – even some good, healthy ones – ensures that remaining units reach their full potential and that the overall company grows stronger.

Some executives do understand the value of a well-planned divestiture program. Divestiture was, for instance, a cornerstone of General Electric's strategy under Jack Welch – every bit as important as mergers and acquisitions. During the first four years of his tenure as CEO, Welch divested 117 business units, accounting for 20% of GE's assets. Sandy Weill, now chief executive of Citigroup, made 11 significant divestitures while leading the Travelers Group through the 1990s, and he recently announced plans to spin off the Travelers Property Casualty business from Citigroup. Richard Wambold, CEO of Pactiv, a specialty-packaging company, has sold six businesses since 1999, using the proceeds to strengthen the company's balance sheet and invest in high-growth opportunities. Greg Summe, CEO of PerkinElmer, has used a combination of divestitures and acquisitions to completely reshape his enterprise, transforming it from a supplier of low-margin services to the government into an innovative high-tech company.

Other managers can also use divestiture to strengthen and rejuvenate their companies, but only if they look beyond the stigma currently associated with selling off businesses and embrace divestiture as vital to their strategies.

Too Little, Too Late

In a study of the performance of the 200 largest U.S. corporations from 1990 to 2000, McKinsey & Company found that those companies that actively manage their business portfolios through acquisitions and divestitures create substantially more shareholder value than those that passively hold their businesses. One hundred dollars invested in the average active manager in January 1990 would have been worth $459 by the end of the decade; that same $100 would have grown to only $353 if invested in the average passive manager. We also found significant differences in performance among the active managers. Those that balanced their acquisitions and divestitures performed better than those that focused more narrowly on either acquiring or divesting. (See the exhibit "Active Portfolio Management Pays.")

We also discovered, however, a strong bias against divestiture. Of the 200 companies we studied, fewer than half divested three or more substantial businesses – those with a disclosed worth of at least $100 million – during all of the 1990s. And only 20% divested more than a half dozen substantial businesses. Acquisitions were much more common than divestitures. Altogether, the 200 companies bought 40% more businesses than they sold – a finding that's consistent with an earlier study, conducted by Constantinos Markides of the London Business School, which found that large companies completed 34% more acquisitions than divestitures during the 1980s.

When companies do divest, they almost always do so reactively, in response to some kind of pressure. If you doubt that, try this experiment:

Pick a week at random, and tally all the divestitures that are noteworthy enough to be reported in your favorite business newspaper. For each one, check to see how analysts and journalists explain its rationale. Invariably, you'll find that the overwhelming majority of divestitures are done under some sort of pressure – perhaps the divested business is suffering heavy losses, the parent has a suffocating debt burden, or Wall Street analysts have turned negative.

In studying nearly 50 of the largest divestitures completed over the past four years, we found that more than three-quarters of them fit this reactive model. And most of these were not just done under strained circumstances; they happened only after long delays, when problems became so obvious that action became unavoidable. An earlier study by David Ravenscraft and F.M. Schrerer backs up this point. They found that divested businesses had below-average operating profits for seven years prior to being sold. (See the exhibit "Most Divestitures Are Reactive.")

Clearly, corporations divest too little, too late. Why? The reluctance to divest, we've found, is rarely purposeful. It's not part of a well-planned strategy. Rather, it reflects a pervasive belief in business that, while acquisitions are marks of strong, growth-focused executives, divestitures signal weakness and even failure. This stigma is prevalent in the top management ranks of many companies but is felt most strongly within divested businesses themselves. As Pactiv's Wambold explains, "Managers of divested businesses can think that they have failed or consider themselves second-class citizens." This attitude feeds on itself. When managers postpone a divestiture until a unit is obviously failing, they guarantee that the move will be seen as an act of desperation, further reinforcing the negative connotations of divestitures and making executives even more reluctant to pursue them.

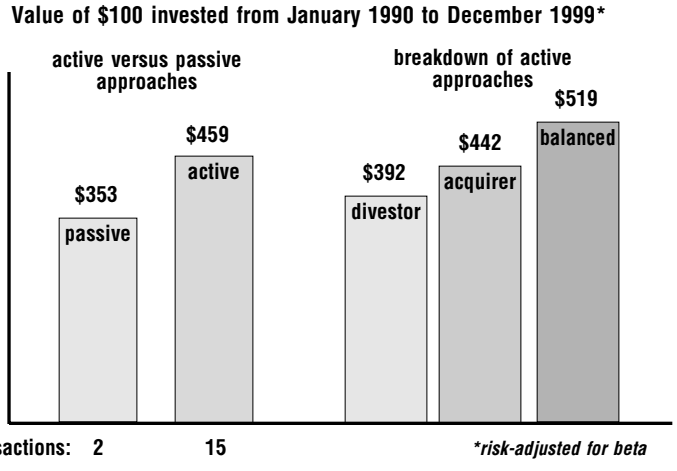
But executives shouldn't feel ashamed to get rid of businesses. The marketplace shows, in no uncertain terms, that active divestiture is central to value creation. In their recent book, Creative Destruction, Richard Foster and Sarah Kaplan point out that while senior managers spend most of their time improving operations, capital markets are actively creating and removing businesses. Over the last five years, the annual turnover rate among companies in the S&P 500 was nearly 7%. That means that about 30 to 50 companies drop out of the S&P every year. The marketplace, in other words, is far more efficient than the typical company in disposing of businesses – and, not surprisingly, the returns generated by the market over the long haul far outstrip those of the average publicly held company. Divestiture is not a symbol of failure; it's a badge of smart, market-oriented management.

The High Costs of Holding

Moving from reactive to proactive divestiture is not easy, of course. The desire to hold on to businesses, particularly successful ones, is strong. A business may

Active Portfolio Management Pays

Companies that actively manage their portfolios of businesses deliver higher shareholder returns than companies that passively hold their portfolios. Among active managers, those that balance acquisitions and divestitures outperform those that focus solely on either acquisitions or divestitures.



generate substantial cash flows. It may deliver marketplace advantages through its relationships with key customer groups. Or it may have strong sentimental attachments for employees or other stakeholders, representing an important component of a company's identity. For executives, selling a business can sometimes seem like treason. When Welch sold off GE's housewares unit, for instance, he got angry letters from employees accusing him of destroying the company's heritage.

But whatever the costs of divesting a business, holding on to a unit too long also imposes costs – both on the entire corporation and on the unit itself. Though these costs are often hidden, and accumulate slowly, they can be onerous, far outweighing the benefits of keeping the business. Let's look at the three forms these costs take.

Costs to the Corporation. The stability provided by well-established, profitable businesses is a mixed blessing. On the one hand, such businesses can produce cash and help keep earnings smooth and predictable. On the other hand, they can cripple a company, dulling its desire to create new, high-growth businesses. Determined business building often requires a sense of crisis – a clear and pressing need for growth. But stability breeds comfort, tempering any feeling of urgency and causing a company to stagnate. Long-held, low-growth businesses may provide the cash that allows a corporation to thrive today, but they can hinder it from preparing for a prosperous tomorrow. Some companies understand this fact. The defense giant General Dynamics, for example, divested several substantial businesses during the early 1990s to set the stage for an aggressive acquisition program – and a sharp increase in shareholder returns – later in the decade. (See the exhibit "How General Dynamics Shrank in Order to Grow.")

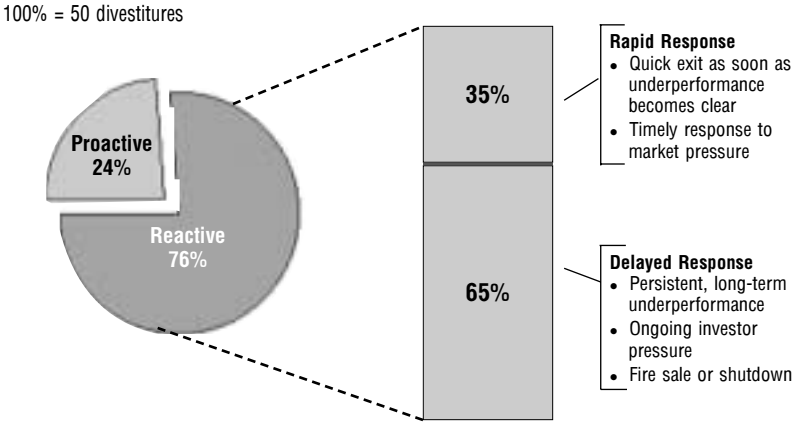
Stability can also hamper growth in other ways. Companies dominated by mature, low-growth businesses often develop inflexible, risk-averse cultures – cultures that stifle innovation and free thinking, that make it difficult to attract energetic and entrepreneurial talent, and that confuse or even repel investors. PerkinElmer's Summe confronted that exact situation when he took over as CEO early in 1998. He quickly launched a series of divestitures not just to reposition the company but also to attract a new team of executives. In a recent HBR interview, he recalled, "We knew recruiting talent for the senior ranks would be a challenge given PerkinElmer's steady-as-she-goes reputation." (It's important to note that cultural conflicts can work the other way as well: Large, high-growth businesses can impose cultural costs on their slower-growing sister units – lenient attitudes about cost control, for example.)

Long-held businesses can also usurp more corporate resources than they merit. They can, for example, take up investment funds that might have gone to creating new businesses with stronger growth prospects. Or, more subtly, they can drain precious management time. In the absence of

Most Divestitures Are Reactive

More than three-quarters of divestitures are reactive, done in response to pressure on the parent or the unit. And nearly two-thirds of the reactive divestitures are delayed, taking place only after the parent or unit has suffered from weak performance for a number of years.

Sources: Wall Street Journal, September of 1998, 1999, and 2000 and August of 2001; literature search; analyst reports; financial statements.



radical decentralization (which some companies have adopted but which can pose its own challenges), a senior executive team can only manage a limited number of businesses. A stagnant portfolio can thus leave a company's management paralyzed, unable to focus on new opportunities. Pactiv, which every year reviews the role of each business unit as part of the overall company's strategic-planning process, sees divestiture as a powerful way to free up resources. When explaining why the company sold its aluminum business despite its strong cash flow, CEO Wambold says, "It was using resources and management time we could use better elsewhere, and its cyclical nature made Pactiv more difficult for investors to understand. It didn't offer the same potential as the other businesses."

Finally, the wrong mix of businesses can confuse customers. That was one of the reasons AT&T decided, perhaps belatedly, to break itself up in 1996. The company was providing telephone services to the public but was also selling equipment to competitors. As the telecommunications markets became more competitive, customers of the manufacturing operation (now Lucent) grew concerned about conflicts of interest with AT&T's telephone services business. In a 1996 speech, AT&T's CEO Robert Allen explained, "If our network equipment business made the best products on the market, we wanted the Bell companies or British Telecom to buy from us without concerns that AT&T's services business was also competing with them. Conversely, we wanted our services business to pursue its opportunities aggressively, unconstrained by fears that they might bother a competitor who was a potential customer for AT&T equipment."

Costs to the Unit. The company as a whole is not the only one damaged when a business unit is held too long. The unit also suffers. A corporate parent is not a mere caretaker of its businesses; it provides many of the skills and resources the businesses need to fulfill their potential. And different parents have different skills and resources. Some, like strong venture capital firms, understand how to seed a business, providing important capabilities in such areas as product development, sales and marketing, and alliance creation. Some understand how to grow it, offering expertise in, for example, operational planning and capital management. Others know how to manage mature businesses, providing assistance in operations rationalization, cost management, and the like. It is rare for a parent to have the expertise required to help a business through every stage of its life cycle. (See the exhibit "Matching Business Units and Parents.")

The problem arises when a corporate parent stops adding distinctive value to a unit but refuses to let it go. At that stage – regardless of the unit's financial contribution – the parent is no longer the natural owner

How General Dynamics Shrank in Order to Grow

Aggressive divestitures by General Dynamics in the early 1990s set the stage for a series of acquisitions later in the decade, dramatically improving the company's returns to shareholders.

Sources: Compustat; company reports; Hoovers.

of the unit and should consider selling it or spinning it off. That's what Wambold did with Pactiv's polyethylene-packaging business. Although the unit was the largest player in its market, the polyethylene industry remained highly fragmented, and Wambold saw that Pactiv did not have the resources needed to spearhead a further industry consolidation. As a result, it was not best positioned to take the unit to the next level of performance. So in January 2001, Pactiv sold the unit to Tyco, whose strategy was to expand its polyethylene business. As Wambold explains, "You have to know what business you are good at and let someone else manage the rest."

In his autobiography, Jack: *Straight from the Gut*, Welch tells an illuminating story about how divestiture can liberate business units and their employees. He recounts how a general manager of an air-conditioning business that GE had sold told him about the sale's salutary effects: "Jack, I love it here. When I get up in the morning and come to work, my boss is thinking about air-conditioning all day. He loves air-onditioning. He thinks it's wonderful. Every time I talked to you on the phone, it was about some customer complaint or my margins. You hated air-conditioning. Jack, today we're all winners and we all feel it. In Louisville, I was the orphan."

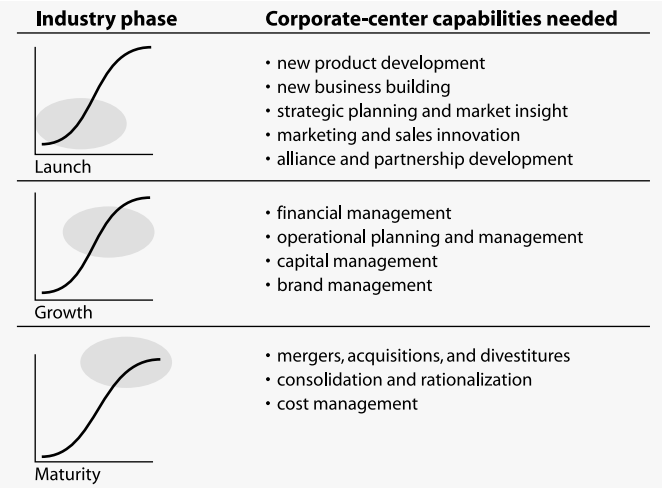
Few corporations today actively consider whether they are adding unique value to each of their businesses. As a result, they may be harming the units' prospects and undermining the morale of their people.

Depressed Exit Price. The final cost of postponing divestitures is the direct impact on shareholder returns. Just as with acquisitions, a well-timed divestiture can contribute to shareholder value, and a poorly timed one can destroy value. Unfortunately, when it comes to managing business units, most corporations fail to follow the age-old maxim "Buy low, sell high." Rather, as we've seen, they unload a unit only after several years of poor performance – at fire-sale prices. In some cases, industries are so turbulent that managers simply cannot foresee market peaks and troughs. In other cases, they may be able to identify the peaks but be unable to find a buyer willing to pay the going price. In most cases, however, companies just look the other way until it is too late.

Timing the market perfectly is not possible, of course. But a simple rule of thumb can improve a company's timing considerably: Sell sooner. For the vast majority of divestitures we've studied, it's clear that an earlier sale would have generated much higher returns. There's a good, if disturbing, reason for this. As Foster and Kaplan's research suggests, the longer a business exists, the worse it performs for shareholders. Total returns fall in a predictable way throughout its life cycle, as illustrated in the exhibit "Time Is the Enemy of Businesses." The implication is clear. Managers should expect that, over time, even the best, most operationally sound businesses will cease to perform

Matching Business Units and Parents

As a business proceeds through the three major phases of its industry life cycle, what it needs from its parent company changes substantially. It's unrealistic to assume that a single parent can provide all the different capabilities needed for a business to thrive over the long term.



as well for shareholders as their younger peers. That's not to say that the businesses will be unprofitable but rather that the capital markets will no longer reward their steady performance with substantial share price increases.

There is another, more immediate reward for not delaying the sale of a business. Several studies have shown that divesting companies outperform the market by between 2% and 5% in the period surrounding the divestiture announcement. When it comes to divestiture, there's no good reason to procrastinate.

Making It Happen

When a coordinated divestiture program happens today in corporate America, it is more often than not a result of a change in a company's leadership, as was the case with Welch at GE, Wambold at Pactiv, and Summe at PerkinElmer. Our research found that just over 50% of all significant divestitures take place within two years of the appointment of a new chief executive. Fresh to the role, the incoming CEO can assess the situation without bias, make decisions without fear, and take the hard actions necessary to unload businesses. But there's no reason that incumbent CEOs can't do the same. Yes, launching a proactive divestiture program goes against the grain of current business practice and against the sensibilities of many managers and employees. But it's necessary to keep a company profitable and growing over the long term. By following a rigorous, carefully managed five-step process, companies are more apt to get a proactive divestiture program off the ground, build support for it throughout the ranks, and ultimately make it a core element of their corporate strategies. (For an overview of the process, see the exhibit "A Template for Proactive Divestiture.")

Prepare the organization. "Today is a sad day for our company." Those are the words that traditionally accompany divestiture announcements. And they underscore just how challenging it is to make divestiture a routine part of doing business. Because the stigma surrounding divestiture is so strong, people will naturally resist it, at least initially. It's critical, therefore, that senior managers spend a lot of time explaining the rationale for divestiture and why it's essential to the corporation's health. PerkinElmer's leadership team, for instance, prepared the ground for its divestiture program by talking directly and repeatedly with people throughout the organization. CEO Summe held regular "town hall" meetings with each of his businesses, explaining the company's strategy and divestiture's role in it. In time, as a company begins to enjoy the results of proactive divestiture, the stigma should fade, and divestiture should become an expected event in a business unit's life cycle. Until then, though, management will have to assure employees that divestiture is a sign not of failure but of strength.

When a company is first building divestiture skills, it can be useful to introduce

Time Is the Enemy of Businesses

A business's shareholder returns decrease as it ages.

Source: Richard Foster and Sarah Kaplan, Creative Destruction (Doubleday, 2001).

some formal forcing mechanisms to ensure that divestiture is routinely considered. A company might, for instance, "date stamp" all its businesses. The purpose is not to force a divestment by a specific date but rather to ensure that divestiture is seriously considered at regular intervals. Private equity firms have done this for years with strong results, and some public companies are starting to do the same. Pactiv, for instance, as part of its strategic planning process, reviews each business every year, reevaluating its contribution to the corporation's overall strategic goals. The process takes several days, and the board of directors is intimately involved, providing an outside perspective. CEO Wambold comments, "We measure each of our businesses against strict criteria: Does it meet our growth, margin, and return-on-capital hurdle rates, and does it have the ability to become number one or two in its industry? We are quite pragmatic. If a business does not contribute to our overall vision, it has to go." There are other ways to force consideration of divestiture, including imposing limits on portfolio size, setting fixed ratios of divestitures to acquisitions, or hiring people with trading mind-sets to sit on boards or fill key strategic roles.

Identify candidates. When you shift from reactive to proactive divestiture, you suddenly have to think about selling off good, profitable businesses. That can be quite a shock to many people, even in the most senior management ranks. It's important, therefore, to establish concrete criteria for analysis and apply them objectively to every unit. Four factors, in particular, should be considered:

¶ *The Business Unit's Impact on the Rest of the Corporation*. What effects, positive and negative, does the business unit have on other units and on the corporation as a whole? A number of analyses can be used to answer this question. A cultural audit, for example, can help assess whether a unit's culture clashes with the rest of the corporation. An analysis of the CEO's calendar can identify units that consume a disproportionate share of management time. Interviews with unit managers and a review of denied capital spending requests can identify opportunities that are not being explored because of competitive conflicts. Talking with recruiters can provide a sense of whether a unit is hindering the rest of the company in attracting talent. On the positive side, a unit should be examined to determine whether it furnishes the rest of the corporation with new growth options or other valuable benefits such as shared R&D resources.

A Template for Proactive Divestiture

Divestiture is not a one-shot effort. It needs to become a routine part of a company's strategy. An iterative, five-step approach works best.

Prepare the organization	• ^Explain to employees the rationale for the divestiture and why it's essential to the corporation's health. • ^Introduce forcing mechanisms to ensure that managers actively consider divestiture.
Identify candidates	• ^Establish concrete criteria for determining candidates, including a unit's impact on the rest of the corporation, the corporation's impact on the unit, the unit's ability to meet or surpass market expectations, and the optimal portfolio for the company. • ^Analyze the practical issues (taxes, availability of buyers, and so forth) to narrow the list of candidates.
Structure the deal	• ^Identify buyers and determine how best to structure the sale (for example, a simple sale for cash, a spin-off to shareholders, or complex structures involving two-step transactions and contingent compensation). • ^Ensure that employees are not distracted during the sale process, perhaps by offering them additional incentives.
Communicate the decision	• ^Hold off on the sale announcement until the completion of the deal seems likely. • ^Communicate the reason for the sale concisely and simply.
Create new businesses	• ^Reinvest the funds, management time, and support-function capacities in attractive new growth opportunities.

The Corporation's Impact on the Business Unit. What value does the corporation add to the business unit relative to other potential owners? This analysis has four parts: determining if the parent's skills are what the unit needs to excel; deciding whether the prevailing corporate culture suits the unit; and quantifying the synergies between the business unit and the rest of the corporation. The matching skills, cultural fit, and synergies then have to be compared with what another owner could offer the unit.

The Unit's Ability to Beat Market Expectations. Does the market currently overvalue or undervalue the business? This analysis can be difficult – management needs to estimate the unit's value based on future expectations for performance and compare that number to the unit's implied market value embedded in the stock price. But as difficult as it is, this analysis is essential because it will show executives whether the unit can realistically create value in the future. Because the analysis will sometimes reveal that existing businesses are overvalued, it will tend to make executives much more aggressive in selling off units and even in changing the overall identity of the corporation. The divestiture candidates pinpointed by this analysis may, for instance, include cash cows, which have always been held sacred. Why sell cash cows? Because they are in mature industries and have limited potential for achieving growth beyond the market's expectations. While a cash cow can deliver benefits to a company, providing protection during downturns, for example, or being a source of funding for new investments, it usually contributes little to shareholder value. Indeed, a cash cow can be very risky to hold because its market value will often decline sharply if it loses any market share – an event that at some point happens to virtually all high-market-share businesses. Moreover, cash cows frequently impose some of the highest hidden costs of ownership on both the parent and its other business units.

The Corporation's Overall Portfolio. What is the best combination of businesses for the company to hold? By examining the portfolio that would remain if different sets of divestitures occurred, you can see the impact on the overall company. This analysis can be both quantitative (assessing cross-unit synergies, for example) and qualitative (determining the value the corporate center provides to the business or the business's role in how Wall Street views the company). It is important to note here that no one type of portfolio is best for every company. The purpose of a divestiture strategy should not

Our Research

In developing our perspective on divestitures, we drew on three sources of information and analysis:

McKinsey Corporate Performance Study
McKinsey tracked the performance of more than 2,000 companies in 27 industries over almost four decades in order to model capital markets in the U.S. economy. The study closely replicates the real economy, except that it does not encompass all industries or companies. Companies were included in the study when they were big enough to be part of the largest 80% of U.S. companies (regardless of whether they are still in existence today). Companies that were acquired or went bankrupt were deleted from the database.

Transaction History of the 200 Largest Companies from 1990 to 2000
Three McKinsey colleagues (Jay Brandimarte, Robert McNish, and William Fallon) identified 200 of the largest companies in 1990 that were still trading independently in 2000 and examined all their acquisitions and divestitures during that period that were worth more than $100 million. We used this database to rank and compare shareholder returns and transaction frequency.

Rationale of 50 Important Deals from 1998 to 2001
We identified all the divestitures mentioned on the front page of the Wall Street Journal during September of 1998, 1999, and 2000, and August of 2001. (For 2001, we used the deals mentioned in August, as the World Trade Center attacks made September an abnormal month.) We investigated the circumstances surrounding each of these divestitures in detail by looking at press comments and analyst research before and after the deal, as well as by analyzing the financial performance of the parent and the divested business unit in the years preceding the deal. We considered deals to have been done in reaction to pressure only when we found clear supporting evidence – we suspect that a far greater number of deals were actually done under pressure, but companies often prefer to hide that fact from public view. We also considered the timing of those divestitures that were done in reaction to pressure. Furthermore, we researched the tenure of the CEOs of the divesting companies.

be simply to transform a diversified, multibusiness company into a focused, single-business company. In fact, research by McKinsey's Neil Harper and Patrick Viguerie has shown that the capital markets reward a moderate degree of diversification. Between 1980 and 2000, moderately diversified companies delivered shareholder returns that were at least as strong as, and in some cases stronger than, those of many focused companies and consistently stronger than those of highly diversified companies.

These four analyses will highlight attractive candidates for divestiture. Not all of the candidates will end up being sold, however. Practical considerations – such as taxes, availability of buyers, market reaction, payment mix, use of divestiture proceeds, and dilution of earnings – also need to be taken into account. Such factors can narrow the list of candidates and can place constraints on exit timing.

Some readers will argue that the practical issues should be considered first. We disagree. Many corporations overemphasize the practical issues and thus presume that divesting is impossible. By focusing on more strategic considerations at the outset, companies will build momentum for divestiture and will look at the practical constraints as problems to be overcome rather than as roadblocks to action. Greg Summe points out that fear of earnings dilution can often stop management from considering divestiture. As he notes, though, "Selling a great cash business will lower your earnings per share. But you can still do well by your shareholders by reinvesting the proceeds in a higher growth business, which should lead to a compensating increase in your price/earnings multiple."

Structure the deal. Once you've narrowed the list of candidates, you need to think about potential buyers and how best to structure the deal. You will typically have many options, from a simple sale for cash, to a spin-off to shareholders, to more complex structures involving two-step transactions and contingent compensation. Citigroup, for example, appears to be structuring its divestiture of Travelers as a two-step spinout, possibly to minimize its tax liability. Even with a straightforward sale for cash, you need to decide how to conduct the sale: Do you have an auction with many buyers, an exclusive negotiation with the most logical buyer, or something in between? As you consider your options, keep in mind your reasons for divesting. Most frequently, these reasons will lead you to favor simple, quick transactions that minimize the costs to the unit being sold and the parent. When considering costs, you'll need to take into account not only transaction-related expenses but also the costs of time, complexity, and taxes. Because spin-offs can be done tax free, they can be particularly attractive in certain situations.

Many of the basic skills required in executing divestitures mirror those involved in acquisitions, such as coordinating the work of bankers, lawyers, and accountants. But there are unique considerations as well. You need to ensure that the employees of the divested unit are not distracted during the sale process. To keep employees focused on the business, PerkinElmer gives them additional monetary incentives to meet their operational targets. You also need to untangle the unit from the rest of the company. At a minimum, shared services such as human resources and financial management must be scaled back. In many cases, the links go much deeper, with business units sharing facilities, intellectual property, and people. While the challenges of separating businesses can sometimes seem overwhelming, it's important to remember that the process can actually deliver substantial benefits, helping companies uncover ways to achieve greater simplicity and transparency in their remaining operations.

Communicate the decision. There's no getting around it. Telling a business unit that it's going to be sold is tough. In some cases, it will make sense to deliver the message as soon as the unit is selected as a divestiture candidate. But doing so can backfire if the deal falls through. Therefore, as a general rule, we suggest holding off on the announcement until the sale appears likely. As Pactiv's Wambold explains, "It is best to reduce uncertainty where possible, so once it becomes clear that a business unit is going to be

sold, we are up-front about the decision with our people. However, when it is not yet clear, it can be best to delay communication. Telling someone that the unit might be sold increases uncertainty and can harm the business."

Regardless of the timing of communication, the reasoning must be stated concisely and simply. GE's Welch famously told his business units that they had to be number one or number two in an industry that fell into one of three categories: core manufacturing, technology, and services. If they failed that test, they knew precisely why they were being sold. Similarly, PerkinElmer's Summe uses two simple criteria: If a business cannot attain market leadership or cannot deliver double-digit revenue growth, it becomes a candidate for divestiture.

Create new businesses. The final step in a proactive divestiture program is, ironically, creation. As companies prune businesses, they also need to formulate expansion plans focused on strengthening remaining businesses, starting new ones, or making acquisitions. The goal should be to create a cycle of rejuvenation, through which the corporate portfolio of business is continually refreshed.

Divestiture is not an end in itself. Rather, it is a means to a larger end: building a company that can grow and prosper over the long haul. Wise executives divest businesses so that they can create new ones and expand existing ones. All the funds, management time, and support-function capacity that are freed up through a divestiture should therefore be reinvested in creating shareholder value. In some cases, this will mean returning money to shareholders. But more likely than not, it will mean investing in attractive growth opportunities. In companies as in the marketplace, creation and destruction go hand in hand; neither flourishes without the other.

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BY JACOB P. ROOSMA, JAMES L. KERR, AND ROBERT F. REILLY

Intellectual Property Lost Profits and Economic Damage Analyses

Introduction

This discussion summarizes the general approaches to the analysis of intellectual property (IP) for purposes of estimating lost profits and economic damages. The quantification of IP lost profits and economic damages arises in litigation claims related to infringement, expropriation, lender liability, breach of contract, bankruptcy, and other deprivation-related controversy matters.

In such controversy matters, IP owners need to know how – and by how much – their IP has been damaged in order to (1) assess the magnitude of their claim and (2) prove their claim when seeking judicial relief. The controversy defendants also need to analyze the alleged IP damages in order to present a credible defense and/or negotiate a reasonable settlement. And, the finder of fact needs to understand all alternative IP damages analyses in order to (1) assign liability and (2) award appropriate compensation to the aggrieved party.

In addition to damages-related controversies, there are numerous other reasons for conducting an IP economic analysis. These other reasons include the following:

1. transaction pricing and structuring, for either the sale, purchase, or license of the IP;
2. financing securitization and collateralization, for both cash flow-based financing and asset-based financing;
3. taxation planning and compliance, with regard to amortization, abandonment loss, and charitable contribution deductions; intercompany transfer pricing; and federal gift and estate tax compliance and estate planning;
4. management information and planning, including business value enhancement analyses, identification of licensing and other commercialization opportunities, identification of spin-off opportunities, and other long-range strategic issues;
5. bankruptcy and reorganization analysis, including the value of the bankruptcy estate, debtor-in-possession financing, traditional refinancing, restructuring, and the assessment of the impact of proposed reorganization plans; and
6. other litigation and dispute resolution, including marital dissolution, dissipation of corporate assets, shareholder disputes, and reasonableness of owner compensation matters.

The approaches and methods described below are relevant to IP economic analyses performed for any of these reasons.

Attributes That Distinguish Intellectual Property

IP is a special class of intangible assets. IP manifests all of the economic existence and economic value attributes of other intangible assets. However, because of its special status, IP enjoys special legal recognition and protection. While intangible assets are often created in the normal course of business operations, IP is created by specific human intellectual and/or inspirational activity.

Because of this unique creation process, IP is generally registered under, and protected by, specific federal and state statutes. The protection of this legal registration provides economic motivation for IP innovators during the creative process. This legal registration also provides protection for IP creators during the commercialization process. It is believed that the information content of IP requires this special protection in order for an IP owner to realize economic value of these special intangible assets.

There are four legally recognized types of IP: trademarks, copyrights, patents, and trade secrets. For economic analysis purposes, these types of IP may be grouped into these five categories:

1. marketing-related, such as trademarks, trade names, and service marks;
2. technology-related, such as product and process patents and patent applications;
3. artistic-related, such as literary and musical copyrights;
4. data processing-related, such as computer software copyrights and computer chip masks and masters; and
5. engineering-related, such as industrial designs and trade secrets.

How Intellectual Property Attributes Affect the Economic Analysis

The various IP legal attributes affect the economic analysis in several ways. The IP legal attributes particularly affect the quantification of lost profits and economic damages.

First, most IP has a specified legal life. This legal life may not be the most important "life measure" with regard to IP economic analysis. However, while most general intangible assets do not have a specified legal (i.e., determined by statute) life, most IP does.

Second, because of the special legal recognition and protection afforded to intellectual property, IP owners have more commercialization opportunities available. This is particularly true compared to the owners of general intangible assets. For example, IP owners often enter into license, joint venture, or other exploitation and development agreements. These agreements allow them to enjoy the economic benefits of commercializing their IP in a way that is external to their current business interests.

Such external commercialization opportunities could include licensing the use and/or development rights for the subject IP:

1. through geographic expansion – into new territories;
2. through industry expansion – into new industries; and/or
3. through product expansion – into new products.

These external commercialization opportunities are typically not available with respect to general intangible assets. For example, the owners of a favorable supplier contract, ongoing customer relationships, or a trained and assembled workforce generally may derive the economic benefits from these intangible assets by commercializing them only within their current business operations.

Third, there are more transactional data available for analysis with respect to IP (compared with general intangible assets). That is, there are more data available with regard to the sale, license, or other external commercialization of IP. There are more transactional data available for analysis because there are more reported sale/license transactions. There are more reported transactions because IP owners are more confident about entering into external commercialization transactions. This is because they know that their legal and economic interests are more likely to be protected by the laws associated with their particular IP.

Fourth, IP generally enjoys higher royalty rates and higher market value pricing multiples than do general intangible assets. Of course, this statement is true under the condition of *ceteris paribus*. And, in the real world, all other things are never equal. Generally, IP trades (i.e., is licensed or sold) for higher prices than general commercial intangible assets. This is because IP buyers – and IP licensees – are willing to pay more due to the protection afforded to them by IP laws. IP laws reduce the risk associated with IP commercial transactions. As a result of this reduced risk, IP buyers and licensees may feel that they can afford to pay a bit more to enter into such transactions.

Fifth, there is substantially more judicial precedent regarding IP than there is regarding general intangible assets. This factor itself has three implications:

1. There is greater judicially determined definition of certain IP than of other intangible assets. For example, due to infringement and other litigation, U.S. courts have defined to some extent what is a trade name and what is a trade

secret. Analysts can generally rely upon these definitions in the identification and analysis of IP. There is much less published precedent with regard to such intangible assets as an optimal distribution system or going-concern value. Therefore, there is somewhat less definition (at least judicial definition) as to what constitutes these general intangible assets.

2. With respect to certain IP, there have been more judicial decisions in the United States with regard to appropriate (and inappropriate) valuation methodology, with regard to reasonable ranges of royalty rates, and with regard to economic damage analysis methods and amounts. Again, such judicial precedent may provide valuable guidance to the analyst. This is not to suggest that analysts should naively apply pricing multiples or royalty rates in a specific analysis just because they are published in a judicial decision. Obviously, such pricing multiples and royalty rates would only be appropriate given the unique facts and circumstances of the specific court case. Nonetheless, a review of published precedent may provide the analyst with an indication of a reasonable range of pricing multiples, royalty rates, damages-related lost profit margins, and so forth.
3. Participants (that is, buyers, sellers, licensors, licensees) in the IP secondary market will be generally aware of the amount of judicial precedent. This precedent will inform market participants that federal and state laws exist and that the courts recognize and protect various types of IP. This level of judicial awareness and protection may motivate more market participants to enter into more market transactions. This is because market participants may consider the IP market to be relatively safe and protected.

Sixth, it is noteworthy that these IP attributes can have a positive effect on both the active value and the passive value of IPs. Active value is generated when an IP is used proactively (that is, to increase prices, market share, or profits). Passive value is generated when an IP is used defensively (that is, to protect prices, market share, or profits). Both active value and passive value may be positively influenced by IP legal attributes.

Identifying Intellectual Property

For IP to exist from an economic perspective, it should possess certain attributes, such as:

- It should be subject to specific identification and recognizable description.
- It should be subject to legal existence and protection.
- It should be subject to the right of private ownership (and this private ownership must be legally transferable).
- It should have some tangible evidence or manifestation of the existence of the asset (for example, expanding a license, a registration document, a computer diskette, a set of procedural documentation, and so on).
- It should have been created or have come into existence at an identifiable time or as the result of an identifiable event.
- It should be subject to being destroyed or to a termination of existence at an identifiable time or as the result of an identifiable event.

While an IP may not possess all of these particular attributes, there should be a specific bundle of legal rights (and other natural properties) associated with its existence.

For IP to have economic value, it should possess certain additional attributes. Some of these additional attributes include the following:

- It should have the ability to generate some measurable amount of economic benefit. This economic benefit could be in the form of an income increment or of a cost decrement. This economic benefit is sometimes measured by comparison to the amount of income otherwise available to the owner if the IP did not exist.
- This economic benefit may be measured in any of several ways, including net income, net operating income, net cash flow, among others.

- An IP in commercial use should be able to enhance the value of other assets used in the commercial enterprise. These other assets may include tangible personal property, real estate, or other intangible assets.

Analysts recognize a distinction between (1) the economic existence of IP and (2) the economic value of IP. An example of this distinction would be a copyrighted software system that, upon creation, is permanently locked in the company's vault. If the software is never used in the production of (or in the protection of) income, then it has no economic value – even though it has economic existence.

Economic phenomena that do not meet the attributes described above usually do not qualify as IP. Some economic phenomena are merely descriptive or expository in nature. Such "descriptive" economic phenomena that do not qualify as IP include:

- high market share,
- high profitability,
- positive reputation,
- market leader position,
- market potential, and
- first entrant in a new market category.

While these descriptive conditions do not qualify as IP, they may indicate that an actual IP has substantial economic value. For example, while these descriptive conditions do not qualify as a discrete IP, they may indicate the existence of a valuable trade name.

Bundle of Legal Rights

One of the first steps in the IP analysis is to identify the specified bundle of legal rights. According to the bundle-of-rights theory, complete IP ownership, or title in fee, consists of a group of distinct legal rights. Each of these legal rights can be separated from the bundle and conveyed by the fee owner to other parties in perpetuity or for a limited time period. When a right is separated from the bundle and transferred, a partial or fractional property interest results. It is possible to examine property interests in an IP from several points of view. This is because the ownership, legal, economic, and financial aspects of IP overlap.

IP ownership interests can take various forms. And, widely different economic values can attach to the different ownership interests. The ownership interests related to the typical income-producing IP include the following:

- fee simple interests,
- term estate,
- license/franchise interests and sub-license/franchise interests,
- reversionary interests, and
- development/exploitation rights.

Economic Damages/Lost Profits Methods

The most common methods for quantifying IP economic damages or lost profits are (1) the "before and after" method, (2) the "but for" method, and (3) the actual/opportunity cost method. Directly or indirectly, each of these damage analysis methods estimates a value by either (1) the decrease in the value of the IP (or the IP owner business enterprise) related to the damage event or (2) the value (albeit negative) of the IP damage event itself. In each of these methods, the damage event could be an infringement, breach of contract/license/joint venture agreement, breach of employment/noncompete confidentiality agreement, breach of a commercialization/development agreement, a business interruption or tort, a lender liability failure to perform, fraud or misrepresentation related to a sale/transfer, and so on.

The before and after method quantifies damages by comparing (1) the value of the subject IP before the damage event to (2) the value of the subject IP after the damage event. The difference, of course, is the economic effect of the damage event. This method requires a valuation of the subject copyright, patent, trademark, or trade secret just before the damage event (or series of events) occurs. Then, this method requires a valuation of the subject copyright, patent, trademark, or trade secret after the damaging event (or series of events) has

occurred. Ideally, the "after" valuation is prepared as of a date after the damage event has ceased. The difference between the before and after values is one measure of the damage to the IP.

This difference in IP values between two dates may not be the only damage suffered by the IP owner. In addition to the decrease in IP value, the owner may have (1) lost profits during the period of the damage events, (2) incurred damage remediation costs during the damage event period, and (3) incurred legal/administrative costs to prosecute the party responsible for the damage event.

The but for method quantifies damages directly by estimating what amount of economic income would have been earned by the IP owner "but for" the damage event. The but for method typically involves (1) a backward looking projection of economic income that would have been earned from the IP use/ownership but for the damage event and (2) a forward looking projection of economic income that would have been earned from the IP use/ownership but for the damage event. The backward projection starts when the first damage event occurs and continues to the date of the analysis (often trial date in a litigation matter or the date of a damage expert's report). The forward projection starts at the analysis date (for example, the trial date) and continues until both (1) the damage event stops and (2) there is no more expected residual effect of the damage event. Typically, the result of the backward projection is future valued to the analysis date, and the result of the forward projection is present valued to the analysis date. The total amount of damages is the sum of (1) the future value of the backward projection and (2) the present value of the future projection.

The but for method is one measure of the damages to the subject IP. Again, the IP owner may have incurred other losses due to the damage event, such as legal fees, expert witness fees, court costs, and so on.

The actual/opportunity cost method quantifies damages to the IP owner by examining (1) the historical cost of developing and commercializing the IP through the analysis date, (2) the historical opportunity cost of not commercializing the IP through the analysis date, and (3) the prospective opportunity cost of not commercializing the IP from the analysis date. The analysis date is typically either the date of the expert's damages report or the date of the trial/arbitration hearing.

The historical cost of patent, copyright, trademark, or trade secret development includes all (1) direct costs (for example, engineering, design, market research time and expenses), (2) indirect costs (for example, management time, support staff time, overhead expenses), (3) commercialization/promotional costs (for example, advertising, promotion, marketing expenses), and (4) entrepreneurial incentive (for example, a fair rate of return on all other development costs incurred during the development process). All of these actual historical costs should be restated to current costs as of the analysis date. This restatement procedure is usually accomplished by applying price inflation trend factors to the actual historical costs.

The historical opportunity cost includes the income the IP owner would have earned from the use of the IP, absent the damage event (for example, the infringement or expropriation). The historical opportunity cost is estimated from the date of the damage event through the analysis date. And, the historical opportunity cost is stated as a future value (that is, inflated to reflect current costs) as of the analysis date.

The prospective opportunity cost includes the income the IP owner would have earned in the future from the use of the IP absent the damage event. The prospective opportunity cost is estimated from the analysis date forward to the date when the damage event is no longer expected to affect the subject IP. And, the prospective opportunity cost is stated as a present value as of the analysis date.

The total damage indication of this method is the sum of the three cost components: (1) historical cost of development, (2) historical opportunity cost, and (3) prospective opportunity cost. In addition to this damage measure, the IP

owner may have suffered other losses due to the damage event, such as legal fees, expert witness fees, court costs, among others.

The three above-described IP economic damage methods are generally analogous to the three IP valuation approaches. Conceptually, this is not surprising. This is because IP economic damages are typically measured (1) indirectly – as a decrement in the value of the subject IP or (2) directly – as the value (albeit negative) of the damage event itself. The market approach to IP valuation is often used in the before and after damage method. The amount of the damages is the difference between (1) the "before" IP market value and (2) the "after" IP market value. The income approach is often used in the but for damage method. The income approach analysis estimates the present value of the economic income the IP owner could have earned but for the damage event. The cost approach to IP valuation is often used in the actual/opportunity damage method. The cost approach estimates (1) the actual cost as replacement direct and indirect cost, (2) the historical opportunity cost as developer's profit, and (3) the prospective opportunity cost as entrepreneurial incentive.

In all three of the IP economic damage methods, economic income can be defined in many different ways. Economic income can be measured by increases/decreases in units (volume) sold, price per unit, market share (absolute or relative), market size, or by being/not being first to market. Economic income can be measured by increases/decreases in fixed/variable production expenses, fixed/variable selling and administrative expenses, or fixed/variable research and development expenses. And, economic income can be measured by increases/ decreases in capital expenditures, working capital investments, or interest expenses. Finally, economic income can be measured by either (1) a change in the absolute dollar amount or (2) a change (acceleration or deceleration) in the timing of any of the above economic variables.

Since (1) IP valuation approaches are often used in IP economic damages analyses and (2) IP valuation approaches typically use the same measures of economic income as IP economic damages methods, the remainder of this discussion will illustrate the application of standard valuation approaches/ methods to quantify IP economic damages.

Remaining Useful Life

There are several "determinants," or factors, that affect the remaining useful life of IP. The following list presents some common life determinants, along with examples of IP that are often influenced by those determinants:

- Legal determinants – patents, copyrights.
- Contractual determinants – intellectual property development rights.
- Judicial determinants – computer software.
- Physical determinants – engineering drawings.
- Technological determinants – proprietary technology, technical documentation, trade secrets.
- Functional determinants – patented/unpatented proprietary technology, trade secrets, computer software.
- Economic determinants – proprietary technology, trademarks, trade names.
- Analytical determinants – engineering drawings, computer software.

Usually the type of IP influences the selection of the appropriate life estimation determinant. The type of data and information required, the amount and detail of analysis to be conducted, and the nature of the final remaining useful life conclusion are all influenced by the selection of the appropriate life determinant. Several of the factors that influence the selection of the life determinant are indicated in Exhibit I on next page.

Remaining useful life analysis is an integral component of the IP economic analysis process, regardless of which methods are used. This is particularly true with regard to lost profits and economic damages analyses.

While methods of life estimation range

from totally qualitative to rigorously quantitative, the remaining useful life estimation involves a consideration of the following factors:

- functional analysis,
- technological progress,
- economic trends,
- management policy decisions,
- government and regulatory policies,
- present condition and use of the IP,
- character and amount of service historically rendered by the IP,
- character and amount of service expected from the IP,
- other pertinent information, and
- professional judgment on the part of the experienced analyst.

Intellectual Property Analysis Methods

There are several methods and procedures used in the valuation and economic analysis of IP. These methods logically group into three categories of analysis: the cost approach, the market (or sales comparison) approach, and the income approach.

The cost approach is based on the economic principle of substitution. This principle states that an investor will pay no more for an asset than the cost to obtain – by either purchasing or constructing – a substitute asset of equal utility. For purposes of this principle, utility can be measured in many ways, including functionality, desirability, and so on. The availability of – and the cost of – substitute assets is directly affected by shifts in the supply and demand within the industry. Unlike fungible tangible assets, there are often no reasonable substitutes for IP. Accordingly, the use of the cost approach may be limited in the case of unique IP.

The market approach is based on the economic principles of competition and equilibrium. These principles conclude that, in a free and unrestricted market, supply and demand factors will drive the price of an asset to a point of equilibrium. The principle of substitution also directly influences the market approach. This is because the identification and analysis of equilibrium prices for substitute assets will provide important evidence with regard to the economic value of the IP.

Exhibit I
Life Analysis Determinants

Type of Life Determinant	Type of Information or Data Required	Nature of Analysis and Life Estimate
Legal	Document	Definite
Contractual	Document	Definite
Judicial	Document	Definite
Physical	Engineering/Experience	Qualitative
Technological	Engineering/Technical	Qualitative
Functional	Engineering/Professional	Qualitative
Economic	Engineering/Economic	Quantitative
Analytical	Age (asset placement and retirement) data	Quantitative

The income approach is based on the economic principle of anticipation, also called the principle of expectation. The value of the IP is the present value of the expected economic income to be earned from its ownership. As the name of this principle implies, the investor anticipates the expected economic income to be earned from the IP. This expectation of prospective economic income is converted to a present worth – that is, the economic value of the IP. There are numerous definitions of economic income. If properly analyzed, they all provide a reasonable indication of value. In this approach, the analyst estimates the investor's required rate of return on the IP generating the prospective economic income. This required rate of return is a function of many variables, including the risk – or uncertainty – of the expected economic income.

Analysts generally attempt to value IP using all three approaches. This multiple approach analysis is performed in order to obtain a multidimensional perspective. The final estimate is usually based on a synthesis – or reconciliation – of the various indications.

Market Approach Methods

The general process to the market (or sales comparison) approach includes these five procedures:

1. Research the appropriate exchange market to obtain information on sales transactions, listings, and offers to purchase or license guideline (that is, somewhat similar) or comparable (that is, nearly identical) IPs. The selected guidelines or comparables are compared to the subject based on such factors as asset type, asset use, industry, age, or the date of the sale or license.
2. Verify that the sale/license transactional data are factually accurate and that the transactions reflect arm's-length market considerations. If the guideline transactions were not negotiated at arm's-length, then adjustments to the transactional data may be necessary. This verification procedure may generate additional information about the current market for the sale or license of the IP.
3. Select relevant units of comparison (for example, income multipliers, revenue multipliers, or dollars per unit – such as per engineering drawing or, for software, per line of code); develop a comparative valuation pricing analysis for each unit of comparison.
4. Compare the selected guideline sale/license transactions to the subject IP using these elements of comparison; and adjust the sale/license price of each transaction to the subject; or if such an adjustment is not possible, eliminate the sale/license transaction from future considerations.
5. Reconcile the various value indications into a single value indication – or into a range of values. In an insufficient market, a range of values may be more meaningful than a single value estimate.

Information regarding IP sales/licenses is often obtained from (1) review of the SEC filings of publicly traded companies in the subject industry, (2) research of trade publications in the subject industry, (3) trade association surveys and other sources, (4) interviews with the subject IP owner who may be aware of industry transactions, (5) research of the numerous IP periodical publications, and (6) review of the IP litigation periodical publications. In order to verify the transactional data obtained from these sources, the analyst may have to personally contact one or both parties to the reported IP transaction.

The following list presents 10 elements of comparison for selecting and analyzing guideline sale/license transactions. While each element may be more or less important given the subject IP, all elements should be considered regarding each selection transaction.

1. the specific ownership of legal rights conveyed in the guideline transaction;
2. the existence of special financing terms or arrangements (for example, between the buyer and the seller);
3. whether the elements of an arm's-length sale or license existed;
4. the economic conditions that existed at the time of the sale/license transaction;
5. the particular industry in which the guideline IP is, or will be, used;
6. the age and expected remaining life of the guideline sale/license properties, compared to the subject;
7. the functional characteristics of the guideline sale/license properties, compared to the subject;
8. the technological characteristics of the guideline sale/ license properties, compared to the subject;
9. the economic characteristics of the guideline sale/license properties, compared to the subject; and
10. the inclusion of other assets in the guideline sale/license transaction; an example is the sale of a bundle or a portfolio of assets, which could include tangible personal property, real estate, and other intangible assets.

The last procedure is the reconciliation. In this procedure, two or more value indications are synthesized into a final value estimate. In the reconciliation step, the analyst reviews the empirical data, the

various analytical procedures, and the results of each analysis. The value indications are then resolved into a range of values, or a point estimate. In this phase, the analyst considers the strengths and weaknesses of each value indication, examining (1) the reliability of the market data compiled and (2) the appropriateness of the analytical procedures performed.

Illustrative Market Approach Example

The following discussion provides a simplified example illustrating a market approach method (that is, the relief from royalty method) for estimating the economic damages to trademarks and trade names. Wellknown Service Company ("Wellknown") owns a trademark and trade name that is highly regarded in its industry. The trademark and trade name are associated with quality service and consumer loyalty. Welknown Service Company (a new competitor in the industry) markets its service using a trademark and trade name that is deceptively similar to the Wellknown mark and name.

A judge has ordered that (1) Welknown has infringed on the Wellknown trademark and (2) Welknown must discontinue its use of the deceptive mark and name. However, Wellknown has already suffered damages as a result of (1) its association with the inferior Welknown service and (2) its loss of customers, business volume, and reputation. This example will illustrate the before and after method for estimating the economic damages to Wellknown.

In this example, the economic damages to the Wellknown trademark are estimated by reference to the economic income it could generate if it was licensed to another company. The estimated royalty income would be based on an analysis of empirical guideline trademark license transactions. Sales and licenses of trademarks are fairly common. Therefore, the analyst was able to assemble the necessary empirical transaction data.

The analyst concluded that Wellknown would generate $250 million of revenues if the trademark infringement had not occurred. This is the before the damage event scenario. As a result of the infringement, Wellknown will only generate revenue of $150 million. This is the after the damage event. To simplify this example, we assume that the economic damage to Wellknown will continue indefinitely.

In the before and after damage analysis presented in Exhibit II, the value decrement to the Wellknown trademark is estimated by multiplying the projected revenue loss by a five percent market-derived royalty rate. The direct capitalization rate is calculated as the market-derived present value discount rate minus the expected long-term growth rate in the projected revenue loss. Capitalizing the projected royalty income by the market-derived 10 percent direct capitalization rate indicates an economic loss in the value of the Wellknown trademarks of $50,000,000.

Exhibit II

Wellknown Service Company
Simplified Example of a Market Approach
Analysis of a Trademark and Trade Name

Projected loss of annual revenues from the trademarked Wellknown services due to the Welknown infringement (i.e., the difference between the "before" scenario revenues and the "after" scenario revenues)	$100,000,000
Multiplied by: A market-derived license royalty rate (based on an analysis of guideline trademark licensing transactions)	5%
Equals: Projected annual royalty to the IP owner associated with a hypothetical license of the Wellknown trademark	$5,000,000
Divided by: A market-derived direct capitalization rate	10%
Equals: Indicated economic damage related to Wellknown trademark and trade name infringement by Welknown (rounded)	$ 50,000,000

Cost Approach Methods

The theoretical bases of cost approach methods relate to the following principles:

- substitution – no prudent buyer would pay more for an IP than the cost to construct a substitute of equal desirability and utility;
- supply and demand – shifts in supply and

demand (1) cause costs to increase and decrease and (2) cause changes in the supply of substitute types of IP; and

- externalities – gains or losses from external factors may accrue to IPs. External conditions may cause a newly created IP to be worth more or less than its original cost.

There are several cost approach methods. Each method uses a slightly different definition of cost. The most common definitions of cost include reproduction cost and replacement cost. There are important differences in the different definitions of cost. Reproduction cost contemplates the construction of an exact replica of the IP. Replacement cost contemplates the cost to recreate the functionality or utility of the IP. Functionality is an engineering concept that means the ability of the IP to perform the task for which it was designed. Utility is an economic concept that means the ability of the IP to provide an equivalent amount of satisfaction.

Some analysts also consider cost avoidance as a cost approach method. This method quantifies either historical or prospective costs that are not incurred as a result of IP ownership.

All cost approach methods include a comprehensive calculation of cost. The cost (whether replacement, reproduction, or other cost) of an IP includes: (1) hard costs (for example., materials), (2) soft costs (for example, engineering, design, labor, and overhead), (3) the IP developer's profit (return) on both the hard and soft cost investment, and (4) an entrepreneurial incentive – to economically motivate the IP development process. And, the total cost (however measured) of an IP should be reduced by all relevant forms of obsolescence, including economic obsolescence. While the cost approach is different from the income approach, there are economic analyses involved in the cost approach. These analyses, which involve historical or prospective income, provide indications of entrepreneurial incentive (if any), or economic obsolescence (if any).

Total cost is adjusted for losses in value due to: functional obsolescence, technological obsolescence, and economic obsolescence. Functional obsolescence is a reduction in value due to the subject's inability to perform the function (or yield the periodic utility) for which it was originally designed. Technological obsolescence is a decrease in value due to improvements in technology that make the subject less than the ideal replacement for itself. Economic obsolescence is a reduction in value due to the effects, events, or conditions that are external to – and not controlled by – the current use or condition of the IP. The impact of economic obsolescence is usually beyond the control of the owner and therefore is considered incurable. In estimating the amounts (if any) of functional, technological, or economic obsolescence, consideration should be given to the IP actual age and to its expected remaining useful life.

Illustrative Cost Approach Example

This example will illustrate the analysis of certain proprietary technical documentation, engineering drawings, and manufacturing trade secrets (collectively, "the trade secrets") of Widget Company ("Widget"). The subject trade secrets include documents, records, drawings, schematics, procedures, and diagrams. This IP was developed by Widget based on the expectation that the IP will be used in a new joint venture that Widget had entered into.

In the joint venture, Widget contributed its IP and the other joint venture partner, Manufacturing Company ("Manufacturing") contributed plant and equipment. The joint venture obtained a financing commitment from Widget's bank. After all of the assets were contributed by the joint venture partners, the bank failed to honor its financing commitment.

Without the promised financing, the joint venture operations quickly deteriorated. Both joint venture partners lost the assets they had contributed. Widget is seeking compensation for its economic damages from its bank in a lender liability claim.

This example illustrates a cost approach analysis of the economic damages suffered by Widget as a result of the loss of its IP.

The cost approach aggregates all the costs required to develop the IP. These development costs are based on:

- the amount of "unique" documentation of the subject trade secrets;
- the "fully loaded" salaries (that is, employee salaries plus employment benefits, employment-related taxes, and other employee-related costs) of the type of individuals who would be involved in the recreation of the trade secrets; and
- the estimated amount of time required to recreate the trade secrets.

In addition to the time required by Widget engineering and design employees to develop the documents, records, drawings, and procedures, there is a time "cost" associated with the conceptualization and development of the trade secrets. This time cost involves numerous individuals within the Widget organization and includes the time cost required to obtain Widget management approval.

Widget management provided the analyst with an estimate of average salary ranges for employees responsible for IP development. Widget management also provided the analyst with an overhead allocation factor of 21 percent (of total salaries). This overhead factor includes items such as employee perquisites, employee benefits (including life, health, disability and dental insurance, and pension and retirement plans) and employment-related payroll taxes. In addition, it includes an allocation of such overhead expense items as office space, equipment usage, office utilities, and development personnel management. Based on interviews with Widget management, the analyst estimated the amount of time required to develop, review, approve, and promulgate the trade secrets.

Because the subject trade secrets are constantly reviewed and updated, the analyst concluded that there was no evidence of technological obsolescence. The subject materials document the most current Widget trade secrets. The analyst concluded that there was no evidence of economic obsolescence. This is because the joint venture was projected to be a profitable business enterprise. In fact, its rate of return on assets was projected to be higher than the industry average for such manufacturing companies.

Exhibit III summarizes the cost approach analysis used in the actual/opportunity cost method

Exhibit III
Widget Company
Simplified Example of Cost Approach
Analysis of Trade Secrets

	Estimate of Replacement Time (in person-hours)			
Trade Secrets Intellectual Property Materials	Draftsmen	Engineers	Management	Total
Engineering drawings	5,000	4,000	1,000	10,000
Technical documentation	4,000	3,000	2,000	9,000
Trade secrets	1,000	5,000	4,000	10,000
Total estimated person-hours of recreation time				29,000
Weighted average cost of Widget personnel				$ 70
Subtotal				$2,030,000
Overhead allocation factor (at 21%)				1.21
Total replacement cost new				2,456,300
Less: obsolescence allowance				0
Replacement cost new less depreciation				$2,456,300
Indicated economic damage to Widget Company trade secrets related to lender's failure to perform (rounded)				$2,500,000

to estimate the economic damages to the Widget IP. To simplify the example, we assume no developer's profit or entrepreneurial incentive.

Based on this cost approach analysis, the economic damage to the Widget Company as a result of the loss of its trade secrets IP is $2,500,000.

Income Approach Methods

Some of the alternative measures of economic income used in IP analysis include: gross or net revenues, gross income (or gross profit), net operating income, net income before tax, net income after tax, operating cash flow, net cash flow, and other measures (such as incremental income).

An essential element in this approach is to ensure that the present value discount rate or the direct capitalization rate is calculated on a basis (for example, pretax versus after-tax) consistent with the measure of economic income used in the analysis. While there are different measures of economic income, all income approach methods may be grouped into the following categories:

1. methods that quantify incremental levels of income – the IP owner will enjoy a greater level of income by owning the IP as compared to not owning it;
2. methods that quantify decremental levels of costs – the IP owner will suffer a lower level of cost (such as required investments or operating expenses) by owning the IP as compared to not owning it;
3. methods that estimate a relief from a hypothetical royalty or rental payment – the amount of a royalty or rental payment that would be paid to a third party if the owner did not own the IP;
4. methods that quantify the difference in the value of the overall business (or similar economic unit) with – versus without – the use of the subject IP; and
5. methods that estimate value of the residual from the overall business value or a similar economic unit.

All of these methods use either direct capitalization or yield capitalization procedures. In direct capitalization, the estimate of the expected income is divided by an appropriate investment rate of return. The appropriate investment rate of return is called the capitalization rate. The capitalization rate is derived either for a perpetual period of time or for a specific finite period (depending on the expected remaining life of the IP). In a yield capitalization, the analyst projects economic income to be generated by the IP for several time periods (usually years). This projection of income is converted into a present value by the use of a present value discount rate. The present value discount rate is the investor's required rate of return (or yield capitalization rate), over the expected term of the income projection. The duration of the projection period (and whether or not a residual value is concluded) is based on the IP expected remaining useful life.

Illustrative Income Approach Example

Let's assume research scientist Ed Employee of Big Dog Pet Food Company ("Big Dog") developed a drug that prevents fleas in cats and dogs. Based on years of research, Ed developed a process to include this drug directly in pet food. Ed filed for and received a patent both for the drug itself and the drug/pet food integration process. After extensive testing of this drug (called "Fleabegone") and the new pet food, Big Dog applied to the U.S. Food and Drug Administration (FDA) for approval to produce and sell the medicated pet food. The FDA approved the sale of the pet food containing the Fleabegone medication. Big Dog built a plant and is ready to produce and sell the medicated pet food.

Like all Big Dog scientific employees, Ed signed an employment/confidentiality agreement indicating that he would assign all patents obtained during his employment to the company. However, just before the new Fleabegone product was produced, Ed resigned from Big Dog and assigned his patent to his new employer (another major pet food manufacturer). Big Dog filed suit

against Ed and his new employer. The lawsuit claims damages associated with the failure to assign the patent to Big Dog, as required by the employment/confidentiality agreement. This example will illustrate the income approach and the but for method to quantify the economic damages related to this IP dispute.

Big Dog marketing management prepared unit selling price, unit volume, and market share projections for the 10 years after the new product introduction. Big Dog manufacturing and engineering management projected (1) the cost of goods sold data and (2) the capital expenditures data for the 10 - year period. And, Big Dog financial management projected all of the various selling, general, and administrative expenses related to this new product over the next 10 years. After a thorough review, the analyst concluded that the projections were reasonable.

Based on (1) the actual Big Dog experience and (2) research of the FDA approval process, the analyst concluded it would take Big Dog another nine years to obtain FDA approval for a new patentable version of a flea medicated pet food. Therefore, the analyst selected nine years as the remaining useful life of the economic damages associated with Ed's failure to assign the patent.

Based upon the speculative nature of this new product, the analyst selected 30 percent as the appropriate discount rate to use in the analysis. A summary of the income approach analysis is presented in Exhibit IV. Based on this analysis, Big Dog suffered economic damages of $2,400,000 as a result of Ed's failure to assign the Fleabegone patent.

Synthesis and Reconciliation

Typically, an IP lost profits or economic damages analysis follows the process summarized above. When more than one approach is used, each approach may result in a different conclusion. Even within the same approach, there may be different damage indications. For example, there may be different damage estimates indicated by alternative income approach methods. The synthesis procedure is an analysis of the alternative indicated conclusions – in order to arrive at the final estimate.

The final estimate is generally a number from the indicated range of conclusions. The final estimate may be one of the indicated conclusions, it may be the mathematical expectation (that is, the weighted average) of the indicated conclusions, or it may be based on another number within the indicated range.

Generally, it is not appropriate to simply average the indicated conclusions. A simple arithmetic mean implies that all of the indications have equal validity and deserve equal weight. While this is sometimes appropriate, it is usually not the case in the typical IP economic analysis.

The final estimate should be derived from the analyst's reasoning and judgment regarding (1) all of the relevant factors and (2) all of the available market evidence.

Summary and Conclusion

This discussion focused on the analysis of patents, copyrights, trademarks, and trade secrets for lost profits and economic damages purposes. These analyses are performed for various litigation support and dispute resolution purposes. This discussion also described the various factors that influence IP economic value. Particular attention was directed to the factors that affect IP remaining useful life.

The most common approaches and methods to IP economic analysis were summarized. And, simplified illustrative examples were presented. These analytical methods are commonly used to estimate IP lost profits and economic damages in claims related to infringement, breach of contract, lender liability, expropriation, bankruptcy, and various other deprivation-related matters.

Exhibit IV
Big Dog Pet Food Company
Simplified Example of Income Approach
Analysis of Patent

	Projection Period								
Economic Damages Analysis Variables	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**
Projected case sales increase		100%	50%	40%	30%	20%	10%	5%	5%
Projected Fleabegone case sales	100,000	200,000	300,000	420,000	546,000	655,200	720,700	756,800	794,600
Sale price increase		5%	5%	5%	5%	4%	4%	4%	4%
Sale price per case of Fleabegone	$ 40	$ 42	$ 44	$ 46	$ 49	$ 51	$ 53	$ 55	$ 57
Projected Fleabegone revenues	4,000,000	8,400,000	13,200,000	19,320,000	26,754,000	33,415,000	38,197,000	41,624,000	45,292,000
Cost of goods sold:									
Variable costs (@ 40%)	1,600,000	3,360,000	5,280,000	7,728,000	10,702,000	13,366,000	15,278,000	16,650,000	18,116,000
Fixed costs	2,000,000	2,100,000	2,205,000	2,316,000	4,000,000	4,200,000	4,410,000	4,630,000	4,862,000
Gross profit	400,000	2,940,000	5,715,000	9,276,000	12,052,000	15,849,000	18,509,000	20,344,000	22,314,000
SG&A expense (@ 20%)	800,000	1,680,000	2,640,000	3,864,000	5,350,000	6,683,000	7,639,000	8,324,000	9,058,000
Pretax income	(400,000)	1,260,000	3,075,000	5,412,000	6,702,000	9,166,000	10,870,000	12,020,000	13,256,000
Less: Income taxes (@ 40%)	(160,000)	504,000	1,230,000	2,164,000	2,680,000	3,666,000	4,348,000	4,808,000	5,302,000
After-tax income	(240,000)	756,000	1,845,000	3,248,000	4,022,000	5,500,000	6,522,000	7,212,000	7,954,000
Plus: Depreciation expense	400,000	400,000	400,000	400,000	600,000	600,000	600,000	600,000	600,000
Less: Capital expenditures	2,000,000	0	0	0	1,000,000	0	0	0	0
Less: Incremental net working capital (@ 10% of incremental revenues)	400,000	440,000	480,000	612,000	743,000	666,000	478,000	342,000	366,000
Net cash flow (NCF)	(2,240,000)	716,000	1,765,000	3,036,000	2,879,000	5,434,000	6,644,000	7,470,000	8,188,000
Less: Capital change on tangible and intangible support assets used in production of Fleabegone	400,000	800,000	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000	1,700,000	1,800,000
Economic income NCF	(2,640,000)	(84,000)	565,000	1,736,000	1,479,000	3,934,000	5,044,000	5,770,000	6,388,000
Present value discount factor (@ 30%)	.8696	.6689	.5145	.3958	.3045	.2342	.1802	.1386	.1066
Present value of NCF	(2,296,000)	(56,000)	290,000	688,000	450,000	920,000	910,000	800,000	680,000
Total present value of economic income NCF	$2,386,000								
Indicated economic damage related to Ed's failure to assign Fleabegone patent (rounded)	$2,400,000								

Source: Robert F. Reilly and Robert P. Schweihs, *Valuing Intangible Assets* (New York: McGraw-Hill, 1999), p. 196.

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