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# VALUATION ALERT

## Valuation of Intellectual Property— Part VII

by Robert F. Reilly, CPA

*Editor's Note: This discussion is the seventh in a 10-part series of discussions related to the valuation of commercial intellectual property. The last two discussions related to the cost approach and market approach valuation methods. This discussion describes and illustrates the income approach valuation methods.*

### Part VII: Income Approach Valuation Methods

In this valuation approach, the intellectual property value is estimated as the present value of the future income from the ownership/operation of the intellectual property. The present value calculation has three principal components:

1. An estimate of the duration of the intellectual property income projection period, typically measured as the analyst's estimate of the intellectual property RUL;
2. An estimate of the intellectual property-related income for each period in the projection, typically measured as either owner income (e.g., license royalty income), operator income (e.g., some portion of the operator's business enterprise income), or both; and
3. An estimate of the appropriate capitalization rate, typically measured as the required rate of return on an investment in the intellectual property.

For purposes of the income approach, the RUL relates to the period of time over which the owner/operator expects to receive any measure related to the intellectual property (1) license, (2) use, or (3) forbearance of use. In addition to the term of the RUL, the analyst is also interested in the shape of the RUL curve. That is, the analyst is interested in the annual rate of decay of the future intellectual property income.

For purposes of the income approach, many different intellectual property income measures may be relevant. If properly applied, these different income measures can be used in the income approach to derive a value indication. Some of the different income measures include:

1. Gross or net revenues;
2. Gross income (or gross profit);
3. Net operating income;
4. Net income before tax;
5. Net income after tax;
6. Operating cash flow;
7. Net cash flow;
8. Incremental income;
9. Differential income;
10. Royalty income;
11. Excess earnings income; and
12. Several others (such as incremental income).

Because there are different income measures that may be used in the income approach, it is important for the capitalization rate (either the discount rate or the

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direct capitalization rate) to be derived on a basis consistent with the income measure used.

Regardless of the measure of income considered in the income approach, there are several categories of valuation methods that are typically used to value intellectual property:

**1. Valuation methods that quantify an incremental level of intellectual property income.** That is, the owner/operator will expect a greater level of revenue (however measured) by owning/operating the intellectual property as compared to not owning/operating the intellectual property. Alternatively, the owner/operator may expect a lower level of costs—such as capital costs, investment costs, or operating costs—by owning/operating the intellectual property as compared to not owning/operating the intellectual property.

**2. Valuation methods that estimate a relief from a hypothetical license royalty payment.** That is, these methods estimate the amount of hypothetical royalty payment that the owner/operator (as licensee) does not have to pay to a third party licensor for the use of the intellectual property. The owner/operator is “relieved” from having to pay this hypothetical license royalty payment because the owner/operator, in fact, owns the intellectual property.

**3. Valuation methods that estimate a residual measure of intellectual property income.** That is, these methods typically start with the owner/operator overall business enterprise income. Next, the valuation analyst identifies all of the tangible assets and routine intangible assets (other than the intellectual property) that are used in the owner/operator overall business. These assets are typically called contributory assets. The analyst then multiplies a fair rate of return times the value of each of the contributory assets. The product of this multiplication is the fair return on all of the contributory assets. The analyst then subtracts the fair return on the contributory assets from the owner/operator business enterprise total income. This residual (or excess) income is the income related to the intellectual property.

**4. Valuation methods that rely on a profit split.** That is, these methods typically also start with the owner/operator overall business enterprise income. The valuation analyst then allocates or “splits” this total income between (1) the owner/operator tangible assets and routine intangible assets and (2) the intellectual property. The profit split percent (e.g., 20 percent, 25 percent, etc.) to the intellectual property is typically based on the valuation analyst’s functional analysis of the owner/operator business operations. This functional analysis identifies the relative importance of (1) the intellectual property and (2) the contributory assets to the production of the owner/operator total business income.

**5. Valuation methods that quantify comparative income.** That is, these methods compare the owner/operator income to a benchmark measure of income (that, presumably, does not benefit from the use of the intellectual property). Common benchmark income measures include: (1) the owner/operator income before the intellectual property development, (2) industry average income levels, or (3) selected guideline publicly traded company income levels. A common measure of income for these comparative analyses is the earnings before interest and taxes (or EBIT) margin.

When publicly traded companies are used as the comparative income benchmark, the method is often called the comparable profit margin (or CPM) method.

All of these income approach valuation methods can be applied using either the direct capitalization procedure or the yield capitalization procedure.

In the direct capitalization procedure, the valuation analyst (1) estimates a normalized income measure for one future period (typically, one year) and (2) divides that measure by an appropriate investment rate of return. The appropriate investment rate of return is called the direct capitalization rate. The direct capitalization rate may be derived for (1) a perpetuity time period or (2) a specified finite time period. This decision will depend on the valuation analyst’s estimate of the intellectual property RUL.

Typically, the analyst will conclude that the intellectual property has a finite RUL. In that case, the analyst may use the yield capitalization procedure. Or, the analyst may use the direct capitalization procedure with a limited life direct capitalization rate. Mathematically, the limited life capitalization rate is typically based on a present value of annuity factor (PVAF) for the intellectual property RUL.

In the yield capitalization procedure, the valuation analyst projects the appropriate income measure for several future time periods. The discrete time period is typically based on the intellectual property RUL. This income projection 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 result of either the direct capitalization procedure or the yield capitalization procedure is the income approach value indication for the intellectual property.

## Income Approach Illustrative Example

Finally, **Exhibit 1** presents a simplified illustrative example of an income approach intellectual property valuation. In this example, the valuation analyst is asked to estimate the fair market value of the hypothetical Gamma Company pharmaceutical

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# EXHIBIT 1 GAMMA COMPANY VALUATION OF PHARMACEUTICAL PRODUCT PATENT INCOME APPROACH YIELD CAPITALIZATION PROCEDURE AS OF JANUARY 1, 2011 (PAGE 1)

		Pro Forma Years									
		12/31/11	12/30/12	12/30/13	12/30/14	12/31/15	12/30/16	12/30/17	12/30/18	12/31/19	12/30/20
Valuation of the Delta Product Patent	Notes	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
Gamma Company Product Line Revenue		4,643,232	4,450,217	4,184,750	3,880,112	3,548,858	3,548,858	3,548,858	3,548,858	3,548,858	3,548,858
Annual Growth Rate Percent		-1.2%	-4.2%	-6.0%	-7.3%	-8.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Estimated Delta Product Attrition Rate	23% [a]										
Revenue Attributable to the Delta Product Patent		3,575,289	2,604,350	1,849,994	1,289,821	883,047	679,946	523,559	403,140	310,418	239,022
Annual Growth Rate Percent	[b]	NA	-27.2%	-29.0%	-30.3%	-31.5%	-23.0%	-23.0%	-23.0%	-23.0%	-23.0%
EBITDA		1,573,127	1,145,914	813,997	567,521	388,541	299,176	230,366	177,382	136,584	105,170
EBITDA Margin	[c]	44%	44%	44%	44%	44%	44%	44%	44%	44%	44%
Less: Depreciation/Amortization Expense		793,018	552,967	375,423	248,354	160,263	123,402	95,020	73,165	56,337	43,380
% of Revenue	[d]	22.2%	21.2%	20.3%	19.3%	18.1%	18.1%	18.1%	18.1%	18.1%	18.1%
EBIT		780,109	592,947	438,575	319,167	228,278	175,774	135,346	104,216	80,247	61,790
EBIT Margin		21.8%	22.8%	23.7%	24.7%	25.9%	25.9%	25.9%	25.9%	25.9%	25.9%
Less: Income Taxes @ 37 percent		288,640	219,390	162,273	118,092	84,463	65,036	50,078	38,560	29,691	22,862
Net Income		491,469	373,557	276,302	201,075	143,815	110,738	85,268	65,656	50,556	38,928
Net Margin		13.7%	14.3%	14.9%	15.6%	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%
Plus: Depreciation/Amortization Expense		793,018	552,967	375,423	248,354	160,263	123,402	95,020	73,165	56,337	43,380
Less: Charges for the Use of Contributory Assets:											
Working Capital Capital Charge	[e]	27,530	20,053	14,245	9,932	6,799	5,236	4,031	3,104	2,390	1,840
Tangible Assets Capital Charge	[f]	(823,022)	(599,454)	(425,589)	(296,467)	(202,736)	(156,107)	(120,202)	(92,556)	(71,268)	(54,876)
Routine Intangible Assets Capital Charge	[g]	(164,756)	(123,965)	(91,524)	(66,472)	(47,625)	(36,671)	(28,237)	(21,742)	(16,742)	(12,891)
Equals: Patent Economic Income		324,239	223,159	148,856	96,422	60,516	46,598	35,880	27,627	21,273	16,381
Discounting Periods	[h]	0.500	1.500	2.500	3.500	4.500	5.500	6.500	7.500	8.500	9.500
Present Value Factor @ 11%		0.949	0.855	0.770	0.694	0.625	0.563	0.508	0.457	0.412	0.371
Present Value of Patent Economic Income		307,767	190,823	114,679	66,917	37,834	26,249	18,209	12,631	8,762	6,077
Present Value of Patent Economic Income (2011-2020)		789,949									
Indicated Fair Market Value of Delta Product Patent		790,000									

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product patent. The analyst is instructed that the appropriate valuation date is January 1, 2011.

The valuation analyst decided to use the income approach and the excess earnings method. Because the patent product revenue is expected to change at a non-constant rate over time, the analyst decided to use the yield capitalization procedure. Using this procedure, this valuation method is often called the multiperiod excess earnings method (or MEEM).

The Gamma Company patent is used to manufacture the Delta pharmaceutical product line. Based on the remaining legal life of the Delta patent and the product line revenue decay rate (considering the effect of a competitive drug product), the valuation analyst estimates a 10-year RUL for the Delta patent.

Gamma Company management provided the analyst with a financial projection for the overall Gamma Company product line in which the Delta product fits. The analyst performed a revenue decay rate analysis related to the Delta product in order to conclude a Delta patent revenue growth rate (or, in this case, decay rate).

**Exhibit 1** presents the projection of the Delta product revenue and profit over its expected 10-year RUL. The analyst estimated an appropriate capital charge on all of the Gamma Company contributory assets, including working capital assets, tangible assets, and routine (non-patent) intangible assets. This contributory asset analysis is summarized on **Exhibit 2**.

For convenience, we will assume that Gamma Company has the same 11 percent cost of capital as in the previous Beta Company (market approach) example (see Part VI of this series, *Business Valuation Alert*, Vol. 12, Issue No. 4). Therefore, the valuation

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## EXHIBIT 1 GAMMA COMPANY VALUATION OF PHARMACEUTICAL PRODUCT PATENT INCOME APPROACH YIELD CAPITALIZATION PROCEDURE VALUATION VARIABLES (PAGE 2)

[a] Considers the historical weighted decay rates for the Delta patented product revenue.

Delta product	2008	2009	2010	Average
Weighted Annual Revenue Decay Rate	23.4%	23.6%	23.3%	23.4%

[b] Represents 77 percent of Delta product revenue in 2011 based on the estimated attrition rate. Thereafter, Delta product revenue is decreased annually based on (1) the estimated attrition rate and (2) the negative annual growth rate.

[c] The projected 2015 EBITDA margin is maintained after 2015.

[d] The projected 2015 depreciation expense as a percent of revenue is maintained after 2015.

[e] Based on (1) working capital requirement for the Delta product line and (2) the return on working capital estimated based on the Gamma Company weighted average cost of capital (WACC).

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Working Capital - % of Consolidated Gamma Company Revenue	-7%	-7%	-7%	-7%	-7%	-7%	-7%	-7%	-7%	-7%
Working Capital Requirement (times Delta product revenue)	(250,270)	(182,305)	(129,500)	(90,287)	(61,813)	(47,596)	(36,649)	(28,220)	(21,729)	(16,732)
Return on Working Capital	11%	(27,530)	(20,053)	(14,245)	(9,932)	(6,799)	(5,236)	(4,031)	(3,104)	(2,390)

[f] Equals the sum of projected capital expenditure allocated to the Delta product line based on (1) % of revenue and (2) the return on tangible assets requirement estimated (based on the WACC).

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Net Tangible Assets as % of Consolidated Revenue (see Exhibit 7)	113%	113%	113%	113%	113%	113%	113%	113%	113%	113%
Tangible Assets Requirement (times Delta product line revenue)	4,038,767	2,941,962	2,089,816	1,457,025	997,520	768,090	591,430	455,401	350,659	270,007
Return on Tangible Assets	11%	444,264	323,616	229,880	160,273	109,727	84,490	65,057	50,094	38,572

[g] Routine intangible assets contributory asset charge as percent of consolidated revenue times revenue attributable to the Delta patented product line (see Exhibit 12-7).

[h] Calculated as if cash flow is received at mid-year.

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analyst used 11 percent as the Gamma Company weighted average cost of capital—or present value discount rate.

## Summary

This discussion is the seventh in a series of discussions related to the valuation of commercial intellectual property. This

discussion focused on the income approach valuation methods. The next discussion in this series will summarize the analyst's valuation synthesis and conclusion procedures. ♦

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### EXHIBIT 2 GAMMA COMPANY VALUATION OF PHARMACEUTICAL PATENT INCOME APPROACH YIELD CAPITALIZATION PROCEDURE CONTRIBUTORY ASSET CAPITAL CHARGE ANALYSIS

	FYE				
	12/31/11				
Tangible Assets Capital Charge:	\$000				
Beginning Tangible Assets [a]	12,034,000				
Capital Expenditures [a]	1,162,971				
Depreciation Expense [a]	(2,249,209)				
Net Tangible Assets	10,947,762				
Consolidated Gamma Company Revenue [b]	9,691,426				
Net Tangible Assets as % of Consolidated Revenue	113%				
	[c]	[d]			
Routine Intangible Assets Capital Charge:	Fair	Estimated			
	Market	Required	Annual		
	Value	Rate of	Return		
	\$000	Return	\$000		
Trademarks/Trade names	970,000	11%	106,700		
Internally Developed Computer Software Systems	2,510,000	11%	276,100		
Trained and Assembled Workforce	580,000	11%	63,800		
Total Contributory Intangible Assets			446,600		
	<b>12/31/11</b>	<b>12/31/12</b>	<b>12/13/13</b>	<b>12/31/14</b>	<b>12/31/15</b>
	\$000	\$000	\$000	\$000	\$000
Consolidated Gamma Company Revenue [b]	9,691,426	9,382,534	9,027,219	8,665,762	8,280,712
Intangible Assets Capital Charge (from above)	446,600	446,600	446,600	446,600	446,600
Intangible Assets Capital Charge as % of Consolidated Revenue	4.6%	4.8%	4.9%	5.2%	5.4%

[a] From Gamma Company business plan.

[b] From Gamma Company business plan.

[c] From Gamma Company business plan.

[d] Based on the Gamma Company WACC.