

**Project/Investment Selection<sup>1</sup>**  
**In-Class Problem<sup>2</sup>**

As a consultant assisting clients in selecting among a choice of private equity offerings, you're often tasked with the responsibility to select model forms, identify discount rates, and then rank projects by their outcomes. An investment banker with whom your client has worked in the past has come up with a few interesting offerings<sup>3</sup> in the private equity markets and presented them to you. You and your client have reviewed the data on these and you're now ready to consider which of the projects best fits your client's needs. The client could easily earn 4% on its available funds in a virtually risk free investment vehicle, but is seeking a higher level of return in exchange for subjecting their capital to a higher level of risk.

In an effort to make an informed decision on each of the target projects, your client has asked that you provide a discounted cash flow (DCF) model valuation for each firm given. You'll be expected to comment on the advisability of providing these firms with the funding amounts they're each seeking and must include the firm's present value from your valuation modeling, the net present value your client can expect in the event the requested investment is made, and the internal rate of return your client can expect to receive if the project is sold at the end of the explicit forecast period at the project's terminal value.<sup>4</sup>

- **Dawn Treader Enterprises** – A green energy start-up with limited resources and only two years of financial statements to review, but with innovative and highly accomplished ownership who've developed game-changing technology. The firm projects negative cash flows for 3 years of \$5,000,000 each, to be followed by cash flow growth of 35% for the 5 years following starting at \$3.5 million based on a set of government contracts recently entered into. Growth projections beyond that period are expected at 8% annually. The investment bank is projecting a risk adjusted discount rate of 20% for a potential investment in this firm. The firm is seeking funding based on a \$25,000,000 valuation. Market returns for firms similarly structured firms are 9% and you've calculated a beta factor for the firm of 1.4.
- **You Can't Get Enough, Inc.** - This firm develops quality food product franchises and has recently had great success capitalizing on the nation's long-overdue focus on BBQ, grits, and Dr. Pepper. The firm has designed innovative training, support and technology sufficient to launch a series of franchise opportunities and has committed to consistent growth of 10% cash flow growth for the following 10 years and industry projected growth rates of 6% beyond that point in time. The firm's most recent financial statements reflects cash flow of \$1,800,000. It has 15 years of financial statements representing consistent profits and has developed a reputation for fiscal prudence and limited risk taking. While its ownership has expanded over the years to include several closely held investor relationships, the firm remains under capitalized to support franchisee acquisition for its BJSJ Ribs line and two new franchise lines under development: Funky Fusion and Bistro Bites. The investment bank is projecting a risk adjusted discount rate of 12% for a potential investment in this firm. The firm is seeking funding based on a \$15,000,000 valuation. Market returns for firms similarly structured firms are 7% and you've calculated a beta factor for the firm of 1.2.

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<sup>1</sup> This problem and solution set is intended to present an abbreviated discussion of the included finance concepts and is not intended to be a full or complete representation of them or the underlying foundations from which they are built.

<sup>2</sup> This problem set was developed by Richard Haskell, PhD (rhaskell@westminstercollege.edu), Gore School of Business, Westminster College, Salt Lake City, Utah (2017).

<sup>3</sup> The firms presented in this problem set, Dawn Treader Enterprises, You Can't Get Enough, Inc. and BTW Boutiques are fictitious firms presented for educational and illustrative purposes only. Any similarity to actual firms is purely coincidental. Comments made by the author are similarly illustrative and not to be considered in any investment or corporate finance decision making.

<sup>4</sup> Consider each firm's CV as the terminal value for which the firm may be sold at the end of the explicit forecast period. In effect, this is the value the firm's expected future cash flows should have as of that point in time.

- **BTW Boutiques – Capitalizing on trends in repurposing quality women’s apparel, BTW has 8 boutiques in highly attractive domestic locations producing consistent cash flow growth of more than 15% for each of the last 5 years, with the most recent year cash flow reported at \$5,000,000. The firm designed an online buying platform allowing them to purchase surplus product from households at low prices in an effort to keep up with consumer demands in their boutique locations. Due to the strength of this source of product supply, the firm has laid extensive plans to employ the same technology in online distribution under the BTW brand. The investment bank is projecting a risk adjusted discount rate of 18% for a potential investment in this firm. The firm projects cash flow growth of 20% annually for the foreseeable future and is seeking funding based on a \$90,000,000 valuation. Market returns for firms similarly structured firms equals 11% and you’ve calculated a beta factor for the firm of 1.3.**

1. **Dawn Treader Enterprises: Provide the firm’s calculated valuation, the NPV, IRR and MIRR your client can expect in the event the requested investment is made and then sold for its expected terminal value.**

<b>Dawn Treader Enterprises</b>			
<b>r</b>		0.2	
<b>g<sub>4-8</sub></b>		0.35	
<b>g<sub>9+</sub></b>		0.08	
<b>Proposed valuation</b>		\$25,000,000	
	<b>Cash Flow</b>	<b>DCF</b>	<b>Σ DCF</b>
<b>0</b>		-	-
<b>1</b>	(5,000,000.00)	(4,166,666.67)	(4,166,666.67)
<b>2</b>	(5,000,000.00)	(3,472,222.22)	(7,638,888.89)
<b>3</b>	(5,000,000.00)	(2,893,518.52)	(10,532,407.41)
<b>4</b>	3,500,000.00	1,687,885.80	(8,844,521.60)
<b>5</b>	4,725,000.00	1,898,871.53	(6,945,650.08)
<b>6</b>	6,378,750.00	2,136,230.47	(4,809,419.61)
<b>7</b>	8,611,312.50	2,403,259.28	(2,406,160.33)
<b>8</b>	11,625,271.88	2,703,666.69	297,506.36
<b>CF<sub>1</sub></b>	12,555,293.63		
	<b>PV<sub>DCF</sub></b>	\$297,506.36	
	<b>CV<sub>DG</sub></b>	\$104,627,447	
	<b>PV<sub>CV</sub></b>	\$24,333,000	
	<b>PV<sub>DCF</sub> + PV<sub>CV</sub></b>	\$24,630,506.5	
	<b>NPV</b>	(\$369,493.5)	
	<b>IRR</b>	19.82%	
	<b>MIRR</b>	19.84%	

*All PV<sub>DCF</sub>, CV<sub>DG</sub>, PV<sub>CV</sub> values do not include CF<sub>0</sub> and are calculated for explicit and continuing value periods*

*IRR include proposed valuation as a cost in period 0 and accounts for the terminal value (CV) as an addition to the cash flow of the last year of the explicit period*

2. You Can't Get Enough, Inc: Provide the firm's calculated valuation, the NPV, IRR and MIRR your client can expect in the event the requested investment is made and then sold for its expected terminal value.

<b>You Can't Get Enough, Inc.</b>			
	<b>r</b>	0.12	
	<b>g<sub>1-10</sub></b>	0.1	
	<b>g<sub>11+</sub></b>	0.06	
	<b>Proposed valuation</b>	\$15,000,000	
	<b>Cash Flow</b>	<b>DCF</b>	<b>Σ DCF</b>
<b>0</b>			- -
<b>1</b>	1,980,000.00	1,767,857.14	1,767,857.14
<b>2</b>	2,178,000.00	1,736,288.27	3,504,145.41
<b>3</b>	2,395,800.00	1,705,283.12	5,209,428.53
<b>4</b>	2,635,380.00	1,674,831.63	6,884,260.16
<b>5</b>	2,898,918.00	1,644,923.93	8,529,184.09
<b>6</b>	3,188,809.80	1,615,550.28	10,144,734.37
<b>7</b>	3,507,690.78	1,586,701.17	11,731,435.54
<b>8</b>	3,858,459.86	1,558,367.22	13,289,802.76
<b>9</b>	4,244,305.84	1,530,539.24	14,820,342.00
<b>10</b>	4,668,736.43	1,503,208.18	16,323,550.18
<b>CF<sub>1</sub></b>	4,948,860.61		
	<b>PV<sub>DCF</sub></b>	\$16,323,550.18	
	<b>CV<sub>DG</sub></b>	\$82,481,010.2	
	<b>PV<sub>CV</sub></b>	\$26,556,677.8	
	<b>PV<sub>DCF</sub> + PV<sub>CV</sub></b>	\$42,880,228.0	
	<b>NPV</b>	\$27,880,228.0	
	<b>IRR</b>	28.70%	
	<b>MIRR</b>	24.40%	

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*IRR include proposed valuation as a cost in period 0 and accounts for the terminal value (CV) as an addition to the cash flow of the last year of the explicit period*

3. BTW Boutiques: Provide the firm's calculated valuation, the NPV, IRR and MIRR your client can expect in the event the requested investment is made and then sold for its expected terminal value. *Include in your valuation analysis a 20-year explicit period.*

		BTW Boutiques	
	r	0.18	
	g <sub>1+</sub>	0.2	
	g <sub>10+</sub>	0.2	
	Proposed valuation	\$90,000,000	
	Cash Flow	DCF	Σ DCF
0		-	-
1	6,000,000.00	5,084,745.76	5,084,745.76
2	7,200,000.00	5,170,927.89	10,255,673.66
3	8,640,000.00	5,258,570.74	15,514,244.40
4	10,368,000.00	5,347,699.06	20,861,943.45
5	12,441,600.00	5,438,338.02	26,300,281.48
6	14,929,920.00	5,530,513.25	31,830,794.72
7	17,915,904.00	5,624,250.76	37,455,045.48
8	21,499,084.80	5,719,577.04	43,174,622.52
9	25,798,901.76	5,816,519.03	48,991,141.55
10	30,958,682.11	5,915,104.09	54,906,245.64
11	37,150,418.53	6,015,360.10	60,921,605.74
12	44,580,502.24	6,117,315.35	67,038,921.09
13	53,496,602.69	6,220,998.66	73,259,919.75
14	64,195,923.23	6,326,439.32	79,586,359.07
15	77,035,107.87	6,433,667.10	86,020,026.18
16	92,442,129.45	6,542,712.31	92,562,738.48
17	110,930,555.34	6,653,605.74	99,216,344.22
18	133,116,666.40	6,766,378.72	105,982,722.94
19	159,739,999.69	6,881,063.10	112,863,786.04
20	191,687,999.62	6,997,691.29	119,861,477.33
CF <sub>1</sub>	230,025,599.55		
	PV <sub>DCF</sub>	\$119,861,477.33	<i>All PV<sub>DCF</sub>, CV<sub>DG</sub>, PV<sub>CV</sub> values do not include CF<sub>0</sub> and are calculated for explicit and continuing value periods</i>
	CV <sub>DG</sub>	(\$11,501,279,977.3)	
	PV <sub>CV</sub>	(\$419,861,477.33)	
	PV <sub>DCF</sub> + PV <sub>CV</sub>	(\$300,000,000.0)	<i>IRR include proposed valuation as a cost in period 0 and accounts for the terminal value (CV) as an addition to the cash flow of the last year of the explicit period</i>
	NPV	(\$390,000,000.0)	
	IRR	#NUM!	
	MIRR	9.51%	

4. Notice that the  $g$  for the explicit forecast period and the continuation period for BTW Boutiques are the same. Calculate the firm's value by simply applying the continuing value portion of the valuation equation and see what happens.

$$Value = \frac{CF_1}{r - g} = \frac{6,000,000}{.18 - .20} = -300,000,000$$

5. Notice the problematic relationship between  $r$  and  $g$  for BTW Boutiques in which  $r < g$  results in an expressly negative valuation. Would you expect a firm posting consistent cash flows would warrant a negative valuation? What might you change about your expectations for the firm to that might result in a more plausible valuation?

A firm with consistent cash flows should reasonably warrant a meaningful value in the markets. There may be two ways of thinking about this: 1) It might be reasonable to assign a more aggressive  $r$  to a firm with such aggressive growth plans, or 2) It might be more realistic to assign a less aggressive long-term  $g$  to the firm, any firm. 20% is a big number to try to live up to year after year, decade after decade, and century after century.... after all, we're talking about a perpetuity based equation.

6. Finally, thoughtfully consider which of the firm's you'll recommend your client make an investment in, make your recommendation and indicate any needed adjustments to the valuation model inputs in support of your recommendation. For example: you might like the firm, but think the projected  $r$  isn't appropriate for your investor, or maybe you'll challenge the firm's long-run growth rate, consider a counter offer to the proposed valuation suggested in the transaction, or consider including some other form of capitalization other than buying the firm outright with cash. Get creative here, have fun, and support anything you suggest.... It's only your low seven figure income that's on the line.

All things considered I'd recommend the client invest in Dawn Treader Enterprises, but I have several items to include in a counter offer.

Here's why I wouldn't invest in the other two firms:

- You Can't Get Enough is a restaurant play and even though it's fills a place in the BBQ space (aka the holy grail of enlightened food products) owning and operating a restaurant is the fastest way I know to lose money with the greatest amount of effort. It's brutal! To make matters worse, it's also a franchise play, which is the second fastest way I know to lose money with maximum effort. To me this is simply a combination of tragic and b-ugly wrapped into one. I wouldn't be a buyer of this enterprise at any price.
- BTW Boutiques is intriguing. Proven track record, consistent profits, technology play ... all of these are interesting and timely. But... it's in the apparel space and I just don't understand that space. I have a hard and fast rule: I don't invest in firms I don't understand... period... end of story. Why, because if things become difficult and the firm's management needs input, I simply have nothing of value to offer. Add to this the fact that I don't believe the firm has the legs to maintain the long-run growth projected. While that might actually help the valuation, given the problematic relationship between  $r$  and  $g$ , it causes me to wonder about the firm's management and how effective the team may be in the future.

So... I like Dawn Treader, but only on my own terms:

- \$25,000,000 purchase valuation
- Require \$5,000,000 be set aside for R&D of additional products to ready for market
- See funding for the required \$5,000,000 for each of the next three years through debt financing after the purchase transaction and based on our client's credit capacity rather than based on Dawn Treader's non-existent cash flow/credit history – I might even have our client fund this at an appropriate rate of interest and have the interest expense accumulate until year 10 after the firm is nicely profitable
- Adjust the expected growth rates to 15% for years 9-13 and 8% thereafter
- The firm must publicly support BBQ and Dr. Pepper as having their own place atop the food pyramid

This would adjust the valuation metrics as follows:

<b>Dawn Treader Enterprises</b>			
	<b>r</b>	0.2	
	<b>g<sub>4-8</sub></b>	0.35	
	<b>g<sub>9-13</sub></b>	0.15	
	<b>g<sub>14+</sub></b>	0.08	
	<b>Proposed valuation</b>	\$25,000,000	
	Cash Flow	DCF	Σ DCF
<b>0</b>		-	-
<b>1</b>	(5,000,000.00)	(4,166,666.67)	(4,166,666.67)
<b>2</b>	(5,000,000.00)	(3,472,222.22)	(7,638,888.89)
<b>3</b>	(5,000,000.00)	(2,893,518.52)	(10,532,407.41)
<b>4</b>	3,500,000.00	1,687,885.80	(8,844,521.60)
<b>5</b>	4,725,000.00	1,898,871.53	(6,945,650.08)
<b>6</b>	6,378,750.00	2,136,230.47	(4,809,419.61)
<b>7</b>	8,611,312.50	2,403,259.28	(2,406,160.33)
<b>8</b>	11,625,271.88	2,703,666.69	297,506.36
<b>9</b>	13,369,062.66	2,591,013.91	2,888,520.26
<b>10</b>	15,374,422.05	2,483,055.00	5,371,575.26
<b>11</b>	17,680,585.36	2,379,594.37	7,751,169.63
<b>12</b>	20,332,673.17	2,280,444.61	10,031,614.24
<b>13</b>	23,382,574.14	2,185,426.08	12,217,040.32
<b>CF<sub>1</sub></b>	25,253,180.07		
	<b>PV<sub>DCF</sub></b>	\$12,217,040.32	
	<b>CV<sub>DG</sub></b>	\$210,443,167	
	<b>PV<sub>CV</sub></b>	\$19,668,835	
	<b>PV<sub>DCF</sub> + PV<sub>CV</sub></b>	\$31,885,875.0	
	<b>NPV</b>	\$6,885,875.0	
	<b>IRR</b>	22.13%	
	<b>MIRR</b>	21.65%	

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