Financial Engineering: Share Buyback Problem Set[1]
GoreCore Enterprises
In-Class Problem[2]

GoreCore Enterprises is a privately held firm specializing in renewable energy production and storage technologies. The firm has enjoyed dynamic growth over the last decade and is providing significant cash flows to its stakeholders. The firm has a low debt-to-equity ratio compared to its industry peers and a low cost of borrowing. The combination of strong cash flows, low debt levels, and inexpensive borrowing have made it an attractive target for private equity, so much so that the firm's board has repeatedly received inquiries with respect to possible transactions, several of which has proposed "friendly" takeover scenarios. In its early years GoreCore's founders envisioned their company firm as a lifestyle firm, but like many, required equity funding to realize growth opportunities and sold equity shares to Angel and Venture Capital investors[3] rather than take on costly debt and the resulting debt service obligations they feared may place excessive pressures on the firm's future cash flows. Now, these early investors are seeking liquidity and the founders fear they may be in a position to lose control of the firm they had expected to keep in "family" hands for generations. As it is, they already own an equivalent of 18.37% of the firm's outstanding equity shares and control 3 of the firm's 7 board seats.

As GoreCore's CFO and one of the founding stakeholders, you're seeking to help you and your early partners solidify control of the firm and see the possibility to simultaneously strengthening the value of your equity positions. Rather than become subject to the possibility select stakeholders may choose to sell their equity stakes to outside investors, you've recommended the firm buy back their shares via a leveraged buyback (buyout) transaction. In anticipation you've arranged up to $78 million in long-term debt financing at 5.50% and are prepared to buy back outstanding shares at a 10% premium to the current market value.

At the end of each year you've prepared an informal valuation estimate of the firm in an effort to approximate the market value of the firm's capital components (see attached Additional Financial Information) for the benefit of the various equity stakeholder. Though this has been sufficient to this point, you now need to consider a more rigorous valuation analysis based on the firm's discounted free cash flows and an EBIT multiple. You've agreed with the board that you'll use an EBIT multiple based on the KVD algebraic form and will accept the average of the two valuation estimates, Free Cash Flow and Forward Market Multiple, as the estimated value of the firm.

Revenue Forecasts

The firm's current revenue mix includes revenues from leasing equipment it effectively sold to existing customers – a capital intensive activity as the firm carries the lease contracts. While providing a resource for good customers, the board has agreed that this activity may not be the best use of the firm's capital and is in support of your recommendation for an alliance with Signature Capital, a Venture Capital and Enterprise Finance firm prepared to provide this service at a low cost to the customer.

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[1] 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.
[2] This problem set was developed by Richard Haskell, PhD (rhaskell@westminstercollege.edu), Gore School of Business, Westminster College, Salt Lake City, Utah (2020).
[3] Angel and Venture Capital stakeholders currently own 100% of the firm's outstanding preferred shares plus 1 million shares of the outstanding common equity.

GoreCore will no longer lease equipment to its customers starting in 2020 and the firm will be completely out of the leasing business by the beginning of 2021. Projected leasing revenue declines for 2020 and 2021 are 25% and 35%.

Simultaneously, the firm has experienced substantial increases in Repair & Maintenance revenues as products placed into service in previous years are now beyond their warranty periods require ongoing maintenance. This revenue category increased by nearly 246% in 2019 and is projected to grow in 2020 by 50% with subsequent annual increase of 40%, 30% and 30% before settling into long-run increases of 5%.

The firm's Consulting Income is expected to increase by 12%, 18%, 16% and 3% for 2020 through 2023. Its Private Equity Incomes, the result of minority holdings in joint ventures entered into in late 2018, are expected to increase at 10% each year through 2022 before leveling off at a modest 3% increase thereafter.

Questions

1) **Use the following format to prepare a Revenue Matrix showing 2018-2019 actuals and 2020-2023 forecasts based on the information provided.**

				Explicit Forecast Period						Continuation Term	
	2018	2019		2020		2021		2022		2023	
		% Δ	Revenue	% Δ	Revenue	% Δ	Revenue	% Δ	Revenue	% Δ	Revenue
Product Sales	213.980	1.40%	216.980	10%	238.678	13%	269.7061	12%	302.071	4%	314.154
Consulting Income	46.200	10.29%	50.952	12%	57.066	18%	67.3382	16%	78.112	3%	80.456
Equipment Leasing	79.880	-1.54%	78.652	-25%	58.989	-35%	38.3429	-100%	0.000		
Service and Repairs	5.680	245.88%	19.646	50%	29.469	40%	41.2566	30%	53.634	5%	56.315
Private Equity Incomes	0.550	238.18%	1.860	10%	2.046	10%	2.2506	10%	2.476	3%	2.538
Total Revenues	346.290	6.30%	368.090	4.93%	386.248	8.45%	418.894	4.15%	436.292	3.94%	453.462

2) **Prepare a forecast panel sufficient to project each of the revenue and expense categories on the attached income statement with enough detail to forecast free cash flow. In addition to each of the revenue and expense categories this should include EBIT, NOPLAT, FA, NWC, IC, ROIC and FCF for the base year, each of the periods in the explicit forecast, and the continuation period.**

		Revenues						Operating Expenses											
	Year	Product Sales	Consulting Income	Equipment Leasing	Service & Repairs	Private Equity Incomes	Total Revenue	Production & Service	Equipment Leases	Marketing & Sales	General & Admin	D&A	EBIT	NOPLAT	FA	NWC	IC	ROIC	FCF
Forecast Ratios		*See Revenue Matrix*						39.88%	8.05%	5.40%	27.81%	1.87%							
	2019	216.98	50.95	78.65	19.65	1.86	368.09	146.80	29.64	19.89	102.36	6.89	62.513	46.260	80.590	65.91	146.500	31.58%	22.210
1	**2020**	238.68	57.07	58.99	29.47	2.05	386.25	154.04	31.10	20.87	107.41	7.23	65.597	48.542	84.566	69.161	153.727	31.58%	41.315
2	**2021**	269.71	67.34	38.34	41.26	2.25	418.89	167.06	33.73	22.63	116.48	7.84	71.141	52.644	91.713	75.007	166.720	31.58%	39.651
3	**2022**	302.07	78.11	-	53.63	2.48	436.29	174.00	35.13	23.57	121.32	8.17	74.096	54.831	95.522	78.122	173.645	31.58%	47.907
	2023	314.15	80.46	-	56.32	2.54	453.46	180.85	36.51	24.50	126.10	8.49	77.012	56.989	99.281	81.197	180.478	31.58%	50.155

3) **Calculate the firm's pre-transaction weighted average cost of capital.**

$$\textbf{WACC} = \left(\frac{E}{V}\,x\,R_E\right) + \left(\frac{P}{V}\,x\,R_P\right) + \left(\frac{D}{V}\,x\,R_D\right)(1 - T_C)$$

	Value	Weight	Costs
Common	337.500	79.35%	13.97%
Preferred	48.375	11.37%	2.11%
Debt	39.452	9.28%	4.75%
Total	425.327	100.00%	
WACC (market based)		11.65%	

4) **Calculate the firm's expected pre-transaction EBIT multiple using the KVD form and some deft algebra.**

$$\frac{EV}{EBIT} = \frac{ROIC - g}{ROIC(WACC - g)}(1 - T) = \frac{.3158 - \ .0394}{.3158\ (.1165 - \ .0394)}(1 - .26) = 8.40$$

5) **Provide pre-transaction valuation panels using the FCF and FMM models given the information from your forecasts, details provided, and the EBIT multiple you've calculated. This should result in two multi-columnar valuation estimates (FCF and FMM).**

			Pre-Tranaction Valuation					
			FCF			FMM (Target)		
	Time	Year	FCF	PV_{FCF}	$\sum PV_{FCF}$	FCF	PV_{FCF}	$\sum PV_{FCF}$
Base Year	0	2019						
Explicit Peri	1	2020	41.31	37.00	37.00	41.31	37.00	37.00
	2	2021	39.65	31.81	68.81	39.65	31.81	68.81
	3	2022	47.91	34.42	103.23	47.91	34.42	103.23
	4	2023	50.16			50.16		
			PV_{FCF}	103.23		PV_{FCF}	103.23	
			CV_{FCF}	650.03		CV	646.55	
			PV_{CV}	467.03		PV_{CV}	464.53	
			$VALUE_{FCF}$	570.26		$VALUE_{FCF}$	567.76	
			Average Valuation		569.01			

6) **Based on the average of your two pre-transaction valuation estimates, calculate the current common and preferred share values and offer commentary with respect to how these compare with the values included in the attached Additional Financial Information.**

	Pre-Transaction	
Estimated EV	569.01	
Debt	39.45	
Cash	10.93	
Estimated Equity	540.49	
Common Shares	15.00	
Preferred Shares	4.30	
Pref to Common Conversion Ratio	2.00	
Converted Preferred Shares	2.15	
Total Equity Shares (common)	17.15	
	Value	**Price**
Common Equity per Share	31.52	22.5
Preferred Equity per Share	15.76	11.25

Based on the data provided in the Additional Financial Information, the per share "value" is substantially greater than the per share "price". This is likely an issue of the being a function of the CFO's informal estimates and the possibility the revenue forecast data provided is overly optimistic. However, if the valuation is accurate, the firm and its founding stakeholders would benefit greatly by executing the proposed share repurchase program.

7) Calculate the firm's post-transaction weighted average cost of capital.

Note that the value of common is based on the price specified in the pre-transaction financial information expanded at the expected acquisition premium of 10%. The preferred values, weights and costs reflect that all of the firm's outstanding preferred were repurchased and there are no preferred shares outstanding post-transaction. The Debt value includes the 77.963 in new debt plus a revalued market value of the existing debt given the new cost of borrowing (5.50%).

	Value	Weight	Costs
Common	346.500	75.16%	13.97%
Preferred	-	0.00%	-
Debt	114.545	24.84%	5.50%
Total	461.045	100.00%	
WACC (market based)		11.51%	

8) **Calculate the firm's expected post-transaction EBIT multiple using the KVD form.**

$$\frac{EV}{EBIT} = \frac{ROIC - g}{ROIC(WACC - g)}(1 - T) = \frac{.3158 - .0394}{.3158\,(.1151 - .0394)}(1 - .26) = 8.55$$

9) Provide post-transaction valuation panels using the FCF and FMM models given the information from your forecasts, details provided, and the EBIT multiple you've calculated. This should result in two multi-columnar valuation estimates (FCF and FMM).

			Post-Transaction Valuation					
			FCF			FMM (Target)		
	Time	Year	FCF	PV_{FCF}	$\sum PV_{FCF}$	FCF	PV_{FCF}	$\sum PV_{FCF}$
Base Year	0	2019						
Explicit Peri	1	2020	41.315	37.050	37.05	41.315	37.050	37.05
	2	2021	39.651	35.558	72.61	39.651	35.558	72.61
	3	2022	47.907	42.961	115.57	47.907	42.961	115.57
	4	2023	50.155			50.155		
			PV_{FCF}	115.57		PV_{FCF}	115.57	
			CV_{FCF}	662.11		CV	658.56	
			PV_{CV}	477.52		PV_{CV}	474.96	
			$VALUE_{FCF}$	593.09		$VALUE_{FCF}$	590.53	
			Average Valuation		591.81			

10) **Based on the average of your two post-transaction valuation estimates, calculate the expected common and preferred share values and offer commentary with respect to how these compare with those pre-transaction values you've calculated.**

	Pre-Transaction		Post-Transaction
Estimated EV	569.01		591.81
Debt	39.45		114.55
Cash	10.93		10.93
Estimated Equity	540.49		488.19
Common Shares	15.00		14.00
Preferred Shares	4.30		-
Pref to Common Conversion Ratio	2.00		2.00
Converted Preferred Shares	2.15		-
Total Equity Shares (common)	17.15		14.00
	Value	**Price**	**Value**
Common Equity per Share	31.52	22.5	34.87
Preferred Equity per Share	15.76	11.25	-

Notice the increase in per share price resulting from the decrease in WACC (discount rate) from 11.65% to 11.51% and the increase in the EBIT multiple, also a function of the changed discount rate.

11) **Show how the proposed transaction would impact the firm's balance sheet and income statement.**

The firm's Income Statement is unaffected by the change in the capital structure, as is the left-hand side of the Balance Sheet (Assets). The Balance Sheet's right-hand side, however, is transformed by the addition of $77. 963 million in new debt and simultaneous reduction of Owner's Equity of $24.75 million in common equity and $53.213 in preferred equity. While the Balance Sheet still "balances" the firm's Debt-to-Equity ratio changes dramatically.

12) **Finally, discuss the impact on the firm and its stakeholders of the share repurchase transaction and offer a convincing argument as to why the board should approve your financing proposal.**

The impact of the proposed leveraged buyback of equity shares in the hands of the firm's Angel and Venture Capital investors appears clear. Not only do the founding stakeholders are management consolidate control, but they also enjoy an increase in the value of their equity stakes. Prior to the transaction these stakeholders had 14 million shares representing 80% of the firm's equity shares with total market price of $315 million, combined, given the values represented on the firm's financials. A more rigorous analysis of the firm's pre-transaction value brought the value of this 80% equity stake to $441.28 million. The post-transaction equity value results in a $488.18 total common equity valuation, 54.98% increase over the informal pre-transaction estimate and 10.63% over the more rigorous pre-transaction estimate.

A few significant questions remain, however: 1) Are the "non-family" equity stakeholders prepared to liquidate their holdings at the expected 10% premium or will they expect a higher per share price? One might expect these investors to hold out for a higher price, in which case, the remaining stakeholder equity value may suffer as a result. It's likely these remaining stakeholders will still. Enjoy an economic benefit, both now and in the future, from the transaction. 2) Will the firm be able to meet its new debt service obligations on the $77.963 million in debt at 5.50% interest rate? The interest payments alone will consume $4.288 million of the firm's $62.513 million in 2019 operating income so the Times Interest Earned relation appears to be robust, but that supposes the firm continues to enjoy relative success and doesn't suffer from significant unexpected shocks similar to the COVID-19 shock currently reverberating through the global economy. 3) Will the firm's credit capacity be effected by the transaction, and if so, what will that do to the firm's valuation? It seems likely the firm would face even higher borrowing costs in the future after taking on almost $78 million in additional debt. Absent an aggressive debt repayment plan, altogether possible given the firm's substantial operating cash flow of $53.58 in 2019, the firm's expected cost of borrowing may well rise and an increase to any level beyond 6% may risk increasing the firm's WACC such that the firm's valuation and equity capitalization may decline below current levels.

GoreCore Enterprises
Balance Sheet (millions)
Year Ending December 31

	2018	2019		2018	2019
Current Assets			Current Liabilitites		
Cash & Securities	7.780	10.933	Accounts Payable	29.360	30.993
Accounts Receivable	37.470	40.910	Wages Payable	6.400	5.620
Inventory	47.700	51.440	Accrued Liabilities	1.440	0.760
Total	92.950	103.283	Total	37.200	37.373
Fixed Assets			Long Term Debt		
Real Estate	16.132	17.311	Bonds	32.340	34.820
Technology	5.985	6.985	Total	32.340	34.820
Equipment	19.893	24.471			
Patents Held	4.930	5.243	Owner's Equity		
Private Equity	19.760	26.580	Common Stock	5.570	5.570
Total	66.700	80.590	Preferred Stock	1.900	1.900
			Accumulated Retained Earnings	82.640	104.210
			Total	90.110	111.680
Total Assets	159.650	183.873	Total Liabilities and Owner's Equity	159.650	183.873

GoreCore Enterprises
Income Statement (millions)
January 1 - December 31

	2018	2019
Revenues		
Sales Sales	213.980	216.980
Consulting Income	46.200	50.952
Equipment Leasing	79.880	78.652
Service and Repairs	5.680	19.646
Private Equity Incomes	0.550	1.860
Total Income	346.290	368.090
Operating Expenses		
Production & Service	136.690	146.802
Equipment Leases	23.500	29.640
Marketing & Sales	18.568	19.888
General & Admin	101.420	102.357
Depreciation	7.640	6.890
Total Expenses	287.818	305.577
Operating Income	58.472	62.513
Non-Operating Expenses		
Interest Paid	2.720	3.050
Total Non-Operating Expenses	2.720	3.050
Taxable Income	55.752	59.463
Taxes Paid	14.496	15.460
Net Income	41.256	44.003
Distribution of Earnings		
Dividends (Common)	17.360	21.413
Dividends (Preferred)	1.020	1.020
Addition to Retained Earnings	22.876	21.570

Additional Financial Information

			2018	2019
Bond Information		**Common Equity**	**2018**	**2019**
Coupon	6.00%	Shares Outstanding (millions)	15.000	15.000
YTM (current yield)	4.75%	12/31 Price per Share	21.000	22.500
P/YR	2	Market Value (millions)	315.000	337.500
Year Issued	2004			
Face Value	1000			
Term (yrs)	30	**Preferred Equity (2:1 preferred to common)**		
Equity Information		Shares Outstanding (millions)	4.300	4.300
Market Returns	12.00%	12/31 Price per Share	10.500	11.250
Risk Free Rate	2.15%	Market Value (millions)	45.150	48.375
Beta (assumed)	1.20	Preferred Equity Conversion Ratio	2	2