Very clearly structured and written report with well-annotated exhibits. Professionally done. Great job!

10/10

Chestnut Foods case (Group 2)

Introduction:

Chestnut Foods (Chestnut) operates two primary divisions: Food Products and Instruments. In early 2014, its stock performance failed to meet expectations for several consecutive years. Due to the depressed share price, Van Muur acquired 10% of Chestnut's shares. After that, he urged the firm to sell its Instruments division and concentrate on Food Products. This advice conflicts with Pedersen's (Chestnut's CFO) plan to invest USD 1 billion in expanding the Instruments division. Pedersen now encounters a critical decision: follow Van Muur's advice to divest or proceed with the investment in the Instruments division.

Chestnut has a long-standing policy to use a single hurdle rate of 7%. However, we believe that a single hurdle rate for both divisions of 7% would not be appropriate given the fact that these two businesses have different risk profiles. Different characteristics of 2 divisions with a single hurdle rate of 7% potentially result in underinvestment in the Food Products division and overinvestment in the Instruments division. Shareholders' value is not maximized due to inefficient capital allocation through the company's risk-return profile. Failure to adjust hurdle rates to conform with risk-return divisions results in competitive disadvantages.

Cost of capital of the Food Products division and Instruments division:

To ascertain if the Food Products and Instruments divisions create value for Chestnut's shareholders, it is necessary to compute each division's cost of capital to compare with its expected return on capital **(Exhibit 1)**. This involves unknown variables including the beta for cost of equity, capital structure, and the cost of debt of each division.

Initially, to determine the **beta** for each division, we calculate the average unlevered beta of Chestnut's comparable firms, as shown in **Exhibit 4**, employing Hamada's equation detailed in **Exhibit 3**. This unlevered beta is then adjusted based on the debt-to-equity ratio of 31.55% and 11.52% for Food Products and Instruments, respectively, which is derived from the average debt-to-value ratio of comparable firms. This approach, utilizing the average debt-to-value ratio of comparable firms as a proxy for each division's debt-to-value, is preferred because it more accurately mirrors the specific financial structures and risk profiles prevalent within each industry, compared to the aggregate debt-to-value ratio of Chestnut. In this calculation, we also include Wendell Instruments, an instruments business with 100% equity, as a peer. This is because including Wendell Instruments as a peer offers a pure view of business risk for the Instruments division. Thus, we obtain a beta of 0.63 and 1.13 for the Food Products division and Instruments division, respectively **(Exhibit 5)**. This also implies that the Instruments division is riskier than the Food Products division as it has a higher beta.

Good. You should justify your decision to include/exclude ...

To determine the **cost of debt** of Food Products and Instruments, we first estimate the credit rating for each division. In this case, we believe that the credit rating for each division is not the same given that they have different risk profiles and performance. We assign an A- rating for the Food Products division, aligning with Chestnut's overall credit rating, and a BBB rating to the Instruments division due to its higher risk. So, we obtain the cost of debt of 3.47% and 4.11% for the Food Products division and Instruments division, respectively **(Exhibit 5)**.

After we obtain all unknown variables, we calculate the cost of equity and cost of capital for each division by using the CAPM and WACC approaches, respectively **(Exhibit 5)**. We obtain the cost of equity of 6.60% and 9.59% for Food Products and Instruments, respectively. Besides, we obtain the cost of capital of 5.54% and 8.86% for Food Products and Instruments, respectively.

Economic value added of the Food Products division and Instruments:

According to the result, we found that, for the Food Products division, the expected return on capital of 6.3% exceeds its cost of capital of 5.54%. Thus, its economic value added (EVA) is positive at USD 10.62 million **(Exhibit 6)**. This means that the Food Products division creates value for Chestnut's shareholders. In contrast, for the Instruments division, the expected return on capital of 7.7% is lower than the computed cost of capital of 8.86%. Therefore, its EVA is negative at USD 6.95 million **(Exhibit 6)**. Also, even after assigning more favorable credit ratings and higher debt-to-equity ratios to the Instruments division, its EVA remains negative, as shown in **Exhibit 7**. Therefore, investing USD 1 billion in expanding this division would likely result in a further decline in Chestnut's overall economic value.

Good. Estimates can be noisy, and a sensitivity analysis can address that

Recommendation

Based on the results, we recommend that Chestnut refrain from further investments in its Instruments division if the expected return on capital does not surpass the division's cost of capital, which stands at 8.86%. This is because the additional investments in the Instruments division could diminish the firm's economic value. Consequently, divesting the Instruments division and reallocating resources toward the Food Products division, as advocated by Van Muur, appears to be a prudent strategy for Chestnut.

Appendix

Exhibit 1: Given information about Chestnut

	Equity Beta	S&P Bond Rating	Total Debt	Total Equity (Book Value)	Total Equity (Market Value)	Debt-to-equity ratio	Net assets	NOPAT	Return on capital
Chestnut Foods	0.9	A–	461	1544	1840	25.1%			
-- Food Products division							1400	88	6.30%
-- Instruments division							600	46	7.70%

Note: The unit of debt and equity is USD million.

Exhibit 2: Cost of capital of each comparable firm

	S&P Bond Rating	Equity Beta	Total Debt	Total Equity (Book Value)	Total Equity (Market Value)	Cost of debt	Cost of equity (Ke=Rf + Beta [MRP])	Wd	We	WACC (Tax rate = 37%)
Food Processing										
Boulder Brands	B+	0.55	298	355	958	6.77%	6.10%	23.70%	76.30%	5.67%
Campbell Soup	BBB+	0.60	4,832	1,349	13,223	3.84%	6.40%	26.76%	73.24%	5.33%
ConAgra Foods	BBB–	0.70	9,590	5,472	13,805	4.62%	7.00%	40.99%	59.01%	5.32%
Diamond Foods	B–	0.75	593	167	578	8.96%	7.30%	50.62%	49.38%	6.46%
Flowers Foods	BBB–	0.50	923	1,076	4,429	4.62%	5.80%	17.25%	82.75%	5.30%
General Mills	BBB+	0.55	8,645	6,633	31,245	3.84%	6.10%	21.67%	78.33%	5.30%
Hormel Foods	A	0.65	250	3,311	11,759	3.25%	6.70%	2.08%	97.92%	6.60%
Kellogg	BBB+	0.60	7,358	3,545	21,841	3.84%	6.40%	25.20%	74.80%	5.40%
J. M. Smucker	BBB+	0.70	2,241	5,168	10,904	3.84%	7.00%	17.05%	82.95%	6.22%
Tyson Foods	BBB	0.80	1,942	6,285	11,469	4.11%	7.60%	14.48%	85.52%	6.87%
Mean								**23.98%**	**76.02%**	**5.85%**
Median								**22.68%**	**77.32%**	**5.53%**
Instruments										
Badger Meter	BBB–	1.06	89	197	723	4.62%	9.16%	10.92%	89.08%	8.48%
Dresser-Rand	BB	1.40	1,287	1,297	4,549	6.45%	11.20%	22.05%	77.95%	9.63%
Flowserve	BBB–	1.30	1,200	1,870	10,767	4.62%	10.60%	10.03%	89.97%	9.83%
Honeywell	A	1.25	8,829	17,467	74,330	3.25%	10.30%	10.62%	89.38%	9.42%
Idex	BBB	1.15	774	1,573	5,933	4.11%	9.70%	11.54%	88.46%	8.88%
Measurement Specialties	BBB	1.35	129	331	944	4.11%	10.90%	12.03%	87.97%	9.90%
Mettler-Toledo	A	1.10	413	935	7,154	3.25%	9.40%	5.46%	94.54%	9.00%
Wendell Instruments	NA	0.52	0	98	230	NA	5.92%	0.00%	100.00%	5.92%
Mean (with Wendell Instruments)								**10.33%**	**89.67%**	**8.88%**
Median (with Wendell Instruments)								**10.77%**	**89.23%**	**9.21%**
Mean (without Wendell Instruments)								**11.81%**	**88.19%**	**9.31%**
Median (without Wendell Instruments)								**10.92%**	**89.08%**	**9.42%**

Note: The unit of debt and equity is USD million. We use a risk-free rate of 2.8%, a market risk premium of 6%, and a tax rate of 37% to calculate the cost of capital of each comparable firm.

Well-annotated. It's good to make your assumptions clear.

Exhibit 3: Hamada's equation for calculating unlevered beta and re-levered beta

Unlever: removing financial risk

$$\beta_E^U = \frac{\beta_E^L}{\left[1 + \frac{D}{E}(1-\tau)\right]}$$

Relever: incorporating financial risk

$$\beta_E^L = \left[1 + \frac{D}{E}(1-\tau)\right]\beta_E^U$$

Note: This equation assumes that the beta of debt is equal to 0

Exhibit 4: Calculation of unlevered beta from comparable firms

	Equity Beta	Total Debt	Total Equity (Market Value)	Debt-to-Equity Ratio	Unlevered Beta
Chestnut Foods	0.90	461	1,840	25.05%	0.78
Food Processing					
Boulder Brands	0.55	298	958	31.06%	0.46
Campbell Soup	0.60	4,832	13,223	36.54%	0.49
ConAgra Foods	0.70	9,590	13,805	69.47%	0.49
Diamond Foods	0.75	593	578	102.52%	0.46
Flowers Foods	0.50	923	4,429	20.84%	0.44
General Mills	0.55	8,645	31,245	27.67%	0.47
Hormel Foods	0.65	250	11,759	2.13%	0.64
Kellogg	0.60	7,358	21,841	33.69%	0.49
J. M. Smucker	0.70	2,241	10,904	20.55%	0.62
Tyson Foods	0.80	1,942	11,469	16.93%	0.72
Mean					**0.53**
Instruments					
Badger Meter	1.06	89	723	12.26%	0.98
Dresser-Rand	1.40	1,287	4,549	28.29%	1.19
Flowserve	1.30	1,200	10,767	11.15%	1.21
Honeywell	1.25	8,829	74,330	11.88%	1.16
Idex	1.15	774	5,933	13.04%	1.06
Measurement Specialties	1.35	129	944	13.67%	1.24
Mettler-Toledo	1.10	413	7,154	5.77%	1.06
Wendell Instruments	0.52	0	230	0.00%	0.52
Mean (with Wendell Instruments)					**1.05**
Mean (without Wendell Instruments)					**1.13**

Note: The unit of debt and equity is USD million.

Exhibit 5: Cost of capital of Food Products division and Instruments division

	Food Products	Instruments
Weight of debt (Wd)	23.98%	10.33%
Estimated credit rating	A–	BBB
Cost of debt	3.47%	4.11%
Corporate tax rate	37%	37%
Weight of equity (We)	76.02%	89.67%
Risk-free rate	2.80%	2.80%
Average unlevered beta	0.53	1.05
Debt-to-equity ratio	31.55%	11.52%
Re-levered beta	0.63	1.13
Market risk premium	6%	6%
Cost of equity	6.60%	9.59%
Cost of capital (WACC)	**5.54%**	**8.86%**
	less than roc	more than roc

Note: We assume that the debt-to-value ratio or weight of debt for each division is equal to the average weight of debt of its comparable firms. In this case, we use the cost of debt corresponding to the credit rating, a tax rate of 37%, a risk-free rate of 2.8%, market risk premium of 6% to calculate the cost of capital for each division. Also, ROC stands for the expected return on capital.

Exhibit 6: Economic Value Added (EVA) of Food Products and Instruments

	Food Products	Instruments
ROC	6.3%	7.7%
-- NOPAT (USD mm)	88	46
-- Total invested capital (NOPAT/ROC)	1,397	597
Cost of capital (WACC)	5.54%	8.86%
EVA (ROC - WACC) * IC	**10.62**	**(6.95)**
	positive	negative

Note: The unit of NOPAT, invested capital, and EVA is USD million. Also, ROC stands for the expected return on capital.

Exhibit 7: EVA of Instruments division sensitivity to credit rating and D/E ratio

		Credit rating or cost of debt					
		A–	BBB+	BBB	BBB–	BB+	BB
		3.47%	3.84%	4.11%	4.62%	5.76%	6.45%
D/E ratio	5%	(7.69)	(7.75)	(7.80)	(7.89)	(8.10)	(8.22)
	10%	(6.92)	(7.05)	(7.14)	(7.32)	(7.71)	(7.94)
	15%	(6.23)	(6.41)	(6.54)	(6.79)	(7.35)	(7.69)
	20%	(5.59)	(5.82)	(5.99)	(6.31)	(7.02)	(7.46)
	25%	(5.00)	(5.28)	(5.48)	(5.86)	(6.72)	(7.24)
	30%	(4.45)	(4.78)	(5.01)	(5.45)	(6.44)	(7.04)

Note: The unit of EVA is USD million.