Valuation Models of Spectrum Pharmaceuticals, Inc.

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Abstract: Spectrum Pharmaceuticals, Inc. is a biopharma company, with a primary strategy comprised of acquiring, developing, and commercializing a broad and diverse pipeline of clinical and commercial products. This essay aims at evaluating this company using both the absolute valuation model and the relative valuation model. Advantages and drawbacks of these models will also be discussed.

1. Introduction

Spectrum Pharmaceuticals, Inc. is a biopharma company which has an in-house clinical development organization with regulatory and data management capabilities, in addition to commercial infrastructure and a field-based sales force for the marketed products. Currently, this company has four main primary strategies and seven approved oncology/hematology products that target different types of cancer. [1]

As market of biopharma companies has gradually become prosperous and popular, SPPI, as an emerging company in the developing market, has the potential to increase its stock value. Thus, in order to judge whether SPPI will be competitive in the future, and whether investors should buy stocks of this company, it is necessary to evaluate SPPI using both absolute and relative methods.

For absolute valuation method in part 2, we choose FCFF (free cash flow to firm) method. For relative valuation method in part 3, we choose P/S (price-to-sale) method. In each part, we discuss the reasons for choosing the model, the valuation process, investment thesis of the method and analyze the drawbacks of the method. Models show that the stock of SPPI is currently overvalued, and suggest the investors to hold or not buy the stocks SPPI.

2. The First Model: FCFF(free cash flow to firms) Method

2.1 Reasons for choosing this method

We first choose the absolute valuation model to estimate the stock price. We did not choose the Dividend Discount Model because this company do not pay out dividend to its shareholders, both in the past years and for the expectation in the future. We did not use FCFE because the net borrowing in FCFE is difficult to be forecast accurately. Also because SPPI's future debt will approximates 0, the free cash flow for firms equals free cash flow for shareholders.

2.2 Valuation Process

Our valuation is based on the DCF analysis. Medical and pharmaceutical technology is evolving rapidly and there is no sign for any stop in the growing trend, so we believe that Spectrum will also evolve along-side the whole industry, which will last for a long-time period. Hence we have used a long-time model to valuate Spectrum.

For our valuation, we developed a 15-year model which forecast into three periods with different sales growth rate: 2019-2022, 2023-2027, 2028-2033. From 2019 to 2022, the annual sales grow is the average company growth rate of the past 10 years, which is 0.2544. From 2023-2027, the industry average growth rate at 0.1532 is pretty reasonable for sales growth rate. From 2028-2033,

we assume the sales growth as the GDP growth rate of the economy.

Using the forecast of sales, we make assumptions of the relationship between other factors and sales, then estimate the pro forma and forecast the future free cash flow. In the first two periods, we calculate the separate PV of free cash flow in each year. For the third period, we calculate the PV by using indefinite growth equation with the constant growth rate. Then we add these two parts together to come up with the present value of the company.

The DCF formula with multiple stages:

$$Value = \sum_{1}^{n} \frac{FCFF_t}{(1+WACC)^t} + \frac{FCFF(1+g)}{WACC-g} * \frac{1}{(1+WACC)^n}$$

Eventually we divide the PV of the firm by stock shares(because debt=0), calculate price of the stock per share and come up with the investment thesis.

Capital Structure: The capital structure of Spectrum has been basically stable in the last 5 to 10 years, which is basically near to 0 or 0 comparing to total sale, which is also shown in the diagram below. Thus we reasonably assigned 0% to the debt level. In this case, it is worth mentioning that, the firm value calculated by FCFF model equals to the stock value for shareholders. [2]
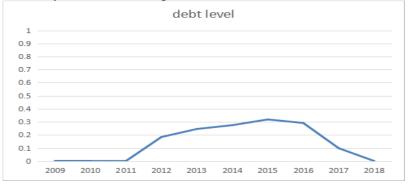

Fig.1

Beta: In order to estimate Spectrum's beta, we collected the beta values for the last 52 weeks on Bloomberg and computed the average of them, 1.58. [3]

$$WACC = \left(\frac{E}{V} * R_e\right) + \left(\frac{D}{V} * R_d * (1-Tax)\right)$$

WACC and Cost of equity:

We use 10-year treasury bonds to estimate the risk free rate of 2.05%. Market risk premium was assumed to be 14.61% according to Bloomberg. We average the debt proportion and equity proportion from 2009 to 2018 to derive E/V and D/V.

Capital asset pricing model (CAPM) is used for modelling the cost of equity,

$$R_e = R_f + \beta(R_e - R_f)$$, where β for SPPI is estimated as 1.58 .

The final outcome of WACC is 18.803%, results are presented in the table below:

Table 1

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Debt	100	0	0	65000	91500	96300	99400	97000	38200	0
Equity	108304	74476	187907	288682	281606	254554	212857	236026	351425	283450
Debt + Equity	108404	74476	187907	353682	373106	350854	312257	333026	389625	283450
Debt proportion	0.0009	0.0000	0.0000	0.1838	0.2452	0.2745	0.3183	0.2913	0.0980	0.0000
Equity proportion	0.9991	1.0000	1.0000	0.8162	0.7548	0.7255	0.6817	0.7087	0.9020	1.0000
Taxrate	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.27
Re	0.218948	0.218948	0.218948	0.218948	0.218948	0.218948	0.218948	0.218948	0.218948	0.218948
Rd	0	0	0	0	0	0	0	0	0	0
WACC	0.218746	0.218948	0.218948	0.178709537	0.165253495	0.158852654	0.149250824	0.155175334	0.197481683	0.218948
Average WACC	0.188031									

2.3 FCFF calculation

For the period 2019-2027, the free cash flows of each year [4] are summarized below:

Table 2

	2019	2020	2021	2022	2023	2024	2025	2026	2027
FCFF	-71962	-45733	-12831	28441	52641	81009	113722.5957	151447.87	194952.7
Discount factor	1	0.8417286	0.7085071	0.59637069	0.50198228	0.42253286	0.355658	0.2993675	0.251986
Future growth									
PV of FCFF	-71961.9	-38494.7	-9091.0	16961.3	26425.1	34229.0	40446.4	45338.6	49125.4
Value of FCFF	92978.1								

For period from 2028-2033 and the value of firm, the result is shown below:

Table 3

Total value=firm value in 2028*discount rate+PV for FCFF from 2019-2027	
Firm value in 2028=FCFF1/(WACC-g)=FCFF0(1+g)/WACC-g	
FCFF0 in 2028	194952.6526
average growth rate	0.082306509
FCFF1	210998.5249
WACC	0.188031355
PV for FCFF of 2019-2027	92978.05033
discount rate for 2028	0.212104007
Evaluated SPPI	516280.9362
shares	111213
price per share	4.642271463
(futur debt of the company=0, thus company value=value for stockholders)	

Conclusion: with all these assumptions and estimations, we calculated expected fair price per share of SPPI to be $4.64. While Spectrum trades at $7.48, therefore we recommend a sell or hold and do not purchase.

2.4 Assumption of the model

Sales: We divided the total 15 years forecast into three periods with different sales growth rate: 2019-2022, 2023-2027, 2028-2033. In the first 4 years, from 2019 to 2022, the two new drugs which are now still in research will be released and therefore it will bring an increase to the company's total sale, but the company's sales were declining ever since 2014, so we decided to put the annual sales grow at the average company growth rate of the past 10 years, which is 0.2544.

From 2023 to 2027, since the two new drugs which is now under research will have been released and they need time to come up with newer ones, we predict the company's growth rate to be slower, so the industry average growth rate at 0.1532 is pretty reasonable.

From 2028 to 2033, for it is too much far into the future and hence it is impractical to predict for the accurate growth rate and we also believe the pharmaceutical industry will become much more mutual than now, thus we assigned the GDP growth rate to the company's sales growth rate. The GDP growth rate is 0.03.

COGS and COGS/sales: We assume the COGS/sales rate as fixed rate of 0.24 in 2018 [5] for several reasons. First, Cost of sales decreased $16.1 million from 2017 to 2018, primarily due to the product sales decrease, as well as the sales mix in each year. The COGS-to-sales ratio also showed a downward trend in the past 3 years, mainly due to the reducing cost of purchasing in each link and the cost of capital occupancy interest, reducing operation and management fees that are necessary in this link. In the annual report, SPPI mentions that it will expand cooperation with other manufacturing companies, and increase the scale effect. Thus the assumption keeps the COGS-to-sales ratio at the low level in the future.

Second, this ratio is in line with industry metrics. Third, we do not assume the COGS-to-sales ratio to reduce in the future because SPPI faces competition with both small companies and research organizations in the future which might cause additional cost of good sold. We decide to make conservative assumption and give SPPI the benefit of doubt.

R&D: We hold the research and development fee constant mainly because of two reasons. First, SPPI's strategy focuses on in-licensing clinical stage drug products that are already in or about to enter human clinical trials which is the late stage of the whole manufacturing process. A late-stage

focus helps the company to effectively manage the high cost of drug development by focusing on compounds that have already passed the many hurdles in the pre clinical and early clinical process. This strategy largely reduce the cost of research and development in the early stage.

Second, we do not assume a reducing R&D because many other large and small companies within the pharmaceutical and biotechnology industry seek to establish collaborative arrangements for product research and development, or otherwise acquire products in late-stage clinical development, in competition with SPPI. SPPI faces additional competition from public and private research organizations, thus SPPI need to devote more in research and development staffs and facilities. SPPI need to take the advantage of researches in order to expand the market share. Base on these two reasons, we assume the R&D is the same as 2018 in the following years.

SG&A: We assume the SG&A expense stay constant at the 2018 level. Although selling, general and administrative expenses increased $6.4 million in 2018, it primarily dues to (i) $3.3 million increase [5] in legal expenses associated with the termination of the former chief executive officer in December 2017, and (ii) $2.1 million increase [5] in payroll tax expenses primarily related to stock option exercises during the year by SPPI former chief executive officer. We believe these are temporary increase of SG&A which might not occur in normal cases.

Additionally, other normal SG&A increase such as expense on various marketing activities, expenses on further support to current operations and planned business growth will be offset by decrease in management cost caused by higher management efficiency, decrease of general cost caused by more reasonable product layout, and reducing benefit-related costs. We also assume the SG&A to keep constant because it is inaccurate to make abstract assumption, the inaccurate growth rate of SG&A might increase the discrepancy of result.

Working capital: We assume the investment in working capital in the future to stay at $848, which is the mathematical average of investment in working capital of the last 5 years. The investment in working capital changes significantly and in-regularly according to Factset. [6]

The working capital of 2018 is much higher than previous years so we do not assume the future working capital as that of 2018. We attempt to forecast working capital close to the historical average level for past 5 years. Although SPPI plan to use the anticipated proceeds from the Acrotech Transaction to advance the in-development drug pipeline,as well as increase general working capital requirements. Future capital requirements and investment in working capital depend on the company's ability to successfully develop and acquire new drugs for the treatment of cancer and successfully bring these drugs to market. These are unpredictable issues which is partially decided by the market as a whole. Volatile economic conditions may not only limit the access to capital, but may also lead to inadequate investment in working capital. On this basis, we treat the investment in working capital as fixed factor.

Depreciation: We assume the depreciation rate to be constant 0.2570 [5], the depreciation rate of 2018. SPPI depreciates its PPE by the straight-line method, thus the annual depreciation rate do not change. We studied the past 10 years depreciation rate and found that depreciation rate in 2018 is regular and representational. In recent 3 years, the depreciation rate change slightly, which indicates that the wear and tear rate of fixed assets tend to stay constant since 2018.

Current assets/sales: Spectrum is having a rather volatile ratio between current assets and sales, it deviates greatly from year to year and there is no obvious relation between those numbers, so it becomes fairly impossible for us to find out a suitable magnitude for it to suit into the to-be-forecasted years. The huge volatility of the ratio makes the average or the median number similarly implausible, therefore using either average or median number would cause inaccuracy. So we used the current assets/sales ratio in the year 2018, which is for 2 reasons. Firstly, 2018 is the nearest year to our forecast, so its ratio presents greater value in reference than the ratio of the more previous years and secondly, the volatility of current assets/sales ratio decreased in the year 2016 to 2018 comparing to prior years, therefore the ratio of 2018 can also represent the last few years. Given the volatility of the current assets/sales ratio, the ratios among the last 10 years stay in a relatively fixed interval and we predicted that Spectrum will not breach out the interval. Thus fixing the current assets/sales ratio to the number of 2018 is reasonable.

Total assets/sales: Similar to the current assets/sales ratio, we assumed that the total assets/sales ratio will stay as a constant in the future years. Also the total assets/sales ratio fluctuated significantly in the last few years, so for the same reason of the current assets/sales ratio, we used the data from the year 2018 to represent the future.

Current liabilities/sales: The current liabilities/sales ratio stayed fairly stable in 2014 to 2016, around 0.5 and suddenly increased to 0.9 in 2017 and declined a bit to 0.8 in 2018. [5] Therefor including the data of the years 2014 to 2016 in our forecast may cause error. And since that the data in 2017 seems unreasonably high, we used the data in 2018, 0.79, for our calculation.

Net fixed asset/sales: The net fixed asset/sales ratio is 0.0035 in 2018, 0.004 in 2017, 0.0038 in 2016, and in 0.0050 in 2015. [5] Therefor including the data decreased to a relatively stable level in 2018. Since that the data in 2018 is reasonable and changes in the normal trend, we used the data in 2018, 0.0035, for our calculation.

Interest rate on debt: Interest rate on debt changed slightly from 2014 to 2016 and finally stabilized in 2018 to 0.0044. [5] So we concluded that the data from 2014 to 2017 may be outdated and subsequently using the data of 2018.

Interest paid on cash and marketable securities: Very similar to the current liabilities/sales ratio, this ratio stayed stable from 2014 to 2015, but changed quite hugely 2016 and finally stabilized in 2018 to 0.0017. [5] So again we concluded that the data from 2014 to 2017 may be outdated and subsequently using the data of 2018.

Tax rate: We predict that Spectrum will come above 0 in 4 years' time in 2022 and have a positive income since then. For these minus-income years, the tax rate is 0 and after 2022 we used the federal tax rate of 21% [7]. The 21% is the official tax level which matches the earning of this company.

Dividend payout rate: The annual report of SPPI shows that it did not pay out dividend to shareholders in the past, thus the dividend payout rate is 0.

2.5 Investment Thesis

SPPI, being in the fast growing industry of pharmaceutical, does have itself well positioned where it can make good use of the booming market. SPPI's coming new drugs will promise them a fast growth in the next few years.

While, both growing and maintaining the company are difficult and expensive for SPPI, especially when their sales are not very optimistic for the last few years. For any company in the pharmaceutical industry, R&D are expensive, which is also true for SPPI. Its R&D use up basically all their incomes. In order to grow, SPPI would have to put money on R&D, at least remain at the original level, which will heavy the budget burden even more.

SPPI is solely depending on the anti-cancer drugs. This extremely imbalanced focus may cause problem when the demand for anti-cancer drugs decreases or their competitors are having the better products. The competition not only lies between SPPI and other similar small or medium-sized company, but also exists when the research institution, biology industry and medical industry thrive. More and more profit-chasing companies and non-profit organizations will join in this area, exploiting both the market shares and the resources of SPPI.

SPPI also solely depends on the equity and outstanding shares to finance the company, this financing method shows that SPPI is not confident with its future promising cash flow, and thus rely on a relatively low-risk financing method, which does not fail out the company when it fails to pay back the dividend.

Competition will also cause the price level of the drug to drop, especially when SPPI's competitors like Takeda or AstraZeneca are also well qualified to produce great products.

After weighing the problems of SPPI, low sales, having negative net income for a few years and facing great competitions, and the advantages, fast growing industry and the up-coming new drugs, we decided to use a prudent and reliable approach when valuating SPPI. So the FCFF approach is our best choice, and by using FCFF valuation, we come up with the recommendation to sell or hold (not buy) this company's stock because it is currently overvalued.

2.6 Sensitive Analysis

Since we used the FCFF approach to estimate the firm value, it is very obvious that our forecast will be heavily influenced by the few factors, such as beta, r_m, r_t, r and the growth rate. Given that the inaccuracy in our assumptions might be small in the magnitude, our forecast is for the future 15 years, therefore a small change may result in big difference.

We created a sensitive table displaying the potential changes in the variables and the outcome. If one should disagree with our assumptions, one could use the sensitive table for adjustments.

Table 4

	beta(1.58)		r_m(0.159)		r_f		g1		g2		g_GDP	
	10%	-10%	10%	-10%	10%	-10%	10%	-10%	10%	-10%	10%	-10%
	1.738	1.422	0.016071	0.13149	0.02255	0.01845	0.27984	0.22896	0.16852	0.13788	0.033	0.027
WACC	0.205074	0.1709887	0.2078556	0.168207	0.18701	0.189052	0.188031	0.188031	0.188031	0.188031	0.188031	0.188031
price per share	4.0706627	5.6879033	3.9727841	5.868674	4.81355	4.718715	4.591871	5.005622	4.791256	4.748223	4.932886	4.609489

3. The Second Model: Price-to-sales Ratio (P/S) Method

3.1 Reasons for choosing this model

To the supplement of the FCFF approach, we also decided to use the comparable and relative valuation method. We choose P/S model to valuate SPPI for several reasons. Since it has negative incomes for some of the years, P/E approach is not useful and since SPPI has a lot of researchers doing research, human capital means a lot to SPPI, therefore P/B does not suit our case perfectly, which left us with P/S.

SPPI has a relatively stable level of expenditures, which makes sales a pretty good indicator for its earnings, and sales for SPPI does not have too much volatility. Additionally, P/S is always positive unlike P/E and P/B, which is helpful for analyzing distressed firms. Accounting manipulations or differing accounting practices have no effect on P/S because they do not effect sales revenue. P/S ratio also allows for valuation of companies that operate in cyclic business environments, or when a business has attained maturity in operations as revenues are always positive regardless how low. In such cases, the ratio ca be used for assessing the recovery-possibility situations of a company, and allow for growth to be double-checked. The method comes in handy when assessing companies that have started issuing profit warning and as a result can allow investors to value their shares. Hence, P/S approach is a good option for out supplement.

3.2 Valuation Process

The P/S ratio is used for assessing the total value that an investor has in a company as compared to the total revenue that a company is able to generate. The ratio is computed as follows:

$$Price - Sales\,Ratio = \frac{Company\;capitalization}{Total\;sales\;in\;12\;months}$$

We calculated the benchmark P/S of SPPI and its peer groups----Takeda and Astrazenecea, by using the mathematical average of these companies' own P/S from 2009 to 2018. We also use the forecasting sales to forecast price of SPPI in 2019, in order to come up with the investment conclusion.

The P/S benchmark for Takeda [8] is shown in the table:

Table 5

Takeda	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Book value of equity	2164.75	2136.66	2071.87	2223.36	2540.64	2206.18	2011.2	1948.96	2017.41	5163.59
Year sales	1465.97	1419.39	1508.93	1557.27	1691.69	1777.82	1807.38	1732.05	1770.53	2097.22
Outstanding share	789.38	789.371	789.414	789.46	789.468	785.892	783.539	780.841	781.309	1554.78
Price 31st. Dec	4122.31	3883.17	3650.33	4930.35	4901.64	5990.96	5136.63	5223.34	5176.29	4511.57
Sale/Share	1856.9	1797.76	1911.17	1972.14	2140.45	2260.74	2293.14	2203.94	2250.56	2169.03
P/S Ratio	2.22	2.16	1.91	2.5	2.29	2.65	2.24	2.37	2.3	2.08
Benchmark					2.15					

The P/S benchmark for Astrazenecea [9] is shown in the table:

Table 6

AstraZeneca	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Book value of equity	12893.5	14952.3	15103.3	14735.2	14039.6	12599.7	12557.8	13490.1	12302.4	11027
Year sales	21020.5	21548.3	20954.2	17653.2	16448.8	15848.2	16172.2	17047.4	17444.2	16566.6
Outstanding share	1451	1409.02	1292.36	1246.78	1257.17	1263.14	1264.12	1265.23	1266.22	1267.04
Price 31st. Dec	29.0849	29.9868	31.4683	29.4968	35.6549	45.5859	46.197	44.402	51.2415	58.7282
Sale/Share	14.4869	15.2931	16.2139	14.159	13.084	12.5467	12.7933	13.4737	13.7766	13.0751
P/S Ratio	2.00767	1.96081	1.94082	2.08326	2.72508	3.63331	3.61105	3.29545	3.71947	4.49162
Benchmark	3.25									

The P/S ratio and price per share for the SPPI Company [10] is summarized below:

Table 7

SPPI	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Book value of equity	108324	74476	187907	288621	281606	254534	212857	236026	351425	283450	
Year sales	38025	74113	192963	267707	155854	186830	162556	146144	128085	108990	137147.3152
Outstanding share	64556	64556	64556	75550	75550	85745	85745	85745	111963	111963	
Price 31st. Dec	4.40	6.01	14.05	11.35	8.41	6.22	7.03	6.41	21.50	11.20	
Sale/Share	0.59	1.15	2.99	3.54	2.06	2.18	1.90	1.70	1.14	0.97	
P/S Ratio	7.47	5.24	4.70	3.20	4.08	2.85	3.71	3.76	18.79	11.51	
Benchmark	9.49										
Price											1301219.535
price per share											11.70024669

3.3 Investment Thesis

To the supplement of the FCFF approach, we also decided to use the P/S model to valuate SPPI. Comparing the benchmarks of SPPI and its competitors, SPPI needs 9,49 units to buy 1 units of revenue, while Takeda takes only 2.15 and Astrazenecea takes only 3.25, which shows that SPPI might be overvalued.

By forecasting the price of stock in 2019 of SPPI, we calculated that its stock price will be $11.7, higher than the market price. However, we are conservative to conclude that the recommendation of investment for SPPI is a buy because of the discrepancy and inaccuracy of this model, which is shown in 8.2.4 Drawbacks analysis.

3.4 Drawbacks of this model

In any business environment, sales revenues do not always equate to profitability. It the economic profitability of a company that guarantees sustainability of a business in the long term. Use of revenue-generation ability as a basis of valuation could give false signals for companies in cyclic business environments, distressed conditions or those with loss-warnings. The structuring of revenue generation methods and subsequent recognition could also vary from one industry to another, or sector to sector. This means that the P/S method is not always a comparable valuation method due to differences in costs structures and valuation recognition differences.

4. Conclusion

This essay mainly choose two methods: FCFF method and P/S ratio method to evaluate the current stock price of SPPI, the biopharma company. The valuation results show that the stock is currently overvalued, thus investors should not buy the stock, or should hold the stock in their hands. However, SPPI stock still might be valuable to some extent, mainly according to two reasons. First, our evaluation process contains some inaccuracies, including the assumption which take some variables as constant, and the calculation of WACC. Second, biopharma industry is a newly developing industry which has lots of opportunities and potentials, it is hard to accurately predict the development of this industry in the future. This essay only shows the current result using academic methods, while it is completely possible that this industry will prosper in dozens of years, and SPPI stocks are eagerly demanded by the public in the future.

References

[1] Yahoo company profile: https://finance.yahoo.com/quote/SPPI/profile/

[2] Bloomberg: SPPI debt data.

[3] Bloomberg: market beta. (2019.07)

[4] https://www.sppirx.com (Cash Flow Table of SPPI)

[5] https://www.sppirx.com (Balance Sheet of SPPI)

[6] Factset: working capital of SPPI.

[7] https://taxfoundation.org/federal-corporate-income-tax-rates-income-years-1909-2012/

[8] https://www.takeda.com

[9] https://www.astrazeneca.com

[10] https://www.sppirx.com (financial information of SPPI)