Fall 2020, HEC Lausanne
Corporate Finance
Instructor: Theodosios Dimopoulos

FACEBOOK

A CORPORATE FORECASTING

By The Game Breakers

Alfonso Corvino Porto
Arlind Rashiti
Arthur Bonetti
Mehdi Oueslati
Nihad Mirzayev

Introduction

In this report, our team of analysts worked on forecasting the free cash flows of Facebook for the five years, from 2020 to 2024. Our analysis combines different methods to obtain the best estimation possible. The three methods that we used in our forecasts are: a two-round Delphi forecast, an analysts consensus forecast and a quantitative forecast based on a linear regression. Our final forecast is a combination of the result of each of these methods.

Overview

Facebook was created in 2004 by 5 students from Harvard University. The best-known, Mark Zuckerberg, and 4 of his classmates. Facebook is a social network that aims to allow its users to share images, videos, documents and messages with other users of this application. Today Facebook has more than 2.1 billion users. The application was originally only available to students at Harvard University. Facebook is headquartered in Menlo Park, California. The company has just over 45000 employees.

This company operates primarily in Computer Processing and Data Preparation and Processing Services (SIC 7374). Beyond its social networking platform, facebook.com, the firm offers other products and services, including Facebook Watch, Facebook Portal and Facebook Messenger. Facebook Inc can be characterized as a social media conglomerate as it acquired numerous companies involved in mass media enterprises, such as Instagram, WhatsApp, Oculus Rift, Giphy and Mapillary.

On top of that, Facebook is the 6th largest market capitalization in the world with 825 billion dollars. It had in 2019 a net income of 18'485 million dollars, which is consequent compared to the sector in which it operates. We also see that Facebook is a company that is little financed by debt, $32 billion for 2019, $13 billion for 2018, $10 billion for 2017 and $5 billion for 2016. These are relatively low numbers for the size of the company. It has a turnover of 70 billion dollars for the year 2019, with a net income margin of 26.1%, which is outstanding.

Moreover, Facebook is a very solvable company as it has little indebtedness. Its current ratio is 4.4 for 2019, which is an indicator of good solvency in the short term. If we always look at the solvency of the company by taking the ratio of all debts (short and long term) divided by the total assets, we arrive at a ratio of 24.2% for last year. Facebook is a very profitable company when we look at its different ratios. The company has a gross margin of over 80% and a net income margin of 26.1% last year. Both ratios are impressive.

Facebook's principal source of revenue is from advertising and today, Facebook’s social networks have become essential for corporate communication. Companies use these platforms to advertise, sell their products online and gain visibility. Even though Facebook operates in other sectors, its advertising revenues amount for 98% of the total revenues.

Initial Delphi Reports from each member

To construct my forecast model, I use predictions on EBITDA. I will explain that below, but that is the reason why I present you these three figures:

- Figure 1: table depicting **growth rates of EBITDA and free cash-flows** (levered and unlevered, but that's only a detail) for two types of rates: "standard" growth rate over previous year and annual compounded growth rate over five years.
- Figure 2: my **EBITDA**'s yearly growth rate **forecasts**
- Figure 3: **free cash-flows forecasted** for years 2020 to 2024

Note that all the dollar numbers in this page are in million.

For the Fiscal Period Ending	12 months Dec-31-2015	12 months Dec-31-2016	12 months Dec-31-2017	12 months Dec-31-2018	12 months Dec-31-2019	LTM 12 months Sep-30-2020
Growth Over Prior Year						
EBITDA	31,0%	80,8%	57,3%	25,8%	1,7%	(9,6%)
Levered Free Cash Flow	33,4%	46,2%	40,8%	(10,9%)	53,0%	(38,2%)
Unlevered Free Cash Flow	33,2%	45,9%	40,8%	(10,8%)	53,1%	(28,2%)
Compound Annual Growth Rate Over Five Years						
EBITDA	47,5%	48,0%	81,3%	49,4%	36,7%	35,6%
Levered Free Cash Flow	NA	49,4%	95,0%	32,5%	30,2%	18,4%
Unlevered Free Cash Flow	NA	48,8%	92,1%	32,1%	30,1%	18,3%

Figure 1

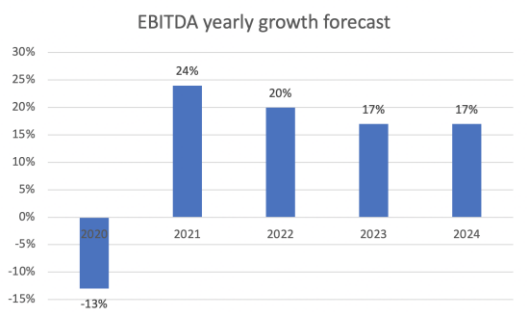


Figure 2

Years	Free cash-flows forecasted
2020	$ 13 798
2021	$ 16 484
2022	$ 19 693
2023	$ 23 526
2024	$ 28 106

Figure 3

My model is the following: since EBITDA makes more sense (I'm more confident working with it), I estimated the yearly growth rate for EBITDA for each year. For 2020, I took EBITDA's growth rate for the 12 months ending September 30th reduced by approximately 4%[1] because I think that the 3 months to December 31st, 2020 risk to be worse than those of 2019 due to the pandemic (I'm being precautious). For the following years, I had a different state of mind for producing those numbers. Facebook is still a growth company but is no more a startup. In other words, its growth rate cannot, in my opinion, continue going up and up: we can see a declining trend in the 5-year compounded annual growth rate over 5 years and it's normal. Facebook is becoming a more mature company, hence those declining growth rates (they're still incredible). 2021 will be a modest recovery year since Facebook has (relatively) not been badly hurt by the pandemic; 24% of EBITDA growth seems appropriate to me. For the other years, I predict a modest decline in growth rate, that will still stay at a pretty high level: 17% for 2023 and 2024 with a 20% transition rate in 2022.

My methodology to reach FCF with those rates is the following: from those rates I derived an annual compounded constant growth rate[2] which will be the annual growth rate of the free cash-flows. 13,798$ of FCF in 2020 is 2019's FCF multiplied by the same growth rate as the one used with 2019 EBITDA: around -13%.

[1] Note: all the numbers come from Capital IQ

[2] I compounded the growth rates from 2021 to 2024 and made a 4-year constant equivalent growth rate for these years. This equivalent growth rate is approximately 19.5%. For 2020 I simply took -13% of growth rate (same as EBITDA's growth rate)

Arthur Bonetti

Facebook Free Cash Flow Forecasts 2020-2024

Facebook, Inc USD million	12 months Dec-31-2018	12 months Dec-31-2019	2020	2021	2022	2023	2024
INCOME STATEMENT							
Revenue	55'838.0	70'697.0	84'836.4	101'803.7	121'146.4	141'741.3	163'002.5
Cost Of Goods Sold	9'355.0	12'770.0	15'962.5	19'953.1	24'542.3	29'205.4	33'878.3
Gross Profit	46'483.0	57'927.0	68'873.9	81'850.6	96'604.0	112'535.9	129'124.2
Gross margin %	*83.25%*	*81.94%*	*81.18%*	*80.40%*	*79.74%*	*79.40%*	*79%*
Selling General & Admin Exp.	11'297.0	20'341.0	25'426.3	31'782.8	39'092.9	46'520.5	53'963.8
R & D Exp.	3'022.0	3'488.0	4'360.0	5'450.0	6'703.5	7'977.2	9'253.5
Depreciation & Amort.	4'315.0	5'741.0	7'176.3	8'970.3	11'033.5	13'129.8	15'230.6
Other Operating Expense/(Incom	2'396.0	4'371.0	5'463.8	6'829.7	8'400.5	9'996.6	11'596.1
Other Operating Exp., Total	21'570.0	33'941.0	42'426.3	53'032.8	65'230.4	77'624.1	90'044.0
% Revenue	*38.63%*	*48.01%*	*50.01%*	*52.09%*	*53.84%*	*54.76%*	*55.24%*
EBIT	24'913.0	23'986.0	26'447.7	28'817.7	31'373.7	34'911.7	39'080.2
Tax rate	*11.24%*	*22.93%*	*12.00%*	*20.00%*	*20.00%*	*20.00%*	*20.00%*
Tax	2'801.0	5'501.0	3'173.7	5'763.5	6'274.7	6'982.3	7'816.0
Unlevered Net Income	22'112.0	18'485.0	23'273.9	23'054.2	25'098.9	27'929.4	31'264.2
Plus: Depreciation	4'315.0	5'741.0	7'176.3	8'970.3	11'033.5	13'129.8	15'230.6
% Revenue	*7.73%*	*8.12%*	*8.46%*	*8.81%*	*9.11%*	*9.26%*	*9.34%*
Less: CAPEX	(13'915.0)	(15'102.0)	(16'612.2)	(18'273.4)	(20'100.8)	(22'110.8)	(24'321.9)
% Revenue	*-24.92%*	*-21.36%*	*-19.58%*	*-17.95%*	*-16.59%*	*-15.60%*	*-14.92%*
Total Current Assets	50'480.0	66'225.0	72'847.5	80'132.3	86'542.8	93'466.3	100'943.6
Total Current Liabilities	7'017.0	15'053.0	14'300.4	16'445.4	18'912.2	21'749.0	25'011.4
Net working capital	43'463.0	51'172.0	58'547.2	63'686.8	67'630.6	71'717.2	75'932.2
% Revenue	*77.84%*	*72.38%*	*69.01%*	*62.56%*	*55.83%*	*50.60%*	*46.58%*
Less: Increases in NWC	(7'709.0)	(7'375.2)	(5'139.7)	(3'943.8)	(4'086.6)	(4'214.9)	(4'323.8)
Plus: Adjustement	10'556.0	19'463.0	10'000.0	10'000.0	10'000.0	10'000.0	10'000.0
FREE CASH FLOW	15'359.0	21'212.0	18'698.3	19'807.3	21'945.1	24'733.5	27'849.1

	2020	2021	2022	2023	2024
Revenue Growth	*20%*	*20%*	*19%*	*17%*	*15%*
Cost Of Goods Sold Growth	*25%*	*25%*	*23%*	*19%*	*16%*
Expenses Growth	*25%*	*25%*	*23%*	*19%*	*16%*
Tax rate	*12%*	*20%*	*20%*	*20%*	*20%*
Capex Growth	*10%*	*10%*	*10%*	*10%*	*10%*
Total Current Assets Growth	*10%*	*10%*	*8%*	*8%*	*8%*
Total Current Liabilities Growth	*-5%*	*15%*	*15%*	*15%*	*15%*

Justifications:

For 2020, I based my projection on numbers from the first three quarters report of Facebook Inc. In addition to that, I read a few articles to improve the accuracy of my forecast. Based on this information, the revenue growth I used for 2020 is 20% and CoGS and expenses growth is 25%. With the Covid-19 pandemic, I assumed that the tax rate would be lower as the US government took measures to help companies by giving them more advantageous tax policies. The reasons that Facebook shines even during a pandemic is in part due to an acceleration in the shift of commerce from offline to online and thus there is an increasing demand for online advertising.

From 2021 on, I based my forecast on press articles and the law of large numbers. There are a few upcoming events that can have positive or negative impacts for the future of the company. The negative incoming events for Facebook are a possible hardening in the regulatory environment in Europe concerning transatlantic data transfers and a decline in popularity that can already be seen in the U.S. and Canada where Facebook already lost users. Positive incoming events are Facebook Virtual Reality and Artificial Intelligence projects. On top of that, Facebook still has no real competitors and it will continue to benefit from its comparative advantage and its growing monthly active users.

Therefore, the possible negative events are counterbalanced by the possible positive events and I concluded that Facebook will still have bright years ahead. As any company cannot produce eternally outstanding growth, the percentages I used are declining toward a market equilibrium.

Nihad Mirzayev

Forecast of Facebook's free cash flows

	2020 prospected		
Assets		Income statement	
Cash and cash equivaler	26932	Revenue	89510
Marketable securities	50501	Costs and expenses:	
Accounts receivable	12051	Cost of revenue	16168
other current assets	1852	Research and developm	17219
Property and equipment,	44723	Marketing and sales	12504
Operating lease right-of-	9460	General and administrat	13250
Intangible assets, net	894	Total costs and expense	59141
Goodwill	23695	Income from operations	30369
Other assets	2759	Interest and other incom	826
Total assets	172866	Income before provision	31195
Liabilities and stockholders' equity		Provision for income tax	7955
Accounts payable	1726	Net income	23240
Partners payable	1122		
Operating lease liabilities	800	Ratios:	
Accrued expenses and c	11735	receivables turnover	7.43
Deferred revenue and de	269	fixed assets turnover rat	2.00
Total current liabilities	15651	accounts payable turnov	9.37
Operating lease liabilities	9524	partners payable turnov	14.41
Other liabilities	7745	intangibles turnover(goo	3.78
Total liabilities	48572	cash/marketable secur	0.53
Stockholders' equity:		sales growth	0.27
Additional paid-in capital	45851	Gross profit margin	0.82
Accumulated other comp	-489	ga/sales	0.15
Retained earnings	78932	rd/sales	0.19
Total stockholders' equit	124294	mark&sal exp/sales	0.14
Total liabilities and stock	172866	effective tax rate	0.25

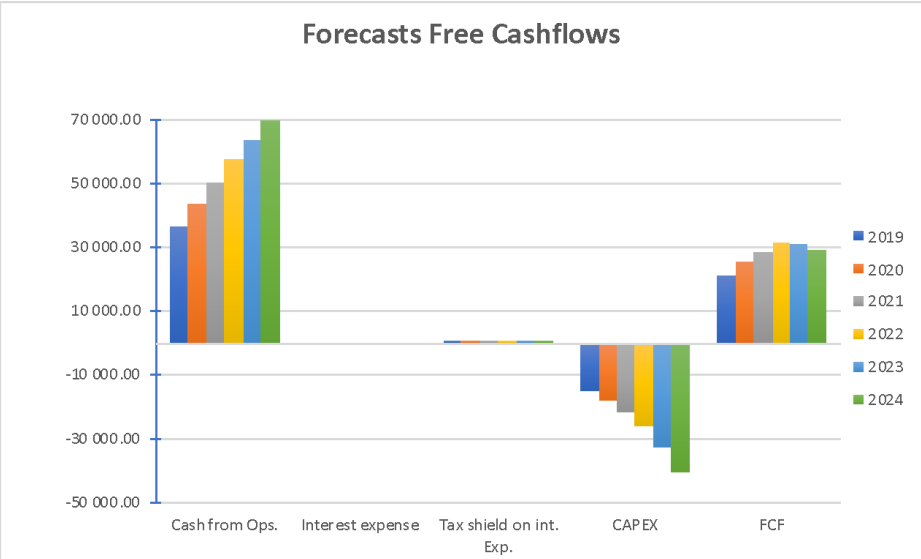
(in millions)	2019	2020	2021	2022	2023	2024
ending cash balance	19079	26932	34784	44926	58026	74945
free cash flow	21212	29943	38673	49949	64513	83323

This paragraph includes forecasts of Facebook's cash flows by Delphi method. For the first forecasted year (2020), the income statement and balance sheet were forecasted by prospective analysis method at first. Then, from the balance sheet, ending cash balance was projected. Finally, by the historical ratios of cash flows to the ending cash balance of the company, cash flow values were predicted for the next 5 years. All numbers are in million USD

Method: First, revenues were forecasted with the historical growth rate. Afterwards, by using ratios like gross profit margin to sale, effective tax rates and others, expense values and finally, net income were forecasted. Balance sheet items were projected by the help of financial ratios such as receivables, fixed assets, payable and intangibles turnovers of the previous year (2019). At the end, cash and cash equivalents and marketable securities were projected in the amount that equalizes total assets to the right-hand side of the balance sheet. And, the exact value of cash and cash equivalents was predicted from the previous year's ratio of cash to the marketable securities.
The forecasted values for ending cash and free cash flow were depicted in the table 2. After ending up with 2020's ending cash balance, I projected free cash flow of 2020 by multiplying 26,932 million with the ratio of free cash flow to the cash balance (2019). In the forecasting of values for the next 4 years, I took the growth rate of ending cash balance (0.29) and the ratio of free cash flow to the ending cash (1.11) as fixed.

Justification: One may object that the forecast of revenues of Facebook based on historical aspects might create a bias due to the Covid crisis. However, I know that during the lockdown period in 2020, the revenues of social media firms have not deteriorated much. Thus, relying on historical growth value of revenues for Facebook is not unreliable. I used turnover ratios in predicting other balance sheet items because these ratios do not change a lot from year-to-year. For minor balance sheet items that have relatively small values such as other assets or other liabilities I kept them the same as previous year's value. The reason why the ending cash balance growth rate was fixed is that I expect Facebook to grow stable in cash balances after the post-pandemic period. According to the news, I expect the recovery of the business world in 2021, as the vaccine of Covid-19 is promised to emerge during that year. Moreover, the global macroeconomic environment of low interest rates would promote growth potential of big companies like Facebook as soon as pandemic will be curbed in the following periods.

Facebook's Free Cash Flow forecasts[3]



	2019	2020	2021	2022	2023	2024
Cash from Ops.	36314	43576.8	50113.32	57630.318	63393.3498	69732.6848
Interest expense	-20	-22	-24.2	-29.04	-34.85	-41.82
Tax shield on int. Exp.	4.2	4.62	5.08	6.10	7.32	8.78
CAPEX	-15102	-18122.4	-21746.88	-26096.256	-32620.32	-40775.4
FCF	21196.2	25437.02	28347.322	31511.12	30745.50	28924.25

My free cash flow predictions for the next 5 years for Facebook are based on the formula of the free cash: Cash flow from operating activities + interest expense – tax shield on interest expense – CAPEX.
The CAPEX will continue to increase due to the investment in equipment necessary to stay up to date especially in the technology sector. This sector being very attractive and very fashionable, many start-ups and companies are expected to grow. A lot of new competitors will arrive in this sector. For these reasons I think the CAPEX will increase by 20% per year for the first 3 years and increase by 25% per year for the last 2 years.

The cash flow from operations will increase by about 20% in 2020, then this rate will drop to 15% for 2 years and in 2023 and 2024 will drop to 10%. My forecasts on this cash flow were based on income. Income will continue to increase, which will increase cash flow from operations. Income will increase but less and less. It will increase this way because Facebook will not be able to increase its income indefinitely. Moreover, with the arrival of more and more companies in the field, Facebook will have to share the market and will gradually slow down the increase of its revenue and thus indirectly its income. This will also be accompanied by an increase in depreciation as Facebook will increase its CAPEX, which is logical.

Facebook is a company with very little debt, which means that it is not financed by borrowing. However, for the next few years, it will be facing takeovers of companies that could become future competitors. For these reasons I think Facebook will borrow more. For the same reason, I think that for the next 3 years, the interest expense will increase by 10% and for the last two years by 20%.
I took 21% as a shield tax on interest expense. I think this rate will remain constant for the next 5 years.

[3] All numbers are in million USD

Arlind Rashiti

Facebook Free Cash Flow Forecasts

In order to forecast the free cash flows for the following years, I used the data from the website "Capital IQ". All my estimations come from this place. So, first, I used this formula to get the FCF: Free Cash Flow = EBITDA * (1-tau) + tau *Depreciation-Capex-NWC.

Let's begin with EBITDA. According to the data from 2015 to 2017, we have a huge growth rate which is compounded over 5 years, but then for 2018 and 2019, these numbers don't grow that much. Because of this, I decided to take the growth over 2 years compounded which was 11.4%. Hence, I decided to assume that this number is used as a constant for the following years. Then, for the effective tax rate, I have seen that since 2016, those rates stay on the same level between 13.7% and 25.5%. That's why taking the mean of those values seems acceptable and for simplicity I took it as a constant for the following years. Now, depreciation values seem to increase strictly since 2015 and with a huge increase of 42% between 2017 and 2018. Then, the growth between 2019 and September 2020 seems smaller (12%). By taking the mean, it gives me an annual increase of 27% which is still reasonable according to values of the five last years. After this, capex values are very stable and turn around $14,539.66. Finally, forecasting the change in net working capital was the hardest part because those numbers are very volatile. According to data, the largest negative number was 5,400 for 2019. The rest is compact. I also used the mean to get a constant number to calculate FCF. But, since the change in net working capital is not a huge number, this will not affect a lot my estimations. To sum up, I chose a conservative method, so that I don't end up with incredible numbers. In my opinion, the only place where estimations could not be exact might come from the growth of EBITDA.

Forecasting FCF	**2020**	**2021**	**2022**	**2023**	**2024**
EBITDA	39236	43709	48691	54242	60426
tau	18.6%				
EBITDA * (1-tau)	31938	35579	39634	44152	49186
depreciation	6916	8841	11301	14446	18466
tau * depreciation	1286	1644	2101	2686	3434
capex	-14539.66	-14539.66	-14539.66	-14539.66	-14539.66
change in net working capital	-288	-288	-288	-288	-288
FCF	*18396*	*22396*	*26908*	*32010*	*37792*

All numbers are in million USD

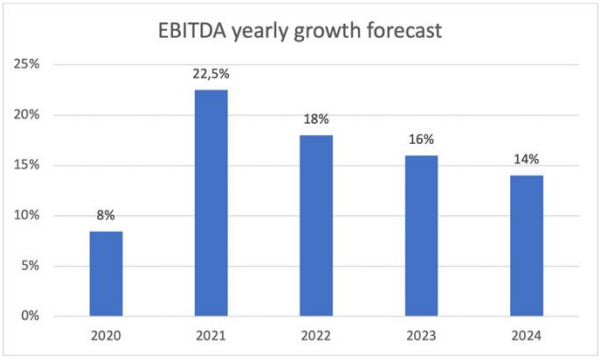
Second Round Delphi Reports from each member

While reviewing my last report and comparing it with my peers, I reckoned that I have been slightly too conservative in my forecasts. I tried to come up with good justifications of an upward reviewing of my numbers, and I realized a few things.

First of all, I still think that my methodology is appropriate: first making a forecast of growth on EBITDA (which is, in my sense, more intuitive to work with) and then applying an equivalent constant annualized growth rate for the free cash-flows. I proceed this way because I think that FCF are too volatile and too hard to predict by themselves. They change too much from one year to another and for this reason, I will assume that they keep growing with the same pattern. I think that on average that can be a valid assumption.

While doing research to reevaluate my forecasts, I realized that the formula of FCF that I took from Capital IQ was maybe not the most conventional one, the most used. For example, on plenty of other reliable websites (like Yahoo Finance, Market Watch…) we find FCF computed with another definition of it: **Cash-Flows of Operations – CAPEX**. It seems more appropriate to me so I will use it for this revised report[4]. The result of this is that for my predictions on EBITDA first, I will start from a higher basis now ($23,000m: trailing 12-month FCF), but I will decrease slightly my expected growth rate as it seems a bit too hopeful to me finally.

The annualized equivalent growth rate applied for predicting free cash-flows from 2021 to 2024 is approximately 17.6%.



Years	Free cash-flows forecasted	
2020	$	23 000
2021	$	27 042
2022	$	31 795
2023	$	37 383
2024	$	43 953

[4] In this report, I took the FCF for 2019 and TTM 2020 on Yahoo Finance. All USD numbers are in million

Arthur Bonetti

Facebook Revised Free Cash Flow Forecasts 2020-2024

	2019	2020	2021	2022	2023	2024
Cash Flow From Ops.	36'314	43'577	52'292	62'228	72'806	83'727
Less: Capex	-15'102.00	-17'367.30	-20'319.74	-24'180.49	-29'258.40	-35'987.83
FCF	21'212.0	26'209.5	31'972.4	38'047.2	43'548.0	47'739.5

All numbers are in million USD

Justifications:

For my revised version of cash flow forecasts, I decided to change my forecast method. After browsing my colleagues' reports, I realized that the method I used to calculate the Free Cash Flows was not adapted for Facebook Inc as I had to add a huge adjustment to meet the numbers of 2018 and 2019. This arbitrary adjustment unconditionally leads to biased estimations. For this reason, I decided to use Cash Flow from Ops minus Capex to arrive at the FCF. This method doesn't require any adjustment to arrive at the correct FCF for year 2019 and is therefore more adapted to forecast the Free Cash Flows for the following years.

I used a decreasing growth rate for the Cash Flow from Ops for 2020 to 2024. Indeed, I believe, with the information I came up with, that Facebook will still have an impressive growth for at least the two following years. Therefore, I used a growth rate of 20% for 2020 and 2021 and then decreased it linearly to 15%. The reason is that soon or later, Facebook will certainly not be able to maintain outstanding growth compared to the sector.

For the Capex, I inspired for my estimations from a colleague's analysis. As Facebook will go forward, it will meet more competitions and more regulations. For these reasons, the company will have to increase its investment in Capex to stay competitive in the market. This view led me to choose an increasing growth in Capex. For 2020, I increased the Capex by 15% and I adjusted it incrementally by 2% every year, to arrive at an increase of 23% from year 2023 to 2024.

As we can see, these modifications had a tremendous impact on my forecasts. In my previous analysis, I came up with a FCF for 2024 of 27'849 and this number is now at 47'739. I really think that the forecasts of my colleagues helped improve mine.

Revised version of FCF forecast

	2024	2023	2022	2021	2020	2019
Revenue	203178	160475	126746	100107	83422	$ 70,697
Cost of revenue	36700	28987	22894	18082	15069	12,770
Research and development	39085	30871	24382	19258	16048	13,600
Marketing and sales	28383	22417	17706	13984	11654	9,876
General and administrative	30076	23754	18762	14818	12349	10,465
Total costs and expenses	134244	106029	83744	66143	55119	46,711
EBIT	68934	54446	43002	33964	28303	23,986
Effective tax rate	22%	22%	22%	22%	22%	22%
depreciation and amortisation	13690	11409	9507	7923	6602	5,741
CapEx	21573	19975	18496	17126	15857	15102
NWC	88572	79082	70609	63044	56289	51172
Change in NWC	9490	8473	7565	6755	5117	7709
Adjustment	15000	15000	15000	15000	15000	19573
Free Cash flow	51396	40428	31988	25534	22705	21212

Ratios and grow rates:

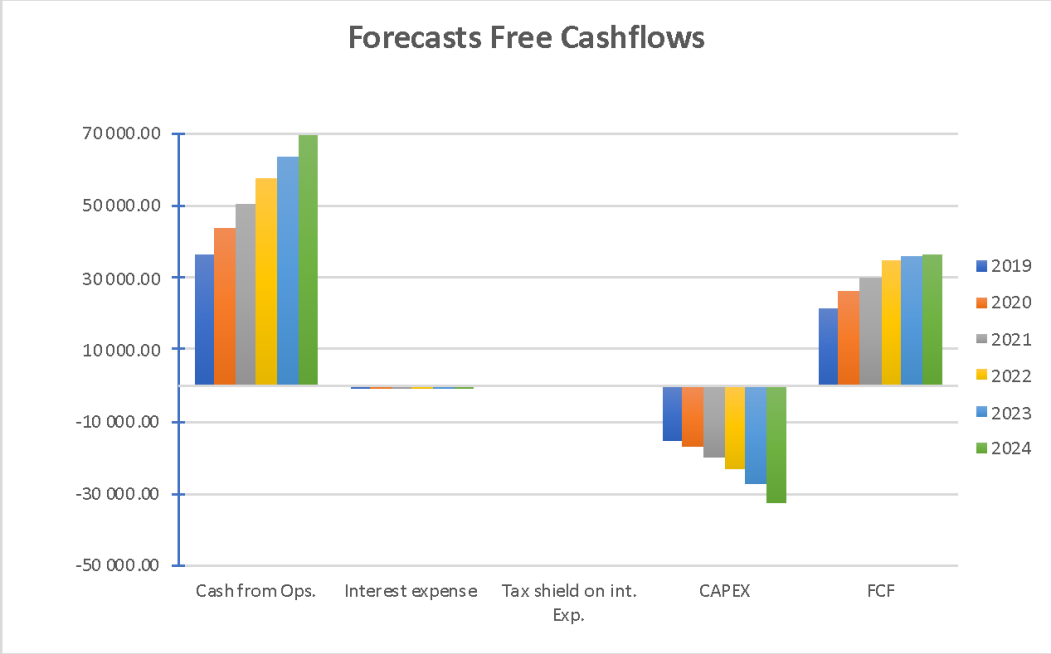
revenue growth	27%	27%	27%	20%	18%	27%
Gross profit margin	0.82	0.82	0.82	0.82	0.82	0.82
gross profit	166478	131488	103852	82025	68354	$ 57,927
ga/sales	0.15	0.15	0.15	0.15	0.15	0.15
rd/sales	0.19	0.19	0.19	0.19	0.19	0.19
mark&sal exp/sales	0.14	0.14	0.14	0.14	0.14	0.14
effective tax rate	22%	22%	22%	22%	22%	22%
capex gr	8%	8%	8%	8%	5%	8%
nwc gr	12%	12%	12%	12%	10%	15%
depr gr	20%	20%	20%	20%	15%	25%

All numbers are in million USD

Changes: After comparing my first FCF forecast to those of my groupmates, I made modifications to my forecast. Firstly, now my analysis includes projected income statements for all forecasted years. Secondly, this time the forecast of FCF is more accurately calculated than the first report as new forecasts of NWC, Capex and Depreciation & Amortization are included in this report. Moreover, in the previous report I did not expect a decline in revenues of Facebook in 2020. However, after inspecting my peers' forecasts, I decided that my previous forecast of revenue growth was over optimistic. Finally, as a result of the current and more elaborate forecast, more realistic FCF values are predicted.

Justification: Revenue growth expectations in 2020 and 2021 are decreased in the light of Covid-19 effects on the business world. According to news, as Facebook does not monetize the use of its social media, the most part of its revenues comes from advertisements. As global lockdown severely hurts retailers and entrepreneurs, their advertisements expenses decrease overall. Thus, in 2020 and 2021 I expect lower advertisement revenues for the social media giant. Furthermore, as the revival period of the global economy is expected to happen after 2021, my forecasts of revenue growth start to increase from the end of 2021 and onwards. For the same reason, growth rates of Capex, NWC, depreciation and amortization are expected to decrease in 2020 and to revive in 2021.

Facebook's Revised Free Cash Flow forecasts



	2019	2020	2021	2022	2023	2024
Cash from Ops.	36314	43576.8	50113.32	57630.318	63393.3498	69732.6848
Interest expense	-20	-22	-24.2	-29.04	-34.85	-41.82
Tax shield on int. Exp.	2.4	4.62	5.08	6.10	8.36	10.04
CAPEX	-15102	-17367.3	-19972.395	-22968.254	-27561.905	-33074.286
FCF	21194.4	26192.12	30121.807	34639.12	35804.96	36626.62

All numbers are in million USD

After comparing my forecasts to those of my colleagues, I made some changes to my predictions for the next 5 years regarding free cash flows.

First, the tax shield rate will change for me especially for 2020. In talking with the other people in the group we concluded that the rate will be lower for 2020 thanks to aid given to businesses because of the pandemic. For this reason, I would lower it to 12% for the year 2020. But I think that since they will lower the rate for 2020, they are going to raise it in a few years to get that money back. For this reason, I will put that for 2023 and 2024, this rate will increase to 24%.

Regarding CAPEX, after speaking with my colleagues, I have revised the CAPEX increase for the other years downwards. I still think that CAPEX will increase because there will be more and more competition in this sector. It will be necessary to increase the CAPEX in order to keep some control of the market. For the years 2020 to 2022, CAPEX will increase by 15% and for 2023 to 2024 it will increase by 20%.

The operating cash flows forecast remains the same as my first forecast.

Arlind Rashiti

Facebook's Revised Free Cash Flow forecasts

First, my methodology consists of deciding which data to take in order to have numbers that don't explode in the future for no reason.

Let's begin with the format of some members. For some, I saw that EBITDA has been decomposed into different parts and had been linked with different growth rates, for example revenues with y% and expenses with x%. In this revised report, I will still use EBITDA growth as the main explanation of variation for this term. But, after checking again data and what members did, I think it would be desirable to add some variations for other terms. For example, for capex values, indeed from 2015 to 2017, there was a huge increase. According to data, from 2017 to 2019, there was in fact a plateau. But from 2018 to 2019, an increase of 15% can be generalized for the following years. Then, it will not be necessary to modify the variation in net working capital since those numbers remain small in proportion. Concerning the level of the tax rate, when comparing with others, setting my tax rate at the current level and letting it as a constant is not a bad thing to do. Therefore, I will still use this level.

At the end, after checking what my team did, I realize that my methodology remains still valid because I can see some convergence in comparison with some teammates. For example, some used a lot of information for the future events that could happen and modify financials. I prefer to rely on the continuity and precautionary principle assuming that the future will depend on the past.

Forecasting FCF	**2020**	**2021**	**2022**	**2023**	**2024**
EBITDA	39,236	43,709	48,691	54242	60,426
taxe rate	18.6%				
EBITDA*(1-taxe rate)	31,938	35,579	39,634	44,152	49,186
depreciation	6916	8841	11301	14446	18466
depreciation * tax rate	1286	1644	2101	2686	3434
capex	-14,539.66	-16,720.61	-19,228.70	-22,113	-25,429.95
change in net working capital	-288	-288	-288	-288	-288
FCF	***18,396.34***	***20,214.39***	***22,218.3***	***24,437***	***26,902.05***

All numbers are in million USD

Final Delphi Forecast

(in millions)	2020	2021	2022	2023	2024
Alfonso	26192	30122	34639	35805	36627
Arlind	18396	20214	22218	24437	26902
Arthur	26210	31972	38047	43548	47740
Mehdi	23000	27042	31795	37383	43953
Nihad	22705	25534	31988	40428	51396
avg. FCF	23301	26977	31738	36320	41323

Method:

The table summarizes Facebook's free cash flow forecasts for 2020-2024, calculated by our group's members based on their revised Delphi reports. The bottom line of the table shows the average mean of our FCF forecasts. In general, our method of calculation of FCF was based on two formulas:

1) FCF=Cash flow from operations – CAPEX
2) FCF=EBIT*(1-tax rate) + Depr. – CAPEX – ch.in NWC

For each of the components of these formulas (EBIT, CAPEX, CFO etc.) our group members prepared a table of forecasts where they reveal their own expectations about future realizations of these values based on the news about the market and the financial statements of Facebook. Tax rates for the following years are taken as an effective tax rate that usually Facebook pays rather than a corporate tax level.

Justifications:

There are 2 prevalent views within our group about the future realizations of FCF. On the one hand, some of our group members expect Facebook to sustain increasing free cash flows at an increasing rate for 2020 and 2021. After 2021, they expect Facebook to lose some steam in the market and end up with lower EBIT growth than those the one for 2020 and 2021. As EBIT growth would slow down, free cash flows would increase at a decreasing rate. Moreover, they predict that Facebook will increase its capital expenditure more than usual after 2022 to regain its previous dominance in the market. Thus, their forecasted free cash flows in 2020 and 2021 are increasing at a higher rate than those of the years 2022, 2023 and 2024.

On the other hand, other members of our group expect a slight decrease in a growth rate (still positive) of free cash flows in 2020 and 2021. This is mostly due to the Covid-19 effect on the economy where the lockdown affects all retailers and entrepreneurs who are the payers of the advertisements in Facebook. As Facebook keeps use of social media for free, the main earnings source for it is advertisement revenue. Thus, those group members do not expect EBIT to increase at an increasing rate in 2020 and 2021. However, after 2022 they predict a huge increase in free cash flows of Facebook as the pandemic is expected to disappear towards 2022 according to news.

Overall, we can see that our average forecast of FCF in 2020 is only slightly higher than FCF in 2019 which was $21,212 million. This implies that we do not expect huge growth in FCF of Facebook in 2020 which was not a good year for businesses. However, from 2021 and onwards, on average our FCF forecasts follow a stable increasing path.

Analyst Forecasts

Here you can see the analysts forecasts[5] for the following variables and years:

Year	2020	2021	2022	2023	2024
Revenue	$ 84'008	$ 103'625	$ 124'086	$ 144'244	$ 164'235
EBITDA	$ 44'214	$ 51'982	$ 64'320	$ 75'185	$ 86'554
EBIT	$ 30'430	$ 35'755	$ 44'693	$ 52'369	$ 59'717
Net Income	$ 26'965	$ 30'133	$ 37'152	$ 42'971	$ 49'282
Free Cash-Flows	**$ 20'853**	**$ 25'694**	**$ 34'230**	**$ 38'786**	**$ 45'936**

All numbers are in million USD

Compared to our first round of Delphi forecasts, the analysts are clearly above our predictions. Only one member of our group makes the exception of being above the analysts' forecasts, especially for the furthest years.
In the second round, we are closer to their numbers. Some are slightly under while some others are slightly above.

Concerning our Final Delphi Forecast, we can make some very interesting observations. Most interestingly, we are truly close to the numbers the analysts are expecting. For the years 2020 & 2021, we are above their expectations by **$2,448m in 2020 & $1,283m in 2021**. From the year 2022 however, our numbers drop below the analysts'. The difference is **$2,492m in 2022; $2,466m in 2023 and $4,613m in 2024**.
The mean of the differences shows that on average, we have a forecast that is **$1,168m lower** than the analysts.

To conclude, we can say that our group is forecasting better performance than the consensus of analysts in the near term. However, in the longer term, we are under-estimating Facebook's free cash-flows' growth relatively to the consensus forecasts.

[5] According to Capital IQ data

Quantitative forecasts of revenue and cash flows

To perform our forecasts of revenue, we used an Arellano-Bover/Blundell-Bond linear dynamic panel-data estimation, in which we have two predetermined variables for sales growth; ROA and Gross Margin.

We used the companies that operate in the same sector as Facebook (SIC 73) to form our panel and with 3,721 observations we were able to predict with confidence the growth of sales in the sector.

growth_sale	Coef.	Std. Err.	z	P>|z|
growth_sale L1	0.1171314	0.0180747	6.48	0.000
Lroa	-1.692809	0.2105752	-8.04	0.000
Lgross_margin	1.046348	0.139384	7.51	0.000
_cons	0.0909125	0.0228567	3.98	0.000

The high values of the z assure us that our estimation of growth_sale is significant enough.

To be able to use this information in our calculation of the FCF, we had to regress two more variables; ROA and Gross Margin. We also used an Arellano-Bover/Blundell-Bond linear dynamic panel-data estimation for both variables and this time with no predetermined variables

roa	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
roa L1.	0.4997317	0.0324667	15.39	0.000	0.4360982	0.5633652
_cons	0.0492599	0.0033765	14.59	0.000	0.042642	0.0558777

gross_margin	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gross_margin L1	0.6487398	0.0330781	19.61	0.000	0.583908	0.7135717
_cons	0.0533053	0.0051198	10.41	0.000	0.0432707	0.0633398

The results indicate that each variable is strongly dependent on past year value and on a constant, both are strongly significant.

By combining these estimations of growth of sales, ROA and gross margin, we came up with an estimation for sales for 2020 to 2024.

Facebook, Inc **USD million**	**12 months Dec-31-2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Gross margin %	*49.12%*	*37.20%*	*29.46%*	*24.44%*	*21.19%*	*19.08%*
ROA %	*18.29%*	*14.07%*	*11.96%*	*10.90%*	*10.37%*	*10.11%*
Growth of sales %	*137.66%*	*45.65%*	*29.55%*	*23.14%*	*18.93%*	*15.92%*
Revenue	**70'697.0**	**102'969.8**	**133'394.6**	**164'263.8**	**195'352.3**	**226'448.9**

As we can see on the table, Facebook Inc ratios for gross margin, ROA and growth of sales are very high for year 2019, as Facebook overperformed compared to other firms in the sector during this year. The ratios are then decreasing toward a sector equilibrium, and thus the increase in revenue is slowing accordingly.

For the second part of our forecast, we estimated EBIT/Sales, Dep/Sales, Capex/Sales, DNWC/Sales ratios by computing the mean over the last ten years of Facebook historical ratios. We then calculated the FCF by multiplying the ratios with our forecasted sales and then added them together. Unfortunately, this method was unappropriated for Facebook Inc. Indeed, by using this method to compute the FCF for 2019 and before, we found a discrepancy from 10 to 20 billion USD. It was therefore inappropriate to forecast the FCF of the following years.

For this reason, we changed our method and computed the FCF by adding the Cash Flows from Operations to the Capex. After a new request on WRDS, we created two new ratios; CFO/sales and Capex/sales and then took the mean over the last ten years.

The mean computed by this process for CFO/sales is 51.09% and the mean for Capex/sales is -18.06%

After this step, we had all the information we needed to forecast the FCF of Facebook for years 2020 to 2024.

Facebook, Inc **USD million**	**12 months Dec-31-2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Gross margin %	*49.12%*	*37.20%*	*29.46%*	*24.44%*	*21.19%*	*19.08%*
ROA %	*18.29%*	*14.07%*	*11.96%*	*10.90%*	*10.37%*	*10.11%*
Growth of sales %	*137.66%*	*45.65%*	*29.55%*	*23.14%*	*18.93%*	*15.92%*
Revenue	**70'697.0**	**102'969.8**	**133'394.6**	**164'263.8**	**195'352.3**	**226'448.9**
CFO	**36'314.0**	**52'607.3**	**68'151.3**	**83'922.4**	**99'805.5**	**115'692.8**
Capex	**(15'102.0)**	**(18'596.3)**	**(24'091.1)**	**(29'666.0)**	**(35'280.6)**	**(40'896.7)**
FCF	**21'212.0**	**34'010.9**	**44'060.2**	**54'256.3**	**64'524.9**	**74'796.1**

Our quantitative estimation of FCF is clearly above our individual forecasts and those of the analysts. However, the percentage increase of the FCF lowers every year as Facebook Inc's ratios move toward the sector equilibrium.

Final forecast of FCF

Our final forecast of free cash flows for Facebook is an arithmetic average of our final Delphi forecast, the analyst consensus and our quantitative forecast that was done in Stata.

(in millions)	2020	2021	2022	2023	2024
FCF - Final Delphi Forecast	23301	26977	31738	36320	41323
FCF - Analyst Consensus	20853	25694	34230	38786	45936
FCF - Quantitative Forecast	34011	44060	54256	64525	74796
FCF - Final Forecast	26055	32244	40075	46544	54019

All numbers are in million USD

It can be easily observed from the table that our Delphi method forecasts of free cash flows in 2020 and 2021 are slightly higher than the free cash flow forecasts of analysts for these years. This might be due to the fact that in our Delphi forecasts some members of our group predicted higher growth in Facebook earnings in 2020 and 2021 as Facebook is a dominant corporation in the sector of social media.

Whereas, it seems that analysts are not much optimistic as we are about the expectations of free cash flows of Facebook in 2020 and 2021, most probably, because of the effect of Covid-19 on the business world. On the other hand, free cash flow forecasts of analysts for 2022. 2023 and 2024 are slightly higher than those of ours. At some point of our Delphi forecast we assumed that Facebook will lose some competition to other social media corporations after 2022. This might be the reason for the slight difference between analyst consensus and our final Delphi forecast of the free cash flows in 2022, 2023 and 2024. In general, it is pretty obvious from the table that our final Delphi forecast of the free cash flows is very similar in numbers to the analyst consensus.

The results from our quantitative forecast of FCF are higher than the analyst consensus of FCF. The reason for this phenomenon might be that Facebook's sales growth for 2019 was 137.66%. Our model forecasts the futures cash flows by using a coefficient of previous year gross margin, ROA and growth of sales ratios and a constant. As 2019 was an outstanding year, the following years' ratios are still high even if they are going towards the sector equilibrium. This can be a reason for such optimistic forecasts in our quantitative model.

Overall, from our final forecast of FCF, we can conclude that free cash flows of Facebook are expected to perform a strong growth for the upcoming 5 years. However, this growth rate during 2020, 2021 and 2022 is expected to be higher than the growth rate of FCF in 2023 and 2024. Our explanation about Facebook losing competition to other rivals might be one of the answers to this difference in growth rates between years.

Conclusion

In this project, we have first analyzed the financial statements of Facebook in order to make ourselves a good idea of the company to perform valid individual predictions of what could happen in the future of the company. One of the key parts of this process has been to make a link between different variables (EBITDA for most of the group) and FCF, which are hard to forecast by themselves.

Sharing our plural views between the members of the group has undoubtedly helped us to improve our reports. Thanks to that we realized we could include some good modifications that we wouldn't have thought of individually.

After that, we confronted our merged revised numbers to the analysts' consensus. Astonishingly, without even having a glance at it before, the result is that we land not far from their predictions. On that point, we've been pleasantly surprised.

After that, a totally contrasting method has been used: quantitative forecasts based on regressions (autoregressive model). It is based on past and current financial parameters of Facebook. This kind of model has maybe not had the expected outcome: it gave us some strangely high numbers. We gave an explanation to such a result.

To conclude, we can say that this work has surely helped us on two main points. The first is that thanks to that, we had to learn from our peers. We realized that it is always best sharing ideas in order to discover relevant points that we could include in our analysis to improve it. The second point is about technical knowledge. Working with autoregressive processes on Stata the way we did gave us some key technical experience on how to perform such predictions with a large database like Compustat, and different regression models in Stata.

References

Overview:

Wikipedia Inc, 7 November 2020, *Facebook*, accessed 8 November 2020, https://fr.wikipedia.org/wiki/Facebook

Pierre-Yves Dugua, Le Figaro, 30 January 2020, *la croissance de Facebook, toujours exceptionnelle, ralenti,* accessed 8 november 2020, https://www.lefigaro.fr/societes/la-croissance-de-facebook-est-moins-torride-20200130

Nextinpact, 30 January 2020, *Facebook : près de 70 milliards de dollars de chiffre d'affaires, 2,89 milliards d'utilisateurs par mois*, accessed 8 November 2020, https://www.nextinpact.com/lebrief/41302/11058-facebook---pres-de-70-milliards-de-dollars-de-chiffre-d-affaires--2-89-milliards-d-utilisateurs-par-mois

S&P Global, 2020, www.capitaliq.com

Statista, 2020, *Facebook's aadevertising revenue worldwilde from 2009 to 2019,* https://www.statista.com/statistics/271258/facebooks-advertising-revenue-worldwide/

Delphi forecast:

Yahoo, 2020, *Facebook,* https://finance.yahoo.com/quote/FB/balance-sheet?p=FB

Yahoo, 2020, *Facebook,* https://finance.yahoo.com/quote/FB/financials/

Gurufocus, 2020, *Facebook Free Cash Flow,* https://www.gurufocus.com/term/total_freecashflow/FB/Free%252BCash%252BFlow/Facebook%2BInc

Facebook 2020, *Facebook reports Fourth Quarter and Full Year 2019 Results,* https://investor.fb.com/investor-news/press-release-details/2020

Techcrunch, 2020,*Ad revenues and e-commerce boom boost Facebook earnings but US users down from COVID surge,* https://techcrunch.com/2020/10/29/facebook-q3-2020-earnings-snap/

S&P Global, 2020, www.capitaliq.com

Alpha Query, 2020, *Facebook, Inc, (FB),* https://www.alphaquery.com/stock/FB/fundamentals/annual/free-cash-flow

Appendix

Quantitative forecast excel sheet

Facebook, Inc CHF million	12 months Dec-31-2019	2020	2021	2022	2023	2024
Gross margin %	0.4912231	=0.6487398*D32+0.0533053	=0.6487398*E32+0.053	=0.6487398*F32+0.053	=0.6487398*G32+0.053	=0.6487398*H32+0.053
ROA %	0.182922	=0.4997317*D33+0.0492599	=0.4997317*E33+0.049	=0.4997317*F33+0.049	=0.4997317*G33+0.049	=0.4997317*H33+0.049
Growth of sales %	1.376604	=0.1171314*D34-1.692809*D33+1.046348*D32+0.0909125	=0.1171314*E34-1.692	=0.1171314*F34-1.692	=0.1171314*G34-1.692	=0.1171314*H34-1.692
Revenue	70697	=D35*(1+E34)	=E35*(1+F34)	=F35*(1+G34)	=G35*(1+H34)	=H35*(1+I34)
CFO	36314	=E35*0.5109	=F35*0.5109	=G35*0.5109	=H35*0.5109	=I35*0.5109
Capex	-15102	=E35*(-0.1806)	=F35*(-0.1806)	=G35*(-0.1806)	=H35*(-0.1806)	=I35*(-0.1806)
FCF	=D36+D37	=E36+E37	=F36+F37	=G36+G37	=H36+H37	=I36+I37