Career Seminar UIUC

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09/16/2021

Agenda

- How are financials reported?
- Cash flow & P&L
- Unit modeling -- building blocks
- Operational Optimization
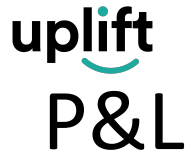- Related career paths

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Company financials

What is typically reported during an earnings call?

- Profit and Loss statement
- Balance sheet
- Cash flow

I will be focusing on cash flow and P&L statements. Balance sheets are snapshots of cash positions within a business.

P&L

What is typically reported in a P&L statement?

- Revenue
- Cost of Revenue
- Gross profits/losses
- Operating expenses
- Net profits/losses
- Earnings per share

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Example P&L

($ in millions, except percentages and per share data)	Q2-2020	Q3-2020	Q4-2020	Q1-2021	Q2-2021	YoY
Automotive revenues	5,179	7,611	9,314	9,002	10,206	97%
of which regulatory credits	428	397	401	518	354	-17%
Automotive gross profit	1,317	2,105	2,244	2,385	2,899	120%
Automotive gross margin	25.4%	27.7%	24.1%	26.5%	28.4%	298 bp
Total revenues	6,036	8,771	10,744	10,389	11,958	98%
Total gross profit	1,267	2,063	2,066	2,215	2,884	128%
Total GAAP gross margin	21.0%	23.5%	19.2%	21.3%	24.1%	313 bp
Operating expenses	940	1,254	1,491	1,621	1,572	67%
Income from operations	327	809	575	594	1,312	301%
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FINANCIAL SUMMARY
(Unaudited)

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Which company is this?

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  - Production capacities
  - Storage costs
  - Start up costs
  - Demand curves

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- Unit economics of each product line
  - Expected revenue & cost per unit
- Cash flows associated with product line
  - How are revenue lines/cost lines distributed over time?

Product production summary

	Q2-2020	Q3-2020	Q4-2020	Q1-2021	Q2-2021	YoY
Model S/X production	6,326	16,992	16,097	0	2,340	-63%
Model 3/Y production	75,946	128,044	163,660	180,338	204,081	169%
Total production	**82,272**	**145,036**	**179,757**	**180,338**	**206,421**	**151%**
Model S/X deliveries	10,614	15,275	18,966	2,030	1,895	-82%
Model 3/Y deliveries	80,277	124,318	161,701	182,847	199,409	148%
Total deliveries	**90,891**	**139,593**	**180,667**	**184,877**	**201,304**	**121%**
of which subject to operating lease accounting	4,716	10,014	13,636	13,602	14,492	207%
Total end of quarter operating lease vehicle count	54,519	61,638	72,089	83,032	95,491	75%
Global vehicle inventory (days of supply)[1]	17	14	11	8	9	-47%
Solar deployed (MW)	27	57	86	92	85	215%
Storage deployed (MWh)	419	759	1,584	445	1,274	204%
Store and service locations	446	466	523	561	598	34%
Mobile service fleet[2]	816	833	894	1,013	1,091	34%
Supercharger stations	2,035	2,181	2,564	2,699	2,966	46%
Supercharger connectors	18,100	19,437	23,277	24,515	26,900	49%

Time nature of line items

Revenue and costs associated with selling a product might not be incurred at time of sale alone.
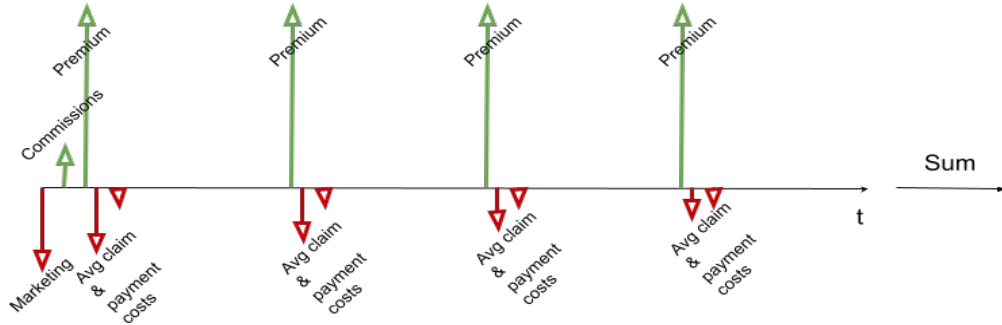
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The problem of defining when cash flows need to be recognized is the purview of accounting -- called GAAP. Non-GAAP numbers might have regulatory issues when disclosing to shareholders.
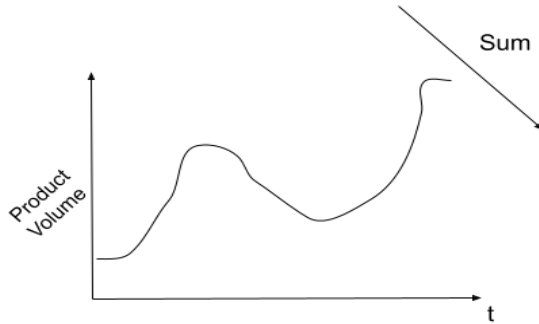
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Example : Insurance

What comes out of modeling the cash flow?

Cash flow over time for product after consummation

What do we need to model? Ex. Insurance.

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- Revenue
  - Pricing : Premiums that can be expected per unit sale
  - Commissions : Channels and market dynamics
- Costs
  - Payment collections : Network and processor costs
  - Claims : Average claims over time once purchased.

These models typically will have analogues that are deployed in funnel which decision in real time as well.

Operational optimization

Given target P&L statements, we need to set up an optimization problem that takes the following as inputs:

- Target P&L over a certain set of future time periods
- Constraints
  - Examples: cost line items not going above a threshold or cash balances which are above a threshold.

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The output typically needs to be:

- Possible optimal production numbers for product lines in future time periods -- i.e. optimal scenarios.

There might actually be no solution as well.

Uplift's P&L -- Revenue

Category		Account	
Revenue	Consumer revenue	Interest Revenue	
		Charge-off Interest	
		Origination Fees	
			Net Consumer Revenue
	Merchant Rev	Merchant Revenue	
		Subvention Revenue	
			Net Merchant Revenue
Total Revenue			Total Revenue

Uplift's P&L -- Costs

Provisions for credit losses	Fair Value Adjustment	
	Charge-off Principal	
	Provision for credit losses	
	Recoveries	
	Other Servicing Costs	
	Gain on Sale of Charge-off Loans	
		Total Provisions For Credit losses
Funding Costs	Interest Expense	
	Facility Amortization - Capital	
	Utilization Fees	
		Total Funding Costs
Processing and Servicing	Bank Origination Costs	
	Credit Bureau	
	Fraud Tools	
	Bank Verification	
	Payment Issuing Costs	
	Merchant Acquiring Costs	
	Third Party Collections	
	Loan Servicing Software	
	Customer Service Costs	
	Verification Services	
	Inmaterial Funding Variances	
		Total Processing and Servicing
Sales & Marketing		Sales & Marketing
Product & Engineering		Product & Engineering
General & Administrative		General & Administrative
Total Operating Expenses		Total Operating Expenses
Other Income		Other Income
Net Income (Loss)		Net Income (Loss)

What do we need to model? Ex. Uplift

Revenue

- Pricing
- Interest accruals over time
- Merchant pricing and risk
- Interchange through card networks

What about costs?

What aspects of data are important?

- Data for as many items in the P&L as possible at a reasonable cadence.
  - Reasonable depends on industry sector -- Tech companies would mostly be every few minutes or seconds. A hard drive manufacturer might be daily.

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- Analytical metrics and dashboarding/monitoring.
- Models -- could be ML based or other stochastic/predictive models.
  - Could be used to estimate financials, but also live in funnel decisioning.
- Model deployment and lifecycle management.

There are a plethora of roles supporting such a cross company endeavor typically.

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Career tracks in data

Specialist (Type B):

- Data engineering/infrastructure
- Machine learning researcher
- Machine learning engineer

Generalist (Type A)

- Data Scientist
- Data Analyst
- Business intelligence

My path started with the Generalist track -- took on more responsibilities infrastructure and business modeling.

What do you need to know?

- Business knowledge -- Not important to know when you join, but critical to learn to progress in any company.
- Convex optimization, linear programming, operations research - Book 1, Book 2, Course.
- Classification/Regression modeling - Book 1, Book 2.
- Probability & Stochastic processes - Book 1, Book 2.
- Information theory - Book 1.
- SQL querying and dashboarding - Link 1, Looker, Tableau.
- Basics of data structures and object oriented programming. - Even if you don't deploy production level code, you need to learn how to read code and understand it along with the data architecture.

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Questions?

Thank you!