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FINANCIAL MODELING AND VALUATION

A Practical Guide to Investment Banking and Private Equity

PAUL PIGNATARO

WILEY

Financial Modeling and Valuation

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To my wife, Carmen, for her love and support, enabling me to find the time to write this book and to juggle a multitude of ventures, I am ever grateful.

Contents

Preface

The markets are vast and complex—not only the United States but also the global markets. Stocks, bonds, mutual funds, derivatives, options—yes, choices are endless, literally. Everyone wants to make money. Yet, throughout the past years we have faced tremendous market swings, leaving investors (and their money) floundering in a sea of lost hopes and few investors with a plethora of wealth. Many of these market anomalies and swings are dependent on, and in a sense dictated by, the investor – you. The investor plays a part in setting the current stock price. The reaction of the investor can aid in determining the success of an initial public offering (IPO). Yes, the collective psychology of the market as a whole plays a major role, but if the everyday investor were better equipped with the proper tools to understand the underlying fundamentals of a rational investment, smarter investment decisions could be made, more rational investments would be made, and the markets would be a more efficient environment.

This book sets out to give any investor the fundamental tools to help determine if a stock investment is a rational one, and if a stock price is undervalued, overvalued, or appropriately valued. These fundamental tools are used by investment banks, private equity firms, and Wall Street analysts.

We will evaluate Amazon, determining its current financial standing, projecting its future performance, and estimating a target stock price. We will further assess if this is a viable investment, but more importantly, give you the tools and concepts to make your own rational investment decisions. We will have you step into the role of an analyst on Wall Street to give you a first-hand perspective and understanding of how the modeling and valuation process works with the tools you need to create your own analyses.

This is a guide designed for investment banking and private equity professionals to be used as a refresher or handbook, or for individuals looking to enter into the investment banking or private equity field. Whether you are valuing a potential investment or business, the tools demonstrated in this book are extremely valuable in the process.

THE AMAZON CASE STUDY

We will analyze Amazon throughout this book. Amazon is an American multinational technology company headquartered in Seattle, Washington. It is currently the second-largest retailer in the world.[1] Through its online and physical stores, Amazon provides hundreds of millions of products sold either directly or via third-party sellers, and manufactures and sells various electronic devices including Kindle, Fire tablet, Fire TV, Echo, Ring, and other devices. Amazon is also involved in a host of technology and internet-focused ventures and initiatives, including Amazon Web Services, intelligent virtual assistance, cloud computing, and live-streaming via Amazon Prime. Amazon also develops and produces media content, and the list of Amazon's offerings continues to expand. If we want to invest in Amazon, how do we determine the viability of such an investment? In order to ensure profitability from a stock investment, we need to understand what the future stock price of Amazon could be. Obviously, stock price fluctuations are largely based on public opinion. However, there is a technical analysis used by Wall Street analysts to help determine and predict the stock price of a business.

This technical analysis is based on three methods:

1. Comparable company analysis
2. Discounted cash flow analysis
3. Precedent transaction analysis

Each of these methods view Amazon from three very different technical perspectives. Individually, these methods could present major flaws. However, it is the common belief that looking at all of these methods together will help us understand the technical drivers supporting Amazon's current stock price. Using Amazon as the example, we will construct all three of the listed analyses and all the supporting analyses exactly as a Wall Street analyst would. We will then have the ability to interpret from the analysis if Amazon is undervalued, overvalued, or appropriately valued. If the company is determined to be undervalued, that may suggest the stock price is lower than expected. We can potentially invest in the business and hope the stock price in time will increase. If the company is determined to be overvalued, that may suggest the stock price is higher than expected. In this case it may not make sense to invest in the business, as the

[1]David Marcotte, "2021 Top 50 Global Retailers," National Retail Federation (March 24, 2021), https://nrf.com/blog/2021-top-50-global-retailers.

stock price in time could potentially decrease. We are assuming in these cases there has been no unusual or unpredictable activity or announcements in Amazon's business or in the stock market. Such activity or announcements would affect the stock price above and beyond what the technical analysis predicts.

It is important to note that the modeling methodology presented in this book is just one view. The analysis of Amazon and its results do not directly reflect my belief, but rather, a possible conclusion for instructional purposes only based on limiting the most extreme of variables. There are other possibilities and paths I have chosen not to include in this book but could have also been sufficient. Many ideas presented here are debatable, and I welcome the debate. The point is to understand the methods, and further, the concepts behind the methods to properly equip you with the tools to drive your own analyses.

HOW THIS BOOK IS STRUCTURED

This book is divided into two parts:

1. Financial Statements and Projections
2. Valuation

In Part One, we will build a complete financial model of Amazon. We will analyze the company's historical performance and step through techniques to make accurate projections of the business's future performance. The goal of this section is not only to understand how to build a model of Amazon, but also to extract the modeling techniques used by analysts and to apply those techniques to any investment.

Once we have a good understanding of Amazon's past and future performance, Part Two will help us interpret the company's financials into a valuation analysis using the methods mentioned previously. You may skip directly to Part Two if your needs do not require building a complete financial model.

It is important to note it is not 100 percent necessary to have a full-scale model in order to conduct a valuation analysis, but it is recommended. Valuation techniques are based on a summary of the company's performance. In this case, to be complete, we will use the model of the company built in Part One to extract the necessary summary information and to conduct the valuation analysis. However, you could technically use summary information as well.

The book is designed to have you build your own model on Amazon step-by-step. The model template can be found on the companion website associated with this book and is titled "NYSF—Amazon—Template.xls." To access the website, go to www.wiley.com/go/pignataro (password: investment).

PART

One

Financial Statements and Projections

Financial modeling is the fundamental building block of analysis in investment banking. We will take a look at Amazon and analyze its financial standing, building a complete financial model as it would be done by Wall Street analysts.

The goals of this section are:

1. Understanding financial statements
   a. Concepts
   b. Historical analysis
   c. Making projections
   d. Model flow between the statements
2. Developing the ability to build a complete financial model of Amazon

It is recommended that a financial model be built on six major components:

1. Income statement
2. Cash flow statement
3. Balance sheet
4. Depreciation schedule
5. Working capital
6. Debt schedule

The first three are the major statements: income statement, cash flow statement, and balance sheet. The latter three help support the flow and continuity of the first three. It is also not uncommon to have even more supporting schedules, depending on the required analysis. Notice the first six tabs in the model template ("NYSF—Amazon—Template.xls"). Each reflects the six major model components. Please use the template and follow along as we build the model together.

CHAPTER 1

The Income Statement

The income statement measures a company's profit (or loss) over a specific period of time. A business is generally required to report and record the sales it generates for tax purposes. And, of course, taxes on sales made can be reduced by the expenses incurred while generating those sales. Although there are specific rules that govern when and how those expense reductions can be utilized, there is still a general concept:

$$\text{Profit} = \text{Revenue} - \text{Expenses}$$

A company is taxed on profit. So:

$$\text{Net Income} = \text{Profit} - \text{Tax}$$

However, income statements have grown to be quite complex. The multifaceted categories of expenses can vary from company to company. As analysts, we need to identify major categories within the income statement in order to facilitate proper analysis. For this reason, one should always categorize income statement line items into nine major categories:

1. Revenue (sales)
2. Cost of goods sold
3. Operating expenses
4. Other income
5. Depreciation and amortization
6. Interest
7. Taxes
8. Non-recurring and extraordinary items
9. Distributions

No matter how convoluted an income statement is, a good analyst would categorize each reported income statement line item into one of these nine categories. This will allow an analyst to easily understand the major categories that drive profitability in an income statement and can further allow him or her to compare the profitability between several different companies—an analysis very important in determining relative valuation. This book assumes you have some basic understanding of accounting, so we will just briefly recap the line items.

REVENUE

Revenue is the sales or gross income a company has made during a specific operating period. It is important to note that when and how revenue is recognized can vary from company to company and may be different from the actual cash received. Revenue is recognized when "realized and earned," which is typically when the products sold have been transferred or once the service has been rendered.

COST OF GOODS SOLD

Cost of goods sold (COGS) is the direct costs attributable to the production of the goods sold by a company. These are the costs most directly associated to the revenue. This is typically the cost of the materials used in creating the products sold, although some other direct costs could be included as well.

Gross Profit

Gross profit is not one of the nine categories listed, as it is a totaling item. Gross profit is the revenue less COGS and is helpful in determining the net value of the revenue after COGS is removed. One common metric analyzed is gross profit margin, which is the gross profit divided by the revenue. We will calculate these totals and metrics for Amazon later in the chapter.

A business that sells cars, for example, may have manufacturing costs. Let's say we sell a car for $20,000, and we manufacture the cars in-house. We must purchase $5,000 in raw materials to manufacture the car. If we sell one car, $20,000 is our revenue and $5,000 is the COGS. That leaves us with $15,000 in gross profit, or a 75% gross profit margin. Now let's say in the first quarter of operations we sell 25 cars. That's 25 × $20,000, or

$500,000 in revenue. Our COGS is 25 × $5,000, or $125,000, which leaves us with $375,000 in gross profit.

Car Co.	**1Q 2021**
Revenue	500,000.0
COGS	125,000.0
Gross Profit	**375,000.0**
% Gross Profit Margin	*75%*

OPERATING EXPENSES

Operating expenses are expenses incurred by a company as a result of performing its normal business operations. These are the relatively indirect expenses related to generating the company's revenue and supporting its operations. Operating expenses can be broken into several other major subcategories, the most common of which are:

1. **Selling, General, and Administrative (SG&A).** These are all selling expenses and all general and administrative expenses of a company. Examples are employee salaries and rents.
2. **Advertising and Marketing.** These are expenses relating to any advertising or marketing initiatives the company employs. Examples are print advertising and Google Adwords.
3. **Research and Development (R&D).** These are expenses relating to furthering the development of the company's product or services.

Let's say in our car business, we have employees to whom we have paid $75,000 in total in the first quarter. We also have rents to pay of $2,500, and we ran an advertising initiative that cost us $7,500. Finally, let's assume we have employed some R&D efforts to continue to improve the design of our car that cost roughly $5,000 per quarter. Using the previous example, our simple income statement looks like this:

Car Co.	**1Q 2021**
Revenue	500,000.0
COGS	125,000.0
Gross Profit	**375,000.0**
% Gross Profit Margin	*75%*

(*Continued*)

Operating Expenses	
SG&A	77,500.0
Advertising	7,500.0
R&D	5,000.0
Total Operating Expenses	**90,000.0**

OTHER INCOME

Companies can generate income that is not core to their business. As this income is taxable, it is recorded on the income statement. However, since it is not core to business operations, it is not considered revenue. Let's take the example of the car company. A car company's core business is producing and selling cars. However, many car companies also generate income in another way: financing. If a car company offers its customers the ability to finance the payments on a car, those payments come with interest. The car company receives that interest. That interest is taxable and is considered additional income. However, as that income is not core to the business, it is not considered revenue; it is considered other income.

Another common example of other income is *income from noncontrolling interests*, also known as *income from unconsolidated affiliates*. This is income received when one company has a noncontrolling interest investment in another company. So when a company (Company A) invests in another company (Company B) and receives a minority stake in Company B, Company B distributes a portion of its net income to Company A. Company A records those distributions received as other income.

EBITDA

Earnings before interest, taxes, depreciation, and amortization (EBITDA) is a very important measure among Wall Street analysts. We will later see its many uses as a fundamental metric in valuation and analysis. It can be calculated as Revenue – COGS – Operating Expenses + Other Income.

It is debatable whether other income should be included in EBITDA. There are two sides to the argument:

1. *It should be included in EBITDA*. If a company produces other income, it should be represented as part of EBITDA, and other income should be listed above our EBITDA total. The argument here is that

other income, although not core to revenue, is still in fact operating and should be represented as part of the company's operations. There are many ways of looking at this. Taking the car example, we can maybe assume that the financing activities, although not core to revenue, are essential enough to the overall profitability to be considered as part of EBITDA.

2. *It should not be included in EBITDA*. If a company produces other income, it should not be represented as part of EBITDA, and other income should be listed below our EBITDA total. The argument here is that although it is a part of the company's profitability, it is not core enough to the operations to be incorporated as part of the company's core profitability.

Determining whether to include other income as EBITDA is not so simple and clear cut. It is important to consider if the other income is consistent and reoccurring. If it is not, the case can more likely be made that it should not be included in EBITDA. It is also important to consider the purpose of your particular analysis. For example, if you are looking to acquire the entire business, and that business will still be producing that other income even after the acquisition, then maybe it should be represented as part of EBITDA. Or maybe that other income will no longer exist after the acquisition, in which case it should not be included in EBITDA. As another example, if you are trying to compare EBITDA with the EBITDA of other companies, then it is important to consider if the other companies also produce that same other income. If not, then maybe it is better to keep other income out of the EBITDA analysis, to make sure there is a consistent comparison among all of the company EBITDAs.

Different banks and firms may have different views on whether other income should or should not be included in EBITDA. Even different industry groups within the same firm have been found to have different views on this topic. As a good analyst, it is important to come up with one consistent defensible view, and stick to it.

Let's assume in our car example the other income will be part of EBITDA.

Car Co.	**1Q 2021**
Revenue	500,000.0
COGS	125,000.0
Gross Profit	**375,000.0**
% Gross Profit Margin	*75%*

(*Continued*)

Operating Expenses	
SG&A	77,500.0
Advertising	7,500.0
R&D	5,000.0
Total Operating Expenses	**90,000.0**
Other Income	1,000.0
EBITDA	**286,000.0**
EBITDA Margin	*57%*

Notice we have also calculated EBITDA margin, which is defined as EBITDA / Revenue.

DEPRECIATION AND AMORTIZATION

Depreciation is the accounting for the aging and depletion of fixed assets over a period of time. Amortization is the accounting for the cost basis reduction of intangible assets (intellectual property such as patents, copyrights, and trademarks, for example) over their useful life. It is important to note that not all intangible assets are subject to amortization. We will discuss depreciation and amortization (D&A) in Chapter 4.

EBIT

Similar to EBITDA, earnings before interest and taxes (EBIT) is also utilized in valuation. EBIT is EBITDA – Depreciation and Amortization. So let's assume the example car company has $8,000 in D&A each quarter. So:

Car Co.	1Q 2021
EBITDA	286,000.0
EBITDA Margin	*57%*
D&A	8,000.0
EBIT	278,000.0
EBIT Margin	*56%*

Notice we have also calculated EBIT margin, which is defined as EBIT divided by revenue.

INTEREST

Interest is composed of interest expense and interest income. Interest expense is the cost incurred on debt that the company has borrowed. Interest income is commonly the income received from cash held in savings accounts, certificates of deposits, and other investments.

Let's assume the car company had $1MM in loans and incurs 10% of interest per year on those loans. So the car company has $100,000 in interest expense per year, or $25,000 per quarter. We can also assume that the company has $50,000 of cash and generated 1% of interest income on that cash per year ($500), or $125 per quarter.

Often, the interest expense is netted against the interest income as net interest expense.

EBT

Earnings before taxes (EBT) can be defined as EBIT – Net interest.

Car Co.	**1Q 2021**
EBIT	278,000.0
EBIT Margin	*56%*
Interest Expense	25,000.0
Interest Income	125.0
Net Interest Expense	24,875.0
EBT	253,125.0
EBT Margin	*51%*

Notice we have also calculated EBT margin, which is defined as EBT divided by revenue.

TAXES

Taxes are the financial charges imposed by the government on the company's operations. Taxes are imposed on earnings before taxes, as defined previously. In the car example, we can assume the tax rate is 35%.

Net Income

Net income is defined as EBT – Taxes. The complete income statement follows.

Car Co.	1Q 2021
Revenue	500,000.0
COGS	125,000.0
Gross Profit	**375,000.0**
% Gross Profit Margin	*75%*
Operating Expenses	
SG&A	77,500.0
Advertising	7,500.0
R&D	5,000.0
Total Operating Expenses	**90,000.0**
Other Income	1,000.0
EBITDA	**286,000.0**
EBITDA Margin	*57%*
D&A	8,000.0
EBIT	**278,000.0**
EBIT Margin	*56%*
Interest Expense	25,000.0
Interest Income	125.0
Net Interest Expense	**24,875.0**
EBT	**253,125.0**
EBT Margin	*51%*
Tax	88,593.75
Tax Rate (%)	*35%*
Net Income	**164,531.25**

NON-RECURRING AND EXTRAORDINARY ITEMS

Non-recurring and extraordinary items or events are expenses or incomes that are either one-time or not pertaining to everyday core operations. Gains or losses on sales of assets, or from business closures, are examples of non-recurring events. Such non-recurring or extraordinary events can be