SMITH+CROWN

ORIGINAL RESEARCH

Cryptofinancial Valuation Series

PART I: ON THE ROAD TO CRYPTOFINANCIAL VALUATION

This article is the first in a series that seeks to provide readers with the resources necessary to evaluate a number of prominent cryptofinancial valuation techniques.

Historically, as new financial structures emerge, whether the earliest joint stock companies or the first cryptoassets, the creation of corresponding valuation methodologies has taken time. While new valuation models stand to move the crypto industry forward, the success of such efforts will likely turn on their author's understanding of the origins, motivations, and assumptions behind traditional valuation methodologies. Those equipped with a basic understanding of the most common tools currently supporting equity valuations will be better positioned to assess the suitability of the cryptofinancial valuation models bound to come.

Overview

In a world saturated with sophisticated financial analysis, it is hard to imagine a time when the essential task of determining a project or company's monetary value faced what must have seemed insurmountable hurdles. While knowledge of compound interest can be traced back to at least as far as the Old Babylonian period (c. 1800 - 1600 BCE), its use was generally limited to financial instruments (e.g., loans and insurance) until the nineteenth century when engineers began to use compound interest to estimate project profitability when selecting among mutually exclusive capital investments[1]. The path from its humble Mesopotamian roots to the relatively unified school of thought that is valuation today involved many steps and contributions from a host of engineers, mathematicians, economists, and capital theorists.

Despite a wealth of writing on the subject of capital expenditure and net present value analysis years earlier, a review of excerpts from Volume 6 of the Journal of Accounting Research suggests that Discounted Cash Flow (DCF) analysis was not widely applied to nonfinancial assets until it was popularized in the 1950s and 60s. Why was there such a long delay between the introduction of the basic pillars of DCF analysis and its eventual ubiquity? While one could argue that the limited adoption in the early nineteenth century was a result of the inherent difficulty in accurately forecasting cash flows and the typically small size of individual capital investments, this does not account for the delay between the time that railroad production (an endeavor that requires a significant amount of upfront investment) had taken off in the mid nineteenth century to widespread adoption of DCF in the 1960s. Furthermore, despite a lack of robust disclosure practices and accounting standards that marked the landscape before adoption of the Securities Act of 1933, there is little to suggest that DCF analysis would have been developed sooner if such standards had already been established.

The explicit duties of accountants in the nineteenth century primarily concerned maintaining records, rather than participating in capital investment decision making, despite the material amounts of writing on compound interest and actuary science

[1] See H. D. Hoskold's Engineer's Valuing Assistant (London: Longmans, Green, 1877).

The development of modern capital expenditure analysis was catalyzed by the coming of the railways given the substantial amount of upfront investment required. Although Discounted Cash Flow analysis was not widely used until the 1950s and 60s, many of its essential concepts can be traced to the work of late 19th and early 20th century engineers.

in place by the end of the eighteenth century. Yet those evaluating potential capital investments would typically consult with accountants, a practice that encouraged accountants to serve as de facto financial advisors. Accountants, often untrained in economics, largely employed more basic (and conservative) capital expenditure decision frameworks that did not involve anything resembling a DCF model. In other words, there was a disconnect between those pioneering new economic theories and those actually practicing in the space.

Jumping forward one hundred years, this disconnect appears analogous to cryptofinance's current state of affairs. Albeit a few financial analysts have attempted to tailor traditional financial models to the emerging asset class. In all likelihood, creating entirely new models based on a deep understanding of cryptoeconomics is off the radar screen altogether. Digging deeply into the implications of token design decisions and successfully spawning a new class of valuation models would no doubt move the industry forward as investors grapple with how best to value an ever-expanding array of crypto structures.

Understanding the impetus and best practices informing current valuation approaches will be instrumental to developing such new models, whose emergence will, of course, take time. What's more, a deep understanding of the various levers, techniques, and caveats that will drive cryptoeconomic valuations in both an immature and mature market requires at least a basic understanding of the most common tools currently supporting equity valuations.

In that spirit, the following short descriptions are offered. Each characterizes a major approach used in traditional finance and indicates the technique's applicability to cryptofinancial valuation.

In the absence of constraints on time and resources, the consummate analyst will seek to utilize many of the below methodologies, with each specifying its own valuation range. Assuming thoughtful execution, the band of overlapping values that results when individual valuation ranges are placed into a single view should represent a good approximation of firm value.

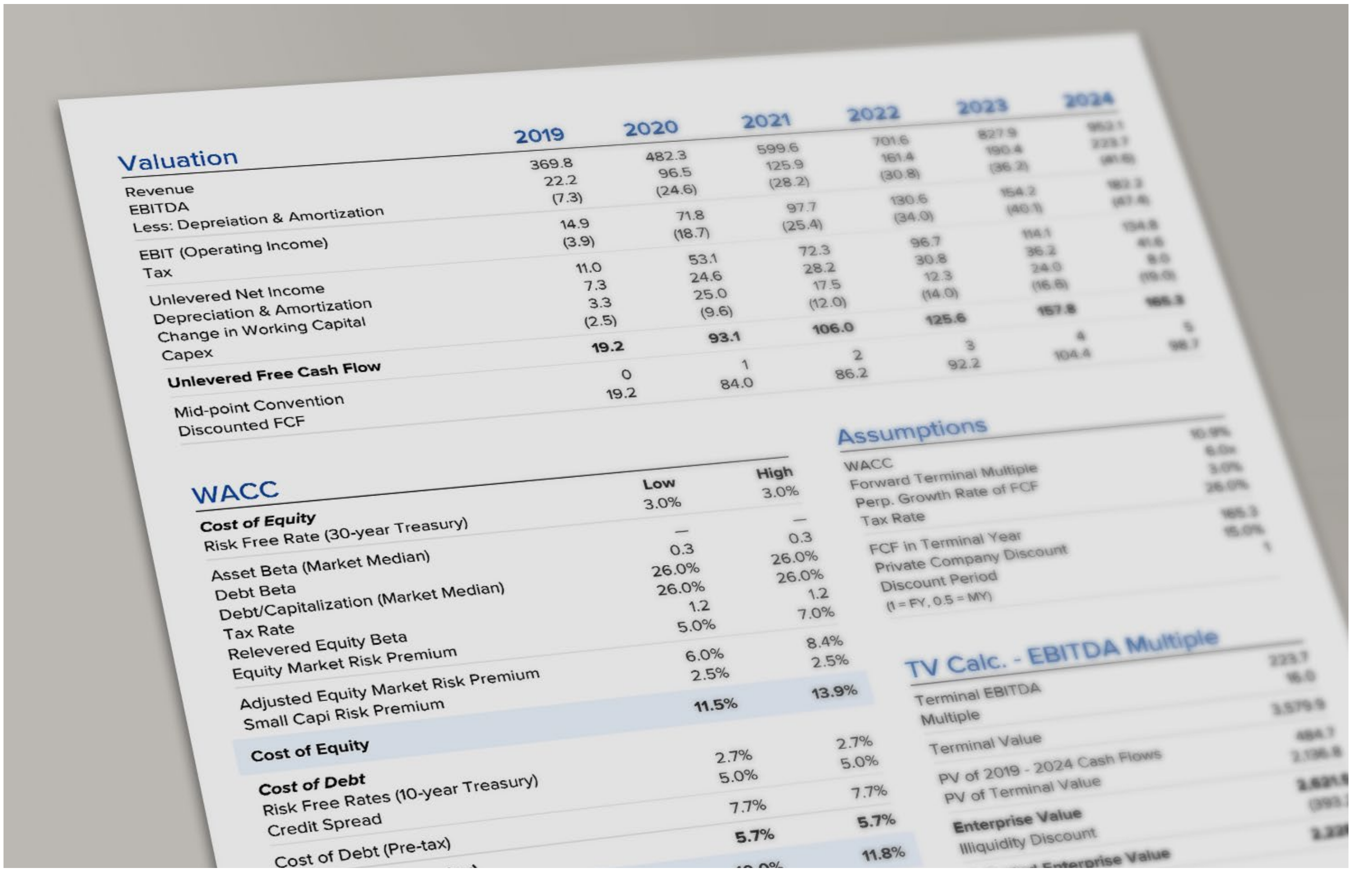
DCF — Discounted Cash Flow analysis represents the heart and soul of traditional equity valuation. The methodology is now considered the gold standard valuation technique given its theoretical soundness and orientation to detail. The approach involves estimating future cash flows with as much accuracy as possible and discounting them back to the present. Analysts project topline revenues, expenses and capital outlays to arrive at an estimate of free cash flow that is available to pay shareholder dividends or reinvest in the company.

It is unsurprising that tracing value through cryptosystems is often much less straightforward than in the case of traditional corporate structures. The vast majority of cryptoassets do not involve cash flows at all, and systems of which the cryptoassets are a part vary greatly. Yet, despite the number of theoretical and practical differences, the desire to fit a cryptoeconomy into the mold of a traditional DCF model—in that present value should be some function of discounted future value—is not entirely unwarranted. Chris Burniske has likely come the closest to popularizing a DCF-inspired cryptofinancial valuation model for payment tokens. While certain aspects of his approach appear sound, for example, the use of an explicit forecast period to project future utility value that is then discounted to the present, the underlying utility value calculations are based on an implementation of the Equation of Exchange (i.e., MV=PQ) that is not consistent with its historical use; we will take a look at these inconsistencies in more detail in our next publication.

Fortunately for the pragmatic analyst, some networks can be modelled using a typical DCF model and a few simple adjustments. Proof of Stake (PoS) protocols in which a token gives the holder a right to perform services and earn a mix of transaction fees (also known as a contribution token in Smith + Crown's token taxonomy) and newly minted tokens (i.e., seigniorage) are one good example. The application is not perfect, because PoS participants perform work rather than passively receive income, making the asset look more like a tradable license, but it is the closest widespread cryptoeconomic token function to which DCF might apply. Readers can also expect a closer look at this approach in future publications.

Trading Comparables — Trading comparables analysis is an excellent way of valuing a company when the data necessary to perform a complete DCF is not available or if a rough valuation range is sufficient. The approach involves identifying similar companies and calculating the average value of relevant valuation ratios across the peer group. The valuation ratios selected are a function of company maturity and sector; the most commonly used ratios are Enterprise Value/EBITDA, Price/Earnings, and Price/Sales, although many more exist[2]. While this process can be done relatively quickly, the diligent analyst will spend additional effort combing through each comparable company's financial statements to identify and adjust for any non-recurring item, such as one time legal fees, restructuring charges,

[2] Note that while these ratios can be calculated on a retrospective basis (e.g., for the trailing twelve month period), when used in the context of valuation, forward looking projections are utilized for values in the denominator.



Given its theoretical soundness and unique ability to effectively model detailed company performance scenarios, Discounted Cash Flow (DCF) analysis is often considered the gold standard valuation methodology.

etc., as these items may materially distort results. Although trading comparables analysis may seem rough and dirty since a fairly limited portion of the analysis is specific to the subject company, the results from a thoughtful attempt are often quite powerful.

Fortunately, trading comparables analysis is very relevant in the land of crypto. Analysts have access to mountains of data ripe for comparison, including transaction count and volume, unique wallet addresses, github commit history, blockchain speed and capacity, and various other measures of adoption, quality and capabilities. That said, there are a number of issues that are likely to arise during any thoughtful crypto trading comps analysis. Comparables analysis implicitly assumes that the market is already pricing the assets in a rational manner with respect to relevant valuation ratios, or, at a minimum, in a manner that is stable and consistently applied. While this is generally a fair assumption in traditional markets, such may not be the case in crypto markets today.

The prevailing pricing of cryptoassets may reflect a limited reliance on a consistent set of valuation ratios, differing calculation methodologies, generally less robust analysis, and more hype. Additionally, there is little agreement on how best to value non-standard and easily gameable metrics, such as Github commits and social metrics.

Moreover, it is often challenging to compare the value of certain metrics such as transaction count and volume across networks as each may have a different meaning within the context of its own

"Additionally, there is little agreement on how best to value non-standard and easily gameable metrics, such as Github commits and social metrics."

blockchain. Despite these issues, some of the more fundamental crypto valuation ratios, such as NVT (i.e., the Network Value to Transactions ratio), are beginning to emerge as standard, thus are more easily applied.

Precedent Transaction Comparables — Transaction comparables analysis is not unlike trading comps analysis, in that the value of the subject company is imputed from that of its peers. The primary difference is that, instead of utilizing a list of active comparable companies, the analyst identifies precedent M&A transactions, typically transactions in which a peer company was purchased for a disclosed amount of stock and/or cash. Since the fruitfulness of this approach is contingent upon an adequate list of relevant precedent transactions, it may be more appropriate for some sectors over others—a long list of recent M&A transactions in the same sector is ideal.

A similar approach can be used to determine a rough estimate of the value of a cryptoeconomy. The analysis involves examining a list of comparable crypto project capital raise (or acquisition) events and making the adjustments necessary to control for major market movements, raise structure (i.e., percent float), future dilution, and anything else that appears relevant and quantifiable. While significant market movements and changes in fundraising environments will often make such analysis challenging, the approach should not be overlooked, given that it may be relatively simple to execute when an emblematic set of comparable transactions exists. Of course, this makes the same assumption a trading comparables valuation approach does—previous buyers priced the asset in a way the market will today or in the future.

Dividend Discount Model (DDM) — Also known as the Gordon Growth Model when specified with a constant dividend growth rate, the DDM is closely related to the basic net present value formula that underpins DCF analysis. Whereas a DCF model attempts to capture all relevant financial statement details, such as cost of goods sold, SG&A (selling, general and administrative expenses), and capital investment to arrive at a complete financial picture, the DDM assumes that the value of a company's stock is simply linked to the perpetual value of its dividend. In contrast to a DCF model that can incorporate such details as product line-specific margins and multistage growth rates, the formulation of the DDM is quite straightforward.

While, given its simplistic nature, applying the DDM to the valuation of most companies is not appropriate, it can be useful when evaluating mature, business cycle insensitive, dividend-paying companies with stable capital structures and consistent growth rates.

Dividend Discount Model

$$P_0 = \frac{D_0\,(1+g)}{(r-g)}$$

P_0	Stock price today
D_0	Dividend this year
r	Required rate of return on equity i.e., the amount of return that a rational investor will demand given the perceived risk
g	Perpetual dividend growth rate

In practice, however, the model is typically used for back-of-the-envelope valuations of specific perpetual cash flows as opposed to full-blown company valuations. In terms of crypto applications, the DDM is an effective way to model a security token that pays a dividend. The DDM could potentially model a utility token that grants its holder a discount on project services, though there are some critical nuances that must be addressed in this latter approach. This topic will be covered in more detail in part III of this series.

Sum-of-the-parts (SOTP) Valuation — Sum-of-the-parts valuation is less frequently used than the aforementioned methods, although it represents an important approach when evaluating conglomerate companies or multi-divisional companies that span multiple sectors. As the name suggests, the analysis involves breaking up the company into distinct segments, ascribing a value to each, and then adding them together to arrive at firm value. Analysts are free to select which of the above methodologies is best when evaluating each segment. SOTP valuation is particularly relevant when considering a company breaking up by spinning off one or more of its divisions. Although the concept could certainly apply to a crypto project with several different irons in the fire, use of this approach is rare in practice.

Wouldn't it be nice if there was a similarly concrete set of cryptofinancial valuation methodologies? One could easily argue this position, although where's the fun in that? Much like in our earlier analogy to the emergence of DCF analysis in traditional finance, the industry is currently at a place where those who are tasked with performing cryptofinancial valuations have very limited experience analyzing cryptoassets in practice. This is no fault of their own given the nascent nature of the industry, but nonetheless represents a significant hurdle that must be overcome before analysts begin to reach consensus on how best to value a cryptoeconomy.

While there is clearly room for improvement in terms of cryptofinancial valuation techniques emanating from the sphere of traditional equities, there have been some admirable attempts to create cryptofinancial valuation frameworks from the crypto community itself. Most techniques have roots in traditional financial analysis, but given the inherent differences between valuing entities with discrete cash flows and those without, creativity is an important prerequisite.

In our next publication we will dive into what is easily the most widely referenced crypto valuation tool, the Equation of Exchange, a.k.a. the Quantity Theory of Money or MV=PQ. We will take a close look at its origins including a review of necessary model assumptions, the modifications needed to facilitate applications to crypto, and best practices.

Future topics will include:

- Discount token valuation techniques
- Cost of production forecasting
- Generalized Metcalfe Analysis
