

CRYPTO

TECHNICAL ANALYSIS

Your One-Stop Guide to Investing, Trading, and Profiting in Crypto with Technical Analysis



ALAN JOHN AND JON LAW

Crypto Technical Analysis

ALAN JOHN AND JON LAW

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PREFACE

This project has consumed an inordinate, yet thoroughly enjoyable, amount of time. Now at the advent of the second edition, I am even more firm in my belief that cryptocurrency has the potential to change the landscape of finance around the world, as well as the greater horizon of daily life for all people. The day is still young, and cryptocurrency, as well as blockchain and decentralized finance, are incredibly exciting fields. For all those reasons, I've since progressed to my third book on cryptocurrency. *Crypto Technical Analysis* may be personal favorite, because it aims to build a unique skill: the ability to turn numbers, lines, and graphs on a screen into real-world profit. It can be a life changer, and I hope you see that by the end of the book as I do. To end this off, I must give a big thank you to you; this book was created for a person such as yourself, and I'm glad it's reached you. Now, let's get on to it, and I'm pleased to introduce to you: *Crypto Technical Analysis: The Guide*.

HOW TO USE THIS BOOK

As I write this, I'm assuming several things about you:

- a. You hold some degree of basic knowledge on the subject of cryptocurrency.
- b. You are very, very excited to get started—100% required!

Pending such obligations, you're free to continue. Everything else, as far as analysis and crypto-investing goes, is covered in the rest of this book. If you are not familiar at all with cryptocurrency, I suggest that you take a moment to learn and, if you wish, consult the essential terms dictionary in the resources section at the back of this book, or perhaps the bonus section (in the back matter), which introduces blockchain.

The book is split into the following “macro” sections:

Part 1: Crypto Analysis

Part 2: Technical Analysis

Part 1 provides a brief but complete introduction to the trading and analysis of cryptocurrencies, as well as an introduction to technical analysis, fundamental analysis, and hype analysis, types of indicators, supply mechanisms, and more.

Part 2 provides the reference portion of this book, namely, it covers all the bases of technical analysis. We'll dive into charts, patterns,

oscillators, and other indicators, and tie it all off with crypto trading rules, algorithmic trading, trading biases, and more.

Following Part 2, the resource section provides a springboard for further independent learning. Such resources include glossaries, YouTube channels, podcasts, and books. I suggest that you take full advantage of the resources section and read both sections (especially part 1) in sequential order. That said, much of the content in part 2 can, and should, be referred to and searched back upon as needed and read front-to-back only as per interest level.

That's all in terms of how to use this book; I do hope you find it fairly straightforward. However, while you may know how to use this book, I have not yet covered how not to use this book.

HOW NOT TO USE THIS BOOK

After you read this book, do not immediately do the following:

- A. Invest all your money.
- B. Quit your job.
- C. Put all your money into Dogecoin.

To be clear, this book is meant to serve as an introductory guide and reference tool. It is meant to fully prepare you to enter the world of trading. To master that world, you need to be willing to learn and stick with it, whether as a weekend hobbyist or a full-time trader. So, take your time, enjoy the process, and please do not throw your savings into a meme coin, no matter how attractive that coin may seem.

PART 1: CRYPTO ANALYSIS

As mentioned, this part contains a complete introduction to analysis. Following completion, you will be able to confidently research coins and tokens in order to arrive at educated and profitable trading decisions. Subsequently, part 2 dives into technical analysis. The parts are organized as such because the whole of analysis is a necessary requirement to advance into technical analysis. We begin on the subject of myth.

On this note I must say that crypto has been blown up beyond proportion in terms of risk vs. reward dynamic. Yes, the rewards are immense, but the market cannot sustain eye-popping gains, and the risk matches the reward. I want to start the book off with a dose of reality, not to point out that the dream of crypto isn't real, but to point out that the dream takes effort. If that effort is put in, the rewards can change your life. If effort is not put in, the risk will make itself blatantly known.

EASY MONEY

Throughout the past half-decade, the crypto market has experienced a massive run-up. Over the past six months, any investor could put money in any well-known coin and turn a profit. This situation cannot last. It may take a few months, a few years, or longer. Whatever the case, making money in the cryptocurrency market will not always be easy, just like it is not easy to make money in stocks, real estate, options, or derivatives. Even if it is easy to make money in the

market right now, operating from such a mindset can only lead to failure. You can save yourself this learning curve by maintaining strong trading principles, obeying the rules outlined later in this section, doing your research, thinking as rationally and unemotionally as possible, and using historical data to back up your decisions.



Figure 1: Risk vs. Reward [\[1\]](#)

Consider this picture. It is based on a principle called the risk-return tradeoff (to be later examined in the risk versus reward section). When one sees everyone else making money, or, at least, social media would lead us to believe that everyone is making money, we're prone to think that the method of making money is not very risky. If everyone's making money, how can it be risky? The risk-return tradeoff principle answers this. Generally speaking, the more reward there is, the more risk there is. So, investing in cryptocurrencies is not risk-free. It is not low risk. It is extremely risky and offers extreme reward and should be treated as such.

100% ACCURATE

This myth applies specifically to technical analysis. Technical analysis is a bet on probability; if something has happened more than 50% of the time in the past, given similar conditions to a current event, it is likely to happen again. Perhaps that probability is 51%, 60%, 80%. In any case, technical analysts bet on the occurrence of historical patterns. Unfortunately, due to the fundamental nature of probability and trading, nothing is ever really certain to happen. Even if all your signals line up, the move that you think will happen may not happen. Really though, this can be freeing—it is completely fine

to be wrong, and just because your strategy didn't work a few times does not mean it won't work over time. If it is a strategy that has historically proven to be profitable, it probably will be. In this way, it works both for you and against you: nothing will work all the time, but many things should work most of the time. So, rely on data, always adjust and improve, and learn to be comfortable with things not working out, no matter how much you think they should go right.

THE TWO TYPES OF CRYPTO ANALYSIS

Two umbrella methodologies of analysis exist: technical analysis and fundamental analysis. [1] You bought this book to learn about technical analysis, so to arrive at a complete understanding of technical analysis, we must begin by filling in the leaky holes. A complete introduction to technical analysis is followed by fundamental analysis and finally a third type of analysis. We will then cover some basic analysis metrics that can be used alongside all types of analysis. If you've been in the space for a little while, you'll probably already know some of this, but I'd also bet there's a lot you could learn, and for that reason, I suggest you read on. And, if you aren't yet an intermediate to advanced trader, this will get you well on your way.

TECHNICAL ANALYSIS

Technical analysis is the discipline by which future movements of securities, currency pairs, and cryptocurrencies are discerned from historical patterns. In a nutshell, technical analysis is the investment process of using history to predict the future. History, in turn, is analyzed through the spectrum of patterns and indicators within charts. Technical analysis is backed by a few select premises, called the key three, which collectively dictate the assumptions behind technical analysis. Everything related to technical analysis, such as indicators, analyzing charts, and even the entire basis of buying and selling assets based on historical events, is based upon these statements.

History Tends to Repeat Itself

While the idea that history tends to repeat itself may sound self-explanatory, it is actually quite a novel concept. No rules require the prices of investments to act a certain way, and no inherent intelligence correlates historical movement to current and future movement. However, the entire basis of technical analysis requires that history does repeat itself, because if history repeats itself, history can be predicted, and if history can be predicted, money can be made. Assuming the above, tendencies to repeat historical price action must be due to outside influences, namely, the investors themselves. Much of this can be traced back to investor psychology and self-predicting patterns, while much of the rest is due to institutional investment patterns.

The Market Discounts Everything

The idea that the market discounts everything, alternatively phrased as “market action discounts everything,” is a part of the Efficient Market Hypothesis (EMH). The EMH states that prices (within our context, the prices of cryptocurrencies) reflect all available information. Various versions of this theory exist, which are thought of as weak, strong, and everything in-between. Since the crypto market is highly volatile and somewhat more trend-based than other security markets, it may be less of an efficient market because prices and price variability may not accurately reflect true value. For example, when Elon Musk tweets about a small-cap crypto and the price increases fivefold, the price increase did not represent an efficient market because the true value of the crypto didn’t change but the price did.

The idea that the market is not completely efficient opens up the possibility of undervalued prices. Technical analysis, in part, aims to identify discounted price (relative to true value) through technical means. Technical analysts care more about what is most likely to happen given historical movements than what may happen based on information already priced into the security, including trading based on earnings, trends, hype, etc.

Prices Move in Trends

Trends are an exceedingly important concept to technical analysts. The entire point of charting price movements is rendered illegitimate

unless one assumes that prices move in trends and that trends are more likely to continue than reverse.

SUMMARY

As an technical trader, one must believe that history repeats itself, the market discounts everything, and prices move in trends. These three statements form the ideological basis on which all technical analysis is based.

TYPES OF INDICATORS

To finish off our introduction to technical analysis, we will take a look at different types of indicators used in the field. Each will be expanded upon in great detail later in the book; this section merely serves as an introduction, albeit an important one.

CHART PATTERNS

Many indicators are patterns on charts. Charts, in turn, are just prices moving up and down, which is price action. Price action that behaves in a predictable way is a pattern, and patterns can be traded upon as a reliable indicator.

LEADING VS. LAGGING

Indicators are either “leading” or “lagging.” Leading indicators predict future price movement, while lagging indicators provide signals once price action has already begun or happened. Leading indicators typically react quickly but are less accurate than the alternative, while lagging indicators are more accurate but may be late to the party. Typically, both types of indicators are combined, one (leading) to enter a position and the second (lagging) to confirm the entry.

SUPPORT AND RESISTANCE LEVELS

Support and resistance levels are probably the most commonly known chart-reading tool; you’ve likely heard of them, if not used them. Support and resistance levels indicate concentrated areas of

buying or selling. At support levels, downtrends often pause due to a concentration of buyers, while resistance levels often stop uptrends due to a large concentration of sellers. Prices typically bounce between support and resistance levels before breaking out, either above resistance levels or below support levels. Then, a resistance level often becomes the new support level (for example, if Bitcoin breaks resistance at 50k and rises to 53k, 50k may become the new support), or support levels replace resistance levels. Resistance levels are also sometimes referred to as “ceilings” and support levels as “floors.” Here’s a look at the support and resistance levels on Bitcoin:



(tradingview.com) Figure 2: Support and Resistance [2]

As you can see, the price tends to trade sideways along support and resistance levels. Then, a breakout occurs (as indicated with the arrows), new support and resistance levels are established, and the cycle restarts. Like all indicators, it isn’t an exact science; however,

support and resistance levels undeniably provide a basis for a large percentage of price movements and breakouts.

VOLUME AND MOMENTUM INDICATORS

Volume indicators provide insight into the number of trades combined with other factors, such as price (volume alone doesn't provide much insight as an indicator, hence why they're usually combined). Momentum indicators, on the other hand, measure the rate of change. Rate of change, in turn, helps determine strength or weakness in a price relative to history. So, momentum indicators show how fast prices move up and down, how strong or weak those movements are, and therefore how likely they are to continue. Popular volume and momentum indicators include the average directional index (ADX), rate of change (ROC), OBV (on-balance volume) Indicator, and volume RSI (relative strength index).

OSCILLATORS

Oscillators are indicators that vary within an upper limit and a lower limit (for example, between 0 and 100) and fluctuate within these limits. Oscillators work within very short timeframes and are used to discover overbought (sell) or oversold (buy) conditions. When the value of an oscillator is closer to an upper limit, it typically means that the asset is overbought, while the lower limit represents oversold conditions. Popular oscillators include the moving average convergence/divergence (MACD), relative strength index (RSI), money flow (MFI), and rate of change (ROC). The MACD, RSI, MFI, ROC, and others will all be thoroughly broken down later, as oscillators rank among the most important and most common types of indicators.



(tradingview.com) Figure 3: Oscillator Example [3]

This is the RSI. Note the action in the bottom section. The number, found to the right of the chart (not shown), generally falls within the purple range, so between 30 and 70. Anytime it hits above 70, the coin is overbought and will likely pull back. This is a sell signal. A buy signal is indicated when it goes below 30. However, since this RSI rarely falls below 30, one may revise a buy signal to be, say, 40 or below, which is relatively low and thus indicates a strong relative overbought condition.

MOVING AVERAGE INDICATORS

Moving averages are lagging indicators that identify support levels, resistance levels, and trend direction. MAs smooth over data into singular lines. If the line is sloping upwards, it represents an uptrend, and if it is sloping downwards, it represents a downtrend. These lines then function as future support and resistance levels. Moving averages are calculated within a customizable time frame. The most popular time frames are 5, 10, 15, 20, 50, 100, and 200 days (for example, one may say they're looking at the "50-day moving average"). Different time frames can be used in conjunction; such crossings signify either a bullish or bearish move (bullish if the shorter-term MA crosses above the longer-term MA and bearish if the shorter-term MA falls below the longer-term MA). The two most popular moving averages are the simple moving average (SMA) and the exponential moving average (EMA).



(tradingview.com) Figure 4: Moving Average Indicator Example [4]
*buy signals are in green thumbs-up symbols, sell signals in red.

Here, the 50-day MA and the 200-day MA are shown. Since the 50-day MA is short-term, it is more aligned with the price, while the 200-day MA is “smoother” and portrays more general trends as opposed to smaller-scale movements. Trading on MAs between the first “buy” signal and the first “sell” signal would result in a 2x gain, then re-entering at the second “buy” signal and selling at the second “sell” would result in a 5x gain. The resulting gain by trading on all the buy and sell signals would be a 13x, while simply holding would be a 10x. So, an active trader would be roughly 30% more profitable by using moving averages (in this case) than someone simply holding. While this is by no means the rule, it does nicely display the benefit that basic technical analysis and moving averages can bring.

VOLATILITY INDICATORS

Volatility indicators don't measure or predict trends. Rather, they measure risk, and risk provides a base layer of context about a coin or token (more on volatility is coming in the basic analysis section). Popular volatility indicators are standard deviations, the average true range (ATR), and Bollinger Bands.



(tradingview.com) Figure 5: Volatility Indicator Example^[5]

BEHAVIORAL TRADING

Technical analysts place a significant degree of importance on the psychological and behavioral aspects of prices. In this sense, behavioral instincts and psychology are an indicator (in the broader sense of the word) since they (from a technical analyst's perspective) affect prices. For example, Bitcoin probably has strong resistance at \$50,000, and much of this resistance may come from the fact that \$50,000 is a nice, round number that people place buy orders at. Through situations such as these and others, psychology is a viable part of price action and, hence, analysis. Check out the chart below to see the effect psychology has on trading:



(tradingview.com) Figure 6: Behavioral Trading Bitcoin Example^[6].

The above Bitcoin chart shows that most support and resistance levels are very near nice, round numbers, such as \$30,000, \$40,000, and \$65,000. This also shows that this isn't the rule 100% of the time, as with \$58,000 and \$43,000. However, exceptions only prove the rule, and the rule is that numbers over which psychology holds more sway do influence prices.

TECHNICAL ANALYSIS INTRODUCTION: COMPLETED!

In combination, all of the above indicators aim to alert [a trader about a trend], predict [future prices], and confirm [the prediction through other indicators]. This three-step system from Jeff Desjardins of the *Visual Capitalist* very nicely simplifies the process. So, remember that the process by which trades are made and the purpose of indicators are to alert, predict, and confirm. That now sums up our introduction to technical analysis. Later in the book is a deep dive into technical analysis; for now we'll take a look at the other mainstream form of analysis.

FUNDAMENTAL ANALYSIS

Fundamental analysis, another means of choosing investments, revolves around analyzing the true value of an asset through valuation techniques that include overall economic analysis, industry and sector analysis, and analysis of financial data. Since fundamental analysis relies purely on publicly available data, investors can find investments through either a top-down or bottom-up approach. In a top-down approach, the health and direction of the economy are first considered, followed by each sector, and finally each organization. Investors select the best of each stage and funnel down to find undervalued opportunities. This concept can be taken from the stock market and applied to cryptocurrency fundamental analysis. Investors can first research the overall health of the cryptocurrency market, then identify a specific undervalued segment. From there, the most undervalued companies and projects may be sought out. An example goes as follows:

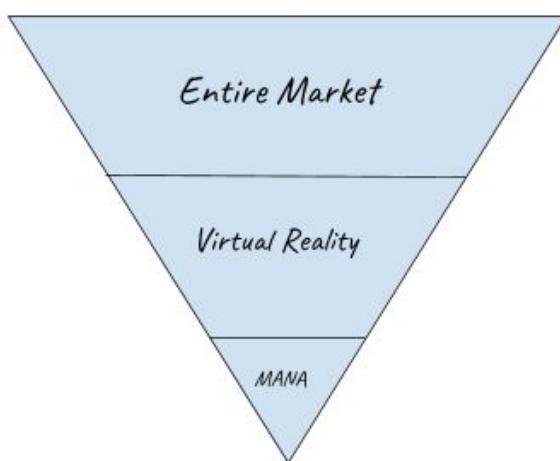


Figure 7: Top-Down Analysis

In this way, one may use a top-down analysis to identify the best investments. However, the nature of the process requires a significant amount of time spent sorting through all sorts of data, first for the overall market, then through various sectors, and finally through all the currencies in that sector.

The opposite approach, called a bottom-up analysis, first analyzes individual assets. This works because individual investments often easily outperform its overall industry or sector, so relying on sectors data ignores the value of overperforming projects in underperforming sectors.

The core idea of cryptocurrency fundamental analysis asserts that coins and tokens have an intrinsic value that should reflect upon price. Therefore, one can conclude that any price under this true value (true value not being stagnant and changing as new information becomes public) renders it undervalued, and any price over the intrinsic value renders it overbought and a sell. Although the concept of value and identifying value may sound like an exact science (e.g., the true value of this crypto is \$20 and it is trading at \$15, easy \$5 potential gain), fundamental analysis is often quite speculative since people since true value is a matter of speculation. The central idea is that all crypto investments are either undervalued or overvalued, and your job as a fundamental analyst is to identify the most undervalued. Fundamental analysts conduct research through a wide range of sources, but most information can be assembled through the following channels:

Teams

- Whitepapers
- Events
- Competition
- Utility
- Sentiment Analysis
- Market Cap
- Activity
- Volatility
- Supply Mechanisms

These ten elements of fundamental analysis are dissected, starting on page thirty-six, throughout the upcoming “basics analysis” section. As of the moment, our introduction to fundamental analysis will conclude with a few key concepts and metrics relating to fundamental analysis not mentioned in the above list, before moving on to hype analysis.

ON-CHAIN METRICS

On-chain metrics concern the network behind a coin. Basically, it's technical jargon, however it is very important jargon, and metrics such as average exchange deposits, miner deposits sent to exchanges, transaction amount and value, activity and value of addresses, hash rates, fees, and so on, are all very applicable in helping investors arrive at investment decisions. That said, on-chain metrics are typically better for short-to-mid-term investments, as opposed to long-term and fundamental trading, since many of the mentioned metrics can change based on a variety of factors, such as through alterations in usage or various scaling solutions (such as Ethereum to Ethereum 2).

PROJECT METRICS

Project metrics describe the big-picture and human elements of a cryptocurrency. This involves the team, white paper, and events, and will be covered shortly.

SENTIMENT

Sentiment describes how people feel towards a given project. While a full explanation and sentiment resources are coming up, keep in mind that peoples' perception of value alters the value; hence, sentiment affects how undervalued or overvalued a coin or token is, and, therefore, sentiment is a part of fundamental value.

UTILITY

Utility is how useful a coin or token is and what real-world, practical application it has. Utility, like relative value (below), could be lumped into project metrics. However, the concept of utility is really valuable since the coins that win in the long term are the ones that are actually useful and, in some way, solve a problem and hence create utility.

RELATIVE VALUE

Relative value can technically be lumped in with project metrics, but given its importance, I feel that it should have a dedicated section. Relative value is analyzing either the true value and/or current value (basically, what you think it should be at versus where it is) of competitors and comparing that to the coin or token you're looking into. For example, if you've done your research and concluded that 6 out of 14 virtual-reality crypto companies have experienced massive, 200% moons and MANA hasn't (please refer to the earlier example on page 30), then you must ask yourself why this hasn't happened.

Perhaps something is wrong with the company, and MANA isn't a buy, or perhaps it just hasn't happened yet, and therefore MANA is an extremely undervalued buy. In this way, analyzing all sorts of metrics relative to similar projects is a great way to gauge value.

This concludes our brief breakdown of fundamental analysis. While this book is about technical analysis and technical analysis certainly is a profitable and much more adrenaline-inducing trading method, I believe that the best long-term strategies and portfolios employ multiple types of analysis, and fundamental analysis should certainly not be overlooked in terms of its reliability and widespread use.

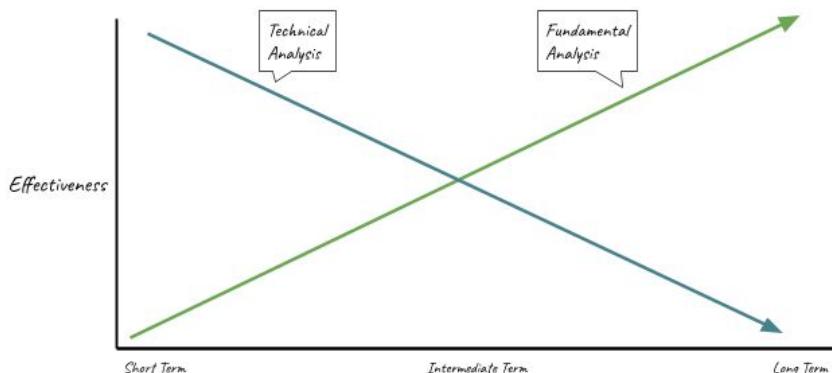


Figure 8: TA vs. FA Effectiveness Comparison

I'd like to make one more point before moving on using the chart above.^[2] Generally, the effectiveness and correctness of technical analysis decreases with time, while the correctness of fundamental analysis increases over time. While it isn't a linear relationship as portrayed on the graph, this rule does hold true most of the time. Technical analysts usually aren't looking at indicators and deciding whether or not to hold a coin or token for months or years, while fundamental analysts aren't looking at market data to determine

whether or not to buy a coin for a quick flip. By no means does this mean you should put yourself in a box; it just portrays the general difference in time frame between TA and FA and hence provides some context on the trading strategy you may choose.

HYPE ANALYSIS

Hype analysis is not a commonly used term in the wider crypto world, but it is a term that adequately describes the phenomenon that is analyzing real-world “hype” trends. Perhaps to a greater extent than any other sizable investment vehicles, the crypto market is driven by hype and trends. Elon Musk may be the prime example of this, as his tweets about cryptocurrencies are notorious for massively influencing the price of the subject, whether positively or negatively. Musk once tweeted just the word “Doge,” and the price of Dogecoin (DOGE) proceeded to move from \$0.036 to \$0.082 in the following 5 days, a 220% gain. While this is mostly unfounded, subcategories within the crypto market, such as DeFi, FinTech, Gaming Coins, Web 3.0, and numerous others, often blow up all at once and cause most of the coins within such areas to experience massive, positive surges. In this way, and others, trading on trends and hype is a strategy that, historically speaking and only if done right, is sound. While I don’t necessarily advise this, if it is done right, the sky is the limit.

RISK VERSUS REWARD

The concept of risk versus reward is the foundation of all investment decisions because an investor expects certain things from certain investments and chooses between, say, Bitcoin, stocks, and real estate as a result. A principle called the “risk-return tradeoff” dictates that higher risk is generally associated with higher reward. Let’s revisit this visual from our myth-busting section a few pages back:

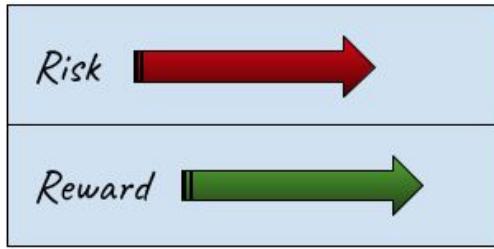


Figure 9: Risk vs. Reward #2

Risk is often measured from historical volatility. For example, government bonds have historically proven to carry very low risk (given insured backing) and very little volatility. Then, take a penny stock. Let's go with CytoDyn, (OTCMKTS: CYDY), which has gone from \$2.80 to \$8.77, back to \$2.02, up to \$7, down to \$2, and up to \$4. All in the past year. In this way, since the volatility is much greater, the risk is much greater. However, despite the risk being greater, any investor who just held the stock would be up 10% for the year, a decent return, and any traders who sold at the right time would be up more than 100%. In this way, as per the mentioned principle, the risk equates to the reward. Of course, higher risk does not always equal higher return, and strategies can be taken to minimize risk within risky investments.

The cryptocurrency space is known as one of the—if not the single—riskiest investments. Despite the risk (and therefore the volatility), anyone who simply bought and held practically any major coin over the past few years is probably up several hundred percent, if not more than a thousand percent. So, while the crypto market is risky and volatile, the rewards can equate and exceed the risk. Let's put the magnifying glass of risk versus reward over the three types of analysis: technical analysis, fundamental analysis, and hype analysis.

Generally, fundamental analysis is used to determine the long-term value of a given investment, while technical analysis is used to determine short(er)-term investments. Fundamental analysis, in concept, carries more unknowns than technical analysis because technical analysis is based on absolutes in historical trading data, while fundamental analysis aims to identify overbought/oversold conditions that can change quickly and base themselves on subjective viewing to actually make the move that, fundamentally, the price should make. So, fundamental analysis is more theoretical than technical analysis, though it should be said that the spread of returns (volatility in returns) is often greater within technical analysis as opposed to fundamental analysis. Meaning, fundamental investors might average an 8% per year return, while technical analysts might make 10% in a day and lose 2% the next day. So, learn about both strategies within the crypto space and beyond, and experiment with both forms. This, in the long-term, will allow you to identify what you prefer and what generates the highest returns.

The third type of analysis, hype analysis, is much more volatile and riskier than the other two, and it is not a generally accepted nor a historically proven method of trading. However, in regard to the current market conditions within the crypto space, the rewards have outpaced the risks if proper research is done and safety protocols are put in place. Given the volatile and risky nature of attempting to analyze and trade upon trends, I suggest (most others would as well) that you start out with technical analysis, as described in this book, as well as some degree of fundamental analysis. Once you have

some experience or in any other way feel comfortable to invest based on pure, trend-based speculation, here's how you to do it right. Please skip this section if you don't have money you're willing to lose or you haven't invested before.

TREND TRADING PSYCHOLOGY

The intensity, success, and duration of trends largely rely on two emotions: fear and greed. The greedier people are, the more trends become overvalued relative to their true (or close to their true) value. A meme coin that becomes the next hottest thing and skyrockets to a \$100 million valuation is just not rational: it is based on fun, then greed, and eventually, the time at which people sell is based on fear. In this way, emotion plays a large part in trends and trend trading. Keep that in mind while viewing trends, and also keep in mind that an excess of fear or greed is liable to lead to bad decisions. Now, to keep this content original and not restate myself, I'll leave the full look at market psychology for later in the book. Feel free to skip ahead if you're interested.

TREND EXAMPLES

2020

Out of the entire dApp (shorthand for decentralized application) trend that picked up steam throughout 2020, DeFi was arguably the sub-trend that performed the best. Some popular companies within the DeFi space in 2020 were Maker (MKR), ChainLink (LINK), and Aave (AAVE). Since 2020 (in the past 15 months, as of this writing), these coins are up 17x, 950x, and 25x, respectively. Aave is the newest of the coins, hence the incredible near-1000x (95,000%) return, while

the other two were established coins that took off from 2020 to 2021. The DeFi space is still growing at an incredible pace.

2021

Gaming coins are a rapidly growing sector within the crypto market as projects develop new ways in which decentralized, crypto, and NFTs can be combined with gaming. A few of the popular gaming coins are Enjin Coin (ENJ), Chain Games (CHAIN), and Decentraland (MANA). Respectively, in just the first three months of 2021, these coins went up 20x, 22x, and 15x. This includes a 10x (1000%) pump from CHAIN in just 7 days. While these coins certainly represent the best of the crypto gaming space, all could be identified through the lens of a gaming trend and then upon further research methods found within the basic analysis section below. Gaming coins still have plenty of room to grow.

TREND SCALE

The scale of trends is important to note. Generally, the larger the trend, the lower the per-asset gains. For example, a massive trend into Aave (AAVE) can cause the 95x gain experienced in 2020, while a trend into the entire DeFi space can cause the entire space to rise 3x, 5x, or 10x and a trend into the overall market might increase the total market cap by 50%, 100%, or 200%. In this way, the scale of a trend can determine the results because the percent gain is the result of the pre-trend market cap compared to the influx of money. In the case of a coin with a 10 million market cap, a trend might provide an influx of \$400 million, resulting in a 40x increase. However, within the \$40 billion DeFi space,^[7] \$400 million would just be a 1% increase and within the \$2+ trillion crypto market, \$400

million is just a 0.002% drop in the bucket. Trend scale also impacts risk and volatility.

SOURCING TRENDS

Trends often start in social and sentiment-based settings, and that's the space I want to emphasize in relation to sourcing trends. Such an activity is really just predicting social momentum, and social momentum usually starts on social platforms. Social platforms, in turn, often spread information in large part through sentiment (emotion) as opposed to a purely logical approach. The fundamental value behind trends does usually exist, but it often gets blown out of proportion by sentiment. In recent years, the zenith of this has been the subreddit WallStreetBets (especially in the still-developing events of GameStop and AMC short squeezes) and Elon Musk's tweets in the crypto space. In both cases, trends originated online, were based upon some degree of fundamental value, and were then blown out of proportion by social momentum. So, the question of sourcing trends is the question of identifying social momentum before it happens. This, unfortunately, is the tricky part. In my experience, insight most often comes by keeping your ear to the ground across crypto communities and influencers on multiple platforms (mainly YouTube, Twitter, Reddit, Discord, Instagram, and TikTok). You don't need to predict trends before they happen, just as they're happening, and before the peak popularity. This is the safest (not that such a strategy is safe) way of getting into trends; not by trying to predict them, but by hitching a ride. Returns aren't the same (relative to being extremely early to a trend), but risk is equally lessened. This concludes a look into hype analysis (as I define it) and the

introduction to fundamental and technical analysis. We'll move on to popular analysis metrics.

BASIC CRYPTOCURRENCY ANALYSIS

This section builds upon the introduction to fundamental analysis provided hitherto and constitutes a thorough introduction to basic analysis before we move on to the more complex subject of analysis through technical means.

- Teams
- Whitepapers
- Events
- Competition
- The Big-Brother Technique
- Utility
- Sentiment Analysis
- Market Cap
- Activity
- Volatility
- Supply Mechanisms

TEAMS

Each coin or token has a person or a team behind it that aims to provide a service, solve a problem, or in some other way provide utility and value. Information on the team behind potential investments is often a great indicator of long-term success. This applies to a lesser degree if a trade is meant to be executed in a short period; still, even then, performing due diligence on a team allows for a greater understanding of an overall situation and provides important context to all investment decisions. Take Storj, a project that aims to create decentralized cloud storage. The team consists of eighty reputable experts from varying backgrounds, and the CEO, Ben Golub, is a professor at Northwestern University and previously taught at Harvard. Additionally, major companies such as Google have put money into the team and project. While nothing here guarantees success, a solid foundation does massively increase the chances of long-term innovation and success. Some cryptocurrencies aren't run by a stand-alone group of developers, but rather by organizations. Cardano, an example of such, is run by three companies: IOHK, Emergo, and the Cardano Foundation, which, in turn, are all managed by reputable industry leaders. ADA is up 4,000% over the past few years.

Projects with people and organizations like ADA and STORJ, as well as many others, are the gold mines of the crypto space. The projects that survive in the long run and continue to build utility and create value are the projects that are likely to deliver massive and sustained growth, and such projects are founded upon a competent and dedicated team. To research the team behind a project you're

interested in, just search around, check out the project's website, and search up team member names.

WHITE PAPERS

A white paper is an informational report issued by an organization about a given product, service, or general idea. White papers present information about the idea of the project and provide a timetable for future events. Generally, this helps readers understand a problem, figure out how the creators of the paper aim to solve that problem, and form a conclusive opinion about the project viability. Three types of white papers frequent the business space: the “backgrounder,” which explains the background of a product, service, or idea, and provides technical, education-focused information that sells the reader on the concept. A second type of white paper is a “numbered list” that displays content in digestible, number-oriented format. For example, “10 use cases for coin HL” or “10 reasons token CM will dominate the market.” A final type is a “problem/solution” white paper, which defines the problem that the product, service, or idea aims to solve and provides the implemented solution.

White papers are used within the crypto space to explain novel concepts and the technicalities, vision, and plans surrounding a given project. All professional crypto projects will have a white paper, typically found on their website, and these reports will give you a better understanding of a given project than practically any other single source of accessible information. On the next page are a few websites that store crypto white papers.

- allcryptowhitepapers.com
- cryptorating.eu/whitepapers

□ coindesk.com/tag/white-papers

EVENTS

A great way to analyze the potential of a coin or token, whether in the short term, midterm, or long term, is through an understanding of upcoming events. Popular crypto event calendars are below.

- CoinMarketCal
coinmarketcal.com/en
- CoinEvents
coinevents.co
- CoinsCalendar
coinscalendar.com

These websites list all upcoming launches, partnerships, airdrops, forks/swaps, and other notable events for most cryptocurrencies. The simple amount of upcoming coin events, not to mention the quality, can tell you a lot about a project. In turn, reading into each event provides a step forward in terms of understanding how a project plans to evolve over time. Since cryptocurrencies do not form a fully efficient market, events occurring a few weeks or months out are often not fully priced into the asset and therefore represent a separation from true value. Trading solely based on is quite risky (and not recommended), and if done at all should focus on events occurring at least a few weeks out from the current date. Even then risk is involved, because if enough traders buy early enough, with the intent of dumping the day of an event after an assumed pump, the price can instead crash, regardless of the event's outcome. So,

weigh all of these event-related factors while considering how or whether to invest in a coin or token and, regardless, make sure to stay in the loop on events happening across the market and within the realm of the assets you hold.

COMPETITION

As within all aspects of business, competition is a must for understanding the relative situation of a company in a given market. Within the highly volatile crypto market, this applies to an even greater degree. There is plenty of space within niches of the crypto market for multiple companies, and this falls back to the Big-Brother concept, which dictates that projects offering a small twist off of another larger project often perform exceedingly well despite established competition.

Examples:

- USD Coin positioned itself as an improved version of Tether.
- PancakeSwap offers lower fees than Uniswap.
- Shiba Inu benefited from the Dogecoin escapade.
- Cardano and Solana grew by being viewed as improved versions of Ethereum.
- The Sandbox leveraged the hype created by Decentraland.

THE BIG-BROTHER TECHNIQUE

The Big-Brother technique, a creation of the popular crypto influencer *Ivan On Tech* (links to his channel are available in the resource section), is an important and extremely easy concept within the sphere of competition and dictates how and why some cryptos can blow up. The technique relies on trends; within such trends (such as DeFi, FinTech, gaming coins), projects that often go parabolic are the ones that have a similar, brother-like project and differ through some positive alteration. This works because investors aren't as likely to embrace a new technology or idea as much as a new project that differs from an already popular coin in only small ways. For example, Ethereum, (ETH), when it first came out was just like Bitcoin (BTC), except ETH utilized smart contracts. Then, Cardano was like Ethereum, except Cardano utilized a modified proof-of-stake algorithm to make its network more scalable. Recently, the exchange Uniswap (UNI) served as the big brother to the exchange PancakeSwap (CAKE), which offers much lower fees. In all these cases, traders were familiar with the general concepts and ideas behind the projects and the new projects that were generally the same but had a few key alterations.

UTILITY

Utility within a coin or token is one of the most important aspects of due diligence, since understanding the current and long-term purpose and value behind a coin or token allows for a much clearer analysis of potential. Utility is defined as being useful and functional and crypto coins or tokens with utility have real, practical uses. They don't just exist, but rather solve a problem or offer a service. Coins with the most functional use cases are likely to succeed as opposed to those without continued purpose, applications, and innovation. Consider the following case studies:

- Bitcoin (BTC) serves as a reliable and long-term store of value, akin to “digital gold.”
- Ethereum (ETH) allows dApp and Smart Contracts to be created on top of the Ethereum blockchain.
- Storj (STORJ) can be used to store data in the cloud in a decentralized manner, similar to Google Drive and Dropbox.
- IOTA (IOTA) offers completely free transactions to be used for small, daily payments.
- Basic Attention Token (BAT) is used within the Brave browser to earn rewards and send tips to creators.
- Golem (GNT) is a global supercomputer that offers rentable computing resources in exchange for GNT tokens.

All of these coins or tokens have real, practical utility. Projects that have utility and work on constantly improving utility have greater success in the long term. Make sure to consider how teams, as previously mentioned, play into utility.

SENTIMENT ANALYSIS

Sentiment analysis is figuring out what people think. Understanding sentiment towards a person, brand, coin, token, trend, etc., is useful information because social momentum often predicts trends. Today, software can analyze social media websites and the wider internet for sentiment (for example, identifying the amount of positive versus negative words in tweets mentioning “Bitcoin” in the past 24 hours) and bundle this information in an easy-to-understand format. You can also do your own research by combing through websites or simply reading article titles. Below are several tools (all of which are free) that can be used to understand sentiment in the entire market, the entire investment community, or individual assets.

- Crypto Fear & Greed Index
alternative.me/crypto/fear-and-greed-index/
- Bulls & Bears Index
augmento.ai/Bitcoin-sentiment
- Santiment
app.santiment.net

MARKET CAP

Market cap, shorthand for market capitalization, represents the total value of a cryptocurrency. Shares, as in the stock market, are represented through coins or tokens. Market cap provides information on volatility, potential upside, and a host of other factors that may influence investment decisions.

To find the market cap of a coin or token, multiply the price by the total number of units. For example, a cryptocurrency with a circulating supply of 1,000,000 coins and a price of \$10 per coin has a market cap of \$10 million. Here are some other market cap equations:

- Helium (HNT)

$\$18 \text{ (price)} \times 77,995,503 \text{ (supply)} = \$1,403,919,054 \text{ (market cap)}$

- Binance Coin (BNB)

$\$475 \times 154,532,785 = \$73,403,072,875$

- PancakeSwap (CAKE)

$\$22 \times 151,000,000 =$

You enter this one (or calculate an estimate in your head)!

ACTIVITY

Activity metrics assist in determining a cryptocurrency's volume of usage, as well as how that usage manifests itself. Three main metrics embody activity: volume, active addresses, and volatility.

The first is trading volume, typically said just as "volume." Volume is the number of coins or tokens traded within a specified time frame. Through an understanding of volume, other information about a coin, such as popularity, volatility, utility, and so on, can be better understood. Below are a few sites that provide easy and free information about volume:

- CoinMarketCap
coinmarketcap.com
- CoinGecko
coingecko.com
- Yahoo Finance Crypto
finance.yahoo.com

The second metric is active addresses, which is the number of unique addresses that participate in one or more successful transactions within a given timeframe and within given parameters defining "active." It can be thought of as the number of people actively trading within a crypto ecosystem, regardless of how much they trade. Understanding active addresses relative to historical data plays a useful part of understanding the overall adoption trends of a given asset. When researching active addresses, choose relevant parameters of activity, such as activity in addresses with a balance of

over \$1 million (to see whether large accounts are buying or selling). Check out the number of active addresses on the Bitcoin network here:

- Glassnode Studio
[studio.glassnode.com/metrics?
a=BTC&m=addresses.ActiveCount](https://studio.glassnode.com/metrics?m=addresses.ActiveCount&a=BTC)

The final activity metric is volatility. Volatility is why many people don't get into the crypto market and also why many do; it both creates riches and bankrupts, and in large part has furthered the stigma surrounding cryptocurrencies. Volatility is a measure of deviation: how fast, how often, and how much prices vary. Put simply, it is the size of change. Volatility is typically calculated through standard deviation and variance and histogram charts are a simple method by which to judge volatility (measured in delta, gamma, vega, and theta).

Different asset classes are known for certain levels of volatility, and this, more often than not, is why or why not an investor gets into a certain investment. Here is a look at several different asset classes:

- Cash
- Bonds
- Real Estate
- Stocks
- Cryptocurrencies

Given the above list, I'll rearrange these asset classes according to volatility (least to most).^[3]

- Cash
- Bonds
- Real Estate
- Stocks
- Cryptocurrencies

So, cash has a very low measure of volatility and people who hold a large percentage of their capital in cash are generally risk averse. Real estate is more volatile than cash, so people who get into real estate must be a little more comfortable with risk. The stock market (especially certain areas of the market, such as penny stocks and options) carries higher levels of risk compared to real estate, while cryptocurrency holds the top spot. You may notice that if the list was rearranged to measure average return from least to greatest, it would stay the same. This is because returns generally correlate with risk, and a principal measure of perceived risk is volatility. Risk-averse investors generally perform much worse than risk-pro investors throughout certain industry and economic booms, but often fare better throughout recessions and market reversals. Overall, understanding the volatility and risk of your investments aids in determining a long-term strategy that suits your investing style. Some people are comfortable with more volatility, others with less, and either way, that's fine; just do you and do your research. Hodl!^[4]

SUPPLY MECHANISMS

Supply mechanisms are the processes by which supply is defined, added, and removed from circulation. In terms of crypto, supply relates to the number of coins or tokens that exist and will exist, as well as how these coins or tokens can be added or removed from circulation. The following pages briefly analyze the concepts of maximum supply and circulating supply and afterward examines several different types of supply mechanisms, all in order to arrive at a full understanding of how supply mechanics affect investment decisions.

MAXIMUM SUPPLY

The maximum supply is the max number of coins that can ever exist for a cryptocurrency. The maximum supply or the lack of such is pre-set, the most notable example being Bitcoin's 21-million-coin limit. Some coins, like Bitcoin, add more coins into the network over time until the maximum supply is reached, while others begin at their maximum supply and others still have no maximum supply. Once a maximum supply is hit, no more coins will ever be procured and for fixed-supply coins that limit will eventually be reached through an "issuance rate" which defines the influx of new coins and typically decreases over time. Contrary to this process, some coins, including Ethereum (ETH), have a set issuance rate and no maximum supply. To fully understand a cryptocurrency, you may want to check out its maximum supply, as well as the circulating supply. This can be done through popular crypto websites such as coinmarketcap.com and coingecko.com. More information about supply mechanisms of given cryptocurrencies can usually be found on the project website.

CIRCULATING SUPPLY

The circulating supply is the total number of publicly available coins or tokens. In some cases, such as that of Bitcoin, the circulating supply will increase until the maximum supply of 21 million coins is reached. In other cases, the number of circulating coins goes down, often through the process of burning, and thus the intrinsic value of the asset must increase (assuming no other variables change) since fewer and fewer will be available. So, the circulating supply is the current number of tradable coins, and the number of tradable coins can either increase or decrease over time.

FIXED SUPPLY - DEFLATIONARY ASSETS

Fixed-supply cryptocurrencies algorithmically limit coin supply. Bitcoin is a fixed-supply asset since no more coins can possibly be created once 21 million have been put into circulation. Currently, nearly 90% of Bitcoins have been mined, and around 0.5% of the total supply is being lost per year. As a result of halving (covered below), Bitcoin will hit its maximum supply around 2140. Many other cryptocurrencies (sourced from cryptoli.st) such as Binance Coin (BNB), Cardano (ADA), Litecoin (LTC), and ChainLink (LINK) operate with similar fixed supplies. The most apparent benefit of the fixed-supply model is that these systems are deflationary. Deflationary assets are assets in which the total supply decreases over time, and therefore each unit increases in value. To illustrate this, say you're stranded on a desert island with ten other people, and each person has one bottle of water. As people drink their water, the total supply of one hundred bottles can only decrease. This

makes the water a deflationary asset. As the total supply decreases, each bottle becomes worth increasingly more. Say, now, there are only twenty water bottles left. Each of the twenty water bottles is worth as much as five water bottles were once worth since the total supply has decreased by a factor of five. In this way, long-term holders of deflationary assets experience increases in the value of their holdings because the fundamental value relative to the whole has increased. For example, at the start of the water-bottle simulation, 1 bottle out of 100 was 1% of the total supply, while by the end 1 out of 20 was 5% of the total supply, making each bottle worth 500% more. In this way, a fixed-supply and deflationary model, much like digital gold, will increase the fundamental value of each coin or token over time and create value through scarcity.



What happens when all the coins are in circulation?

When the max limit is reached, and all coins have been mined, the reward system (specifically of Bitcoin as well as most other coins on similar systems) must change their validation system since miners will no longer be able to directly earn crypto through validating transactions and adding blocks to the blockchain. The solution to this problem is simply to switch over to a fee-based system in which users directly pay fees to miners alongside each transaction.

UNLIMITED SUPPLY – INFLATIONARY ASSETS

Each unit of a deflationary asset increases in value relative to the total supply over time as the total supply goes down. With inflationary assets, new money enters the total circulating supply and

causes all the other money to lose value. Return to the island scenario in which ten people have ten water bottles each. Assume that our stranded island-goers are discovered, and a plane will fly over the island and deliver twenty bottles of water per day until the group can be rescued. Each person will then receive two water bottles per day, equivalent to 20% of their total supply. In 30 days, the total supply (ignoring drunk water) will be at seven hundred water bottles, meaning each bottle accounts for 0.14% of the total supply as opposed to the original 1%. This is a 7x decrease in value and reflects the effect of sustained inflation. The same principal transfers over into securities and cryptocurrencies; many coins have an unlimited supply and experience inflation as a result. Popular coins using an unlimited supply model are Ethereum (ETH), Dogecoin (DOGE), and numerous others.

All that said, an unlimited supply is not innately a destructive force because of inflation—at least in terms of value, though surely not for our island-goers. Consider Ethereum (ETH), which has an unlimited supply. Eighteen million Ether are mined per year, which is a set constant. Given an infinite amount of time, an infinite number of coins could be produced. However, since the eighteen million additions remain the same while the total supply increases, inflation over time must decrease. To visualize this, if 250 million Ethereum coins exist, inflation is at 7.2%, since $18/250$ is 0.072. Yet, in ten years, when 180 million new coins have been minted and the total supply is at 430 million, the same number of coins (eighteen million) are produced, bringing inflation down to 4%. Another ten years down the road and inflation is at 2.9%, and twenty years after that, it is

down to 1.8%. In this way, inflation decreases over time. So, while inflation still certainly exists for coins with unlimited supplies, the rate of inflation decreases over time. Additionally, a small amount of inflation is good for the economy, as it forces people to spend or otherwise use money for that money not to lose purchasing power. All that said, while most cryptocurrencies have a limited supply and most investors like the idea of deflationary assets, neither the limited nor unlimited models are completely superior to the alternative. As always, you should do your research and understand what you're getting into, and while supply mechanisms should certainly factor into your decision, they should not be the deciding factor (in most cases).

BURNING

The term “burned” refers to coins being permanently removed from circulation. Burning is a supply mechanism that enables coins to be taken out of circulation, hence acting as a deflationary tool and thus increasing the value of each other coin in the network, much like buy backs in the stock market. Burns are usually performed by the team behind a cryptocurrency to drive the price upward through deflation. Burning can be done in several different ways: one of these ways is by simply sending the coins to an inaccessible wallet, which is called an “eater address.” In this case, while the tokens haven’t technically been removed from the total supply, the available supply has effectively gone down. Currently, around 3 million bitcoins (200+ billion of value) have been lost through this process. Tokens can also be burned by coding a burn function into the protocols that govern a token, but the far more popular option is through the mentioned eater

addresses. As with halving, (immediately below) scarcity creates value, and burning increases scarcity and therefore value.

HALVING

Halving is a supply mechanism that governs the rate at which coins are added to a fixed-supply cryptocurrency. The idea and process were popularized by Bitcoin, which halves every 4 years. Halving is set in motion by a programmed reduction of block rewards. Block rewards are the rewards given to the miners that process and validate transactions in a given blockchain network. From 2016 to 2020, all the computers (called the nodes) in the Bitcoin network collectively earned 12.5 Bitcoin every 10 minutes, and that was the number of Bitcoins entering circulation. However, following May 11th, 2020, the rewards dropped to 6.25 Bitcoin per the same timeframe. In this way, for every 210,000 blocks mined, which equates to roughly every four years, the block rewards will continue to halve until the max limit of 21 million coins is reached around the year 2140. Thus, halving increases the value of Bitcoin by decreasing supply while not altering demand. Scarcity, as mentioned, drives value, and limited supply combined with growing demand creates greater and greater scarcity. For this reason, halving has historically driven the price of Bitcoin up and will likely be a long-term growth catalyst.

PART 2: TECHNICAL ANALYSIS

A deep-dive into all aspects of technical analysis.

Part 1 covers all bases of crypto analysis, and this section develops the subject matter of this book: a guide and reference tool for those interested in crypto technical analysis. Below is a brief outline of part 2; please consult the table of contents or the index for further information:

[Part 2: Technical Analysis](#)

[Types of Charts](#)

[Chart Patterns](#)

[Candlestick Patterns](#)

[Indicators](#)

[Oscillators](#)

[Investing and Psychology](#)

[Resources](#)

STARTING OUT WITH TECHNICAL ANALYSIS

As you read the rest of this book, I suggest you consult the resource section to access a range of cryptocurrency resources. Resources include top podcasts, YouTube channels, other books, and more, all of which enable you to stay up-to-date with the crypto market and pursue alternate learning methods.

STRATEGY

At the end of this section, we'll revisit the concept of a cumulative strategy. For now, be on the lookout for connections between

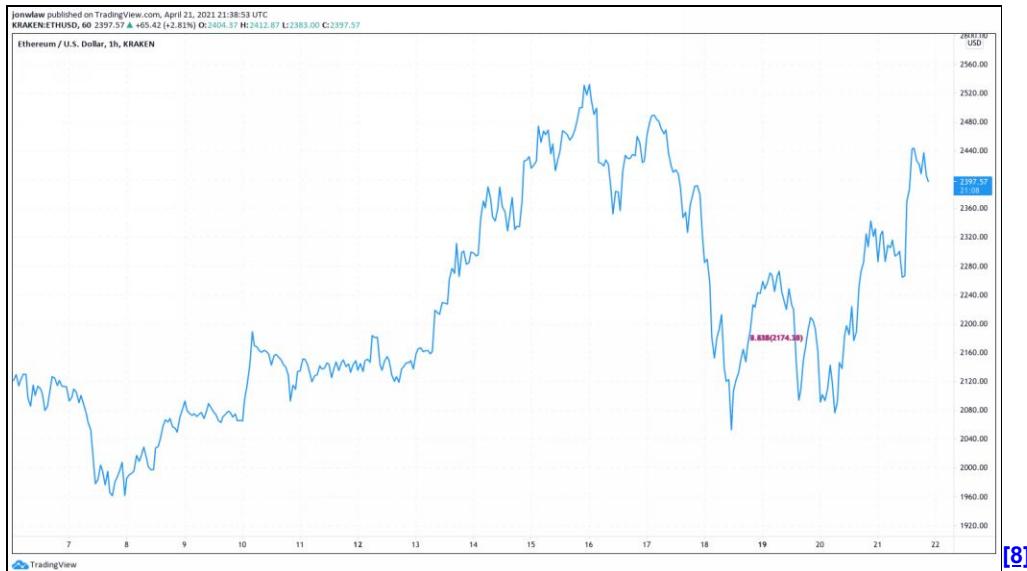
individual tools and indicators, and think about building a trading “toolbox” that includes a multitude of tools, all of which build upon one another and allow for efficient, streamlined, and profitable picks.

TYPES OF CHARTS

Charts are the foundation of technical analysis; they form the basis by which prices can be examined and patterns can be found. Charts, on one level, are simple, and on another, deep and complex. We'll begin with the basics; different types of charts and their different uses.

LINE CHART

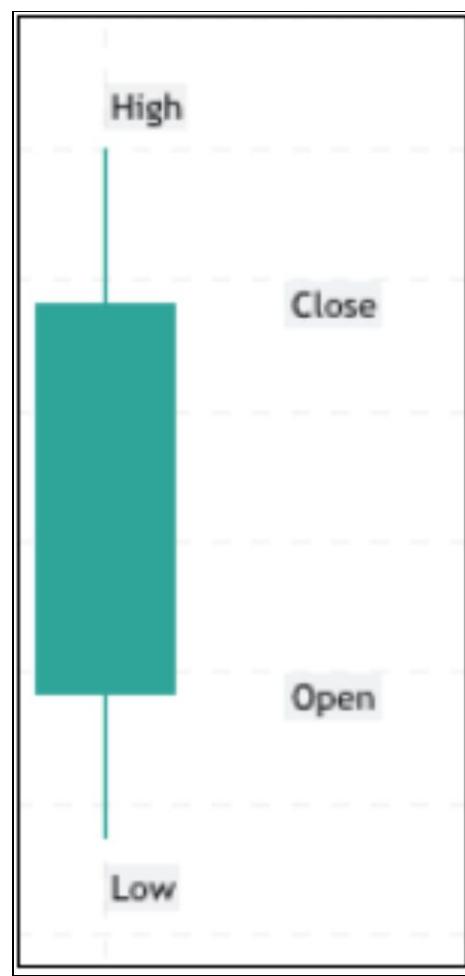
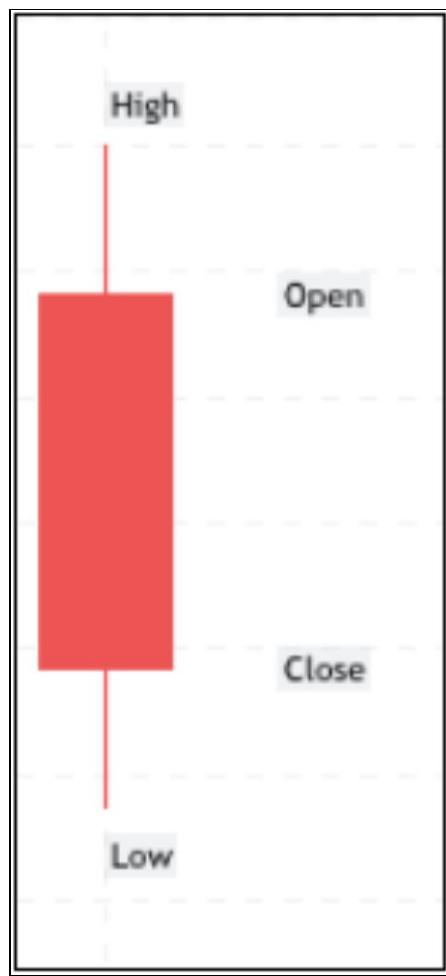
A line chart is a chart that represents price through one single line. Most charts are line charts because, although they contain less information than popular alternatives, they are extremely easy to understand. Robinhood and Coinbase (both of which target their services towards less experienced investors) set line charts as the default chart type, while institutions aimed towards a more experienced audience, such as Charles Schwab and Binance, use other chart forms.



(tradingview.com) Figure 10: Line Chart^[9]

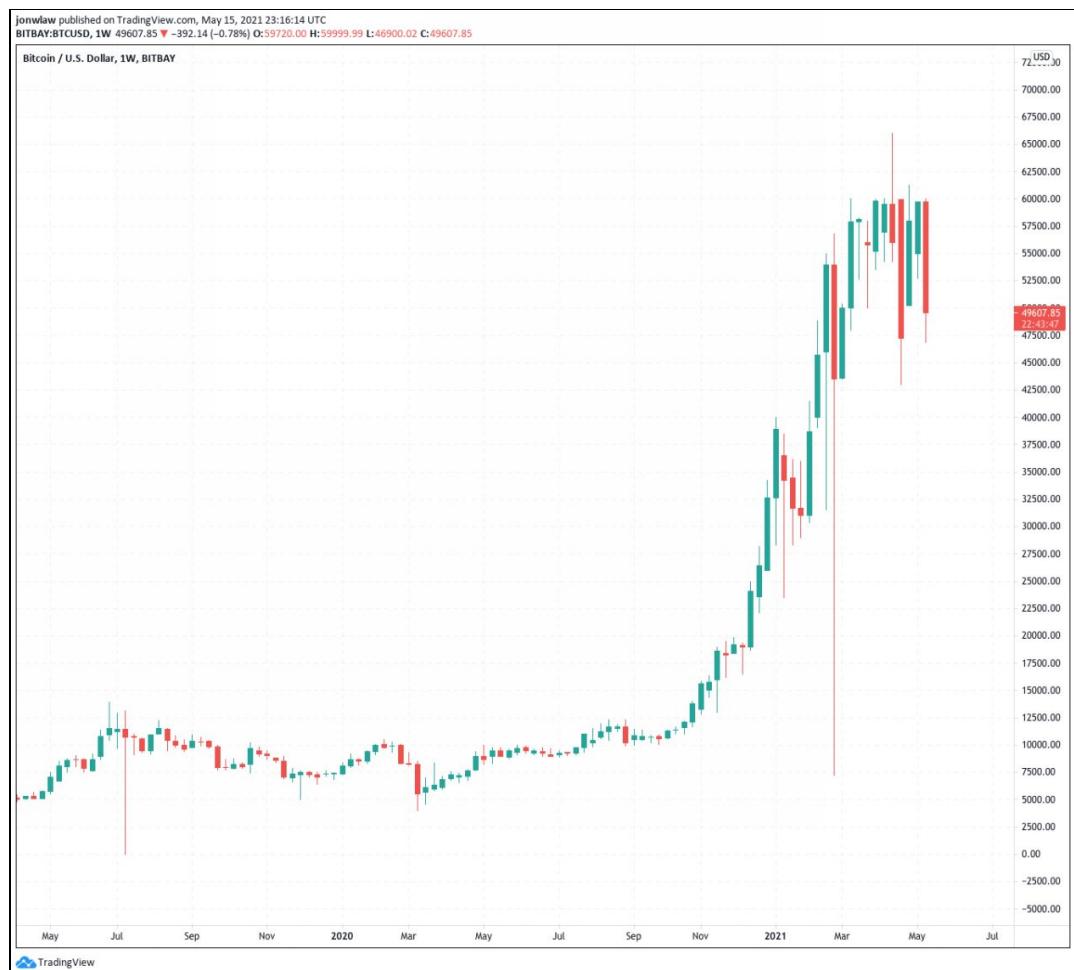
CANDLESTICK CHART

Candlestick charts are a much more useful form of displaying information about a coin and are the chart of choice for most investors. Within a given period, candlestick charts have a wide “real body” and may be red or green (the other common color scheme being empty and filled real bodies). If it is red (filled in), the close was lower than the open (meaning it went down). If the real body is green (empty), the close was higher than the open (meaning it went up). Above and below the real bodies are the “wicks” also known as “shadows.” Wicks show the high and low prices of the period’s trading. So, combining what we know, if the upper wick (aka the upper shadow) is close to the real body, the high the coin or token reached during the day is near the closing price, and the opposite also applies. You will need to have a solid understanding of candlestick charts, and services such as TradingView are a great way to get comfortable.



(tradingview.com) Figure 11: Bearish Candle [\[10\]](#)

(tradingview.com) Figure 12: Bullish Candle [\[11\]](#)



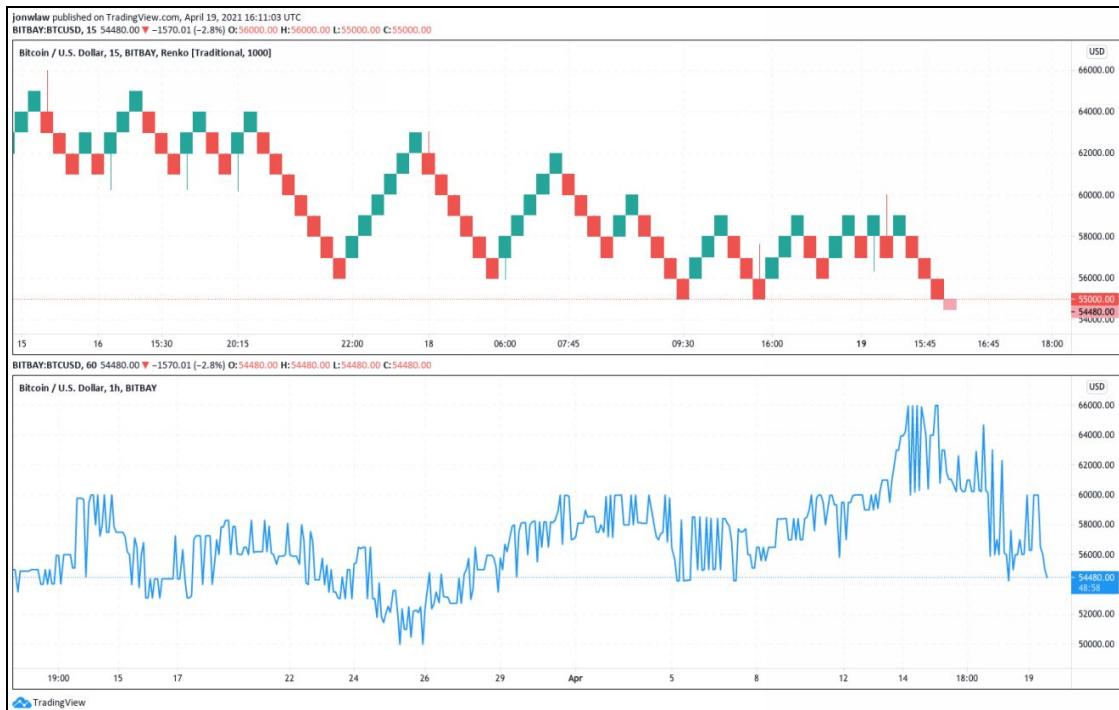
(tradingview.com) Figure 13: Candlestick Chart^[12]



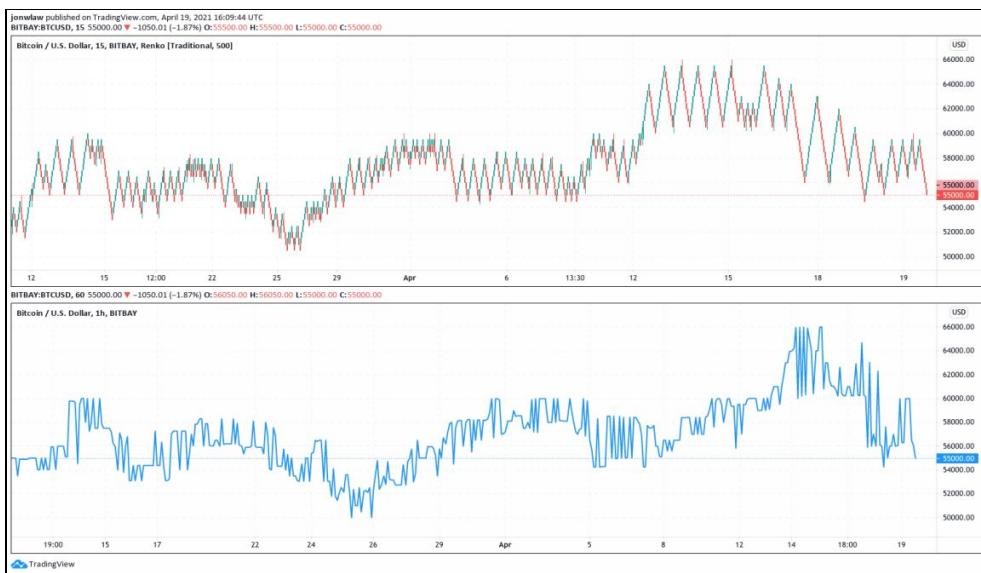
(tradingview.com) Figure 14: Candlestick Chart - Expanded View [13].

RENGO CHART

Renko charts only show price movement and ignore time and volume. Renko comes from the Japanese term “renga,” meaning “bricks.” Renko charts use bricks (represented as boxes), typically in the color scheme of red/green or white/black. Renko boxes only form at the top or bottom right corner of the proceeding box, and the next box can only form if the price passes the top or bottom of the previous box. For example, if the predefined amount is “\$1” (think of this as similar to time intervals on candlestick charts), then the next box can only form once it passes either \$1 above or \$1 below the price of the previous box. These charts simplify and smooth out trends into easy-to-understand patterns, especially making support and resistance easier to discern.



(tradingview.com) Figure 15: Renko Chart^[14]



B: (*tradingview.com*) Figure 16: Renko Chart #2^[15]



C: (*tradingview.com*) Figure 17: Renko Chart #3^[16]

A: Close-up of a Renko chart. Notice the boxes and the simplified patterns.

B: Renko chart compared to a line chart.

C: Plotted support and resistance lines on a Renko chart.

POINT & FIGURE CHART

While the point and figure (P&F) chart aren't as well-known as the others on this list, it does have a long history and a reputation as one of the simplest charts for identifying good entry and exit points. Like Renko charts, P&F charts don't directly account for the passage of time. Rather, Xs and Os are stacked in columns; each letter represents a chosen price movement (just like the blocks in Renko charts). Xs represent a rising price, and Os represent a falling price. Look at this sequence:

X
X O X
X O
X

Let's say the chosen price movement is \$10. We must start at the bottom left: the 3 Xs indicate that the price rose \$30, the 2 Os signify a \$20 drop, and then the final 2 Xs represent a \$20 rise. Time is irrelevant, and as in the below visual, trends are smoothed out.

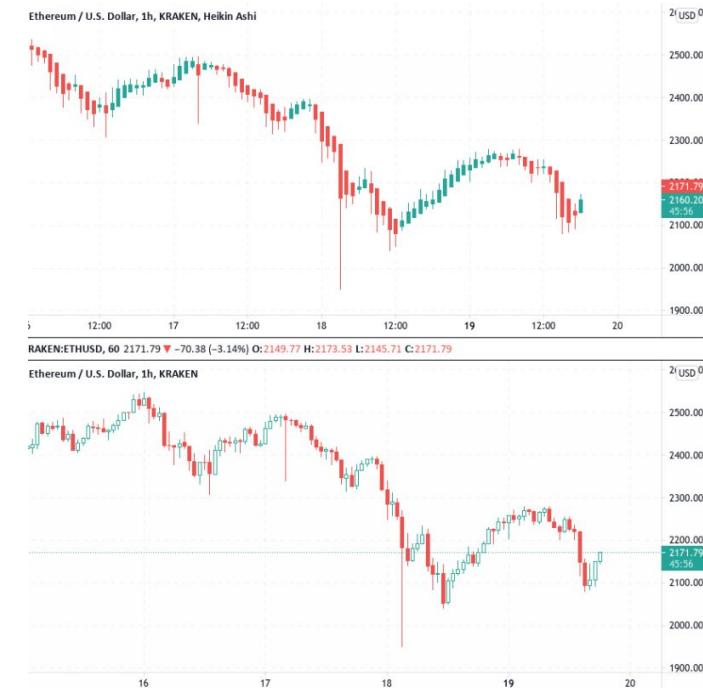


[17]

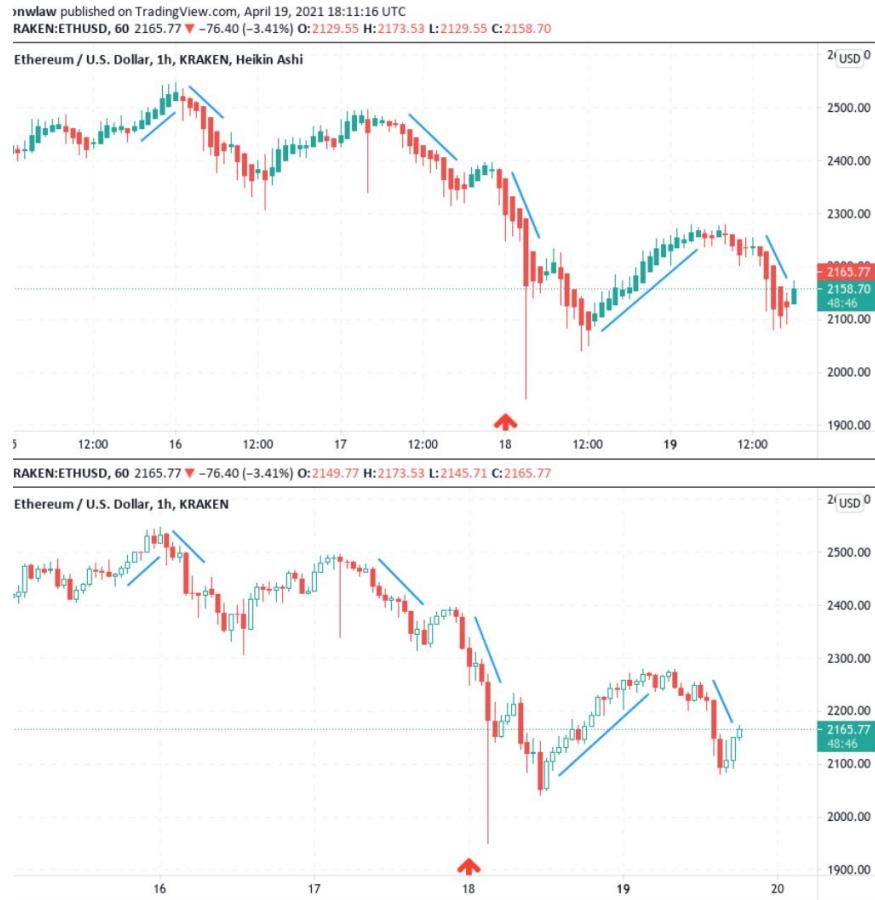
(tradingview.com) Figure 18: Point & Figure Chart

HEIKIN-ASHI

Heikin-Ashi (hike-in-aw-she) charts are a simpler, smoothed version of candlestick charts. They function almost the same way as candlestick charts, (candles, wicks, shadows, etc.), except HA charts smooth price data over two periods instead of one. This essentially makes Heikin-Ashi preferable to many traders versus candlestick charts because patterns and trends can be more easily spotted and false signals (small, meaningless moves) are, in large part, omitted. That said, the simpler appearance does obscure some data relative to candlesticks, which is partly why Heikin-Ashis haven't yet replaced candlesticks. I suggest that you experiment with both chart types to *figure* out what best fits your style and ability to discern trends.



(tradingview.com) Figure 19: Heikin-Ashi Chart^[18]



(tradingview.com) Figure 20: Heikin-Ashi Chart #2[\[19\]](#)

- A: Note that the trends on the Heikin-Ashi chart are smoother and more discernible than on the lower candlestick chart.
- B: Note that significant upward trends have continuously green candles without the lower shadow, while strong downward trends have continuous red candles without the upper shadow.

CHARTING RESOURCES

- TradingView
tradingview.com (best overall, best social)
- CoinMarketCap
coinmarketcap.com (simple, easy)
- CryptoWatch
cryptowat.ch (very established, best for bots)
- CryptoView
cryptoview.com (very customizable)
- GoCharting
gocharting.com (good free options)
- Coinigy
coiniqy.com (great range of pairs and exchanges)
- Coin 360
coin360.com (unique UI, check this one out!)
- Altrady
altrady.com (scanners, handy tools)
- CoinCheckup
coincheckup.com (simple)

CHART PATTERN CLASSIFICATIONS

Chart patterns are classified in order to quickly understand role and purpose. Here are a few of such classifications:

BULLISH

All bullish patterns are likely to result in the outcome being favorable to the upside, so, for example, a bullish pattern may result in a 10% uptrend.

BEARISH

All bearish patterns are likely to result in the outcome being favorable to the downside, so, for example, a bearish pattern may result in a 10% downtrend.

CANDLESTICK

Candlestick patterns apply specifically to candlestick charts, not to all charts. This is because candlestick patterns rely on information that can only come across in a candle (body and wick) format.

NUMBER OF BARS/CANDLES

The number of bars or candles in a pattern is usually no more than three.

CONTINUATION

Continuation patterns signal that the pre-pattern trend is more likely than not to continue. So, for example, if continuation pattern X forms

at the top of an uptrend, then the uptrend is likely to continue.

BREAKOUT

A breakout is a move above resistance or below support. Breakout patterns indicate that such a move is probable. The direction of that breakout is specific to the pattern.

REVERSAL

A reversal is a change in the direction of price. A reversal pattern indicates that the direction of the price is likely to change, meaning an uptrend becomes a downtrend, or a downtrend becomes an uptrend.

RISK MANAGEMENT

Along with classifications, here are a few risk-management trading strategies:

STOP LOSS

A stop loss is an extremely useful tool that enables sell orders to be placed and executed once a price reaches a certain level. This enables risk management through control over the maximum possible loss (excluding slippage). We will consider this situation: You're placing a risky bet on a breakout over \$40. If the price breaks out, the next resistance level is at \$46, representing a 15% gain. In this case, you may want to place a stop-loss order at \$37. If the price ever reaches \$37, your entire position will be immediately sold.

Essentially, this means that the downside risk is limited to 7.5% while there's a good chance of the upside being 15%. You can alter the stop loss to cap your potential risk at whatever you want, whether it be 5%, 15%, or 30%. Make sure to account for volatility to prevent false signals from triggering stop losses.

TRAILING STOP LOSS

Trailing stop losses are an advanced form of stop losses that move with the price. For example, given the example directly above, instead of placing a stop loss at \$37, you could place a stop loss at \$3 below the market price. This way, the order will still execute at \$37, but if the price moves to \$43, the order will then execute at \$40. Hence, risk is limited no matter the price. Trailing stop losses can be set as fixed-dollar amounts, or as percentages. You must also choose the degree to which the order will trail the price (meaning, should the stop loss execute if the price is \$3 below the previous day's close, the previous hour's close, and so on).

LONG VERSUS SHORT TRADING

The terms “long trade” and “short trade” will be used throughout this section. “Long” and “buy” are used interchangeably; for example, you may establish a long position, which means you bought coins, or you may be “long on Bitcoin,” which means you bought and held Bitcoins. “Short” refers to shorting an asset, which is betting that a price will go down. Shorting is riskier and much less popular than buying and owning shares. Many of the popular centralized exchanges in the US and around the world don’t allow shorting, and therefore only buying long applies to you. However, for full clarity and for those using exchanges around the world that do accept shorting (shorting services will likely become more common as the industry grows), I have included shorting in the descriptions of chart patterns, oscillators, indicators, and throughout the rest of this book.

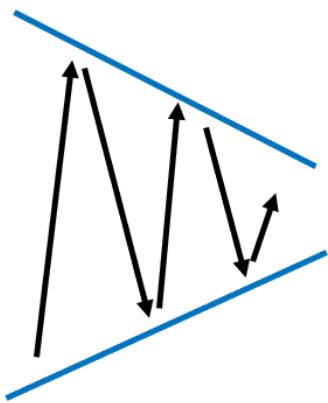
CHART PATTERNS

Before moving on to candlestick-specific formations, about a dozen basic chart patterns should be looked at. These are general shapes formed within charts (whether line, candlestick, or others) that can affect and predict future price action. All are usually discernable on a wider timeframe, as opposed to the short-term timespan of most candlestick formations. The most important and common of these patterns are included in the essentials section at the end of this chapter. That said, don't underestimate any, and I recommend carefully reading into each, as these form the foundation of chart movement.

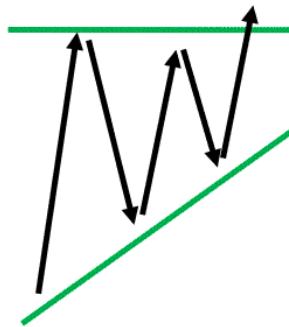
- Triangles
 - Symmetrical
 - Ascending
 - Descending
- Price Channel
- Rounding Bottom
- Cup and Handle
- Pennant
- Flag
- Rectangles
- Wedge
- Head and Shoulders
- Double Bottom/Double Top
- Triple Bottom/Triple Top
- Bump and Run

TRIANGLES

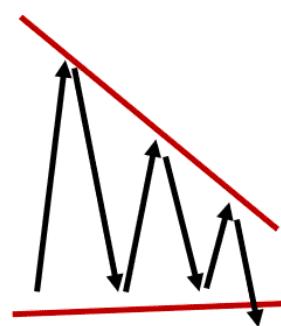
Triangle patterns are the most well-known formations, being practically synonymous with popular knowledge of technical analysis. Three sub-categories of triangle formations exist, all of which are continuation patterns. Continuation patterns signal that a trend is likely to continue in the direction it's currently going. Triangle patterns are relatively common across crypto charts and, if traded upon correctly, serve as fairly reliable indicators. Next up is a look into each triangle pattern, along with real examples.



Symmetrical Triangle



Ascending Triangle



Descending Triangle

ASCENDING TRIANGLE

Ascending triangles are continuation patterns that form a horizontal upper trendline and a diagonally rising lower trendline. Typically, a bullish breakout will occur near the tip of the triangle (really, it will occur once the trading range diminishes enough for buyer support to recover and push through resistance, which is normally close to the tip). The upper trendline (the resistance) then becomes the new support line. Thus, a simple ascending triangle short-term trade involves buying a long order once two bars close above the breakout line (to omit false signals) and setting a stop-loss order at or just under the breakout line.



(tradingview.com) Figure 21: Ascending Triangle [\[20\]](#)



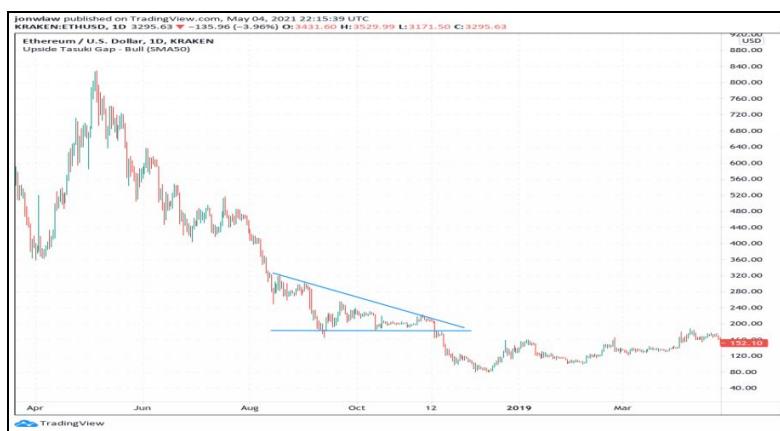
(tradingview.com) Figure 22: Ascending Triangle #2 [\[21\]](#)

DESCENDING TRIANGLE

Descending triangles are the opposite of ascending triangles: They consist of a horizontal lower trendline and a diagonally sinking upper trendline (meaning the low stays low, and the high gets lower). The descending triangle is a bearish continuation pattern, meaning that a price is more likely to downtrend as the trading range decreases. A simple trade involving a descending triangle involves shorting once two bars close under the lower trendline and setting a stop-loss order at or just above the breakout line.



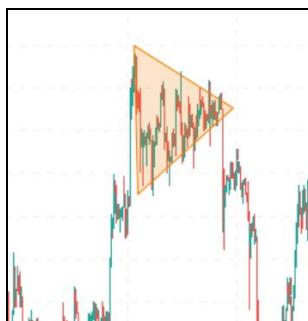
(tradingview.com) Figure 23: Descending Triangle [\[22\]](#)



(tradingview.com) Figure 24: Descending Triangle #2 [\[23\]](#)

SYMMETRICAL TRIANGLE

While both ascending and descending triangles have a direction (up or down) and indicate a directional movement (also up or down), symmetrical triangles have neither. Symmetrical triangles represent near-equal bullish and bearish power and trade within a declining price range (basically, lower highs and higher lows). Eventually, the price range declines to a point (near the tip of the triangle) at which a breakout is likely to occur. The breakout can be either positive or negative. It's tougher to trade upon symmetrical triangles since the direction can't be assumed, so the best course of action is to place an order as soon as possible after the breakout occurs and confirms —a long position if the breakout is positive, or a short position if the breakout is negative. A stop-loss order can then be placed, respectively, at the upper trendline or bottom trendline of the triangle. To weed out false signals (called "head fakes" in this case), you should watch for a spike in volume and a few closes beyond the trendline before placing an order. All that said, symmetrical triangles do tend to break out in the direction of the move pre-formation. It is by no means something to assume or trade upon, rather something to keep in mind given the strategy outlined above.



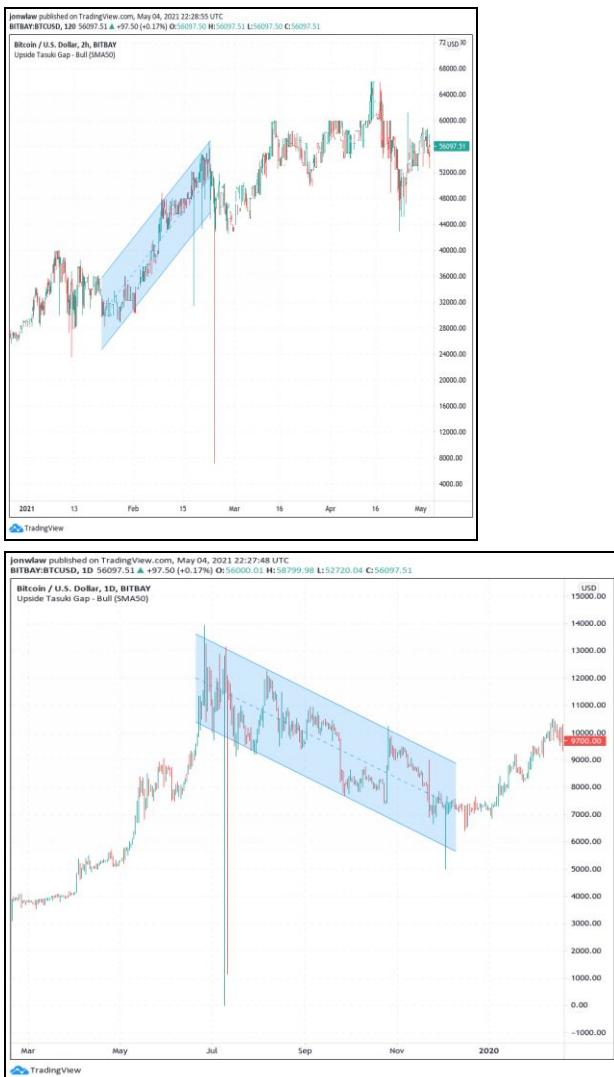


(tradingview.com) Figure 25: Symmetrical Triangle [\[24\]](#)

(tradingview.com) Figure 26: Symmetrical Triangle #2 [\[25\]](#)

PRICE CHANNEL

A price channel (less commonly referred to as a trading channel) is a foundational formation formed by a pair of parallel trend lines advancing in any direction.^[6] Often, price channels form support and resistance levels; hence, prices tend to oscillate between such lines. If trendlines are broken through, whether above or below, the result is a breakout. Many of the patterns in this chapter involve price channels in some form and attempt to predict breakouts, in part, through them.



(tradingview.com) Figure 27: Price Channel^[26]

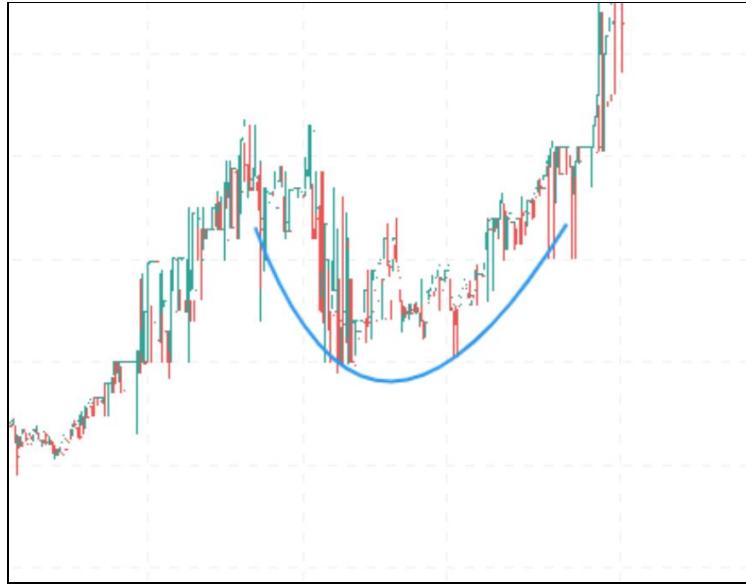
(tradingview.com) Figure 28: Price Channel^[27]

ROUNDING BOTTOM

Rounding bottoms are the “cup” of the cup and handle formation, as elaborated upon directly below. Rounding bottoms (also known as saucer bottoms) are found following uptrends, form the shape of a “U,” and signify a long-term reversal. This pattern may take weeks or months to form. It indicates that selling pressure pushed the price down and the subsequent lower price resulted in an influx of buyers and a solid base, which led to those buyers pushing the price back up. The cup and handle is a popular variation of this pattern, which is known to be more reliable than the rounding bottom given its relative lack of false signals.



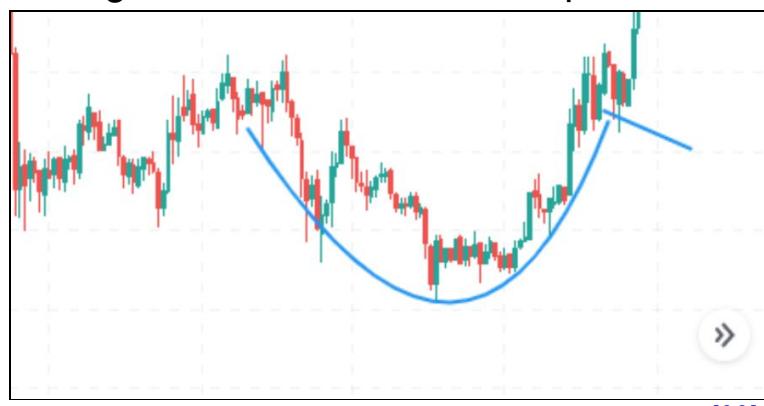
(tradingview.com) Figure 29: Rounding Bottom [28].



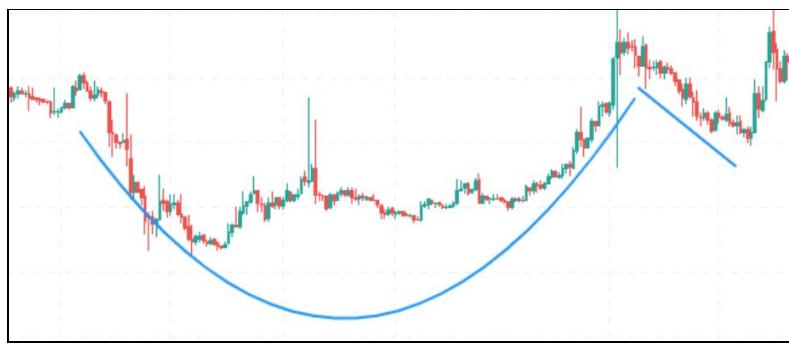
(tradingview.com) Figure 30: Rounding Bottom #2^[29]

CUP AND HANDLE

The cup and handle is a bullish continuation pattern defined by William O'Neil in 1988. The pattern forms a rounded U-shape and a handle that trends slightly downward. Cups with more gradual U-shaped bottoms provide better signals relative to distinct "V" bottoms. Handles form above the midpoint of the cups, and neither cups nor handles should be overly deep. In theory, the cup and handle formation indicate that price has tested a high, hence incurring selling pressure and consolidating the price back downwards before retesting the high, briefly pulling back, and then breaking resistance and moving higher. Cup and handle patterns are generally identified with a wider timespan (typically within the range of seven weeks up to sixty-five weeks) and signal longer-term price movements, which may occur over months or years. Some traders estimate the substance of the breakout by measuring the increase from the bottom of the cup to the top right of the cup and adding that percent to the end of the price channel. While that rule can serve as a general estimation, it isn't decidedly accurate. As the crypto industry settles into itself, cup and handle patterns will likely become more commonplace. Note the varying slope of the cups and the variation in the length of the handles in both photos.



(tradingview.com) Figure 31: Cup and Handle [30]



(tradingview.com) Figure 32: Cup and Handle #2^[31]

PENNANT

A pennant is a continuation pattern that appears after a large positive or negative jump. The pennant formation consolidates subsequent to the jump and typically continues in the same direction. Pennants only differ from symmetrical triangles through the flagpole, which is the rapid uptrend or downtrend. Apart from the flagpole, the pattern is just a symmetrical triangle and should be treated as such, except in that the breakout is extremely likely to continue in the initial direction. To trade upon pennants, simply follow the triangle rules of buying after a confirmed positive breakout or shorting following a confirmed negative breakout (and, of course, don't forget stop-losses).



(tradingview.com) Figure 33: Pennant^[32]



(tradingview.com) Figure 34: Pennant #2^[33].

FLAG

The flag pattern is very similar to the pennant pattern, except pennants form a triangle after the flagpole, while flags form two parallel lines.^[7] Most of the pennant rules apply to flags; the formation represents a likely continuation of previous trends and can be traded upon accordingly.



(tradingview.com) Figure 35: Flag^[34]



(tradingview.com) Figure 36: Flag #2^[35]

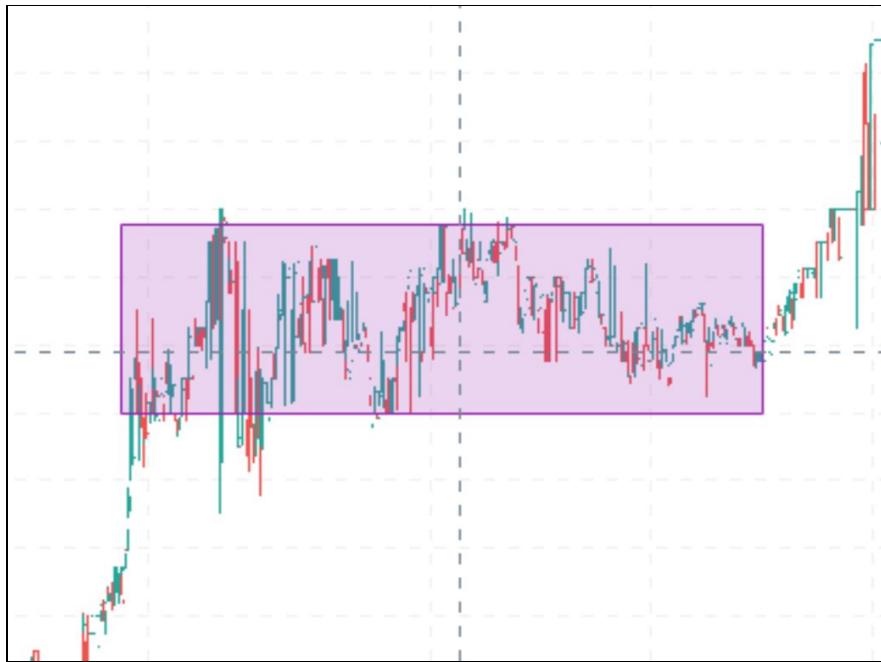
RECTANGLES

Rectangle patterns help chart viewers identify support and resistance levels (they're just a horizontal price channel). This is useful in discerning other patterns and in identifying good entry/exit prices.



(tradingview.com) Figure 37: Rectangles [\[36\]](#)

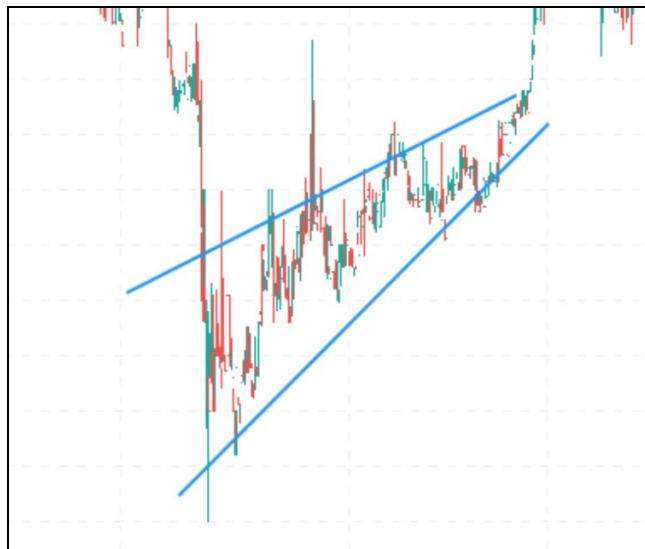
(tradingview.com) Figure 38: Rectangles #2 [\[37\]](#)



(tradingview.com) Figure 39: Rectangles #3^[38].

WEDGE

Wedge patterns can either be a falling wedge or a rising wedge; falling wedges couple a shrinking price range with a downtrend, while rising wedges combine a shrinking price range with an uptrend. Falling wedges indicate a potential negative breakout while rising wedges signal a positive breakout. While research has shown that both indicators are fairly accurate, the falling wedge is thought to be more reliable than the rising wedge.



(tradingview.com) Figure 40: Wedge [\[39\]](#).



(tradingview.com) Figure 41: Wedge #2^[40].

HEAD AND SHOULDERS

Head and shoulder patterns are as popular as chart patterns can get; such formations have a reputation for reliability and predict bearish reversals. They involve a baseline price and three peaks, one of which [the head] is sandwiched between the two others [the shoulders]. In concept, this represents a price up trending to a peak, pulling back, accelerating to a new high, pulling back once more, and rising to a third peak before finally succumbing to resistance and falling back below the “neckline” price (formed by the troughs of the first and third peaks) or to support below either shoulder. This completes the reversal. Head and shoulder patterns are often traded upon through an entry at the left-most part of the neckline and a stop-loss above (or below) the estimated price of the right shoulder. That said, while the pattern is known to be reliable (it's found to be correct roughly 85% of the time), it is not a golden rule. As I have previously said, exceptions are necessary to prove a rule.

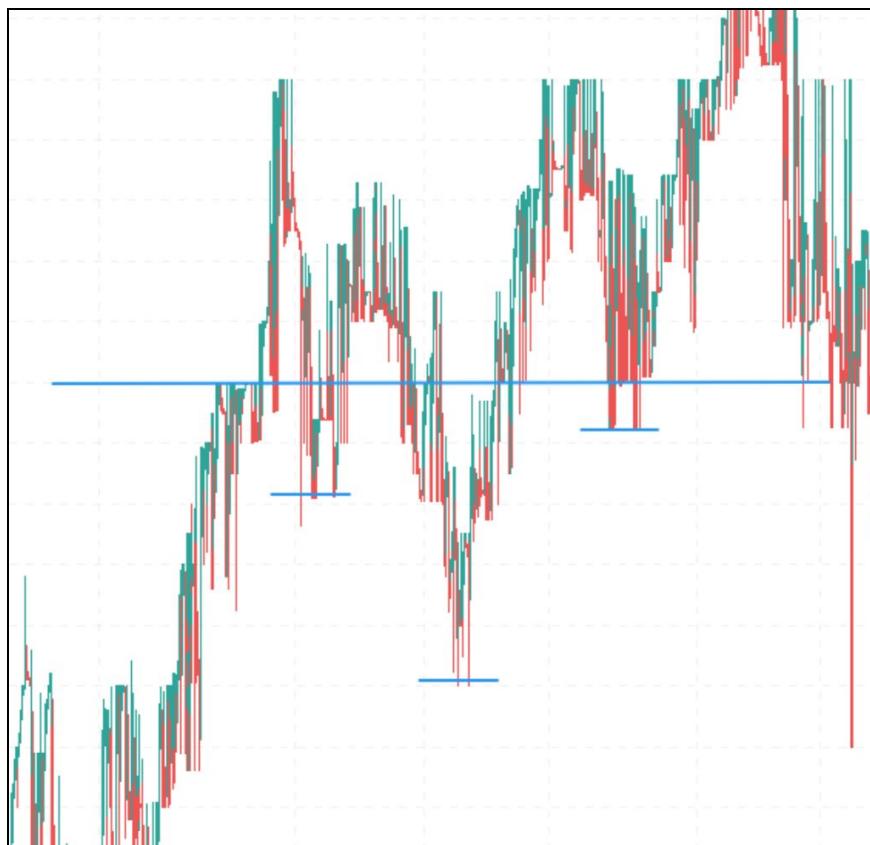


Figure 42: Head and Shoulders [\[41\]](#)

[8]

INVERSE HEAD AND SHOULDERS

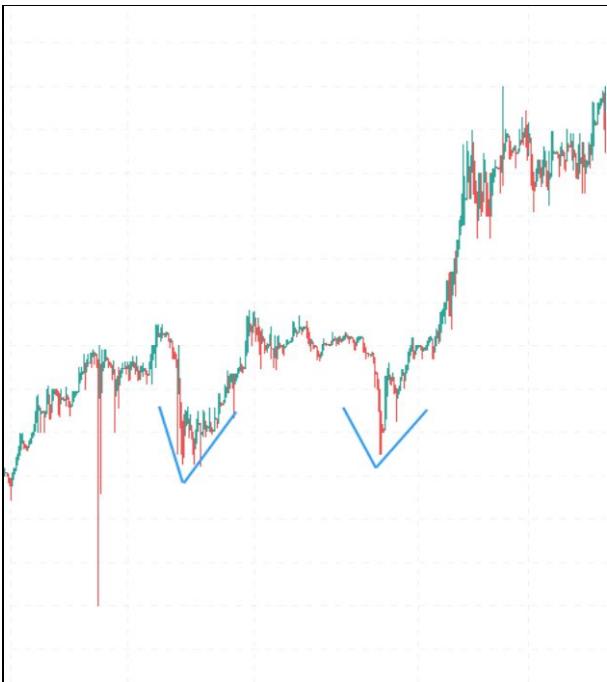
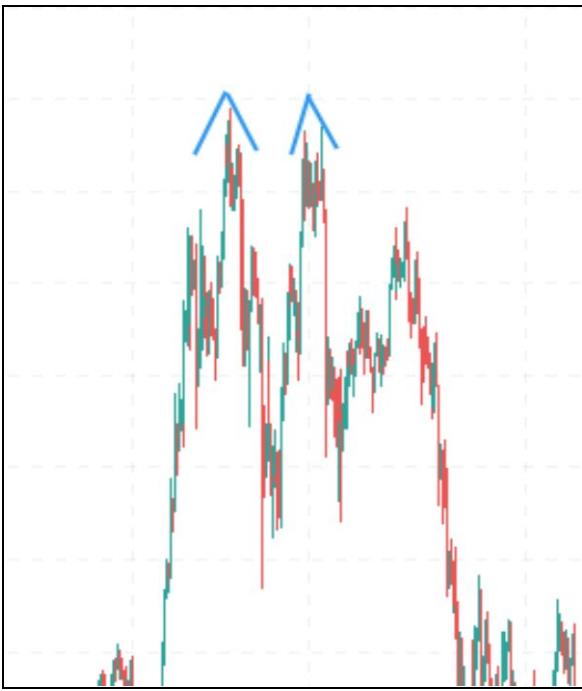
The inverse head and shoulder pattern is the bullish antithesis to the head and shoulder formation. It is also referred to as a “head and shoulders bottom” and consists of a bottom shoulder, a lower head, a subsequent second shoulder, and then a positive breakout above the neckline. The neckline will often switch from resistance to support. To trade upon this formation, investors enter once the neckline price is broken (either immediately after or, to prevent false signals, once the price closes) and sell once the price is run up and finds new resistance.



(tradingview.com) Figure 43: Inverse Head and Shoulders [42]

DOUBLE BOTTOM/DOUBLE TOP

Double bottoms and double tops are the most common charting patterns. Double tops look like an “M,” while double bottoms look like a “W.” In each, a price is reached, fallen away from (either positively or negatively), and reached again. Double tops often signify a bearish reversal, while double bottoms can signify bullish reversals. When identifying these patterns, make sure to interpret them carefully and be wary of false signals and similar-looking patterns that aren’t actually double bottoms or double tops.

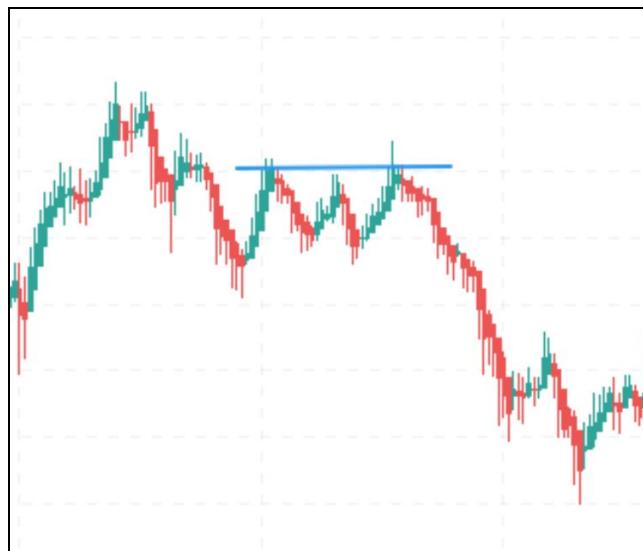


(tradingview.com) Figure 44: Double Top [\[43\]](#).

(tradingview.com) Figure 45: Double Bottom [\[44\]](#).

TRIPLE BOTTOM/TRIPLE TOP

The triple top and triple bottom are the next evolution of double tops and double bottoms; they involve a similar price being hit three times and rebounded (either positively or negatively) upon. Triple tops consist of three peaks and pullbacks in between, while triple bottoms consist of three troughs with uptrends in between. Triple tops and triple bottoms are regarded as more reliable than the cousin double bottom and double tops. Triple tops signify bearish reversals, while triple bottoms indicate bullish reversals. Traders can enter short positions once the third peak breakthrough is denied (for triple tops) and long positions once the third trough negative breakthrough is denied (triple bottoms).



(tradingview.com) Figure 46: Triple Top [\[45\]](#).



(tradingview.com) Figure 47: Triple Bottom [46].

BUMP AND RUN

Bump and run patterns signal strong reversals, typically subsequent to a fundamentally excessive price increase. The formation consists of three phases: the lead-in, the bump, and the rollover. The lead-in generally lasts either weeks or months and involves a steady uptrend. An angle of 30 to 45 degrees is best (degree measuring tools can be found within most charting services). The bump phase induces a rapid and steep advance in price. Eventually, a top will form. The price then rolls over into a decline that switches previous support levels into resistance levels.



(tradingview.com) Figure 48: Bump and Run^[47].

COMBINING KNOWLEDGE

To test all of the patterns we have identified, I pulled up a random Bitcoin (BTC) chart and plotted some patterns; price channels, support and resistance, rounded bottoms, triangles, rectangles, and so on (also note that support and resistance often match with nice, round, 10k intervals). I suggest that you do the same with a coin of your choice. This concludes basic chart patterns, and we will now be moving into some specific candlestick formations.



(tradingview.com) Figure 49: Combined Patterns [48]

CANDLESTICK PATTERNS

50 of the most popular and accurate candlestick patterns.

Outline:

- Hammer
- Inverse Hammer
- Hanging Man
- Bullish Engulfing
- Bearish Engulfing
- Piercing Line
- Tweezer Bottom
- Tweezer Top
- Morning Star
- Evening Star
- Three White Soldiers
- Three Black Crows
- Upside Gap Two Crows
- Shooting Star
- Dark Cloud Cover
- Doji
- Marubozu
- Harami
- Harami Cross
- Spinning Top
- Rising Three Methods
- Falling Three Methods
- Abandoned Baby
- Upside Tasuki Gap
- Downside Tasuki Gap
- Piercing Line
- Stick Sandwich
- Three Line Strike
- Two Black Gapping

HAMMER

A hammer is a one-candle pattern that involves a short body with a long lower wick (and little to no upper wick) found at the bottom of a downtrend. Such a sign indicates that strong buying pressure prevented the price from falling further and is likely to drive the price back up.

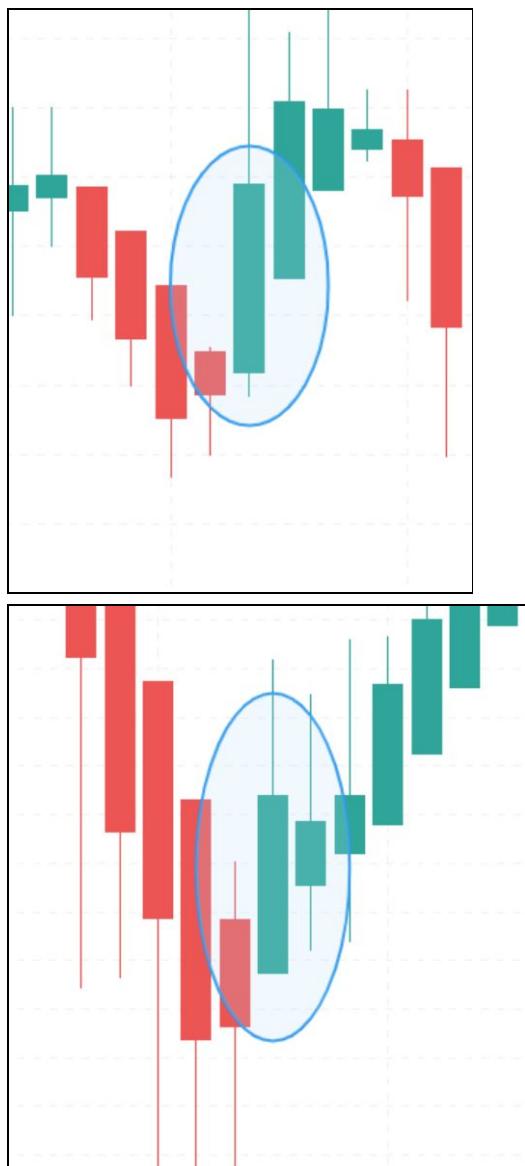


(tradingview.com) Figure 50: Hammer [\[49\]](#)

(tradingview.com) Figure 51: Hammer [\[50\]](#)

INVERSE HAMMER

An inverse hammer, like a hammer, has a short body at the bottom of a downward trend. However, unlike the hammer, inverse hammers have a long upper wick and a short lower wick. This is still a bullish sign; the bearish hammer equivalent is directly below.



(tradingview.com) Figure 52: Inverse Hammer [\[51\]](#).

(tradingview.com) Figure 53: Inverse Hammer #2 [\[52\]](#).

HANGING MAN

The hanging man is the bearish equivalent of the hammer. It forms at the end of an uptrend, appears as a short red body with a long lower wick, and is indicative of a downtrend.



(tradingview.com) Figure 54: Hanging Man [53]



(tradingview.com) Figure 55: Hanging Man #2^[54]

BULLISH ENGULFING

A bullish engulfing pattern is a two-candle bullish pattern that involves a red candle followed by a green candle that completely covers the first candle (in terms of the body, not the wick). This pattern indicates a positive reversal and occurs less often than may be thought.



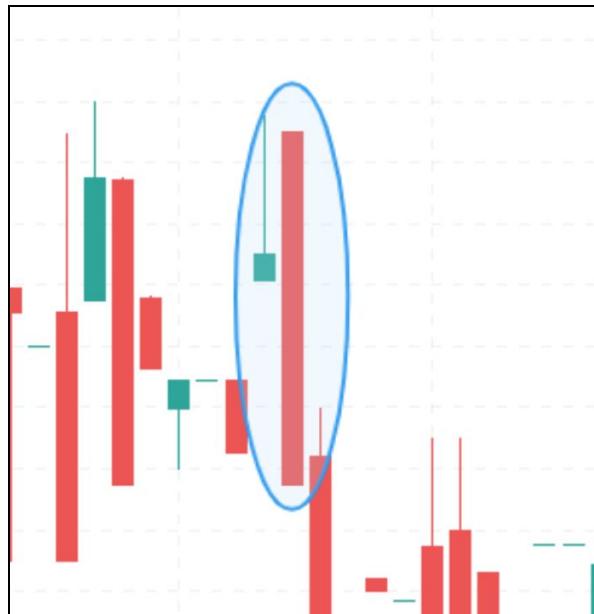
(tradingview.com) Figure 56: Bullish Engulfing [\[55\]](#)



(tradingview.com) Figure 57: Bullish Engulfing #2^[56].

BEARISH ENGULFING

A bearish engulfing pattern is an uncommon two-candle reversal pattern that involves a small green body engulfed by a subsequent long red body. It indicates an upcoming negative reversal; the lower the second candle goes, the stronger the downtrend is likely to be.



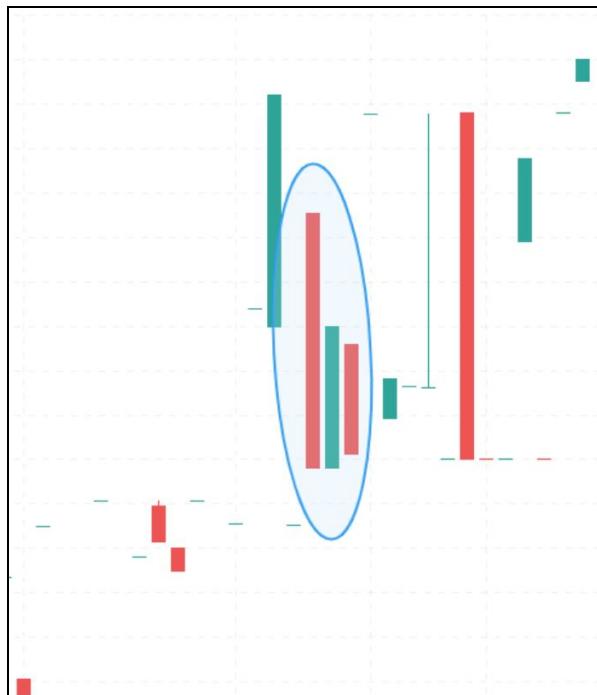
(tradingview.com) Figure 58: Bearish Engulfing [\[57\]](#)



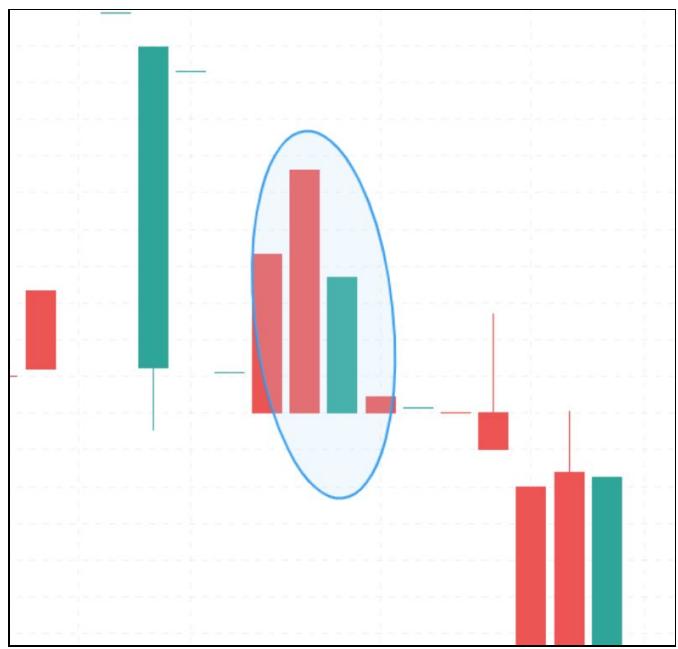
(tradingview.com) Figure 59: Bearish Engulfing [\[58\]](#)

PIERCING LINE

A piercing line (also called a piercing pattern) is a two-candle pattern that usually follows a price decline. It involves a long red candle with small or no wicks followed by a long green candle that closes above the midpoint of the first candle. This indicates heavy buying pressure and a potential positive reversal.



(tradingview.com) Figure 60: Piercing Line^[59]



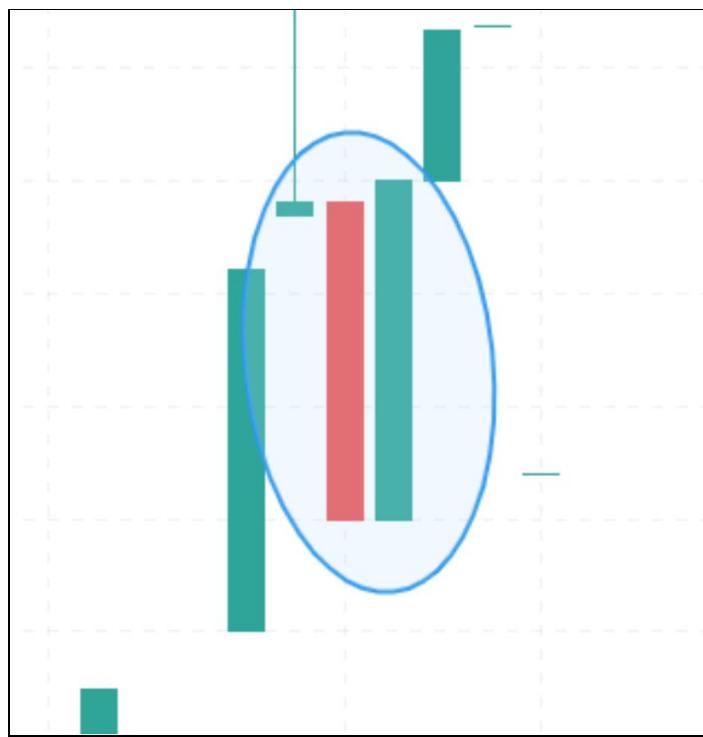
(tradingview.com) Figure 61: Piercing Line #2^[60]

TWEEZER BOTTOM

A tweezer bottom is a two-candle bullish reversal indicator formed by two consecutive candles, one red and one green, the second of which re-rests the previous low and closes higher. This indicates that the price is unlikely to move lower and may uptrend.



(tradingview.com) Figure 62: Tweezer Bottom [\[61\]](#)



(tradingview.com) Figure 63: Tweezer Bottom #2^[62]

TWEEZER TOP

The tweezer top is the bearish opposite of the tweezer bottom. It involves two candles that test a high and close lower, indicated by matching tops. This means that the price is unlikely to move higher and may downtrend.



(tradingview.com) Figure 64: Tweezer Top [63]



(tradingview.com) Figure 65: Tweezer Top #2^[64].

MORNING STAR

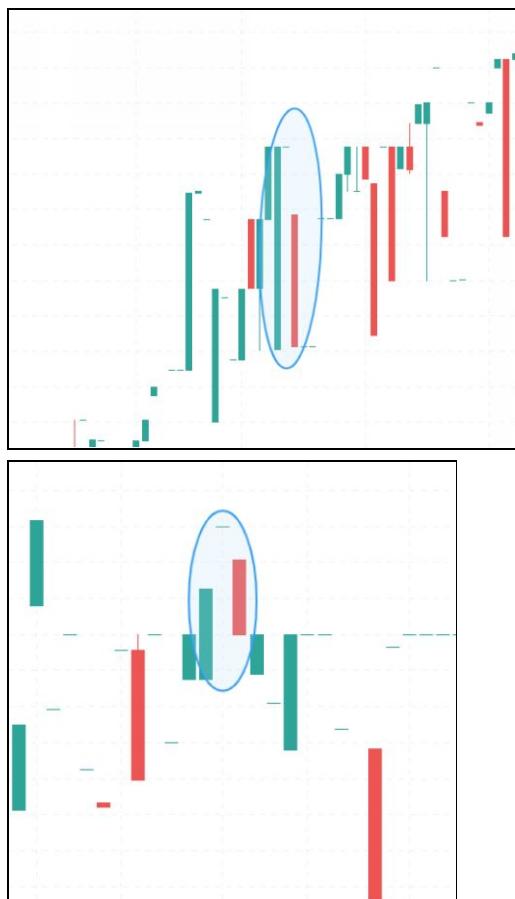
The morning star, called such for the hope it brings to traders, is a three-bar pattern that involves a short-bodied candle between a long red and a long green. This indicates that buying pressure is overtaking selling pressure and a positive reversal is likely.



(tradingview.com) Figure 66: Morning Star^[65]

EVENING STAR

An evening star is a three-candle bearish reversal pattern that consists of a large green candle followed by a small-body candle (either green or red) that gaps above the previous candle. This is followed by a red candle that closes within the first green body. Such a pattern indicates a downward reversal.



(tradingview.com) Figure 67: Evening Star #1^[66]

(tradingview.com) Figure 68: Evening Star #2^[67]

THREE WHITE SOLDIERS

Three white soldiers are a very good sign—the trinity involves three consecutive green candles with small wicks. It indicates the end of a downtrend and the beginning of an uptrend.

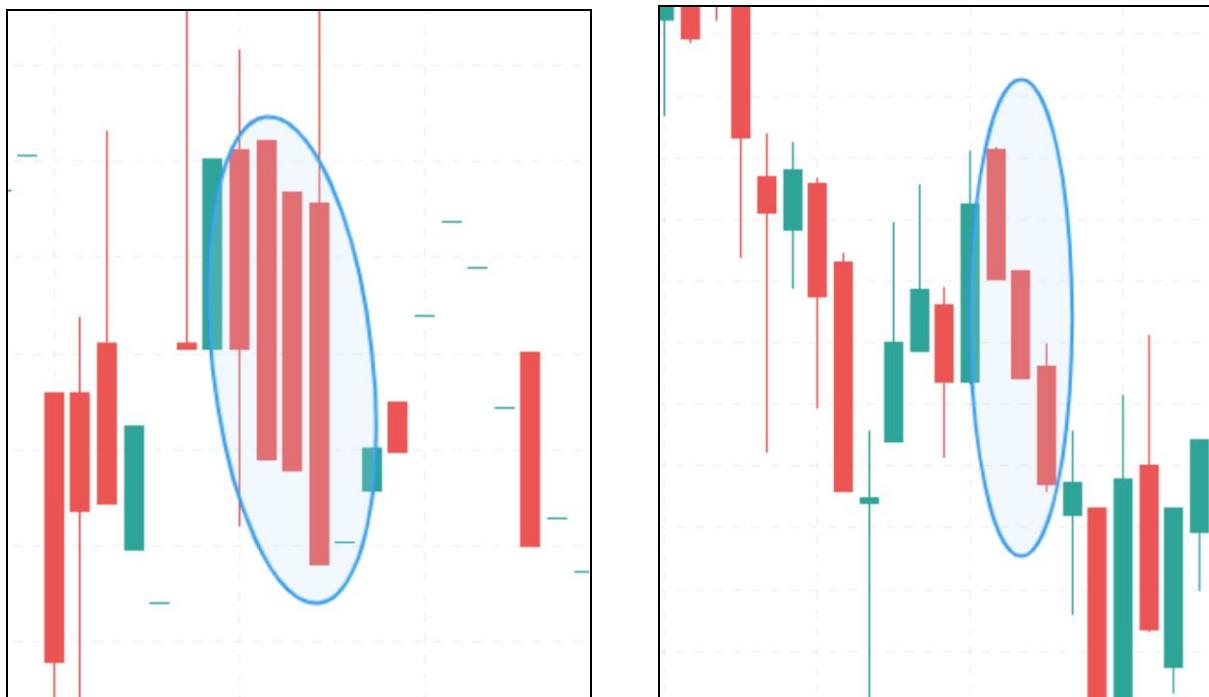


(tradingview.com) Figure 69: Three White Soldiers [\[68\]](#).

(tradingview.com) Figure 70: Three White Soldiers #2 [\[69\]](#).

THREE BLACK CROWS

Three black crows are the opposite of three white soldiers—the pattern consists of three consecutive red candles with small wicks. This indicates that the bears have overtaken the bulls and continued downward pressure is probable.

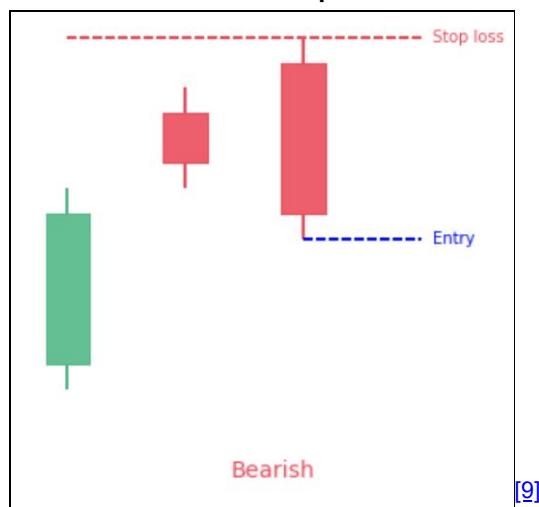


(tradingview.com) Figure 71: Three Black Crows[\[70\]](#)

(tradingview.com) Figure 72: Three Black Crows #2[\[71\]](#)

UPSIDE GAP TWO CROWS

The UGTC is a three-candle pattern that signals momentum weakness and a potential negative reversal. It must form in an uptrend and consists of a green candle that pushes the uptrend higher, followed by a red candle that gaps higher at the open, and finally a red candle that opens higher than the second candle and closes below the close of the first green candle. The UGTC should be combined with other indicators or patterns.



SHOOTING STAR

A shooting star is the opposite of an inverted hammer; it involves a small lower body with a long upper wick (and no lower wick) formed at the top of an uptrend. The upper wick must be at least 2x the length of the body. Shooting stars are bearish and indicate that a higher price was rejected.



(tradingview.com) Figure 73: Shooting Star^[72].

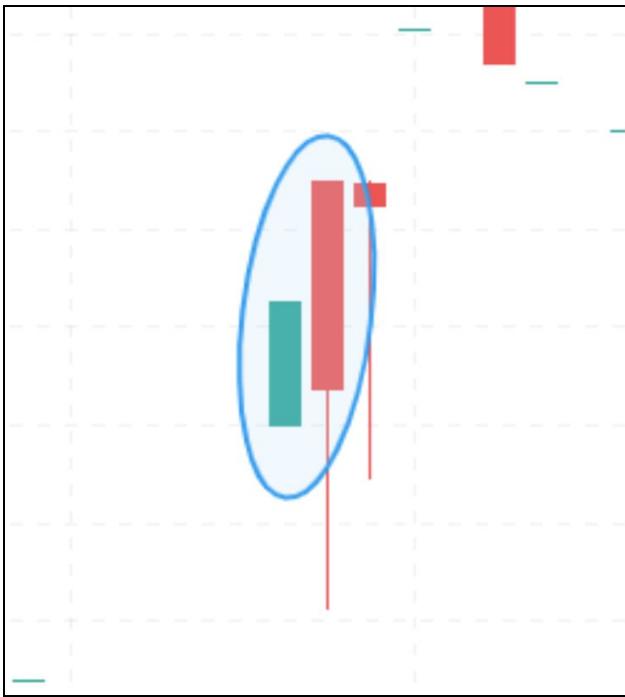
(tradingview.com) Figure 74: Shooting Star #2^[73].

DARK CLOUD COVER

Dark cloud cover is a two-candle reversal pattern that forms after an uptrend and consists of a green candle followed by a red candle that closes below the halfway mark of the first candle. This signals that selling pressure overtook previously bullish momentum.



(tradingview.com) Figure 75: Dark Cloud Cover^[74]



(tradingview.com) Figure 76: Dark Cloud Cover #2^[75]

DOJI

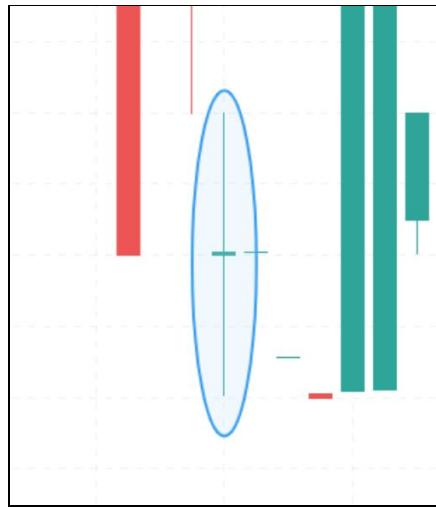
A doji is a very popular type of pattern that forms the basis for quite a few other patterns, many of which are upcoming on this list. Doji candlesticks look like a cross, a plus sign, or an inverted (upside-down) cross. All such patterns are one-candle and indicate probable reversals. All doji patterns open and close within a very small trading range; differentiation occurs within the shadows. Since dojis can come in many different forms, I'd like to fully cover all of the main five doji patterns below, as well as doji stars:

STANDARD DOJI

A standard (neutral) doji forms when opening and closing prices are close to equal. The resulting candle looks like a vertically elongated plus sign.



(tradingview.com) Figure 77: Standard Doji^[76].



(tradingview.com) Figure 78: Standard Doji #2[\[77\]](#).

LONG-LEGGED DOJI

A long-legged doji is similar to a neutral doji (it is, in fact, a specific kind of a neutral doji), except the wicks are very long, both below and above the body. This indicates indecision since the volume required to reach the highs and lows combined with the small body renders the bears and the bulls practically equal; at the top of an uptrend or the bottom of a downtrend, this can signal a reversal.



(tradingview.com) Figure 79: Long-Legged Doji^[78]



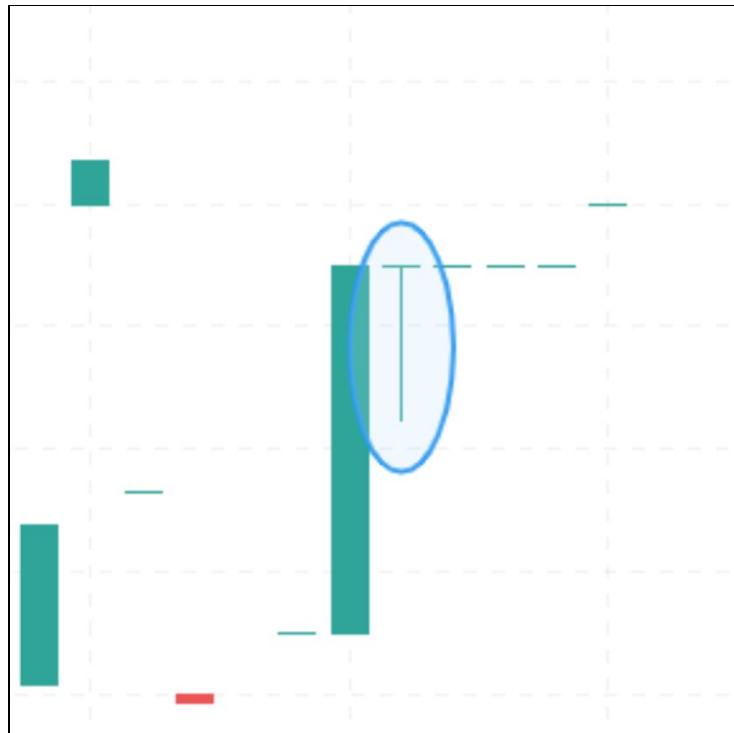
(tradingview.com) Figure 80: Long-Legged Doji #2^[79]

DRAGONFLY DOJI

A dragonfly doji has a small body with a long lower wick and looks like a stretched-out “T.” This pattern suggests an imminent reversal and can only form when the opening and closing prices are practically the same and occur at the high of the day. This pattern typically forms at the bottom of a downtrend and signals a potential bullish reversal.



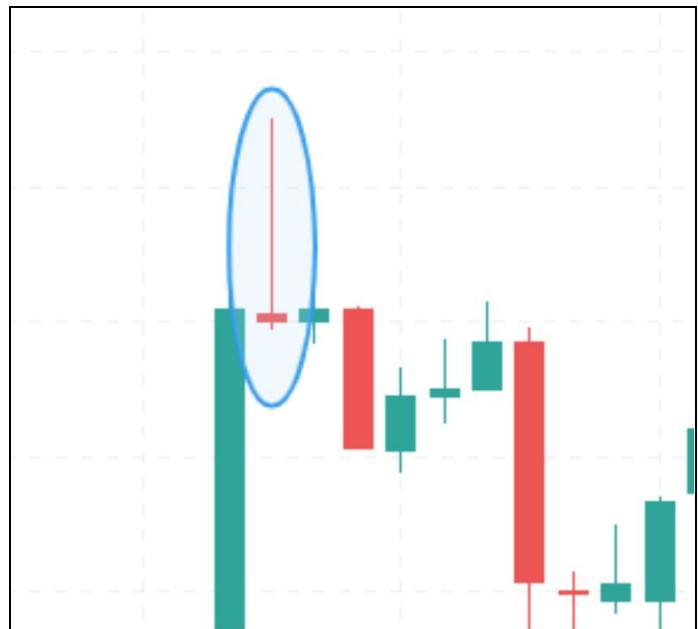
(tradingview.com) Figure 81: Dragonfly Doji^[80]



(tradingview.com) Figure 82: Dragonfly Doji #2^[81].

GRAVESTONE DOJI

A gravestone doji is the opposite of a dragonfly doji; it looks like a flipped “T,” or, as the name implies, an elongated tombstone. This pattern typically forms at the top of an uptrend and the long upper shadow suggests a potential downward reversal.



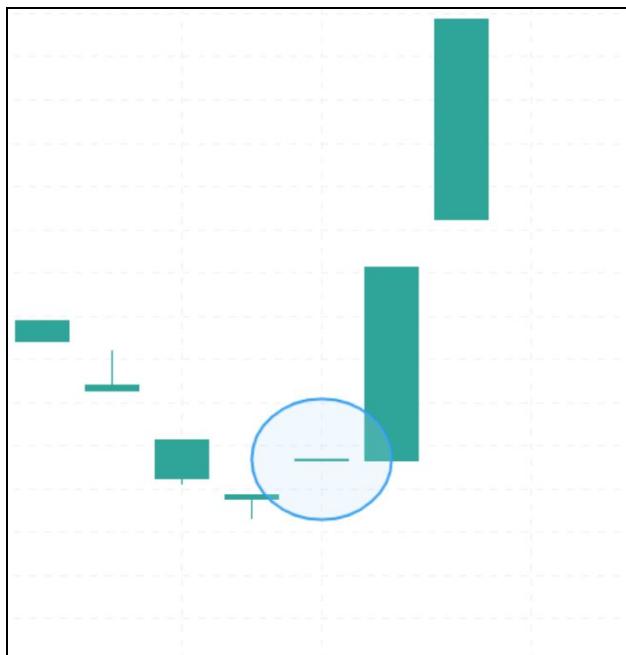
(tradingview.com) Figure 83: Gravestone Doji^[82]



(tradingview.com) Figure 84: Gravestone Doji #2^[83]

FOUR-PRICE DOJI

A four-price (4-price) doji is a rare pattern that occurs when all four prices—open, close, low, and high—are equal. This can really only occur with extreme indecision and low volume.



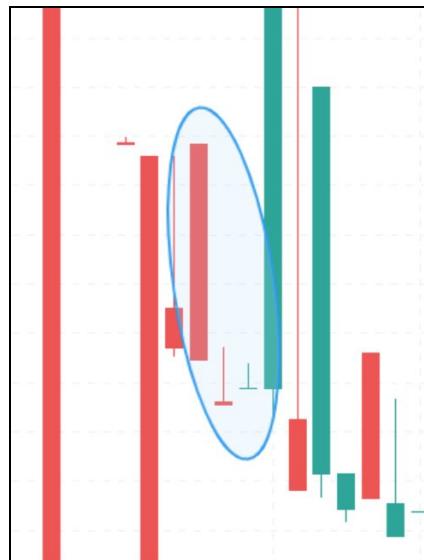
(tradingview.com) Figure 85: Four-Price Doji [\[84\]](#)



(tradingview.com) Figure 86: Four-Price Doji #2^[85].

BULLISH DOJI STAR

Doji stars are a three-candle reversal pattern. The morning doji star is bullish, while the evening doji star is bearish. Morning doji stars form during a downtrend (typically a somewhat long downtrend). They consist of a long-bodied red candle, a second doji-looking candle that gaps lower, and a third candle that closes above the midpoint of the first bar. To minimize risk, a stop-loss can be placed below the second candle.



(tradingview.com) Figure 87: Bullish Doji Star^[86].



(tradingview.com) Figure 88: Bullish Doji Star^[87]

BEARISH DOJI STAR

The bearish form of a doji star is called the evening doji star; this involves a long-bodied green candle, a second small red candle that looks like a normal doji and gaps above the first candle, and a third bar that closes below the midpoint of the first candle.



(tradingview.com) Figure 89: Bearish Doji Star^[88]



(tradingview.com) Figure 90: Bearish Doji Star #2^[89]

MARUBOZU

Marubozu (also known as the bald/shaven head) is a continuation pattern that consists of one green candle with little-to-no shadow on either side. A bearish Marubozu constitutes the opposite: one red candle with no or little shadow. Marubozu indicates that a trend is likely to continue.



(tradingview.com) Figure 91: Marubozu^[90].



(tradingview.com) Figure 92: Marubozu #2 [91]

HARAMI

The harami is a two-candle reversal pattern that comes from the Japanese word “pregnant” which is indicative of the candle’s appearance. Haramis can be bearish or bullish; the bullish pattern forms after a downtrend and is made up of one large red candle with small wicks followed by a smaller green candle that gaps up and trades within the open and close of the first {red} candle. The bearish harami pattern is formed by one large green candle, followed by a smaller red candle that gaps up from the previous close and trades within the open and close of the first {green} candle. Both patterns indicate potential reversals; stop-loss orders can be placed at or below the bottom of the first bar.



(tradingview.com) Figure 93: Bearish Harami^[92].

(tradingview.com) Figure 94: Bullish Harami

HARAMI CROSS

A harami cross is a two-candle reversal pattern that combines elements of haramis and dojis. A bullish harami occurs during a downtrend and consists of a large red candle followed by a doji, while a bearish harami occurs during an uptrend and consists of a large green candle followed by a doji. In both the bullish and the bearish patterns, the doji must be contained within the bodies of the first bar. Harami crosses are given more notice if they occur at support levels; this indicates a rebound. As always, Harami crosses, if traded upon, should be used with other indicators and patterns.



(tradingview.com) Figure 95: Harami Cross [\[93\]](#)

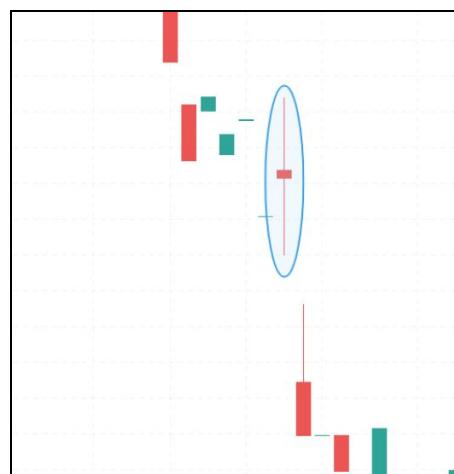
(tradingview.com) Figure 96: Harami Cross #2 [\[94\]](#)

SPINNING TOP

The spinning top is a one-candle pattern that indicates neither the bulls nor the bears have gained the upper hand. Following a large uptrend or downtrend, this may indicate a reversal; following sideways trading action, this may indicate more neutral movement. Spinning tops consists of a small body vertically centered between long lower and upper shadows. Bullish spinning tops are green candlesticks, while bearish spinning tops are red candlesticks. This pattern can be easily used as a confirming pattern in conjunction with other patterns, oscillators, and indicators.



(tradingview.com) Figure 97: Spinning Top [\[95\]](#)



(tradingview.com) Figure 98: Spinning Top #2^[96]

RISING THREE METHODS

Rising three methods is a five-candle bullish continuation pattern that, during an uptrend, signals that a trend is likely to continue. The first candle is green with a large body. The next three candles are small, red, and trade within the first candle. The last candle is a large green candle that pushes above the high of the first bar. To manage risk if trading upon this pattern, a stop-loss order can be set slightly beneath the low of the first candle.



(tradingview.com) Figure 99: Rising Three Methods [97]



(tradingview.com) Figure 100: Rising Three Methods #2^[98]

FALLING THREE METHODS

The falling three methods is the bearish equivalent of the rising three methods (left) that indicates a likely continuation of previous trends. The first candle is a large and red, followed by three small green bars that trade within the first candle. The last candle is large, red, and breaks below the low set by the first candle. As with the rising three methods, a stop-loss order can be placed slightly above the high of the first candle to manage risk while shorting.



(tradingview.com) Figure 101: Falling Three Methods [99]



(tradingview.com) Figure 102: Falling Three Methods #2 [\[100\]](#).

ABANDONED BABY

The abandoned baby is a rare three-bar reversal pattern known to be quite reliable in identifying short-term reversals, especially after rapid price drops or rises. It's similar to the morning star and evening star formations and can be either bullish or bearish; the bearish pattern is predictive of an uptrend reversal and forms when a large-bodied green candle is followed by a doji candle that gaps upwards and a third large-bodied red candle that gaps downwards. The first and the third candles typically have small shadows. The bullish equivalent, predictive of a downtrend reversal, consists of a large green candle, a doji that gaps lower, and a third large green candle that gaps higher. I must note, I could not find the origin of the name, but I can say that the original Japanese term for the pattern, "sute go," translates to "child abandonment," so the term has been around for some time.



(tradingview.com) Figure 103: Abandoned Baby [\[101\]](#).

(tradingview.com) Figure 104: Abandoned Baby #2 [\[102\]](#).

UPSIDE TASUKI GAP

The upside tasuki gap is a three-bar continuation pattern that involves a large green candle, a subsequent green candle that gaps above the high of the previous candle, and a third red candle that closes between the gap of the proceeding two candles. The third candle indicates that resistance was shortly met but didn't last; hence, the uptrend should continue.



(tradingview.com) Figure 105: Upside Tasuki Gap [\[103\]](#).



(tradingview.com) Figure 106: Upside Tasuki Gap #2 [\[104\]](#).

DOWNSIDE TASUKI GAP

The downside tasuki gap is the opposite of the upside tasuki gap (above). It is formed by a large red candle, a second red candle that gaps below the close of the first candle, and a third green candle that closes within the gap of the first two bars.



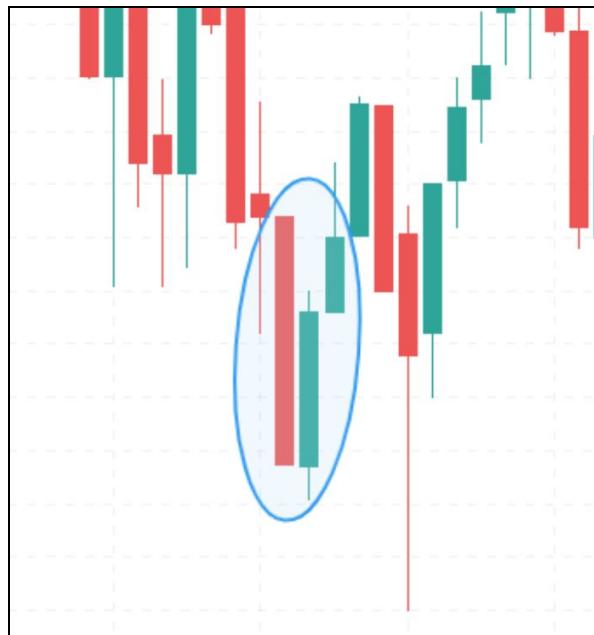
(tradingview.com) Figure 107: Downside Tasuki Gap [\[105\]](#)



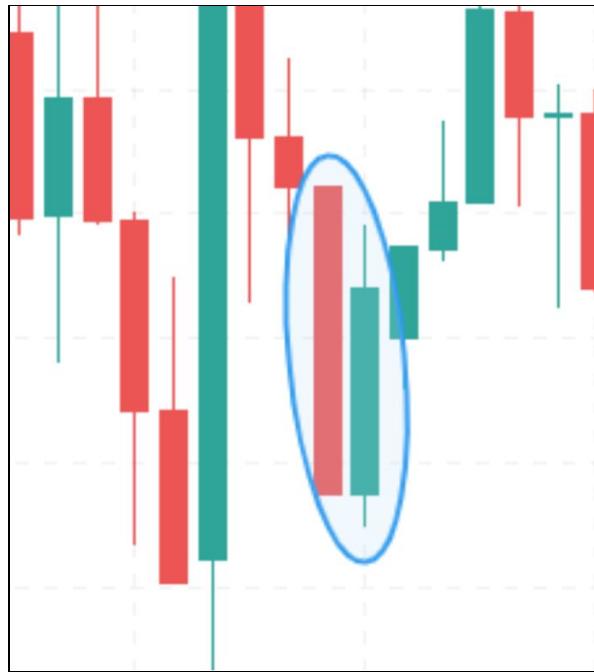
(tradingview.com) Figure 108: Downside Tasuki Gap #2 [106].

PIERCING LINE

The piercing line is a two-candle bullish reversal pattern that follows a downtrend. The first candle is red, and the second green candle must close above the midline of the first [red] bar. This indicates a positive reversal.



(tradingview.com) Figure 109: Piercing Line^[107]



(tradingview.com) Figure 110: Piercing Line #2[\[108\]](#)

TWO BLACK GAPPING

Two black gapping is a bearish continuation pattern that appears after an uptrend and consists of a gap followed by two red candles, each forming lower lows. It indicates that the price will continue downtrending.



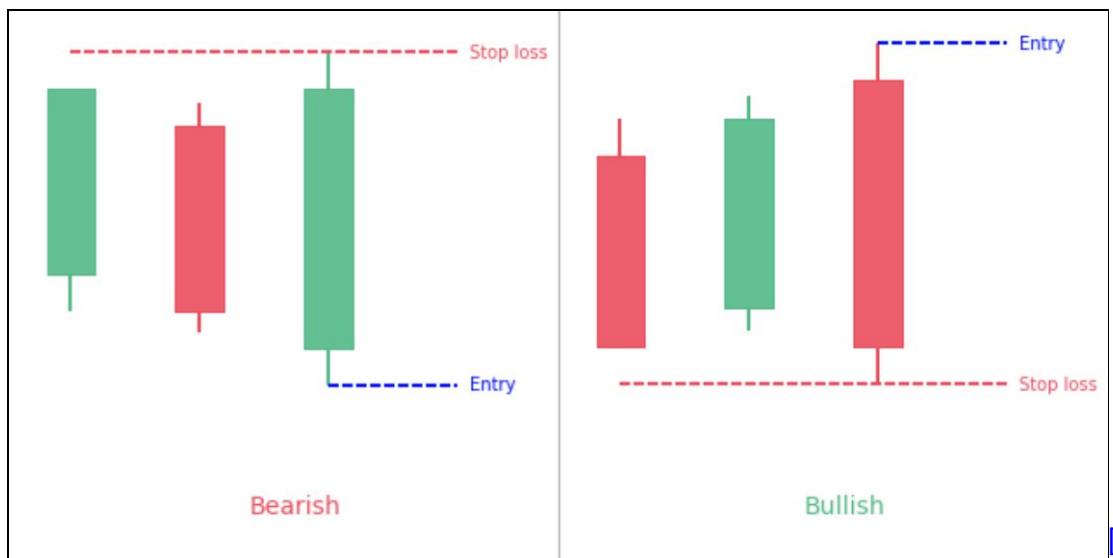
(tradingview.com) Figure 111: Two Black Gapping [\[109\]](#)



(tradingview.com) Figure 112: Two Black Gapping #2 [\[110\]](#)

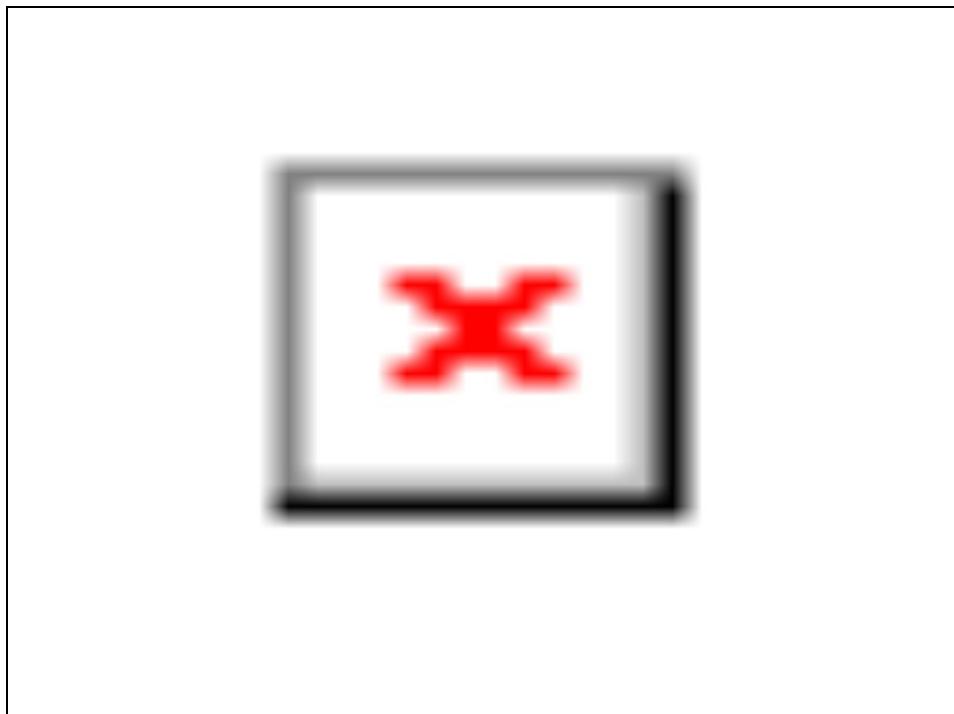
STICK SANDWICH

Stick sandwiches are rare three-candle reversal patterns that can be either bearish or bullish. As the name implies, this pattern looks like a sandwich. Bullish patterns consist of one small green candle sandwiched between two larger red candles, the first of which closes near its low. The second green candle gaps up from the previous close and closes above the previous candle open. The last candle has the same closing price as the first candle. Following this pattern, an uptrend is likely to occur if the high of the third candle is broken. The opposite of this [a bearish stick sandwich] involves a large green candle that closes near its high, a second red candle that gaps downward and closes between the previous candle open, and a final green candle that has the same closing price as the first candle. Once the low of the third candle is broken, a downtrend is likely to occur or continue.



THREE LINE STRIKE

The three-line strike is a rare bullish or bearish five-candle reversal pattern. The bullish pattern is made up of a large green candle, three subsequent green candles, and a large red candle, of which the low is lower than the prior three candles (not all four). This indicates that an uptrend will continue. The bearish three-line strike pattern consists of three red candles followed by a large green candle that brings the price above the high of the previous three bearish candles. To manage risk within the three-line strike, a trailing stop-loss can be applied.



[12]

ESSENTIAL: PATTERNS

This section provides a simplified view of eight patterns out of the fifty or so above. All are important, and modern charting tools allow for patterns such as these to be automatically and easily identified.

The following patterns made it to this list:

1. Triangles
2. Rectangles
3. Head and Shoulders
4. Double/Triple Bottom/Top
5. Doji
6. Morning Star/Evening Star
7. Abandoned Baby
8. Two Black Gapping

TRIANGLES

Triangle patterns can be either symmetrical, ascending, or descending. Ascending triangles consist of a horizontal trendline and a diagonally rising lower trendline, descending triangles consist of a horizontal lower trendline and a diagonally sinking upper trendline, and symmetrical triangles represent two trend lines and a shrinking price range. Ascending triangles signal bullish breakouts, descending triangles signal bearish breakouts, and symmetrical triangles signal potential breakouts in either direction.



(tradingview.com) Figure 113: Symmetrical Triangle #3 [\[111\]](#)

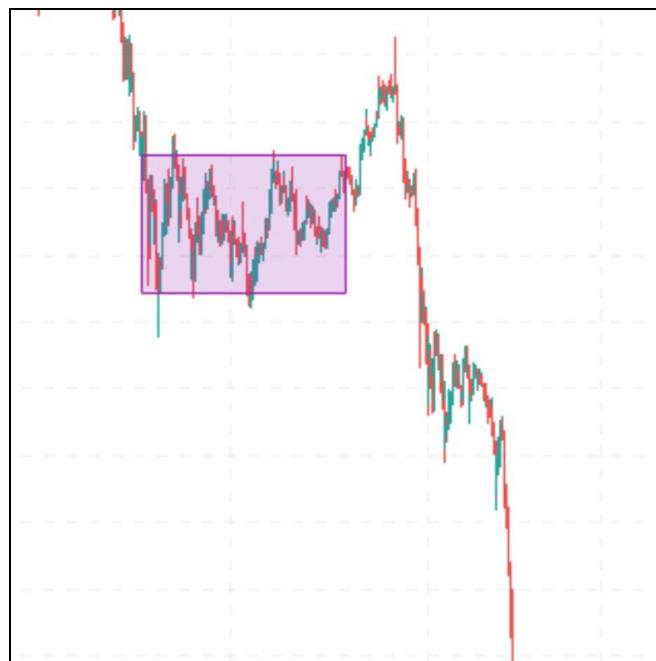
(tradingview.com) Figure 114: Symmetrical Triangle #4 [\[112\]](#)



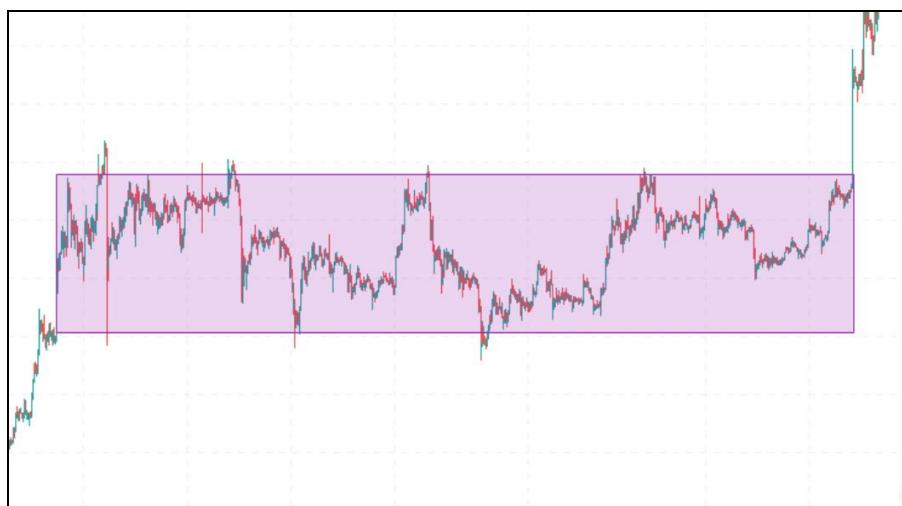
(tradingview.com) Figure 115: Ascending Triangle #3^[113].

RECTANGLES

Rectangle formations are continuation patterns signified by near-equal successive tops and bottoms. Rectangles have been found to be roughly 80% accurate, and breakouts reliably extend as far as the trading range (the width) of the rectangle.



(tradingview.com) Figure 116: Rectangles #4^[114]



(tradingview.com) Figure 117: Rectangles #5^[115]

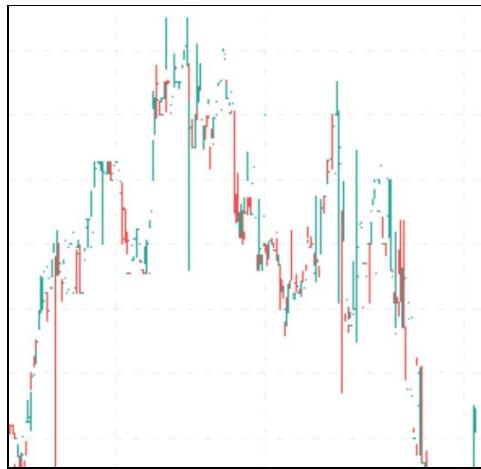
*Note that the resulting uptrends in both cases were roughly equivalent to the height of the respective rectangles.

HEAD AND SHOULDERS

Head and shoulders are statistically the most accurate price action pattern, being correct roughly 85% of the time. The pattern consists of a baseline price and three peaks; the middle peak is called the “head” and is sandwiched between two “shoulders.” The troughs of the shoulders form the “neckline” price. Head and shoulder formations indicate a bearish reversal. Inverse head and shoulder patterns are bullish.



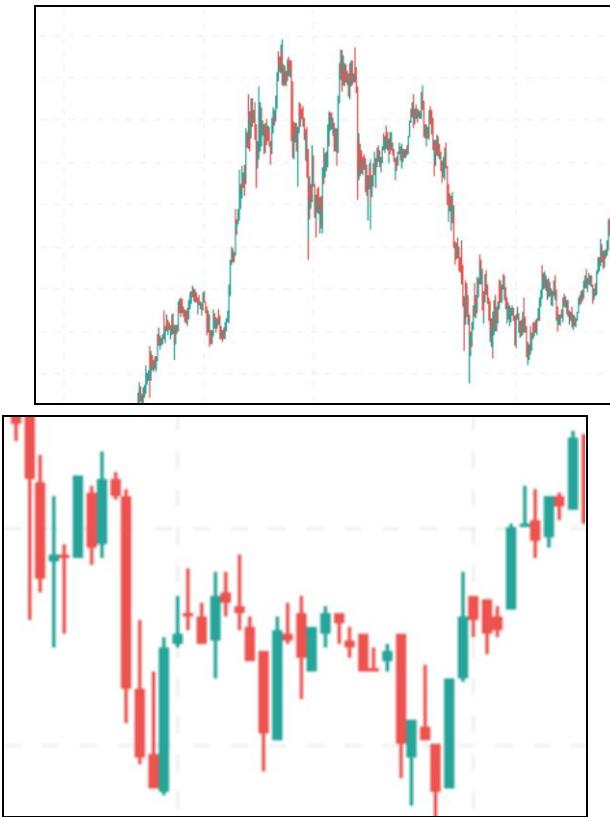
(tradingview.com) Figure 118: Inverse Head and Shoulders #2 [\[116\]](#)



(tradingview.com) Figure 119: Head and Shoulders #2^[117].

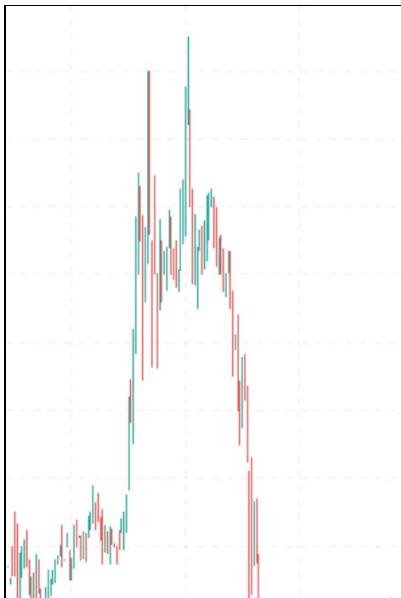
DOUBLE/TRIPLE BOTTOM/TOP

Double tops, double bottoms, triple tops, and triple bottoms signify reversals. Each is signified by the corresponding number of distinct peaks or troughs. The formations, as a whole, are 75% to 80% accurate.



(tradingview.com) Figure 120: Double Top #2^[118].

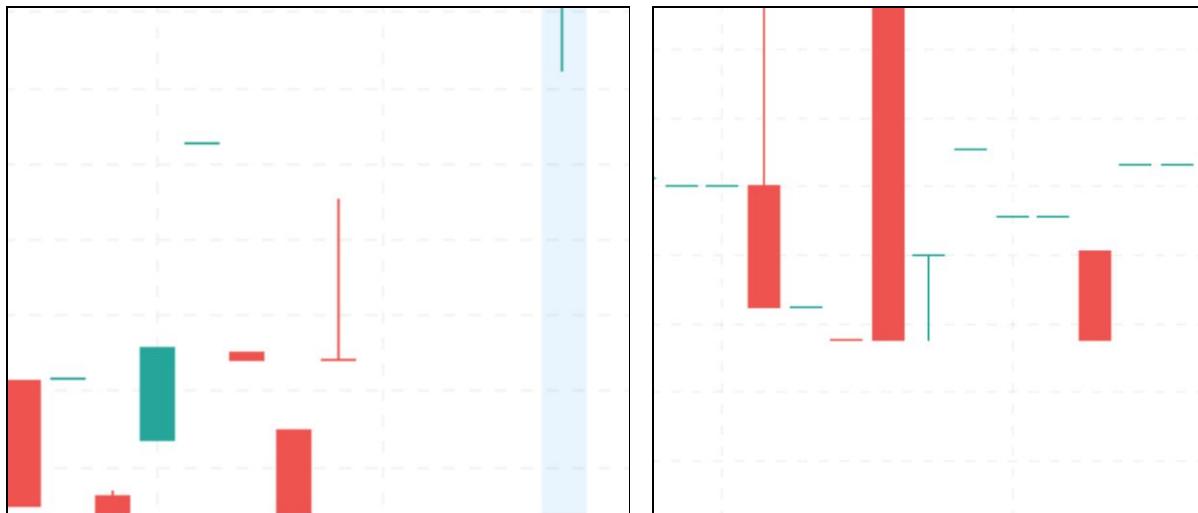
(tradingview.com) Figure 121: Triple Bottom #3^[119].



(tradingview.com) Figure 122: Double Top #3^[120]

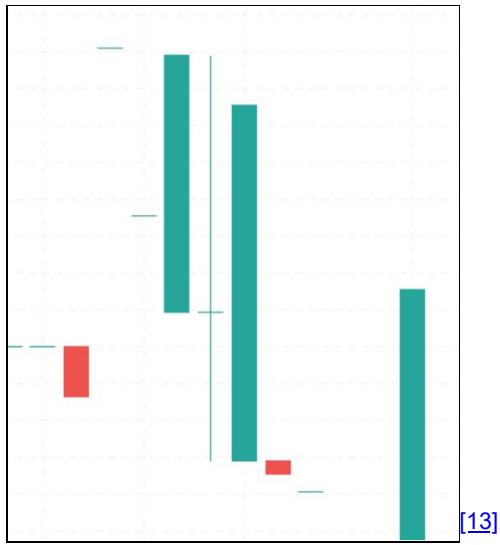
DOJI

Dojis are one-candle formations characterized by a small trading range and long shadows. Standard dojis and long-legged dojis have shadows of equal length, dragonfly dojis have long lower shadows, gravestone dojis have long upper shadows, and four-price dojis are one thin, horizontal line with no shadows. Dojis often signify reversals but are much better used in conjunction with other bars to form stronger indicators.



(tradingview.com) Figure 123: Gravestone Doji #3^[121]

(tradingview.com) Figure 124: Dragonfly Doji #3^[122]

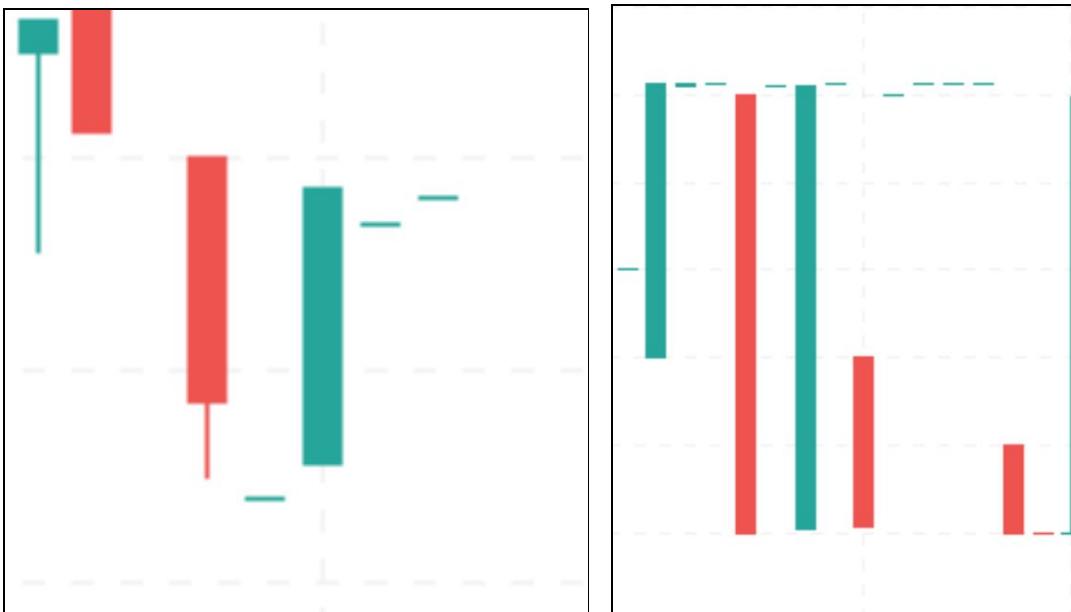


[13]

(tradingview.com) Figure 125: Long-Legged (Neutral) Doji^[123].

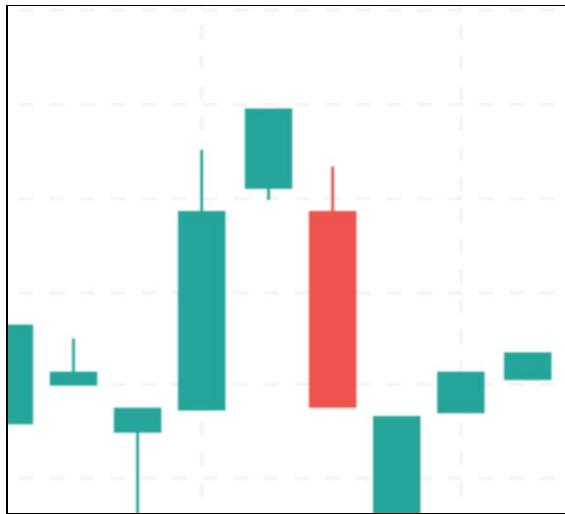
MORNING STAR/EVENING STAR

The morning star and evening star are three-bar patterns, morning being bullish and evening bearish. The morning star constitutes a short-bodied candle between a long red (left) and a long green (right). The evening star constitutes a long green (left), a short-bodied middle candle, and a long red (right). Morning stars happen at the bottom of a downtrend, while evening stars happen at the top of uptrends. Both indicate reversals.



(tradingview.com) Figure 126: Morning Star #2[\[124\]](#)

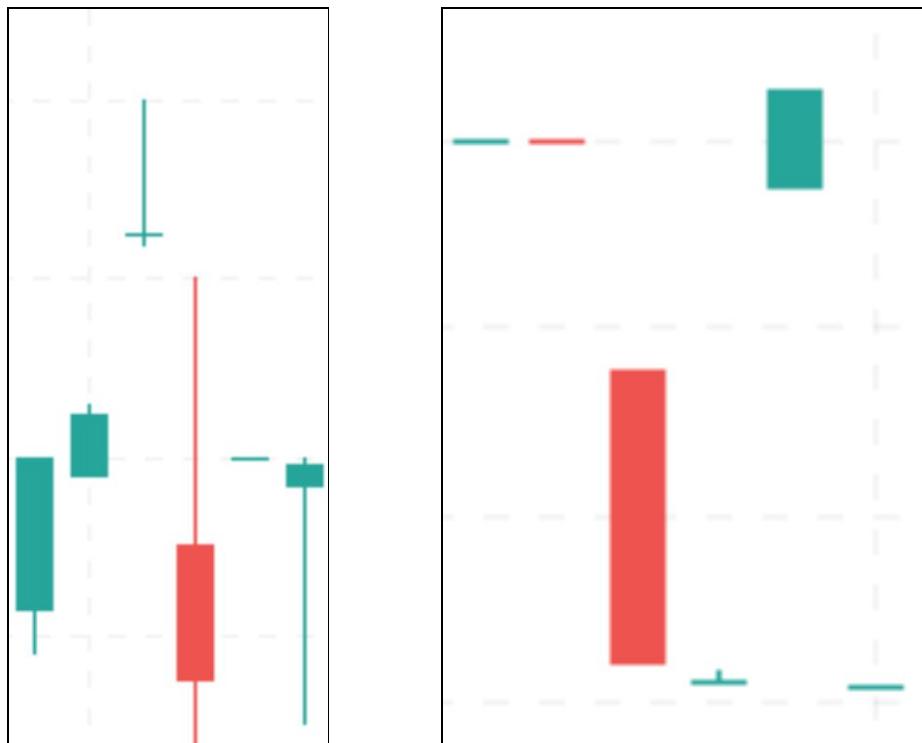
(tradingview.com) Figure 127: Morning Star #3[\[125\]](#)



(tradingview.com) Figure 128: Evening Star #3 [\[126\]](#)

ABANDONED BABY

An abandoned baby is a three-bar reversal pattern.^[14] The bullish pattern constitutes a large candle, a doji that gaps lower, and a third large green candle that gaps higher. The bearish equivalent constitutes a large green candle followed by a doji that gaps upwards and, finally, a large-bodied red candle that gaps downward. This formation is known to be apt at predicting short-term reversals.





(tradingview.com) Figure 129: Abandoned Baby [\[127\]](#)

(tradingview.com) Figure 130: Abandoned Baby #2 [\[128\]](#)

(tradingview.com) Figure 131: Abandoned Baby #3 [\[129\]](#)

TWO BLACK GAPPING

Two black gapping is a bearish continuation pattern that constitutes two red candles formed at the top of an uptrend, the second of which gaps below the first. This is indicative that the short-term trend will remain bearish. This formation is accurate roughly 70% of the time.



(tradingview.com) Figure 132: Two Black Gapping #3^[130]

(tradingview.com) Figure 133: Two Black Gapping #4^[131]



(tradingview.com) Figure 134: Two Black Gapping #5^[132]

INDICATORS

This section covers a few select indicators not covered in either the oscillator or the pattern section. Please consider the Fibonacci Indicators, Parabolic SAR and Bollinger Bands to be essential information, while the Ichimoku, Pitchforks, and Gann Indicators are supplementary and advanced material that should be further pursued (if interested) outside of this book, though introductions are included.

ICHIMOKU (KINKO HYO)/ICHIMOKU CLOUD

The Ichimoku is a popular tool that combines momentum, trend, support, and resistance into one indicator. While this indicator can seem intimidating, once understood the result can be a streamlined and efficient analysis tool. The five lines of the Ichimoku combine to form an “Ichimoku cloud,” which collapses information from all five lines into one easier-to-read formation. The five lines that form the Ichimoku cloud are also viewable while using the Ichimoku, hence providing the dexterity and multi-faceted approach trademarked by the Ichimoku.

Baseline - Tenkan-Sen

The Tenkan-Sen is a moving average that is typically represented as a red line. It indicates a general market trend (upwards, downwards, or sideways).

Conversion Line - Kijun-Sen

The Kijun-Sen acts as support and resistance and is typically represented by a blue line. The Kijun-Sen is similar to the Tenkan-Sen, except a longer time frame is applied. Hence, the Kijun usually lags the Tenkan.

Leading Span A - Senkou A

The Senkou A is the average of the highs and lows of the previous two lines [Tenkan-Sen and Kijun-Sen], and is typically represented as an orange line. If the price of the coin or token is above the value of the Senkou A, the top and bottom lines [of the five] become

support levels, while if the price moves below the Senkou span A, the bottom and top lines become resistance.

Leading Span B - Senkou B

Senkou span B is an expanded version of Senkou A. The difference between Senkou A and Senkou B is colored and creates the Ichimoku cloud; if the Senkou A is above the Senkou B, the cloud is green. If the Senkou A is below the Senkou B, the cloud is red.

Lagging Span - Chikou Span

The Chikou span shifts the current price 26 periods leftward and is represented as a green line. When the Chikou span crosses the price in an upwards direction, it indicates a buy signal, and a Chikou span cross below the price is a sell signal.

Ichimoku Signals

- When the Tenkan-Sen and Kijun-Sen are above the cloud , the trend is positive.
- When the Tenkan-Sen and Kijun-Sen are below the cloud, the trend is negative.
- A buy signal is reinforced when the Tenkan-Sen crosses above the Kijun-Sen while both lines and the price is above the cloud.
- A sell signal is reinforced when the Tenkan-Sen crosses below the Kijun-Sen when both lines and the price are above the cloud.

The Ichimoku Cloud is often paired with momentum indicators, such as the RSI and Stochastic oscillator.

BOLLINGER BANDS

Bollinger bands are a simple indicator known as a price envelope. Price envelopes are represented as a band around a price and identify range, support, and resistance. Through identifying range, traders can get an idea of whether prices are high or low on a relative basis. Bollinger bands are used in conjunction with a moving average, which is a line called the “middle band” that stays roughly within the upper and lower band. The closer the price hugs either the upper or lower band, the stronger the trend is, and the closer the price to the upper band, the more overbought the price, while the closer the price moves to the lower band, the more oversold the price. Since approximately 90% of price action occurs between the two bands, the resulting 10% of price action is likely to be indicative of major breakouts. Stop losses can be placed at the breakout price once the breakout is confirmed.

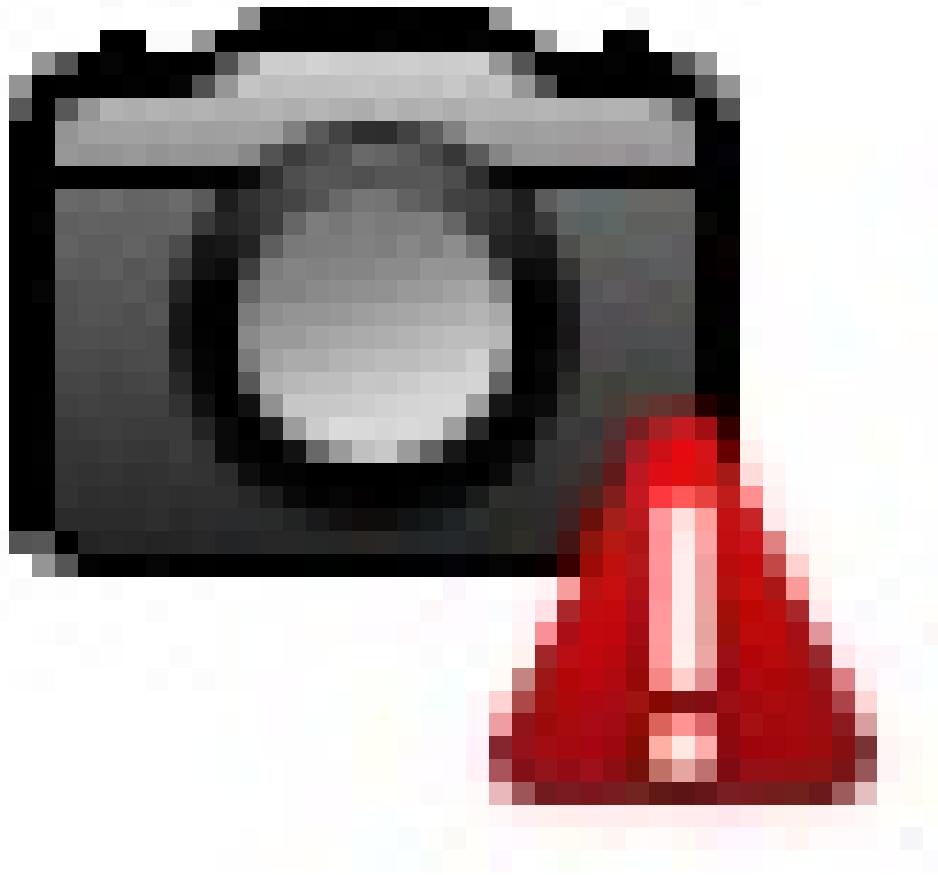


Figure 135: Bollinger Bands

BOLLINGER BAND WIDTH (BBW)

The Bollinger band width is the difference between the upper and lower bands divided by the middle band. The BBW is portrayed as one single line. Higher BBW values indicate a more overbought condition, while lower BBW values indicate a more oversold condition.

PARABOLIC SAR

The Parabolic SAR (stop and reverse) is an indicator created by J. Welles Wilder^[15] to determine trend direction and identify reversals. On a chart, this indicator appears as a series of dots. Dots below the price are bullish, while dots above the price are bearish. Dots that cross the price signal a trend reversal. Parabolic SARs work best during a strongly trending market, as opposed to a choppy or sideways-trading market. The Parabolic SAR is best used in combination with other indicators that aid in determining the strength of trends as opposed to the occurrence thereof.



[16]

Figure 136: Parabolic SAR



Figure 137: Parabolic SAR #2

[17]

GANN

William Delbert Gann (1878 – 1955) was a finance trader known for using time cycles, geometry, and other forms of mathematics to predict events in price action. Here are a few rules^[18] from W. D. Gann:^[19]

- Always use stop-loss orders.
- Reduce trading after your first loss; don't increase (this is also mentioned further on in the trading rules section).
- Don't buy or sell just because a price is low or high.
- Don't overtrade.
- Don't alter a position without a good reason.

GANN FAN

Gann angles are tools based upon the idea of the market being cyclical, and of time affecting price. Gann fans consist of lines that incorporate ratios to determine angles. The ratios are 1:8, 1:4, 1:3, 1:2, 1:1, 2:1, 3:1, 4:1, and 8:1. All base themselves off of a central 45-degree angle (meaning the 45-degree line is the 1:1). The 1:1 line is regarded as the main indicator of support and resistance and the other lines also serve as lesser support and resistance indicators. The 1:1 line should always be placed on the chart at a 45-degree angle. Below are the angles of all 9 Gann fan lines assuming the ratios prescribed above.

$1 \times 8 = 82.5$	$1 \times 4 = 75$	$1 \times 3 = 71.25$
---------------------	-------------------	----------------------

degrees	degrees	degrees
$1 \times 2 = 63.75$ degrees	$1 \times 1 = 45$ degrees	$2 \times 1 = 26.25$ degrees
$3 \times 1 = 18.75$ degrees	$4 \times 1 = 15$ degrees	$8 \times 1 = 7.5$ degrees

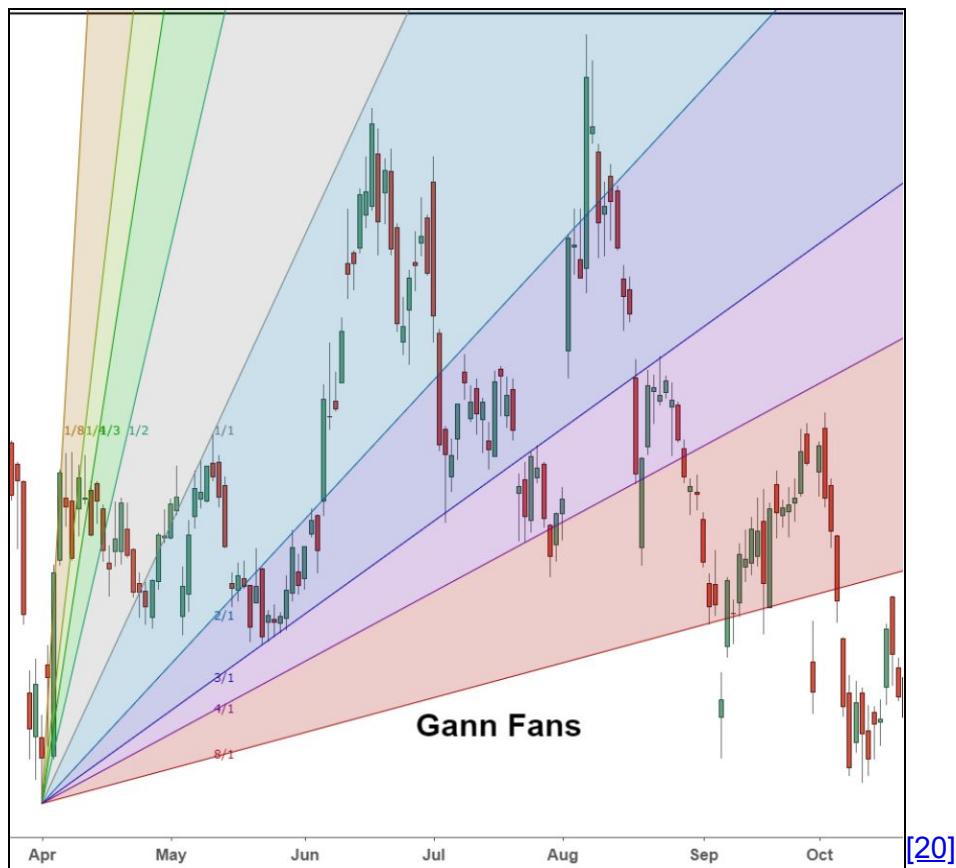
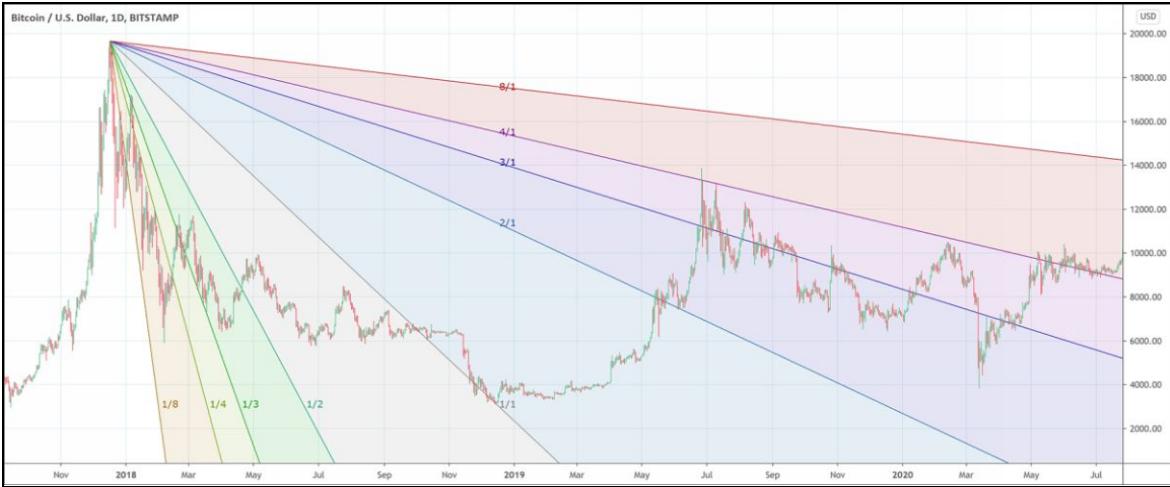


Figure 138: Gann Fan
Note the ratios.

[20]



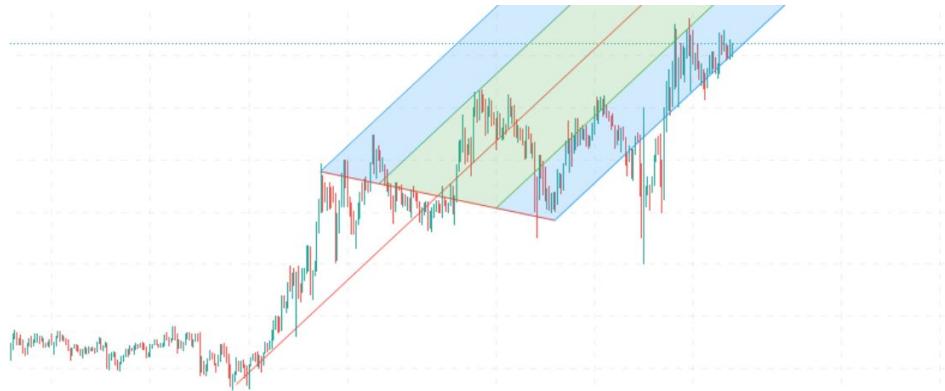
[21]

Figure 139: Gann Fan #2

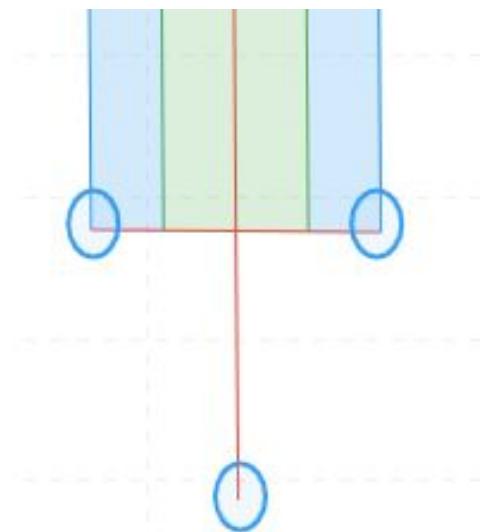
Note the plotted lines, especially the 4/1, forming support and resistance for price.

PITCHFORK

The standard pitchfork indicator, known as Andrews' Pitchfork, is a tool that allows for quick identification of support and resistance through trend channels. Pitchforks are created through three points on the chart, all of which are placed at the end of previous trends. Lines extend diagonally upward from the three points, forming a pitchfork pattern. This creates the “median line” and another two sets of lines above and below that median line. The below chart shows how the pitchfork lines act as support and resistance in the upper right portion of the chart. Pitchfork upper and lower line breakout should be confirmed through other indicators that can judge trend strength (and the likeness of a breakout) instead of just where that breakout should occur.



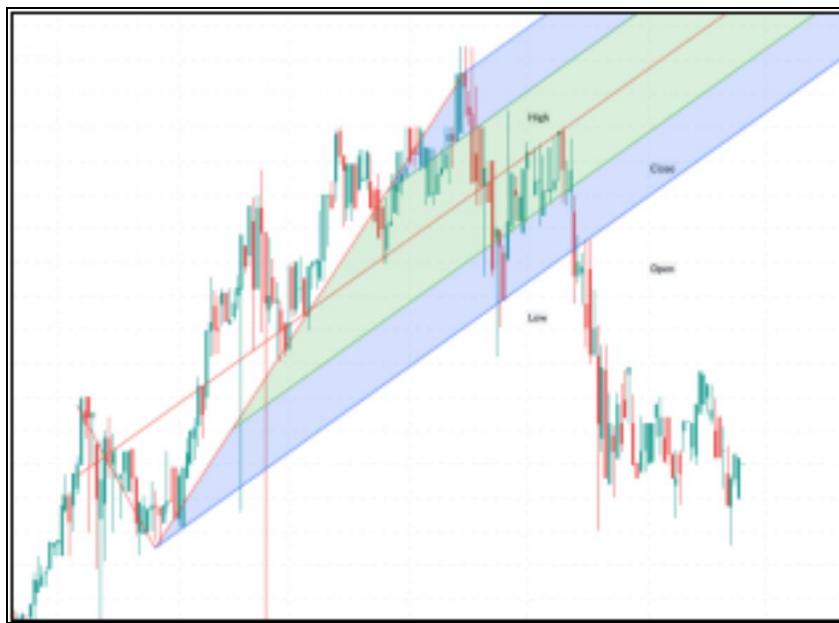
(tradingview.com) Figure 140: Andrews' Pitchfork (chart)



(tradingview.com) Figure 141: Andrew's Pitchfork (visual)

SCHIFF PITCHFORK

The Schiff Pitchfork is derived from Andrews' Pitchfork; the difference is in the location of the origin point, which is $\frac{1}{2}$ of the vertical distance between the high and low points.



(tradingview.com) Figure 142: Schiff Pitchfork [\[133\]](#)

FIBONACCI

You have likely heard of either the Fibonacci numbers, the golden spiral, or the Fibonacci sequence. Fibonacci numbers and tools fill a top spot in the indicator market and maintain a cult-like following. The Fibonacci sequence was invented by Leonardo of Pisa (1180–1250), an Italian who grew up in North Africa during the Middle Ages.

[22] His nickname was Fibonacci. He wrote a work called “Libre Abaci,” which roughly translates to “The Book of Calculation.” The book popularized the Hindu-Arabic arithmetic system relative to the old Roman numeral system. Within the book, the sequence of numbers that later became the Fibonacci sequence was used to calculate the growth of a rabbit population. [23] The question goes as this: how many pairs of rabbits will there be in one year, assuming that one initial pair of rabbits produces another pair of rabbits every month following a one-month infertility period? (Assuming each pair breeds indefinitely). The result is an equation that adds the sum of the two previous terms to get the next term:

$$F(n) = F(n) + F(n-1)$$

So, starting with 1 pair of rabbits, the following ensues:

1 + 0 =	0 + 1 =	1 + 1 = 2	1 + 2 = 3	2 + 3 = 5	5 + 3 = 8
1 [24]	1				
8 + 5 =	8 + 13 =	13 + 21 =	21 + 34 =	34 + 55 =	55 + 89 =
13	21	34	55	89	144

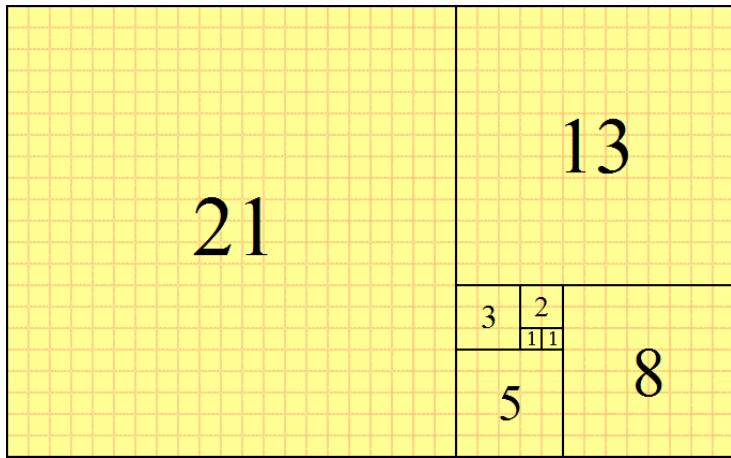


Figure 143: Golden Numbers

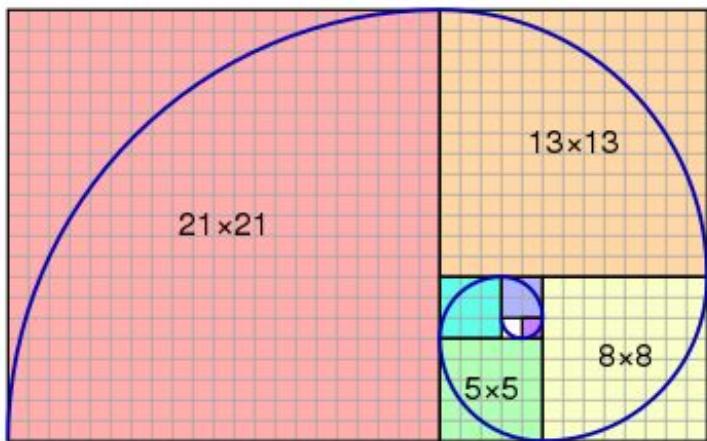


Figure 144: Fibonacci Spiral

The resulting sequence and the equation (the summing of the previous two terms) is called the Fibonacci sequence. The golden spiral, in turn, is derived from the Fibonacci sequence. Both the Fibonacci spiral and the golden numbers involve the “golden ratio” of 1.618. The Fibonacci sequence and the golden ratio have been found all over the natural world and prove to be a naturally occurring pattern, being found in pinecones, flowers, various fruits and vegetables, honeybee colonies, and even the human body.

Fibonacci numbers have since been found to hold sway in the stock market. All Fibonacci market-related tools involve a trendline (often multiple) drawn between two points and indicate support and resistance.

FIBONACCI RETRACEMENT

The Fibonacci retracement tool plots retracement lines as per the Fibonacci sequence. A retracement is a minor pullback or change in direction, so a retracement line is a line that indicates where support and resistance (hence, pullbacks and change in direction) are likely to occur. Fibonacci retracements are created by drawing a trend line between two points (typically a low and a high, or vice versa). Six horizontal lines are then automatically drawn at points that intersect the original trend line. These interception points occur at Fibonacci levels of 0.0%, 23.6%, 38.2%, 50%, 61.8%, and 100% (in fraction form: 0, 0.236, 0.382, 0.5, 0.618, and 1). These lines identify possible areas of support and resistance.



(tradingview.com) Figure 145: Fibonacci Retracement [134]

FIBONACCI FANS

Fibonacci fan lines are similar to the Fibonacci retracement. First, a trend line is drawn between two points (typically an extreme point—either a high or a low). Then, four trend lines are drawn from the initial point and pass through an invisible vertical line below the second extreme point at the Fibonacci percentage levels described previously.



(tradingview.com) Figure 146: Fibonacci Fans

FIBONACCI ARCS

Fibonacci arcs are half-circles that extend outward from a vertical line that extends from the second of the two extreme points. The arcs of the half-circle are drawn at points that interest the trend line at Fibonacci levels.



(tradingview.com) Figure 147: Fibonacci Arcs

Other Fibonacci Tools:

Fib Wedge - set of Fibonacci-based arcs.

Fib Channel - parallel Fibonacci-based trendlines.

Fib Circles - 11-layered Fibonacci-based circle.

Fib Time Zones - vertical lines that represent potential movement based on Fibonacci-based time increments.

MOVING AVERAGE (MA)

Moving averages are lagging indicators that signal support, resistance, and momentum through a singular, smoothed-out line calculated in accordance to a time frame. Hence, one may say “5-day MA” or “100-day MA.” Often, moving averages are used in pairs; in such cases, crossovers signal change in momentum (positive if the shorter-term MA crosses above the longer-term MA and negative if the shorter-term MA falls below the longer-term MA). Exponential moving averages (EMAs) are MAs that place greater importance on recent price action, hence creating a signal line that associates more closely with price.



Figure 148: Moving Averages [\[25\]](#)

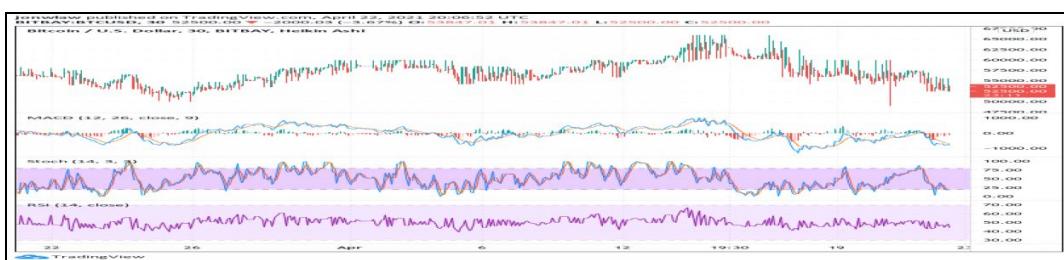
OSCILLATORS

Oscillators, to recap, construct an upper and lower limit and provide a number that fluctuates within these bounds. I'll quickly note that they're pronounced "awe-si-laters"—the c is silent. Typically, the high limit represents an overbought condition, while the low limit represents an oversold condition (limits are typically multiples of 10). Therefore, the higher the line, the more of a sell it is, and the lower the line, the more a buy it is. We will cover 15 oscillators , all of which are loosely ranked in order of popularity:

- Relative Strength Index (RSI)
- Moving Average Convergence Divergence (MACD)
- Stochastic Oscillator (SO)
- True Strength Index (TSI)
- Money Flow Index (MFI)
- Commodity Channel Index (CCI)
- Klinger Oscillator (KO)
- Percentage Price Oscillator (PPO)
- Percentage Volume Oscillator (PVO)
- Chaikin Oscillator (CO)
- SMI Ergodic Oscillator (SMIEO)
- Detrended Price Oscillator (DPO)
- Chande Momentum Oscillator (CMO)
- Ultimate Oscillator (UO)
- Awesome Oscillator (AO)

I ask you to make this an involved process. I chose only to show graphs of each oscillator, and not the graph the oscillator is based upon, to save space. However, it is a much better experience if you pull up free charts and experiment with each oscillator while simultaneously viewing the graph.

RELATIVE STRENGTH INDEX (RSI)



(tradingview.com) Figure 149: RSI Oscillator [\[135\]](#)

The RSI, originally developed by J. Welles Wilder Jr. in 1978, is a momentum oscillator that measures the strength or weakness of price trends. The RSI trades within a range of 0 to 100; a value over 70 indicates an overbought condition and suggests an incoming pullback, while a value under 30 indicates an oversold condition and suggests an upward reversal. To simplify: higher is bearish, while lower is bullish. In the chart below, the red circles indicate overbought conditions (and hence, sell signals), while the green circles indicate oversold conditions (buy signals).



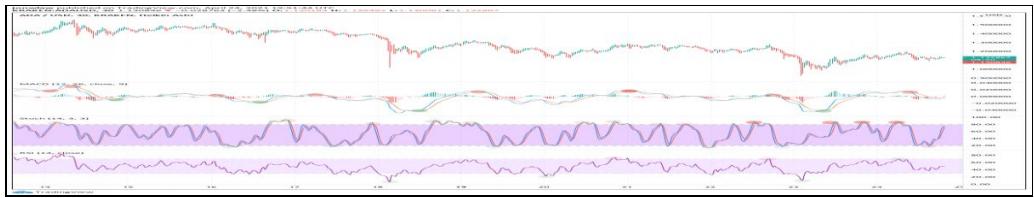
(tradingview.com) Figure 150: RSI Oscillator #2 [\[136\]](#)

MOVING AVERAGE CONVERGENCE DIVERGENCE (MACD)



(tradingview.com) Figure 151: MACD Oscillator^[137].

The MACD is a popular (if not the most popular) momentum oscillator used to identify price trends. MACD charts contain two lines (above, the blue and yellow line) and a histogram. The two lines are the MACD and a signal line. The MACD is found by subtracting the 26-day EMA from the 12-day EMA and the signal line is a 9-day EMA. Crossovers between these two lines indicate either a bearish move or a bullish move—bullish when the MACD crosses above the signal line, and bearish when the MACD passes below the signal line. MACD charts also display a histogram (which looks similar to volume, but it isn't). The histogram displays the distance between the MACD and the signal line. If the MACD is above the signal line (remember, a bullish move), the histogram is above baseline, as represented in green. If the MACD is below the signal line, the histogram is below baseline, in red. The height of the histogram indicates the strength or weakness of the trend and the probability of a reversal. The MACD is often combined with the RSI (directly above), which provides a more thorough look at overbought/oversold conditions and momentum. In the chart below, note the crossovers (bullish in green and bearish in red) and note how deviation on the histogram provides information on trend strength.



(tradingview.com) Figure 152: MACD Oscillator #2[\[138\]](#)

STOCHASTIC OSCILLATOR (SO)



(tradingview.com) Figure 153: Stochastic Oscillator [\[139\]](#).

The Stochastic Oscillator is another momentum indicator developed in the 1950s by George Lane that, like the RSI, oscillates within a range of 0 to 100. The SO generates information on overbought versus oversold conditions. Since it doesn't rely on price or volume, just speed and momentum, the stochastic is a leading indicator to predict trends and reversals before they happen. This works because changes in momentum often foreshadow trends before those trends happen. Similar to the RSI, the stochastic uses a range to indicate overbought and oversold conditions, which functions exactly the same as the 70/30 on the RSI but happens to be 80 and 20. Several variations of the stochastic oscillator are used: the fast stochastic, which is choppier and more volatile; the slow stochastic, which is smoothed with an SMA; and the full stochastic, as shown in the above and below visuals.



(tradingview.com) Figure 154: Stochastic Oscillator #2 [\[140\]](#).

TRUE STRENGTH INDEX (TSI)



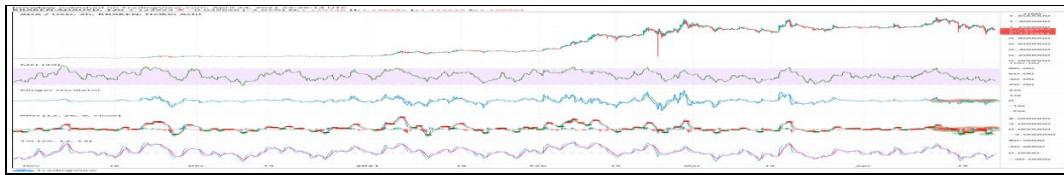
(tradingview.com) Figure 155: TSI Oscillator [141]

The True Strength Index is a momentum oscillator created in 1991 by William Blau. The TSI can be used to identify buying and selling pressure (meaning the same as overbought and oversold levels), as well as the strength and duration of trends. The TSI is based around a centerline (dotted). A positive value (anything above the centerline line) indicates positive momentum, while a negative value indicates negative momentum. The other two lines within the TSI graph are similar to the MACD; one is the signal line, and the other is the TSI indicator. When the TSI crosses under the signal line, it forecasts a bearish trend, while the TSI crossing over the signal line is bullish. So, crossovers are a great way to use the TSI, and another is to view the overbought and oversold levels, which vary by asset. You can determine these levels by looking to see what values (say, +30, +20, or +15) historically led to a pullback and vice versa. Divergence is also an important concept within the TSI. Divergence is the degree of separation between the price and the indicator. For example, divergence would be exemplified if the TSI drops heavily while the price moves upwards. A bullish divergence occurs when the price is dropping while the TSI is rising, and bearish divergence occurs when the price is rising while the TSI is dropping.



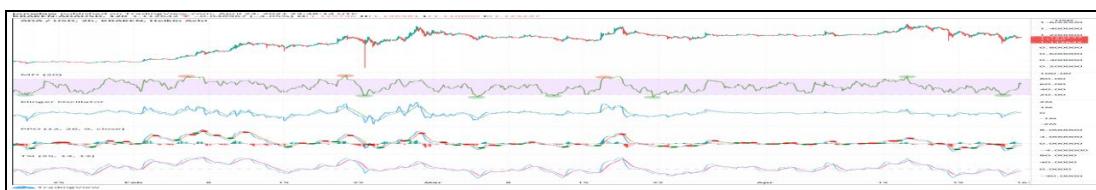
(tradingview.com) Figure 156: TSI Oscillator #2[\[142\]](#).

MONEY FLOW INDEX (MFI)



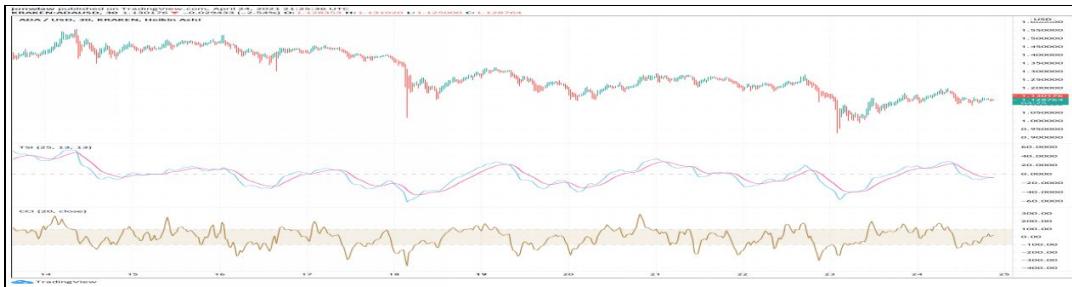
(tradingview.com) Figure 157: MFI Oscillator [\[143\]](#).

The Money Flow Index is a technical oscillator that measures overbought and oversold conditions through a combination of price and volume. The MFI may also be called the volume-weighted RSI because the two use the same base formula and differ only through the incorporation of volume. A value over 80 indicates an overbought price, while a value under 20 indicates an oversold price. To omit false signals, some traders prefer using an upper limit of 90 and a lower limit of 10. Price movement can also be predicted through divergence, as in the TSI (left). It's a bad sign if the price is moving up and the MFI is moving down, while if the price is moving down and the MFI is moving up, it is a good sign. The MFI is best used in combination with other momentum indicators, such as the RSI and TSI.



(tradingview.com) Figure 158: MFI Oscillator #2 [\[144\]](#).

COMMODITY CHANNEL INDEX (CCI)



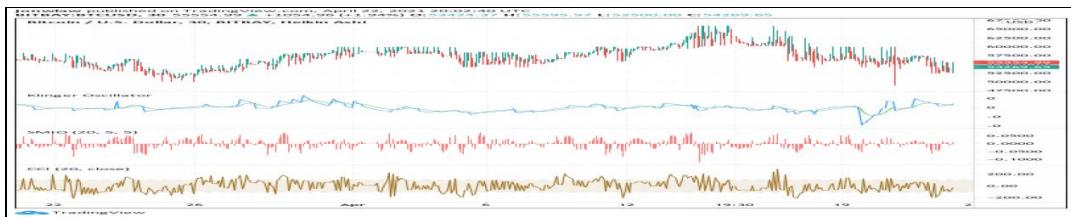
(tradingview.com) Figure 159: CCI Oscillator [\[145\]](#)

The CCI is a lagging momentum oscillator developed by Donald Lambert in 1980 to signal overbought and oversold levels by measuring the difference between current and historical prices. The CCI has no set limits (such as the “0” and “100” within the RSI) and is called an unbounded oscillator. For this reason, overbought/oversold conditions are identified and altered based only on historical data. Normally, these conditions are identified when outside a +100 or -100 range. So, a value over 100 indicates an overbought condition, while a value under -100 indicates an oversold condition. The CCI was originally intended to generate buy and sell signals when +100/-100 bounds were exceeded and then traded when the value peaked and reversals seemed imminent. Keep in mind that although it is generally accurate, it is a lagging indicator, so it may miss trends. The CCI is best used alongside trend lines and moving averages.



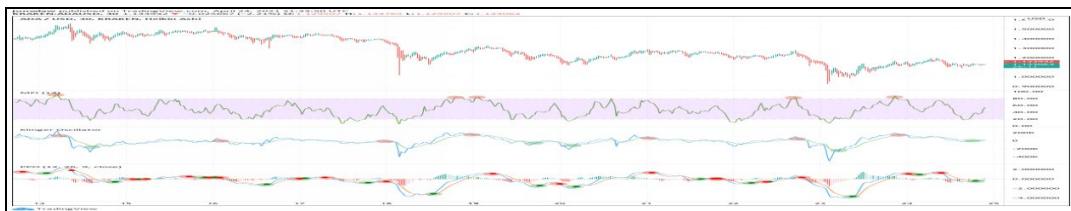
(tradingview.com) Figure 160: CCI Oscillator #2^[146]

KLINGER OSCILLATOR (KO)



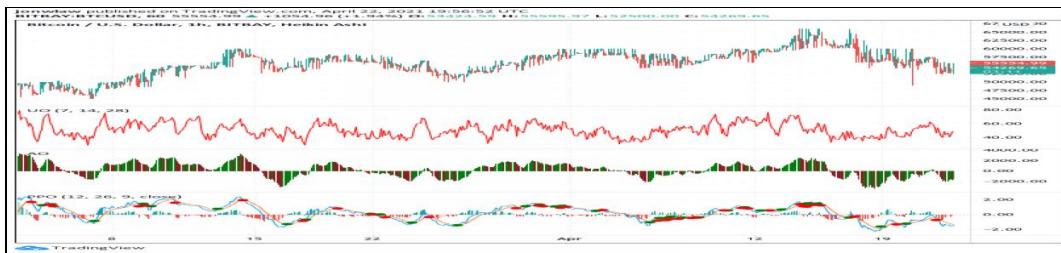
(tradingview.com) Figure 161: KO Oscillator [\[147\]](#).

The Klinger Oscillator is a simplistic volume indicator created by Stephen J. Klinger that specializes in identifying long-term money flow trends (while still remaining predictive of short-term moves). It works by comparing volume (volume force) to price movement (EMAs) and then simplifying the results into an oscillator that fluctuates below and above zero. The two lines, typically red and blue, can be used as signals either during centerline crosses (crossing zero) or crossovers. A crossover above the signal line is a bullish indicator, while a crossover below the signal line is a bearish indicator. Divergence should be noted; it is good if the Klinger is positive and the price is falling, while not good if vice versa. Given the many false signals it may incur, it is best combined (based upon Al Hill's research) with the stochastic oscillator, parabolic SAR, and/or two moving averages.



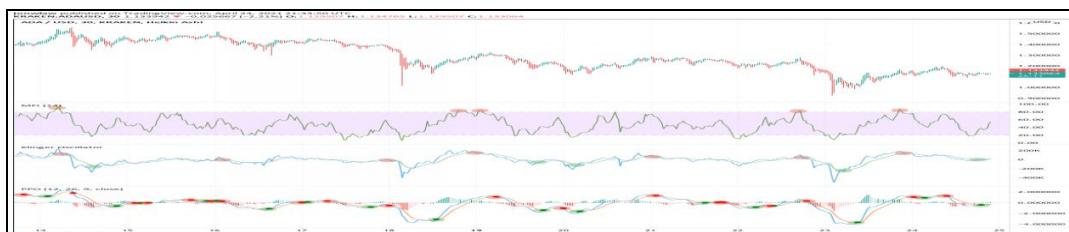
(tradingview.com) Figure 162: KO Oscillator #2 [\[26\]](#).

PERCENTAGE PRICE OSCILLATOR (PPO)



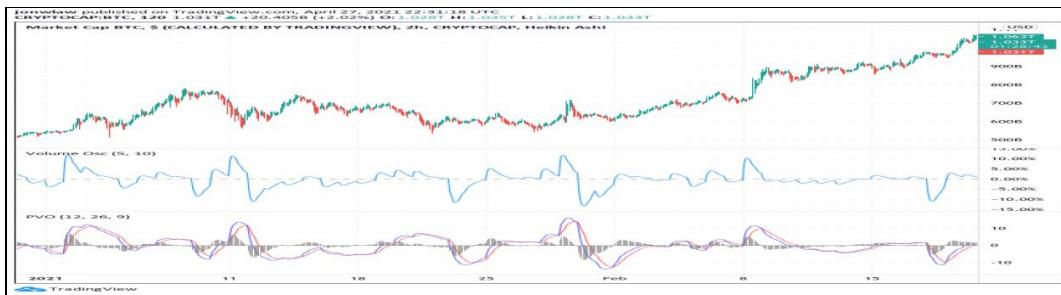
(tradingview.com) Figure 163: PPO Oscillator [\[148\]](#)

The PPO is a momentum indicator similar to the MACD, except the MACD measures the absolute difference between two EMAs, while the PPO measures the percentage difference. This renders the PPO comparable between multiple assets with different absolute prices, as opposed to the MACD. Like the MACD, the PPO generates buy signals through crossovers. When the PPO line crosses above the signal line, it is a buy, and when it crosses below the signal line, it is a sell. The two lines relative to the centerline are important; above zero is considered bullish, while below zero is considered bearish. The histogram displays divergence (the distance between the PPO and the signal line).



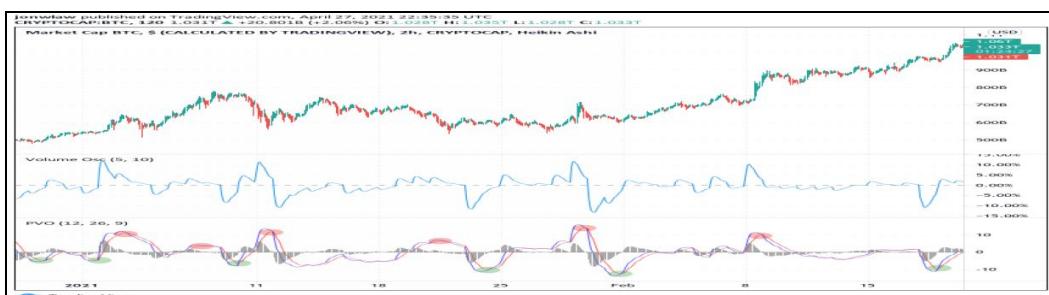
(tradingview.com) Figure 164: PPO Oscillator #2 [\[149\]](#)

PERCENTAGE VOLUME OSCILLATOR (PVO)



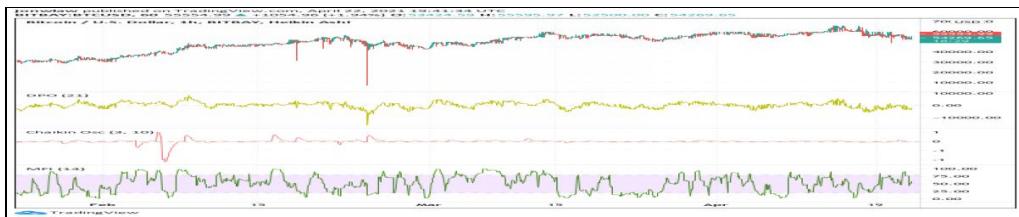
(tradingview.com) Figure 165: PVO Oscillator [\[150\]](#)

The PVO is a momentum oscillator; as with the MACD, the PVO is represented as a centerline, two lines (one, the PVO, and the second, the signal line), and a histogram. Crossovers between the signal line, which is a 9-day EMA of the PVO, and the PVO; which is a 12-day volume EMA (VEMA) subtracted from a 26-day VEMA divided by the longer VEMA period multiplied by 100, are used as confirming indicators to support breakout signals. Centerline crossovers indicate that, if above zero, volume is above average, and, if below zero, volume is below average. As with the MACD, the PVO's histogram represents divergence. The PVO is best used with one or multiple supporting indicator.



(tradingview.com) Figure 166: PVO Oscillator #2 [\[151\]](#)

CHAIKIN OSCILLATOR (CO)



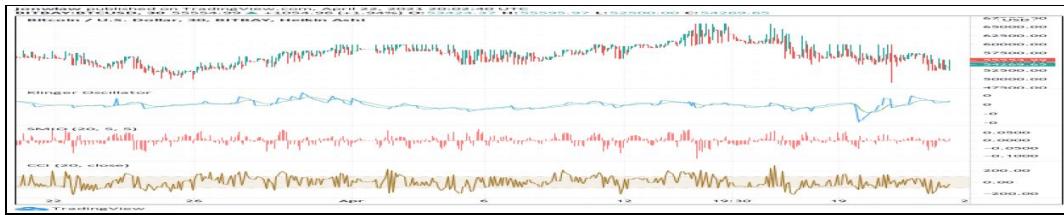
(tradingview.com) Figure 167: CO Oscillator [\[152\]](#)

The Chaikin Oscillator, created by Marc Chaikin (founder of Chaikin Analytics), measures the momentum of the accumulation-distribution line (the ADL is an indicator that measures underlying supply and demand) of the MACD. It is a leading indicator designed to predict momentum and price trends. The ADL is represented as the centerline in Chaikin graphs, and the value (the line) is found by subtracting 10-day and 3-day EMAs. Buy and sell signals are generated with centerline crossovers over the ADL (buy) and centerline crossovers under the ADL (sell). Additionally, positive divergence (meaning the oscillator is moving up while the price is moving down) signals an uptrend, and a rising price combined with a falling oscillator signals a downtrend. You may also trade according to a certain range (for example, $>0=\text{buy}$, $<0=\text{sell}$). The Chaikin Oscillator is best used in combination with the MACD or RSI.



(tradingview.com) Figure 168: CO Oscillator #2 [\[153\]](#)

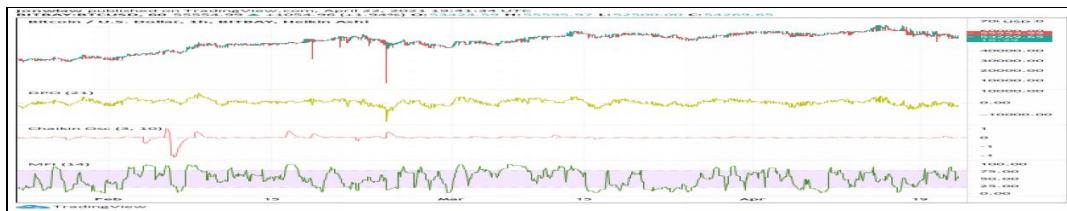
SMI ERGODIC OSCILLATOR (SMIEO)



(tradingview.com) Figure 169: SMIEO Oscillator [154].

The SMIEO is a little-known oscillator that plots the difference between the SMI Ergodic Indicator and the signal line as a histogram. In turn, the SMI Ergodic Indicator (SMIEI) is the same as the True Strength Index (TSI), except it includes a signal line from which crossover signals can be generated. Those crossover signals are then used to generate the SMIEO. As with most crossover strategies, a negative crossover (below centerline) is bad, and a positive crossover (above centerline) is good. So, applied to the histogram, the higher the value, the better, and the lower the value, the worse. It can be used as a confirming indicator (to determine the strength of trends) and is best used in conjunction with a leading indicator or oscillator, such as the RSI or the Stochastic Oscillator.

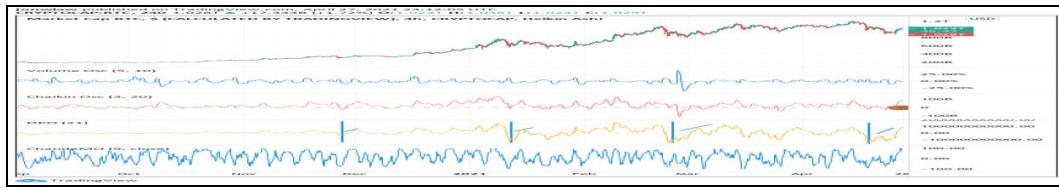
DETRENDED PRICE OSCILLATOR (DPO)



(tradingview.com) Figure 170: DPO Oscillator [155]

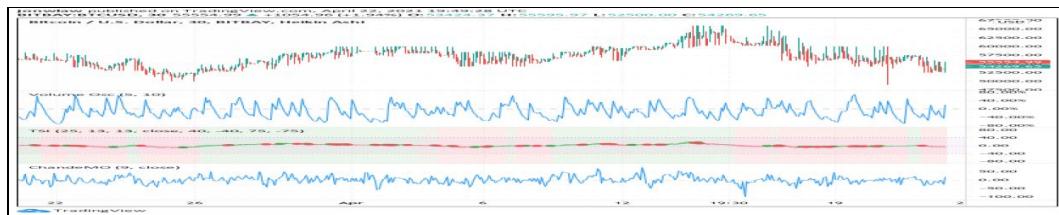
The DPO is a lagging price oscillator (just like the percentage price oscillator detailed above) that attempts to remove short-term trends from price in order to analyze longer-term cyclical patterns. Cycles can be identified by counting the number of periods (for example, 1 day, 1 month, etc.) between peaks or troughs. Peaks and troughs are simply high points and low points. This information can be traded upon because, for example, you may identify that new peaks (highs) are reached roughly every three months on a given price. It would then be easy to trade upon that information. In this way, identifying general cycles within the DPO can be very useful. It's best used in combination with other indicators.

*In this Bitcoin (BTC) chart, it can be seen that lows are hit roughly every two months, after which a quick pop resumes the overall uptrend. However, it should also be noted that the massive overall uptrend could not be predicted solely through the DPO. As the entire crypto industry settles and cyclical patterns emerge, indicators like these will become more prevalent.



(tradingview.com) Figure 171: DPO Oscillator #2^[156].

CHANDE MOMENTUM OSCILLATOR (CMO)



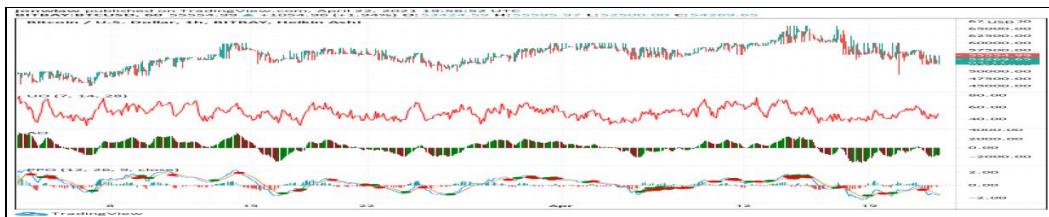
(tradingview.com) Figure 172: CMO Oscillator [\[157\]](#)

The Chande Momentum Oscillator (developed by Tushar Chande in 1994) uses momentum to identify price strength or lack thereof. The CMO operates within a -100 and +100 range; generally, any value over 50 is considered overbought, and values below 50 are considered oversold. Often, a 10-day or 12-day MA is added to the CMO as a signal line. Divergence is also important; a downtrending price is bullish if combined with an uptrending CMO and vice versa. The CMO should be used with confirming indicators.



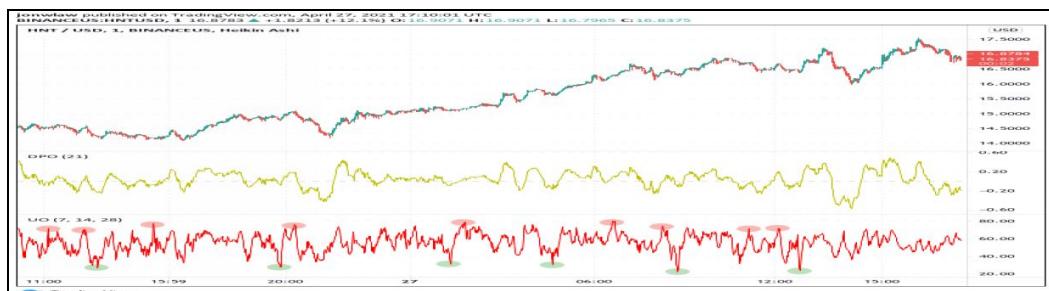
(tradingview.com) Figure 173: CMO Oscillator #2 [\[158\]](#)

ULTIMATE OSCILLATOR (UO)



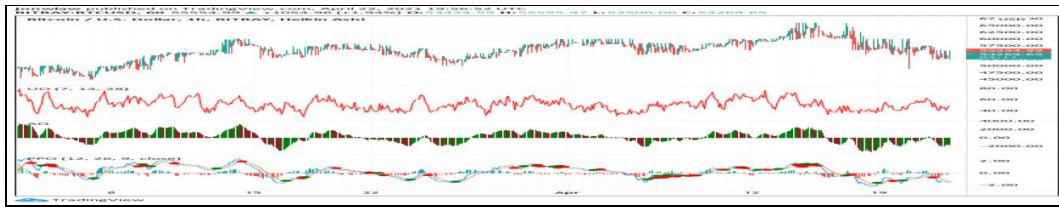
(tradingview.com) Figure 174: Ultimate Oscillator [\[159\]](#)

The Ultimate Oscillator, created by Larry Williams in 1976, aims to measure price momentum (buying & selling pressure) across three different periods (7-day, 14-day, and 28-day). The three periods are weighted and averaged, which results in a less volatile indicator and fewer false signals (as well as fewer signals overall). The UO operates within the same rules as the RSI: limits of 0 and 100, with under 30 indicating an oversold state, and over 70 indicating an overbought state. Williams suggests several steps to confirm a buy signal; while they won't be covered at this time, they are helpful in risk management and to definitively confirm signal. If you're interested, I suggest you search "Larry Williams three steps."



(tradingview.com) Figure 175: Ultimate Oscillator #2 [\[160\]](#)

AWEsome OSCILLATOR (AO)



(tradingview.com) Figure 176: Awesome Oscillator [\[161\]](#)

The Awesome Oscillator is a momentum indicator created by Bill Williams (not related to Larry Williams) that aims to determine whether bulls or bears are dominating a market or asset. The AO is plotted as a histogram and can most easily be used through observing centerline (also known as zero-line) crossovers. When the oscillator value is above zero, the bears are in control and vice versa. So, buy and sell signals can be generated whenever the centerline is crossed upwards (buy) or downwards (sell). Divergence in the AO is indicative of a reversal. Given the limitations and many false signals that the AO generates, it should be used alongside various other confirming indicators.



(tradingview.com) Figure 177: Awesome Oscillator #2 [\[162\]](#)

ESSENTIAL: OSCILLATORS

This section provides a recap of the top four most essential oscillators out of the fifteen above. All are popular and provide relatively accurate signals. That said, don't forget that many of the other charts on the list above do hold value; I suggest that you give all of them a try at some point throughout your trading activities.

RSI

The RSI (Relative Strength Index) is a momentum oscillator that measures the strength or weakness of price trends and, therefore, the likeness of reversals. RSIs trade within a range of 0 to 100: a value over 70 indicates an overbought condition (a sell), and a value under 30 indicates an oversold condition (a buy).



(tradingview.com) Figure 178: RSI Oscillator #3 [163].

MACD

The MACD is a momentum oscillator that identifies potential trend reversals through change in momentum. The MACD operates through the MACD line (found by subtracting the 26-day EMA from the 12-day EMA), the signal line (a 6-day EMA), and a histogram, which plots divergence. Crossovers between the two lines indicate a change in momentum; a bullish crossover is the MACD passing above the signal line, and a bearish crossover is a MACD cross below the signal line. The height of the histogram is indicative of momentum strength.



(tradingview.com) Figure 179: MACD Oscillator #3 [\[164\]](#)

STOCHASTIC

The Stochastic Oscillator is a leading momentum oscillator that aims to signal potential reversals and changes in momentum before they happen. The stochastic value is plotted between 0 and 100; above 80 indicates overbought conditions and under 20 indicates oversold conditions. The Stochastic Oscillator is known to be quite accurate.



(tradingview.com) Figure 180: Stochastic Oscillator #3 [165]

BUILDING A STRATEGY: REVISITED

This section concludes a look into on-the-ground cryptocurrency trading types, methodologies, patterns, charts, indicators, and oscillators. The last piece of the puzzle, namely, is fitting the pieces together, and this is done through an overarching investing strategy, beginning with infrastructure.

Investing infrastructure is the software that surrounds and powers an investor. The modern game is played online; and software helps you find potential investments, evaluate those investments, and make trades. Setting up an investing framework begins with choosing an exchange, the most popular of which (in the US) are Coinbase, eToro, Binance US, and Kraken. The most popular global exchanges are (respectively) Binance, Coinbase Exchange, Huobi Global, Kraken, and Bitfinex.^[27] Then, charting software is always useful, the most popular of which being TradingView. Following setup on these platforms, other useful software includes sentiment analyzers (santiment.net, etc.), calendar websites (coinmarketcal.com, etc.) bot software, market data websites (onchainfx.com, coinmarketcap.com, etc.), airdrop websites (airdrops.io, airdropalert.com), and bitcoinvisuals.com. With this software and more, you'll have the toolbox within which your tools and trading can flourish.

Once infrastructure is operational, the next step is to establish a set of rules. Here, we'll progress to the next section: investing and psychology.

INVESTING AND PYSCHOLOGY

Money is a very emotional experience. Money holds such sway over our lives, not to mention the world, and our relationship to money determines how we spend the most valuable currency of all; our time. 70% of married couples argue about money, 73% of Americans rank money as their number-one stress in life, and the average person spends one third of their life working for money.^[28] Statistics aside, consider your personal relationship with money.^[29] Money dictates how you spend your time and the things you can do, where you live, how you live, and so on. Most people judge others (judge implies negativity, it could better be said as “form opinions about” for better or worse), to some extent, on their relationship with money, and you likely compare yourself to others in regard to money all the time. While none of this is how things should be, it is how things are.

Since money is important to us, the loss or gain of money, for most, is a very emotional experience. Harvard researchers found that making good trades in the market affects the brain in the same way as cocaine.^[30] If you've been there, you can believe it! Beyond a base degree of natural emotions, money-related decisions are usually driven by family history, insecurity, fear, or greed, all accompanied by some degree of rationality. So, you should understand two things: psychology affects how *you* trade, and psychology affects how other people, and hence *the entire market*, moves. Bull markets and uptrends are based on greed, euphoria, optimism, and trust.^[166] Bear markets and downtrends are based on

anxiety, denial, fear, and panic. Beware of both sides of this: as we'll elaborate upon in the crypto trading rules section, nothing lasts forever, and thinking as rationally as possible in times of up and down is the best thing you can do. Here are a few things you can do to aid in rational thinking during emotional experiences.

WHEN TO STOP TRADING

Stop trading after three consecutive wins or losses. This can be a painful rule, but also an effective one. Three consecutive good trades incur an emotional high, while three losing trades in a row incurs emotional lows. Either way, these situations incur emotional states of mind and the ability to think rationally and make good decisions is largely impaired. So, at the very least, take a long break. The best thing to do is simply stop trading and resume the next day. Of course, as with all these rules, adjust it to fit your personality; if you're experienced and consistently profitable, you might move to 4. If you're just starting out or know yourself to be prone to emotional trading, move it down to 2.

HAVE A MANTRA

Having a few choice words to repeat to yourself can be a quick way to reach a confident and focused state of mind. While it is much better for you to choose something that's truly meaningful to you (as the kids says, "hits different"), here are a few mantras for inspiration:

- “I am calm, focused, and confident.”
- “Focus, focus, focus.”
- “Slow and steady wins the race.”
- “Discipline, patience, focus.”

- “Look at me now, mom.”

TAKE BREAKS

Take breaks. Take a walk, exercise, meditate, listen to music, or get some food. In some way (preferably out of the home) relax and unwind your mind.

ESTABLISH RULES

This, if anything, is the one habit I hope to impart to you from reading this list. Most of the other tips on this list are rules that should fit within your overall rule-based strategy.

TRADE SIZE

Don’t increase or decrease the money you’re putting into a position because “you’re feeling it.” Adjust positions based on risk; nothing else. As a rule, it is best not to change a standard amount of money put into trades unless it’s based on thought-out analysis. Have a conversation with yourself and ask why you want to make the investment you do. What’s it founded on?

TRADING JOURNAL

Many traders keep a log of all trades; they’ll write down entry and exit prices, the asset, and any notes or observations. This isn’t just an activity that benefits your trading; it is also fun and provides useful perspective in times of both up and down.

BIASES

Every trader has unconscious biases that influence decisions. If you think you're not subject to biases, you'd then be subject to the blind-spot bias. When it comes to understanding biases, awareness is everything because biases inherently alter awareness and skew perception away from the truth. So, I hope you won't fall victim to the blind-spot bias and will instead consider yourself and your own habits from an absolute viewpoint. I don't say this to be negative (and I can't say I haven't been a hypocrite with this) but rather to make you lots of money. If you want to do that and be a better trader (and perhaps an improved person, although I'm sure you're already spectacular!), go into these biases with a magnifying glass placed directly overhead.[\[31\]](#)

Definitions:

A *bias* is a prejudice against or for something.

A *fallacy* is a mistaken belief.

A *heuristic* technique is an approach to problem-solving that shortcuts to an incomplete solution.

INTUITION

Intuition may not fall directly into trading rules, but it does tie into risk mitigation, and rules are all about mitigating risk. Intuition, at its core, derives from subconsciously realized patterns. An experienced, long-time day trader might experience strong intuition based on patterns not consciously noticed. This, ultimately, is where the question of intuition must end. The more experienced you are, the better your intuition will become. While just starting out, "I'm feeling it" will probably lead to a big, red loss. Of course, the logical question is

then asking when you draw the line; is it one year, three years, or so on? I say take steps to test your intuition over time while mitigating risk. So, perhaps trade with 1/10th of your normal volume, or perhaps don't trade, but track whether you would have been right and adjust from there. Just make sure to recognize intuition as intuition and not greed or fear in disguise, and don't use intuition as an excuse for a bad decision. And no matter how much you're feeling it, sticking to your investing plan is nearly always the better option.

SUNK COST FALLACY

The sunk cost fallacy is the tendency to continue an action or endeavor because time, money, and effort have already been sunk into it (a “sunk” cost is a cost that cannot be recovered) regardless of whether the current or eventual costs will outweigh the benefit. This fallacy is exceedingly common; hanging onto expensive clothes you don’t wear, painting a room in a color you realize you don’t like but continuing regardless, investing money into a business that seems to be failing, or purchasing a ticket to an event that switches locations and requires severe inconveniences to attend. In the market, if you’ve lost money, this fallacy makes you likely to go at it again to try and make your money back, even if the odds aren’t in your favor. Beware of unconsciously making decisions because of the sunk cost fallacy.

SOCIAL PROOF

While social proof isn’t a bias, it should hold a place on this list because it can impact investors profoundly, as exemplified through “hype” coins or tokens. Social proof raises perceived value and

alters the perceived risk versus reward dynamic. While social proof does carry very real gains along with it and trend trading is quite literally based upon social proof and projects that “everyone’s talking about,” it should be taken into account that hype coins and tokens may not carry real, long-term utility and therefore may be perfect for a quick flip or short-term hold, but nothing more. At the end of the day, just do your research, don’t get caught up in the hype, and identify social sentiment (since “hype” is really just an extremely positive and widespread sentiment) as a variable to be considered in all investment decisions.

AVAILABILITY BIAS

The availability bias (or availability heuristic) distorts risk perception by relying on information that first comes to mind. One may then overestimate the importance of that data and skew decision-making as per that available information. For example, someone who saw a car crash on Monday is extremely likely to make conservative driving decisions for the next few days or weeks. Despite that, the risk of driving before and after Monday hadn’t changed; instead, all that changed is the availability of information about the dangers of driving. Within trading, this concept goes as follows: investment decisions can be skewed by the most available information, even if that information is not the most accurate. So, next time you’re making an investment decision, take some time to consider whether the information you’re trading upon takes the full puzzle into account, not just one piece. This bias also goes by the name of the overweighted familiarity bias, availability heuristic, recency bias, and frequency illusion bias.

MARTINGALE BIAS

This bias is interesting since the “martingale strategy” actually has a 100% chance of being profitable if one has enough money. Martingale strategies are so effective, given enough money, that casinos effectively banned them through the introduction of minimums and maximums. However, unfortunately, this doesn’t work in trading, and the Martingale bias is something not to do. Essentially, the strategy relies on “doubling down” on a losing investment. For example, say you have a 1% chance of winning a casino game. You’ll lose 99/100 times, but assuming you double your investment every single time, it is a mathematical certainty that you will eventually win and make back everything you lost and more because you’re always putting in double what you previously put in. The Martingale strategy has since expanded to refer to putting more money in a losing investment, with the hope that the investment rises in value and the purchases farther down the line make up for the loss of the initial buy-in. So, with that being said, the Martingale bias in our context refers to the heuristic of putting more and more money in falling investments. Sometimes, this can be good, assuming that the price will recover; you’d then simply have bought the dip. However, it is a slippery slope, and there must come a point where you may want to put more money in a downed investment, but you, rationally speaking, shouldn’t. Either way, I suggest that you make the decision of whether to invest in a deeply wounded coin or token with the Martingale bias in mind; this will give you the best chance of putting emotion to the side and dealing with the problem as it is—a game of probability.

HOT-HAND BIAS

The hot-hand bias is a cognitive fallacy in which a person who consecutively experiences a successful or unsuccessful outcome believes that such outcome is more likely to happen again. For example, an NBA shooter may have sunk several shots in a row. He now considers himself “on fire” and believes that he is more likely than not to make subsequent shots. Within examples such as that in which variables can be controlled, the hot-hand fallacy may not actually be a fallacy (due to the placebo effect, among other factors), but it very much is within the context of trading. So, whether you’ve had a string of wins or losses, you absolutely do not have a better chance of the given outcome continuing just because of the previous outcomes. I suggest above that one should stop trading after three consecutive winning trades or three consecutive losing trades in part due to this bias.

ANCHORING BIAS

Anchoring is the bias by which initial information affects the judgment of all subsequent information. For example, in a negotiation, say for an acquisition worth \$50 million, the offering party might come right out the gate with an offer of \$30 million. The sellers feel that they’re worth \$50 million, but whether they are or aren’t, the entire rest of the negotiation is based on the number “\$30 million.” Marketers use the anchoring bias all the time to affect the perception of a product or service, and it holds even more importance in the art of negotiation (check out the book *Never Split the Difference* by Chris Voss if you’re interested in learning more). While learning about a coin, token, or project for the first time, you’re likely to develop an anchor. You may read an article about how bad the coin is before you look into it, or form opinions about it just by the name and price. In those

ways and many more, you form a subconscious anchor that affects all subsequent decisions. Keep this in mind during initial impressions and remember that sticking to a strategy (for example, trading upon certain metrics), in large part, renders the anchoring bias a non-issue.

CONFIRMATION BIAS

The confirmation bias is an inclination to find, interpret, and recall information in a way that supports or confirms prior beliefs. Basically, people are biased towards confirming that what they already believe is correct. Confirmation bias is the reason for many arguments, erroneous situations, and flawed decisions. This bias is used against us; within social media networks, algorithms provide content that serves our prior beliefs and hence mostly restricts perception to one viewpoint. This, in part, is why people are so polarized in the US on many issues; they're literally being force-fed one, and only one, perspective. Within trading, the confirmation bias affects research, which affects perception [of companies], which affects trading decisions. For example, you may love the juice shots of company X. When you research the company, you find that the business isn't actually doing so well, but to support your previous beliefs, you only search and read information about the positives of the business, while downplaying or making excuses for the negatives. In this way, emotional connection downplays rationality. Make sure to keep this in mind while researching investments and attempt to disregard prior beliefs as much as possible. This is especially important in technical analysis, where trades are based only on real data, and it is easy to see what you want to see in charts.

CONSERVATISM BIAS

The conservatism bias is the bias towards revising prior beliefs insufficiently when given new data. As an example, let's resume with the juice shots of Company X. You still really do love the juice, but

you manage to overcome the confirmation bias and look at the hard facts, which are that the company is overspending and is badly managed. Instead of moving from the belief that *this company is great* to *this company sucks as an investment*, the conversation bias would lead you towards “*this company is fine, they’ll do better one day.*” In this, instead of uprooting prior beliefs in favor of a directly contrasting belief, you change your position only slightly. Basically, you’re conservative in changing your ideas. You may make excuses or only focus on the most positive data. So, if you’re ever looking into a coin or token that you have preconceived notions about, whether for better or worse, recognize that, and do your best to find objective data and make objective decisions.

OUTCOME BIAS

Outcome biases occurs when decisions are based on previous outcomes without considering previous processes. This one is especially brutal in trading. For example, say you hear about a friend who made a 5,000% return on Dogecoin. You may then immediately invest in Dogecoin, not because you paid attention to how or why that 50x profit happened and whether the circumstances have presented themselves again, but because your friend made a crazy amount of money and you really, really want to also make a crazy amount of money. So, judge information based on the process that created it, not solely because of the outcome, and don’t get burned by “trust me, bro” tips.

ENDOWMENT EFFECT BIAS

This involves placing too much value on assets already owned and overweighting such assets relative to investments not owned. This can also consist of only trading in the industry you work in or the country you live in, despite the benefits of diversifying across multiple industries and global markets.

FRAMING BIAS

Framing biases compare relative data, as opposed to studying absolute data. For example, studying 10 bad companies will make one decent company look amazing, even if it is not actually that good in terms of absolute metrics.

LOSS AVERSION BIAS

An aversion to loss actually results in more loss; those who never sell at a loss get stuck in losing investments. This doesn't necessarily mean that you should cut losses; it just means that you consider your research and understand that sometimes selling at a loss is necessary.

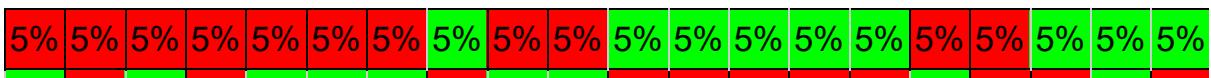
TRADING WITH PSYCHOLOGY IN MIND

This brings us to the end of the primary biases and fallacies in investing. I'll bet right now that, at some point, you'll do something described above, remember it, and hopefully make a better investment decision or general decision as a result. Even better, I hope that I've made clear the fickleness of the subconscious and imparted that establishing a strong strategy, cultivating self-awareness, and learning from experience are the best ways to combat fallacies, biases, and heuristics in trading. If you do this, you won't be fighting against yourself but rather be a collective, focused, and able force.

ALGORITHMIC TRADING

Algorithmic trading is the art of getting a computer to make money for you. Or, at least, that's the goal. Algo traders, as the slang goes, attempt to identify a set of rules that, if used as a foundation to trade upon, turn a profit. When these rules are chosen and triggered, the code will execute an order. For example, say you like trading with exponential moving average crossovers (EMAs). Whenever you see Bitcoin's 12-day EMA pass the 50-day EMA, you invest 0.01 Bitcoin. Then, you typically sell when you've made a 5% profit or, if it isn't working out, you cut your losses at 5%. It would be very easy to convert this preferred trading strategy into algorithmic trading rules. You'd code an algorithm that would track all the Bitcoin data, invest your 0.01 Bitcoin during your preferred EMA crossover, and then sell at either a 5% profit or a 5% loss. This algorithm would run for you while you sleep, while you eat, literally 24/7, or during any timeframe you wish. Since it only trades exactly as you set it, you're comfortable with the risk. Even if the algorithm works just 51 out of every 100 trades, you are turning a profit and could simply continue forever without putting in any time. Or you could consult more data and improve your algorithm to work 55 per 100 times or 70 per 100 times. Ten years later, you're now a multi-trillionaire making money every second of every day while you sip tropical juice on a sunny beach.

Sadly, it's not that easy, but that is the concept of algorithmic trading. The really nice hypothetical aspect of trading with a machine is that the income ceiling is practically limitless (or, at the very least, immensely scalable). Consider the chart on the next page. This is a visualization of an algorithm that trades 200 times per day if certain conditions are met. As in the above example, the algorithm will exit the position either at a 5% profit or a 5% loss. Let's assume that you give the algorithm \$10,000 to work with, and 100% of the portfolio is put into each trade. Red signifies an unprofitable trade (a 5% loss), and green signifies a good trade, a 5% gain.



5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
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5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Figure 181: Algorithmic Trading Imagery [\[167\]](#).

As per the chart, this algorithm is correct just 51% of the time. At this tiny majority, a \$10,000 investment would become \$11,025^[32] in just one day, \$186,791.86 in 30 days, and, after one full year of trading with your \$10,000, the result would be \$29,389,237,672,608,055,000. That's 29 quintillion dollars, which is roughly 783 times as much as the total value of every single US dollar in the world. Obviously, that wouldn't work. However, let's now assume that given the same rules, the algorithm makes a profitable trade just 50.1% of the time, which means 1 extra profitable trade out of every 1,000. After 1 year, this algorithm would turn \$10,000 into \$14,400. After 10 years, just under \$400,000, and after 50 years, \$835,437,561,881.32. That's 835 billion dollars.^[33]

This seems pretty easy. Just use historical data to test algorithms until you've found one that's at least 50.1% profitable, get \$10k, and your kids will be trillionaires. Sadly, this doesn't always work out, and here are some of the challenges facing algorithmic traders:

ALGORITHMIC TRADING CHALLENGES

#1: ERRORS

The most obvious challenge is that of an error-free algorithm. Many services today make the process much easier and don't require as much coding

experience. However, some still require some level of coding ability and the rest a degree of technical knowledge. As I'm sure you can imagine, any misstep in creating an algorithm can result in a game-over.^[34] That's why you probably shouldn't code it yourself unless you actually know how to code, in which case you should probably still consult a coder friend!

#2: UNPREDICTABLE DATA

Just as with technical analysis as a whole, the expectation that historical patterns are likely to repeat is the foundation on which algorithmic trading rests. Black-swan events^[35] and unpredictable factors, such as news, global crises, quarterly reports, and so on, all can throw an algorithm off and render a previous strategy unprofitable.

#3: LACK OF ADAPTABILITY

The challenge of unpredictable data is coupled with an inability to adapt to circumstances given new, contextual data. In this way, manual updates may be required. The solution to this problem is AI that learns, improves, and tests, but this is far from reality and, if it worked, probably wouldn't be all that good for the market since a few influential players could simply monetize it for their own use (given that it would be a literal money-printing machine) or share it with everyone, in which case the self-destruction challenge (below) applies.

#4: SLIPPAGE, VOLATILITY, AND FLASH CRASHES

Since algorithms play by set rules, they can be “tricked” through volatility and rendered unprofitable through slippage. For example, a small altcoin may jump several percent, whether up or down, in seconds. An algorithm might see the price hit the limit sell order and trigger liquidation, despite the price simply jumping back up to the previous price or higher.

#5: SELF-DESTRUCTION

In the hypothetical occurrence of an intelligent AI that can sort through all available data, identify the best possible trading algorithms, put them into practice, and adapt to circumstances, multiple such AIs would eradicate their

own trading strategies. For example, say 1 million of these AIs exist (really, many more people than this would use it if it became available for purchase). All of the AIs would immediately discover the best algorithm and start trading on it. If this happened, the resulting influx of volume would render the strategy useless. The same scenario does occur today, except without the AI. Really good trading strategies are likely to be discovered by multiple people, then used and shared until they no longer are profitable or as profitable as they once were. In this way, the best strategies and algorithms impede their own progress.

So, those are the challenges that prevent algorithmic trading from being the perfect, 4-hour workweek, tropical vacation-inducing, money-printing machine. That said, algorithms can certainly make money. Many large firms and companies base their business solely on profitable trading algorithms. So, while trading bots shouldn't be considered easy money, they should be regarded as a discipline to work on, as with any other business or interest. Here are some highlights of algorithmic trading and information on how you can get started.

BACKTESTING

Since algorithms take an input and react accordingly, algo traders can backtest algorithms against historical data. For example, going with the previous examples, if Trader X wants to make an algorithm that trades upon EMA crossovers, Trader X could test the algorithm by running it through every single year that the entire market has been in existence. The returns would then be plotted, and through split-testing, Trader X can come up with a formula that has been historically proven to work without ever actually having put money on the table. In this way, you can test your own algorithms and play around with different variables to see how they affect overall returns. To experiment with creating and using a trading algorithm, check out the websites on the next page.

Statistics			
	All trades	Long trades	Short trades
Initial capital	200000.00	200000.00	200000.00
Ending capital	212995.00	187455.00	225540.00
Net Profit	12995.00	-12545.00	25540.00
Net Profit %	6.50 %	-6.27 %	12.77 %
Exposure %	42.99 %	20.29 %	22.70 %
Net Risk Adjusted Return %	15.11 %	-30.92 %	56.25 %
Annual Return %	120.85 %	-55.75 %	353.86 %
Risk Adjusted Return %	281.12 %	-274.81 %	1558.61 %
Total transaction costs	2400.00	1200.00	1200.00
All trades	12	6 (50.00 %)	6 (50.00 %)
Avg. Profit/Loss	1082.02	-2090.83	4256.67
Avg. Profit/Loss %	0.13 %	-0.25 %	0.50 %
Avg. Bars Held	117.67	113.00	122.33
Winners	8 (66.67 %)	4 (33.33 %)	4 (33.33 %)
Total Profit	49820.00	9520.00	40300.00
Avg. Profit	6227.50	2380.00	10075.00
Avg. Profit %	0.73 %	0.28 %	1.17 %
Avg. Bars Held	145.50	128.00	163.00
Max. Consecutive	3	3	4 [36][168]

Figure 182: Backtesting Sheet

RISK CONTROL

Backtesting is a great way to mitigate risk. The best alternative is through use of stop-losses and trailing stop-losses. Both of these tools are elaborated upon in the risk management section.

SIMPLICITY

Many people have concepts of algorithm trading that necessitate complex, multi-layered code involving multiple, if not a dozen or more, indicators, patterns, and oscillators. Most (public) successful algorithms used by professionals and non-professionals alike are surprisingly un-complex. Most involve one indicator, or perhaps the combination of two. I suggest you follow this established route, but that said, if you do happen to discover an extremely complex and superior algorithm, I will be the first to sign up!

ALGORITHMIC TRADING RESOURCES

Trality - trality.com | No code, free backtesting.

Quant Connect - quantconnect.com | Great community.

SuperAlgos - superalgos.org | Open-source platform.

Napbots - napbots.com/ | No coding required.

Gunbot - gunbot.shop | Very customizable.

Shrimpy - shrimpy.io | Automated social trading.

CryptoHopper - cryptohopper.com | Provides education, good UI.

CryptoHero - cryptohero.ai | Automated, easy-to-run bots.

Wunderbit - trading.wunderbit.co/en | Copy other users.

Bitsgap - bitsgap.com | All-in-one platform, including bots.

3Commas - 3commas.io | A bit advanced, nice UI.

Pionex - pionex.com | Free trading bots.

Haasonline - haasonline.com | Use bots or build your own.

Hummingbot - hummingbot.io | Offers pre-built templates.

HIGH-FREQUENCY TRADING

It would be improper to write about algorithmic trading and fail to mention HFT, so I will take a moment to do it now. You've probably heard of high-frequency trading used in the stock market; it has a reputation as being bad for the little guys. However, it is very common, and the same HFT strategies proven to be profitable in the stock market are being transferred into crypto markets.

High-frequency trading is algorithmic trading on steroids. HFT utilizes computer programs to process an extreme number of orders, perhaps thousands, in fractions of seconds. High-frequency traders use volume to profit on very small differences in price. They might make a penny per transaction, but multiply that by millions of transactions, and you've got a pretty good profit.

HFT accounts for 50% of all stock trading volume in the US. That means that half of all stock trades are never even looked at by humans but rather executed by a computer in some warehouse. While HFT hasn't yet been rolled out to this extent to crypto markets, it is definitely something to look out for as a trend in the near future, or, arguably, something to take advantage of while the space remains relatively unsaturated.

CRYPTO TAXES

As the saying goes, we can't avoid taxes, and such an idea certainly applies to cryptocurrency (and especially short-term trading) despite the seemingly anonymous and unregulated nature of the industry. I suggest you visit the website of your tax-collection organization to learn more about cryptocurrency taxes in your country. That said, the following information places a spotlight on US-set rules.

- In 2014, the IRS declared that virtual currencies are property, not currency.
- If cryptocurrencies are received as payment for goods or services, the fair market value (in USD) must be taxed as income.
- If you hold a coin or token for more than a year, it's classified as long-term gain, and if you bought and sold it within a year, it's a short-term gain. Short-term gains are subject to higher taxes than long-term gains.
- Income from mining virtual currencies is regarded as self-employment income (assuming the given individual is not an employee) and is subject to self-employment tax as per the fair equivalent value of the digital currencies in USD. Up to \$3,000 of losses may be recognized.
- When digital currencies are sold, profits or losses are subject to capital gains tax (since the digital currencies are regarded as property) just as if a stock was sold.

CRYPTO TRADING RULES

These 5 rules, I'm glad to say, will save you both a lot of money and emotional trauma. As follows:

- Nothing lasts forever
- No woulda, shoulda, coulda
- Don't be emotional
- Diversify
- Prices don't matter

NOTHING LASTS FOREVER

Just in viewing this simple chart of Bitcoin over the past five years (this writing taking place in 2022), it is easy to see that no market condition has lasted for any significant period of time. Periods of bull runs are typically followed by sharp downtrends, while on a larger scale most cryptocurrencies that currently exist won't exist at scale by the end of the decade^[37]. Anyhow, no market condition is permanent, no asset will thrive permanently, and the state of global economic situations are highly variable. This just means that it's best to detach from short-term FOMO and JOMO and seek an understanding of both short-term and long-term cycles in assets and markets.^[38]



NO WOULDA, SHOULDA, COULDA

This rule is taken from a popular and legendary stock trader and host of the show *Mad Money*, Jim Cramer. The idea is represented through no woulda, no shoulda, and no coulda. In investment goes wrong (and plenty surely will), take a few minutes to think about how you can learn and improve. Following those few minutes, don't think about what you *would* have done, what you *should* have done, or what you *could* have done. Doing so allows room for reflection and improvement while simultaneously maintaining sanity. At the end of the day, you always could have done it better. Don't beat yourself up about losses, and don't let wins get to your head.

DON'T BE EMOTIONAL

Emotion is the antithesis of analysis-based trading. Emotion, more often than not ("not" simply due to the random occurrence of making a good decision through a bad process), will only hurt you and take away from your investing strategy. Some people are naturally comfortable with the risk and emotional rollercoaster of investing, especially in volatile assets; if you're not, it's best to adjust your investment strategy to fit the personality. While all that may seem a bit over the top, just wait until you enter into a risky position and try to go to sleep, or, worst of all, sell right before a week-long 300% pump. RIP.

DIVERSIFY

Diversification counters risk. While you both assume and are likely looking for a certain level of risk (due to risk and reward largely correlating) by investing in crypto, you are likely to have a certain level of risk that you're not comfortable with. Diversification helps you stay within that maximum load of risk. Generally, investors in the crypto space should keep a somewhat diversified portfolio, no matter how much belief may be held in a certain project. Fund allocation should (usually) be split between Bitcoin, Ethereum or ETH alternatives (such as Cardano and Solana) and various altcoins, along with some cash. While exact percentages vary depending on individual situation (35/25/30/10, 60/25/10/5, 20/20/40/20, etc.), investing in a diversified manner across various aspects of the cryptocurrency market is a sustainable way to invest, capture gains across the market, and lower the impact of mistakes. However, all that said, the crypto market is somewhat unprecedented. Some traders put most of their money into small-cap altcoins, while others dollar-cost average Bitcoin and touch nothing else. At the end of the day, establish a strategy that fits your situation, resources, and personality, and then diversify within the boundaries of that strategy.

PRICES DON'T MATTER

Given that supply and initial price can both be set, price itself is largely irrelevant without context. Just because Binance Coin is at \$500, and Ripple is at \$1.80 doesn't mean that XRP is worth 277x the value of BNB. Rather, the two coins are currently within 10% of each other's market cap. When a cryptocurrency is first created, supply is set by the team behind the asset. The team may choose to create 1 trillion coins, or 10 million. So, looking back at XRP and BNB, it can be seen that Ripple has roughly 45 billion coins in circulation, and Binance Coin has 150 million. In this way, price doesn't really matter. A coin at \$0.0003 can be worth more than a coin at \$10,000 in terms of market cap, circulating supply, volume, users, or utility. Price matters even less due to the advent of fractional shares, which lets investors invest any amount of money in a coin or token regardless of price. So, while price is still half of the market cap equation (price per unit x number of units = market cap), the second half of the equation can be set from the start. Plenty of other metrics should be considered before price, and absolute price should not factor in to investment decisions.

ACKNOWLEDGEMENTS

This concludes the non-reference portion of the book. Following is the resource section, which is outlined on the next page. I'll now take a moment to present some well-deserved acknowledgements.

Thanks to Jack Jacobs for introducing me to cryptocurrency. I'm indebted to Blake Martin, without whom I wouldn't have the same clarity, and to Cole Morgan and Henry Lin for unwavering support throughout the process and beyond, and further so to Ana Joldes, Jonas Perez, and Augusto Andres. Lastly, thanks to Ori Sherman, Hallie C, and NK. You're all awesome!

To an exciting future,

Jon Law & Alan John

RESOURCES

This section provides a compilation of various reference resources:

- Essential Dictionary
- Trading Dictionary
- Exchanges
- YouTube Channels
- Podcasts
- News Outlets
- Charting Services

CRYPTO ESSENTIAL DICTIONARY

A small dictionary (glossary, if you may) is included in this book to provide a solid foundation of knowledge (if needed), a source to refer to, and full comprehension of any topics previously discussed in this book. It is split into two sections: essential terms and trading terms. Essential terms are a few handpicked, important words that must be known in order to operate with confidence in the crypto space. It is brief, but worth spending a few minutes looking through. The second section, titled “crypto trading dictionary,” consists of important terms related to technical analysis, all other forms of crypto analysis, and trading as a whole. It can be used if any words previously used in this book aren’t understood or covered or to build a ground-up vocabulary. If any words were missed, not understood, or otherwise should be included, please contact me and suggest edits may be rolled into later editions.

ACCOUNT

An account is a pair of public and private keys from which you can control your funds. You typically view your account through an exchange, which provides an ideal trading interface. However, your funds are actually stored on the blockchain, not in your account.

ADDRESS

An address, also known as your public key, is a unique collection of numbers and letters that function as an identification code, comparable to a bank account number or an email address. With it, you can carry out transactions on the blockchain. Addresses have round, colorful "logos," that are called address identicons (or, simply, "icons"). These icons allow you to quickly see whether or not you input a correct address.

AIRDROP

An airdrop is a marketing tool used by new coins. The team behind a new coin or token will give users the ability to receive the asset for free, typically in exchange for a small task, such as following the company on social media or providing an email address. Airdrops are great for projects, since many new customers get excited about the coin and want to see it rise in value. It's also great for users, since they get the coin for free and can potentially make a lot of money. However, airdrop scams are common, and many new coins fail, so make sure to do your research to understand what new airdrops good, and what airdrops are aren't. Here are a few sites that provide information about new airdrops:

- aidrops.io
- airdropalert.com
- icomarks.com
- cocoricos.io

ALGORITHM

An algorithm consists of the mathematical rules that a code or software must follow. Many forms of algorithms are used across the internet, such as those used by social media services to decide which content gets how much exposure. Blockchains and cryptocurrencies use algorithms to perform a variety of tasks.

BITCOIN

Bitcoin was the first cryptocurrency. It was created in 2008 by an individual or group of individuals operating under the name of Satoshi Nakamoto.

CASH

In the world of crypto and investments, cash does not mean keeping literal cash, but rather money that is not invested and rather being held in a digital account.

CONFIRMED

Transaction confirmation refers to a transaction being confirmed, which means multiple peers in the network have validated the given

transaction. Once a transaction has been confirmed, it is permanently stored and viewable in the public ledger.

DAPP / DAOS

dApp is short for “decentralized application.” Basically, any app that runs on a blockchain (or any other peer-to-peer network) and does not have a centralized owner is considered a dApp. DAO is shorthand for decentralization autonomous organization and refers to any organization that is transparent, owned by a network of distributed participants, and run by programmed rules as opposed to a centralized structure.

DECRYPTION / ENCRYPTION

Encryption is the process of converting plain text into coded information through the use of a cipher. The opposite is decryption, which converts coded information into plain text. Decryption in crypto involves turning encrypted data back into plain text.

DIGITAL COMMODITY

A digital commodity is a digital asset that holds value. Digital commodities do not have to be digital currencies. NFT's, digital art, and anything else that holds value and exists online are digital commodities.

DIGITAL CURRENCY

Digital currencies lie within the realm of digital commodities. Instead of referring to all digital assets, digital currencies refer to all

currencies that operate solely online and do not have a physical form.

DIGITAL SIGNATURE

Your digital signature is used to confirm that online documents come from you. This is not equivalent to a physical signature. Instead, digital signatures are code generated by an algorithm.

DISTRIBUTED LEDGER

A distributed ledger is a ledger that is stored in many different locations so that transactions can be validated by multiple parties. Blockchain networks use distributed ledgers.

DOLPHIN / WHALES

Crypto holders are classified through a few different animals. Those with extremely large holdings are called whales, while those with moderately sized holdings are called dolphins.

DUMP

To dump, or dumping, refers to selling a large amount of cryptocurrency or a large amount of a coin or token being sold. For example, you might say "that coin is dumping," or "I'm dumping this coin."

ERC-20 / ERC-20 STANDARD

An ERC-20 is one of the many Ethereum token types. Remember, a token is a token because it is built upon another blockchain, while

coins are built on their own blockchains. ERC-20 is significant in the world of Ethereum tokens because it is used to define the rules by which all tokens on the Ethereum blockchain function. It can be likened to a security guard; it requires and ensures that all tokens in its vicinity follow that set of rules. The ERC-20 “standard” is the combined list of all the rules. Tokens using the ERC-20 standard can transact between each other and exchange in a more efficient manner.

ETHER

Ether is the native cryptocurrency of the Ethereum blockchain. Its ticker symbol is ETH, and to use any currency on the Ethereum blockchain you must pay fees in Ether.

EXCHANGE

A [cryptocurrency] exchange is a marketplace in which cryptocurrencies are traded. Exchanges must be combined with wallets. In wallets, coins can be held through addresses. Exchanges act as an easy intermediary to help users transact.

FIAT

Fiat refers to governmental currencies, such as the US dollar and Euros.

FINTECH

Fintech is short for financial technology. Fintech consists of any technology that supports and/or enables financial services.

Cryptocurrencies are fintechs, as well as companies such as GoFundMe and PayPal.

FORK / HARD FORK / SOFT FORK

A fork is the occurrence of a new blockchain being created from another blockchain. For example, Bitcoin Cash once forked off from Bitcoin. Forks occur when algorithms have a disagreement and split into two different versions. Two kinds of forks exist: A hard fork and a soft fork. A hard fork in a blockchain is a fork that occurs when all the nodes in the network upgrade to a newer version of the blockchain and leave the old version behind. Two paths are then created: the new version and the old version. A soft fork contrasts this by rendering the old network invalid; this results in just one blockchain, not the two that comes as a result of a hard fork.

FUNDAMENTAL ANALYSIS

Fundamental analysis is analysis of a coin or token through its fundamental metrics. Fundamental metrics looks at economic and financial activity to determine value.

GAS

Gas refers to the fee required to complete transactions on the Ethereum blockchain. Gas fees are given to the miners, who validate blocks and ensure secure networks.

GWEI

Gwei is the denomination (the price-per-unit) used in defining the cost of Etherium gas. You can think of Gwei and Etherium as similar

to the penny versus the dollar. 1 ETH equals one billion Gwei. Gwei is used instead of Etherium because seeing that gas fees are 1 Gwei is easier than seeing the fee as 0.0000000001 Ether. That said, gas fees are quite high as of 2022, and for this reason resorting to Ether denominations is currently more applicable, though this will not be the case forever.

HALVING

Halving is the process by which the reward for mining Bitcoin is cut in half. Bitcoin halving happens every 210,000 blocks, which roughly equates to every 4 years. Halving will happen until the maximum supply of Bitcoin has been reached and all 21 million coins are put into circulation.

HASH / HASH RATE

A hash is a function that converts one value into another; a hash in the crypto world converts an input of letters and numbers (a string) into an encrypted output of a fixed size. Basically, hashes help with encryption. “Solving” each hash requires working backwards to solve an extremely complex mathematical problem. The measure by which a computer is judged in terms of its ability to hash is called a hash rate. Put simply, the hash rate is the speed at which a node can perform hashing, and hashing is important in cryptography.

HOT WALLET / COLD WALLET

A hot wallet refers to a cryptocurrency wallet that is connected to the internet. The opposite, cold storage, refers to a wallet that is not connected to the internet. Hot wallets allow for the owner of an

account to easily send and receive tokens; however, cold storage is more secure than hot storage.

INITIAL COIN OFFERING (ICO)

In order to raise funds and awareness, the creators of a cryptocurrency often put an initial portion of their coin supply up for purchase.

INITIAL EXCHANGE OFFERING (IEO)

An IEO is similar to an ICO. Both are initial offerings of coins or tokens used solely within the crypto space. IEOs are coming into fashion as the improved version of ICOs because IEOs allow online crypto trading platforms to directly make the asset tradeable. Basically, IEOs require less effort to invest in and streamline the trading process of an initial offering.

KEYS

A key is a random string of characters used by algorithms to encrypt data. Two keys are used for cryptocurrency: a public key and a private key. Both are important to understand and are defined in depth below.

MINING

Mining is the process by which blocks are added to a blockchain through the solving of mathematical problems. Solving these problems takes an extremely large amount of computational power, hence, rewards are provided to those who do the work. People or

organizations who use their computational power to mine are known as “miners.”

NETWORK

A network, at its core, is an interconnected system. The system within a cryptocurrency network is made up of many nodes (devices) that assist a blockchain in a variety of tasks. So, a crypto network can be thought of as many different computers working together to run a blockchain.

NODE

A node is a computer connected to a blockchain’s network that assists the blockchain in writing and validating blocks. Some nodes download an entire history of their blockchain; these are called masternodes and perform more tasks than regular nodes. Additionally, nodes are not locked into a specific network. Rather, most nodes can switch to different blockchains practically at will, as is the case with multipool mining.

PEER-TO-PEER (P2P) / P2P NETWORKS

A peer-to-peer network involves many computers working with each other to complete tasks. Peer-to-peer networks do not require a central authority and are an integral part of blockchain networks.

PRIVATE KEY / PUBLIC KEY

Cryptocurrency users will utilize two keys: a public key and a private key. Both keys are strings of letters and numbers. Once a user initiates their first transaction, a pair of both a public key and a

private key is created. The public key is used to receive cryptocurrencies, while the private key allows the user to carry out transactions from their account. Both keys are stored in a crypto wallet.

PROTOCOL

A protocol is a system or procedure that controls how something should be done. Within cryptocurrency, protocols are governing layer of code. For example, a security protocol determines how security should be carried out, a blockchain protocol governs how blockchain acts and operates, and a Bitcoin protocol controls how the Bitcoin network functions.

PUMP / DUMP

A pump is a rapid upward price movement in a coin or token. A dump is a rapid downward price movement in a coin or token. “To the moon” refers to a massive pump.

RANK / RANKING

Cryptocurrencies are ranked by market cap. Within the ranking system, which may be thought of like a scoreboard, being in the top 10 is equivalent to a badge of honor. You’ll often hear people say, “I think this could be a top 10 coin,” and similar statements. Bitcoin has held the top spot since inception and is likely to hold that spot for at least another few years. Check out the coin rankings for yourself at any of the following sites:

- coinmarketcap.com
- coingecko.com

- cryptoslate.com

SATOSHI NAKAMOTO

Satoshi Nakamoto is the individual or possibly the group of individuals who created Bitcoin. Not much is known about this mysterious figure, and his anonymity has spawned countless conspiracy theories. While Nakamoto lists himself as a 45-year-old male from Japan on an official peer-to-peer foundations website, he uses British idioms in his emails. Additionally, the timestamps of his works better align with someone based in the US or the UK. Nakamoto currently holds a fortune worth more than \$50 billion through holdings of 1.1 million bitcoins.

SEED / SEED PHRASE

A seed phrase is interchangeable with a mnemonic phrase. Seed phrases are 12-to-24-word sequences that identify and represent a wallet. With it, you can never lose access to a connected account. If you forget it, there's no way to reset it or get it back. Anyone who has your seed phrase has full access to the connected wallet and cryptocurrency holdings.

SMART CONTRACTS

Smart contracts are an essential part of the cryptocurrency world. A smart contract is a self-executing contract run on code. The terms of the contract, as well as the execution, is directly written into the smart contract and therefore removes the issue of trust for all parties in the transaction. Transactions issued with smart contracts are irreversible and untraceable. These contracts can be used not just for managing cryptocurrency transactions, but also in voting

systems, various financial services, information storage, and throughout a multitude of other industries.

STABLECOIN

A stablecoin, similar to a pegged currency, is a coin or token that is designed to remain at the same price of a designated asset, typically a government-issued currency. For example, USDT and DAI are two popular stablecoins pegged to the US dollar, meaning that 1 USDT and 1 DAI will each exist in perpetuity as equal to 1 US dollar. Stablecoins experience practically no volatility, typically provide a few percent interest (APY) on holdings per year, and are generally a good place to store crypto holdings.

TECHNICAL ANALYSIS

Technical analysis is a type of analysis that looks at technical indicators in order to predict price movement. Technical analysts use historical data from charts to make their predictions.

TICKER / TICKER SYMBOL

A ticker is a sequence of letters that identifies a specific coin or token. All stocks, as well as cryptocurrencies, have ticker symbols. For example, Bitcoin is symbolized through BTC and Ethereum through ETH.

TOKEN

While cryptocurrency coins are built upon their own blockchain, cryptocurrency tokens are built upon a non-native blockchain. Many tokens use the Ethereum blockchain, and are thus referred to as

tokens, not coins. Token uses are represented under subcategories, the most essential of which are security tokens, platform tokens, utility tokens, and governance tokens. Understanding tokens is an integral part of understanding what exactly you're trading, as well as understanding all uses of digital currencies, and for those reasons we will take a brief look at the token types just mentioned.

- Security tokens represent legal ownership of an asset, whether digital or physical. The word “security” in security tokens doesn’t mean security as in being safe, but rather, “security” refers to any financial instrument that holds value and can be traded. Basically, security tokens represent an investment or asset.
- Utility tokens are built into an existing protocol and can access the services of that protocol. For example, utility tokens are commonly given to investors during an ICO. Then, later on, investors can use their utility tokens as a means of payment on the platform that provided the tokens. The macro definition to keep in mind is that utility tokens can do more than just serve as a means to buy or sell goods and services.
- Governance tokens are used to create and run voting systems for cryptocurrencies that enable functions such as system upgrades.
- Payment (transactional) tokens are used solely to pay for goods and services.

TRANSACTION

A transaction is any exchange between multiple parties. A cryptocurrency transaction involves one party buying a coin or token,

and another party selling that coin or token.

UNPERMISSIONED LEDGERS

Unpermissioned ledgers are ledgers that have no single owner. The purpose of such a ledger is to allow for all the benefits of decentralization.

WALLET

A wallet is the user interface that you use to manage your account(s). Holdings are not actually stored in wallets, which are accessible through a private and public key, but rather on a blockchain. Coinbase wallet and Exodus are common wallets.

CRYPTO TRADING DICTIONARY

BEAR FLAG / BULL FLAG

A bear flag is an indication on a coin or token chart that a downtrend is likely. A bull flag is the opposite of a bear flag and signals an uptrend.

BEAR TRAP / BULL TRAP

A bear trap refers to false downtrend signal. This is referred to as a “trap” because traders who take a bear trap as an indication of a downtrend may short the coin or token; hence losing money when the price actually increases. A bull trap is the opposite of a bear trap. Bear traps can sometimes be manipulated into existence. In such a case, a group of traders aims to quickly crash a cryptocurrency and then make a quick profit on the rebound. Those involved must own a sizable position of a given coin. Then, they all sell their positions at the same time, which bluffs the market into thinking a crash is occurring, which triggers more selling, causing stop losses to be hit and more selling to occur, leading to an even sharper fall. Those who set the trap proceed to buy back into their position at the lower price. Once the price rebounds, they make a profit.

BEAR / BEARISH / BULL / BULLISH

To be a bear means that you think the price of a coin, token, or the value of the market as a whole is going to go down. Investors who think like this are considered “bearish” on the given asset. The opposite is to be bullish: a person who thinks a rise in value will occur is bullish on that asset.

BUBBLE

A bubble in crypto and all investments refers to a time in which most of the market is going up, usually at an unsustainable rate. Often, bubbles will pop and trigger a large crash. For this reason, being in a bubble, whether referring to the or a specific coin or token, is not such a good thing.

BUY WALL

A buy wall occurs when a large limit order is placed to buy a cryptocurrency at a certain value. This "buy wall" can prevent the asset from falling below that value, since demand at that price far exceeds supply.

CONFLUENCE / CONFLUENCE TRADING

Confluence occurs when multiple strategies and indicators are combined into one strategy. Confluence trading is an extension of this; it refers to a trader who utilizes confluence in their trading strategy.

CORRECTION

A correction is a price movement downward after a quick jump or a peak in price. For example, a move from \$10 to \$25 may result in a correction to \$20, at which price support is found.

DEAD CAT BOUNCE

A dead cat bounce is a term that refers to a brief price recovery before a large crash.

DEPTH CHART

Depth charts graph buy and sell requests. The depth chart shows the crossover point at which transactions are quickly completed, which is the market price.

DUMP

To dump, or dumping, refers to selling a large amount of cryptocurrency or to a large amount of a coin or token being sold. For example, "that coin is dumping," and "I'm dumping this coin."

FILL OR KILL ORDER (FOK)

A fill or kill order is an order that must be executed upon immediately. If this doesn't happen, the trade will be canceled. FOK's are used to ensure that transactions involving large positions will be completed in a very short period.

FUNDAMENTAL ANALYSIS

Fundamental analysis is analysis of a coin or token through its fundamental metrics. Refer to the earlier section on fundamental analysis for a comprehensive overview.

GOLDEN CROSS

A golden cross is a chart pattern involving a short-term moving average (say, a 10-day MA) crossing above a long-term moving average (perhaps a 50-day MA). Golden crosses are bullish indicators.

LEVERAGE

Investors can “leverage” their money by taking on debt. Say you have \$1,000 and you take on 5x leverage; you’re now able to invest \$5,000 worth of funds. By that same function, 10x leverage is \$10,000 and 100x is \$100,000. Like margin trading, leverage allows amplified profits by, in a sense, renting money and pocketing the extra profit. However, leverage trading is very risky; unless you are an experienced trader and financial stable, leverage trading is not recommended.

LIMIT ORDER / BUY / SELL

When you mean to execute a trade, you may choose to have that trade executed in several different manners. One of such manners is through a market order, which executes orders immediately at the best market price available. The popular alternative is a limit order, which lets the buyer or seller choose the price at which they want to buy or sell. For example, say a coin is trading at \$200. If you choose to buy one coin with a market order, that order will immediately execute, perhaps at \$200, or perhaps at \$199 or \$201.^[39] If you place a limit order, you choose the price you want to purchase the one coin at. Maybe this coin is volatile, so you decide to place a limit buy order at \$197 in the hopes of the price spiking down to that level at some point throughout the day and before recovering and continuing in an uptrend. In this case, the order would only execute when the price of the coin hits \$197 or below. Generally, limit orders are good for catching the price slightly below the market value at the time of the order, though limit orders can be set at any price for various other reasons. If you’re placing and order and don’t really

care whether your purchase point is 2% lower or not (or whatever it may be), you can just set a market order and purchase the security instantly.

LONG / SHORT (POSITION)

Taking a long position means that an investor intends to hold an asset for the long-term; this generally means at least a few months. A short position is the opposite; the trader intends to get in and get out in a relatively short time period, whether minutes, hours, or days.

MARGIN TRADING

Margin trading is a popular strategy whereby traders borrow funds to place trades. For example, someone with \$10,000 may trade with 5x margin, giving them \$50,000 of capital. If the trade works out, they repay the \$50,000 (typically with interest or some type of fee) and keep the extra profit. Margin trading should only be performed by experienced investors—if trades go bad, many traders end up with more debt than money. So, the rewards are massive, but the risks are just as exceptional.

MARKET CAPITALIZATION (MARKET CAP)

The market cap of a coin is the total trading value. This can easily be calculated by multiplying the total supply of a coin by the price of the coin. For example, a cryptocurrency trading at \$5 with a supply of 1 million units has a market cap of \$5 million.

MARKET MOMENTUM

The momentum of a market is the ability of that market to maintain periods of growth or shrinkage. A market that has been in the green for six months has strong momentum, while the same can be said if that market plunges into bear territory and stays in the red for significant periods of time.

MARKET ORDER

A market order is one several types of orders that can be placed to execute a trade. Market orders are immediately filled at the best market price available. The opposite, limit orders, allows the buyer to choose the price they want their trade to be fulfilled at. While market orders may result in the purchase point being slightly higher than a smart limit order, they allow for quicker entry.

OVERSOLD / OVERBOUGHT

An oversold cryptocurrency experienced much more selling pressure than buying pressure. As a result, it has been sold to a price that is considered below its fundamental true value. Therefore, being oversold generally means that the security should rebound at least to its true value. Overbought is the opposite and occurs when a coin or token has been bought up to what may be considered an unjustifiably high price. Usually, if someone believes that a coin or token is oversold, they believe that it will go up, while if they believe it is overbought, they believe it will go down.

PUMP

A pump is a rapid upward price movement in a coin or token.

PUMP AND DUMP

A pump and dump is a scheme carried out by a large investor or, more typically, a group of large investors. In a pump and dump, the starting group will buy a significant amount of a coin or token. Other investors see the strong upwards pressure and buy in. Then, once the price has been significantly inflated, the original investors dump their shares and take profits. This practice is looked down upon since it is manipulative and causes most investors involved to lose money.

RESISTANCE

Resistance is a price that an asset struggles to break through in an upwards manner. Sometimes, levels of resistance can be physiological. For example, Bitcoin may hit resistance at \$100,000, since many people place sell orders at the nice, round, and pleasant-sounding price of \$100,000. When a resistance level is broken through, price can quickly climb. In a situation where bitcoin breaks past \$100,000 following a period of strong resistance, the price may quickly climb to \$105,000. Support is the opposite of resistance.

SELL WALL

A sell wall is a very large sell order at a limit price. Sell walls drive prices downwards. The opposite is a buy wall, which can stop a coin or token from falling beneath a certain price.

SLIPPAGE

Slippage can occur when a trade is placed through a market order. Market orders try to execute at the best possible price, but sometimes a notable difference occurs between the expected price

and actual price. For example, say you want to buy 20 BNB for \$1000, but you place a market order and only end up getting 9 BNB for \$1000. Slippage is rarely this drastic, but regularly varies in the 1-3% range. When placing large orders, it is usually better to place a limit order as opposed to a market order. This eliminates the danger of slippage.

SUPPORT

Support is the price at which an asset struggles to break through in a downward manner since many investors are willing to buy the asset at that price and therefore buying pressure far exceeds selling pressure. Often, if a coin hits support levels, it will reverse into an uptrend. Support level bounces are often good short-term buy opportunities, though if support levels are broken through in a downward manner, a sharp and extended fall is likely.

SWING / SWING TRADERS

A swing is a dramatic reversal in price. Swing traders try to catch and trade upon market and asset-specific swings.

TANK / TANKED

Refers to a price taking a massive dive, e.g., "it tanked from \$20 to \$10."

TECHNICAL ANALYSIS

Technical analysis looks at technical indicators to predict price movement. Technical analysts use historical data from charts to

make their predictions. Refer to the technical analysis section earlier in the book for an extended look into technical analysis and various charting strategies.

VOLATILITY

Volatility is the size of change in a coin or token, and therefore the ability and likelihood that a price will change rapidly, whether in a positive or negative direction. So, a coin that moves 10% up one day, 27% down the next day, and 22% up the third day is more volatile than a coin that moves up 2%, down 0.5%, and up another 1%. Some coins, specifically stablecoins, have very little volatility, while other coins or tokens, typically those with a relatively small market cap, are extremely volatile and move up and down rapidly.

WICKS / WHISKERS / SHADOWS

Whiskers are the lines extending from the colored bars on candlestick charts and refer to the low-high range of the given asset. Wicks, whiskers, and shadows are synonymous.

EXCHANGES

- Binance - binance.com (binance.us for US residents)
- Coinbase – coinbase.com
- Kraken – kraken.com
- Crypto – crypto.com
- Gemini – gemini.com
- eToro – etoro.com

YOUTUBE CHANNELS

□ Hasoshi

<https://www.youtube.com/c/Hashoshi4>

□ Digital Asset News

<https://www.youtube.com/c/DigitalAssetNewsDAN>

□ Benjamin Cowen

<https://www.youtube.com/channel/UCRvqjQPSeaWn-uEx-w0XOlg>

□ Coin Bureau

<https://www.youtube.com/c/CoinBureau>

□ DappUniversity

<https://www.youtube.com/c/DappUniversity>

□ Forflies

<https://www.youtube.com/c/Forflies>

□ DataDash

<https://www.youtube.com/c/DataDash>

□ The Crypto Lark

<https://www.youtube.com/c/TheCryptoLark>

- Crypto Jebb -
<https://www.youtube.com/channel/UCviqt5aaucA1jP3qFmorZLQ>

- Sheldon Evans
<https://www.youtube.com/c/SheldonEvansx>

- [BitBoy_Crypto](#)
https://www.youtube.com/channel/UCjemQfjaXAzA-95RKoy9n_g

- [Real-Crypto](#)
<https://www.youtube.com/channel/UC93MJYEjwCW3-9ipq09k7XQ>

- [Colin Talks Crypto](#)
https://www.youtube.com/channel/UCnqJ2HjWhm7MbhgFHLUE_NfQ

- MDX Crypto
<https://www.youtube.com/user/Beanfield123>

- Crypto Insight
https://www.youtube.com/channel/UCI2metlgoJpgBAFiKBDmVE_A

- The House of Crypto
<https://www.youtube.com/channel/UCojKnjrW3D5wT81MMm8I4EA>

- Crypto Mike
<https://www.youtube.com/channel/UCAOEOYGEhQNVT1ZNqp42e3g>
- Ivan on Tech
<https://www.youtube.com/user/Liljeqvistivan/videos>
- Suppoman
<https://www.youtube.com/user/Suppoman2011/videos>
- Crypt0
<https://www.youtube.com/user/obham001/videos>
- Anthony Pompliano
<https://www.youtube.com/channel/UCevXpeL8cNyAnww-NqJ4m2w>
- Aimstone
<https://www.youtube.com/channel/UC7S9sRXUBrtF0nKTvLY3fwg/about>
- Chico Crypto
<https://www.youtube.com/channel/UCHop-jpf-huVT1IYw79ymPw>
- Crypto Love
<https://www.youtube.com/channel/UCu7Sre5A1NMV8J3s2FhluC>

w/featured

- Lark Davis
https://www.youtube.com/channel/UCI2oCaw8hdR_kbqyqd2kIIA/about
- Boxmining
<https://www.youtube.com/channel/UCxODjeUwZHk3p-7TU-IsDOA>
- DataDash
<https://www.youtube.com/channel/UCCatR7nWbYrkVXdxXb4cGXw/videos>
- Altcoin Daily <https://www.youtube.com/channel/UCbLhGKVY-bJPcawebgtNfbw>

PODCASTS

- What Bitcoin Did by Peter McCormack (Bitcoin)
- Untold Stories (early stories)
- Unchained by Laura Shin (interviews)
- Baselayer by David Nage (discussions)
- The Breakdown by Nathaniel Whittemore (short)
- Crypto Campfire Podcast (relaxed)

- Ivan on Tech (updates)
- HASHR8 by Whit Gibbs (technical)
- Unqualified Opinions by Ryan Selkis (interviews)
- Crypto 101 (education)

NEWS OUTLETS

- CoinDesk – coindesk.com
- CoinTelegraph – cointelegraph.com
- TodayOnChain – todayonchain.com
- NewsBTC – newsbtc.com
- Bitcoin Magazine – bitcoinmagazine.com
- Crypto Slate – cryptoslate.com
- Bitcoin.com – news.bitcoin.com
- Blockonomi – blockonomi
- The Block – theblockcrypto.com
- Bitcoinist – bitcoinist.com

CHARTING SERVICES

- TradingView – tradingview.com
- CryptoView – cryptoview.com
- Altrady – Altrady.com
- Coinigy – Coinigry.com
- Coin Trader - CoinTrader.Pro
- CrytpoWatch – CryptoWat.ch

ALGORITHMIC TRADING RESOURCES

- *Trality* - trality.com | No code, free backtesting.
- *Quant Connect* - quantconnect.com | Great community.
- *SuperAlgos* - superalgos.org | Open-source platform.
- *Napbots* - <https://napbots.com/> | No coding required.
- *Gunbot* - gunbot.shop | Very customizable.
- *Shrimpy* - shrimpy.io | Automated social trading.
- *CryptoHopper* - cryptohopper.com | Provides education,
good UI.
- *CryptoHero* - cryptohero.ai | Automated, easy-to-run bots.
- *Wunderbit* - trading.wunderbit.co/en | Copy other users.
- *Bitsgap* - bitsgap.com | All-in-one platform, including bots.
- *3Commas* - 3commas.io | A bit advanced, nice UI.
- *Pionex* - pionex.com | Free trading bots.
- *Haasonline* - haasonline.com | Use bots or build your own.
- *Hummingbot* - hummingbot.io | Offers pre-built templates.

BOOKS

- *Mastering Bitcoin* – Andreas M. Antonopoulos
- *The Internet of Money* - Andreas M. Antonopoulos
- *The Bitcoin Standard* – Saifedean Ammous
- *The Age of Cryptocurrency* – Paul Vigna
- *Digital Gold* – Nathaniel Popper
- *Bitcoin Billionaires* – Ben Mezrich
- *The Basics of Bitcoins and Blockchains* – Antony Lewis
- *Blockchain Revolution* – Don Tapscott
- *Cryptoassets* - Chris Burniske and Jack Tatar
- *The Age of Cryptocurrency* - Paul Vigna and Michael J. Casey

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BONUS SECTION: BLOCKCHAIN

We've previously touched on the idea of the blockchain; it can simply be described as a new type of database, created in order to transfer cryptocurrency without a centralized middleman. You don't need to be an expert on everything blockchain, but every action you take in relation to anything crypto is most likely founded on blockchain networks. Therefore, we'll cover it in the most understandable way possible. The goal, at least initially, should be to understand the concepts at hand and be able to use the terms that surround blockchain.

BLOCKCHAIN IN THEORY: THE JEWELRY THIEF.

Imagine this: Two billionaires purchase \$100 million worth of valuable diamonds. Both take pride in their security, although their methods are very different. Billionaire #1 keeps his jewels in a vault in a location surrounded by security cameras, guards, and blast-proof walls. Billionaire #2 moves her jewels constantly to new locations based on a randomized system; any location the jewels end up belongs to other people in far-off places. The people holding the jewels, not her, nor anyone knows where the jewels are at any given time; to access them she must use a backup code that only she knows. Even if the jewels were found, they're protected by mathematical equations that are extremely difficult to solve; doing so would take years for even the brightest minds. Billionaire #1 soon discovers his jewels are missing. Why? Who knows? Maybe the security systems were hacked, maybe a guard or other insiders

helped the intruder gain access, maybe the intruder conned his way in, maybe the entire security force conspired against the billionaire to steal his jewels.

This, in essence, is centralization versus decentralization. While real-life examples are certainly prone to the unique situation and the mentioned example certainly isn't a realistic situation, the basis is sound. Centralization can be attacked from a variety of angles and is prone to human error and malevolence. Decentralization removes the opportunity for human error (assuming your seed phrase stays private. If you're hacked because someone used your seed phrase, that's a personal error, not an issue with the larger network. It's also quite easy to keep your seed phrase safe), and provides an entire network that relies on many different computers to keep data secure. Additionally, centralized financial services always reserve the right to stop providing their services to you and your money; hence, fees can be raised, companies can go under, databases can be hacked, etc. Decentralized networks rely on an algorithm; this algorithm cannot be changed once put into place and hence, so to speak, the rules of the game cannot be changed. The same cannot be said for centralization. That, in essence, is the core concept of blockchain; we shall now move on the practical, technical side of blockchains.

BLOCKCHAIN: BROKEN DOWN

Blockchain, in its most basic form, can be thought of as storing data in literal chains of blocks. Let's walk through how exactly blocks and chains come into play.

- Each block will store digital information, such as the time, date, amount, etc. of transactions.
- The block will also store who participated in a transaction by using your “digital key,” which is a string of numbers and letters that you receive every time you open a wallet.
- Blocks cannot operate on their own. Blocks need verification from other computers, aka “nodes” in the network.

Nodes

You will hear “node” and “nodes” thrown around all the time. In the crypto space, a node is a computer that connects to a cryptocurrency network. Bitcoin has tens of thousands of nodes, while other cryptocurrencies may have more or less.

- The other nodes will validate the information of one block. Once they validate the data, and if everything looks good, the block and the data it carries will be stored in the public ledger.
- The public ledger is a database that records every single approved transaction ever made on the network. For example, the Bitcoin blockchain has its own public ledger.
- Each block in the ledger is linked to the block that came before it and the block that came after it. Hence, the links the blocks form create a chain-like pattern and a blockchain is formed.

Summary: The **block** represents digital information, and the **chain** represents how that data is stored in the database.

So, to recap our earlier definition, blockchain is a new type of database. We now know what the block and the chain represent, but the last part of the equation only touched upon is the public ledger.

Blockchain is a DLT technology. DLT stands for Distributed Ledger Technology. DLT technology is revolutionary because it solves the issue of trust. For example, if someone runs a popular transactional network, how do we know that they won't just take some of the money for themselves? Or, if we keep our money with their network, how do we know they won't raise fees, shut our account down, or go bankrupt? Really, although it's unlikely, we don't. DLT technology solves this problem by being distributed. All participants (digital participants, meaning computers) in the network have a copy of the ledger, which records every single transaction, along with the amount and a timestamp. Here, I ask you to visit either of the following webpages:

<https://www.blockchain.com/btc/unconfirmed-transactions>

<https://etherscan.io/>

With these two links, you can explore the public ledger of Bitcoin and Ethereum. You'll be able to see the amount of the transaction, the time at which the transaction took place, and the two addresses

involved. Public ledgers and DLT technologies lie at the core of blockchain and allow cryptocurrencies to operate as they do.

BLOCKCHAIN: ORIGINS

- In 1991, a cryptographically secured chain of blocks was conceptualized for the first time.
- Nearly a decade later, in 2000, Stegan Knost published his theory on cryptography secured chains, as well as ideas for practical implementation.
- 8 years after that, Satoshi Nakamoto released a white paper (a white paper is a thorough report and guide) that established a model for a blockchain, and, in 2009 Nakamoto implemented the first blockchain, which was used as the public ledger for transactions made with the cryptocurrency he developed, called Bitcoin.
- Finally, in 2014, use cases (use cases are specific situations in which a product or service could potentially be used) for blockchain and blockchain networks were developed outside of cryptocurrency, hence opening up the possibilities of Bitcoin to the wider world.
-

BLOCKCHAIN Q&A

Q: Are there multiple types of blockchains?

A: Yes. There are four main types of blockchains: public, consortium, hybrid, and private. All are used in varying degrees; the single most

common are public blockchains. Anyone with a computer and an internet connection has access to a public blockchain.

Q: Is blockchain safe?

A: Yes. Blockchain is very secure, since each transaction must get approved by many separate nodes (nodes are computers in the network).

Q: How would you explain blockchain to a 5-year-old?

A: Blockchain is a tool that lets many different people safely pass around valuable information without giving someone else control.

Q: Have blockchain networks ever been hacked?

A: To hack a blockchain network, a 51% attack would need to be carried out (for a full definition, please refer to the definition section.) A 51% attack involves a group of attackers, called miners, having enough computers and raw processing power to essentially hijack the network by controlling the majority share needed to validate transactions. If this happens, they can use their control to alter transactions. This type of attack has never been successfully carried out and a blockchain network has yet to be hacked.

However, that said, the exchanges on which transactions are carried out, such as Coinbase, Binance, and Kraken, are much easier to hack. Hacks on exchanges have been successfully carried out many

times; in fact, in 2019, 12 crypto exchanges were hacked, and 510,000 user logins were stolen, along with \$292,665,886 worth of crypto. So, ironically enough, the core issue that blockchain fights against, centralization, is the very reason crypto attacks can and have happen.

Q: Can anyone start a blockchain?

A: Technically, yes. Anyone can start a blockchain and create their own coin, although it does take more than a bit of coding experience. Some websites even offer to do it for you, although such services are usually quite expensive. Here are a few sites that have offered this service:

<https://dev.cryptolife.net/>

<https://www.walletbuilders.com/>

IMAGE CREDIT

[1] We'll stick with this for the sake of simplicity. There are more than just these two, depending on your perspective.

[2] Inspiration for this visual from trading-education.com.

[3] Consider the following a generalized list of macro market volatility which excludes asset-specific risk and volatility.

[4] HODL is a common term used in crypto, which is a variation of the word "hold" and means the same. I include this to point out that in volatile markets, it's often better to hold for the long term than to make short-term buy or sell decisions.

[5] Photo credit: 1investing.in

[6] The different directions form either descending price channels, ascending price channels, or neutral (horizontal) price channels.

[7] The proper difference would be "converging versus parallel trend lines."

[8] Credit: forex.academy

[9] Credit to patternswizard.com

[10] Credit to patternswizard.com

[11] Credit to patternswizard.com

[12] Credit to avasaram.com

[13] *Four price dojis can be found in all three images.

[14] Yes, I also wonder why that specific name was chosen.

[15] Wilder also notably created the RSI (relative strength index).

[16] Original image.

[17] Original image.

[18] He also has some unconventional rules, including these:

- If the market rises for 5 consecutive days, it is likely that a correction will last for 3 days.

- In a highly uptrending market, weekly lows happen on Tuesday.

- In a strongly downtrending market, weekly highs are usually achieved on Wednesday.

[19] These rules were written specifically in regard to the stock market, but still hold relevancy to cryptocurrencies.

[20] Credit to Investopedia.com

[21] Credit to patternswizard.com

[22] His name, going by various primary sources, may also be Leonardo Fibonacci, Leonardo Bonacci, or Leonardo Pisano.

[23] Fibonacci himself didn't regard his calculations as important. Instead, in 1877, the mathematician Edouard Lucas published studies involving the sequence which he called "the Fibonacci Sequence" in honor of the original author.

[24] The initial pair of rabbits is infertile for the first month, hence the repeated 1.

[25] Credit to dailyfx.com

[26] Highlighted buying and selling signals are applied only for effect. The red and green dots on the chart already display the crossovers.

[27] Based on current market data from coinmarketcap.com. Liable to change.

[28] 1 - Money Magazine – 2014 Survey of Couples and Money
2 - CreditWise 2021 Survey

[29] "What Percentage of Your Life Will You Spend at Work ..." <https://revisesociology.com/2016/08/16/percentage-life-work/>.

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[31] Note: I recommend the book *You are Now Less Dumb* by David McRaney.

[32] Not just \$11,000 because, remember, the 5% profit is compounded into the next trade. \$10,000 at 5% is a \$500 profit, but then \$10,500 at 5% profit is \$11,025.

[33] Check these numbers out for yourself with Money Chimp's compound interest calculator:

http://www.moneychimp.com/calculator/compound_interest_calculator.htm

[34] Or, as would be a nice movie plot, an algorithm randomly turns out to be perfect and ends up earning all the money in the market, resulting in a depression and a global economic collapse!

[35] Black-swan events are any random or unknown factors coming into effect.

[36] Photo credit: marketcalls.in

[37] Most likely as the result of some filter event, just like the dot-com burst.

[38] Fear of Missing Out and Joy of Missing Out. On this note, I recommend Ray Dalio's *The Changing World Order* as a fantastic read on nation-state wide economic cycles.

[39] This is called slippage. Slippage may be as high as 2-3%.

[1] Created by Author

[2] Image credit: created through TradingView (tradingview.com)

[3] Image credit: created through TradingView (tradingview.com)

[4] Image credit: created through TradingView (tradingview.com)

[5] Image credit: created through TradingView (tradingview.com)
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[7]

[8] Image Credit: TradingView (tradingview.com)
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Iterate, improve, fall down and come back stronger. Plan while they play, build while they destroy.