

MONEY, MASTERED · THE ROADMAP

BOOK FIVE OF EIGHT

CANDLESTICKS · TRENDS · CHART PATTERNS · INDICATORS · RISK · HONESTY



READING THE PRICE CHART — HONESTLY

Technical Analysis

The other half of the picture: not the business, but the price itself. Candlesticks, trends, patterns and indicators — what each really means, the actual math behind them, and a frank account of what charts can and cannot do.

REAL CHARTS · REAL FORMULAS · FIVE PARTS · EIGHTEEN CHAPTERS · BUILDS
ON BOOKS 1-4

Technical Analysis. Book Five of *Money, Mastered — The Roadmap*. First Edition · 2026. It builds on Books 1–4 and assumes you know what a share, a market and a price chart are.

A note on the charts. The price charts in this book are *drawn* to illustrate each concept clearly — they are realistic teaching diagrams, not snapshots of any specific stock on any specific day. In them, an **up** candle (close above open) is shown dark and a **down** candle gold; your trading app will typically use green for up and red for down. Currency is shown as \$ as a stand-in for any currency.

Education, not advice — and an unusually important warning here. Technical analysis is widely *oversold*. This book teaches it properly *and* tells you the truth: it is a tool of probability, not prophecy, and the data on short-term trading is grim. Nothing here is investment advice, a trading system, or a promise of profit. No pattern or indicator predicts the future reliably.

Set in Fraunces, Spectral & Archivo. All charts & diagrams are original vector graphics; the book is self-contained and works offline.

READ THIS BEFORE YOU TRADE ON ANYTHING IN THIS BOOK

The large majority of active short-term traders lose money after costs — this is one of the most consistent findings in all of finance, and regulators worldwide repeat it. Technical analysis can sharpen *when* you act on a decision you already have good reason to make; it cannot turn chart-reading into a money machine. If anyone sells you “sure-shot” signals or a “guaranteed” system, they are taking your money, not making you rich. Treat this book as a way to understand price behaviour — and to protect yourself — not as a licence to gamble.

THE ROADMAP

Where This Book Sits

Book 4 judged the business. This one studies the price chart. Together they give you both lenses on a stock — what it's worth, and what its price is doing.

STAGE 1 · FOUNDATIONS

Book 1 · Money, From Zero DONE

Book 2 · Where to Put Your Money DONE

STAGE 2 · THE MARKETS

Book 3 · How the Market Works DONE

Book 4 · Fundamental Analysis DONE

Book 5 · Technical Analysis YOU ARE HERE

Book 6 · Funds, SIPs & Portfolios PUTTING IT TOGETHER

Book 7 · Derivatives, Tax, Psychology & Safety ADVANCED & PROTECTION

STAGE 3 · WEALTH

Book 8 · Building & Protecting Wealth THE LONG GAME

A caution before you start: most long-term investors (Books 1–2) can succeed without ever using technical analysis. This book is for understanding price behaviour and for those who choose to time entries carefully — always on top of, never instead of, sound judgement.

CONTENTS · BOOK FIVE

What's Inside

Forty-two chapters in ten parts, plus a Reader Paths preface and four reference appendices (Common Mistakes, Quick Reference, Charts Index). We build from how to read a chart, through candlesticks (with real charts of every major pattern) and chart patterns, to indicators (with the actual math), then risk management and an honest reckoning. From there, a wide tour of the deeper schools (Dow, Wyckoff, Elliott, Ichimoku) and the breadth-and-intermarket views that complete the picture; six historical case studies on the real S&P 500 chart; specialised techniques (harmonic patterns, volume/market profile, alternative chart types); and finally a practical part with a chapter on backtesting *properly*, a workbook of 60+ exercises with answers, and a complete Python companion with code for every indicator.

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WELCOME

How to Use This Book

Technical analysis is the most over-promised subject in all of investing — and one of the most misunderstood. This book does something rare: it teaches the craft properly, with real charts and real math, while telling you the honest truth about its limits.

If Book 4 asked “what is this business worth?”, this book asks a completely different question: “what is the price actually *doing*?” Technical analysis studies the chart — the footprints left by every buyer and seller — to read the mood of the market and to time decisions. Used with discipline and humility, it's a genuine skill. Sold as a crystal ball, it's a trap that has emptied countless accounts.

We'll build carefully. **Part I** teaches you to read any chart — trend, support and resistance, the grammar of price. **Part II** is the heart: candlesticks, with a real drawn chart of every major pattern. **Part III** covers the larger chart patterns. **Part IV** tackles indicators — moving averages, RSI, MACD, Bollinger Bands — and, unlike most books, actually shows you *the formulas and how to compute them*. **Part V** is where the real money is made or saved: risk management, and a brutally honest chapter on what trading is really like.

How each chapter is built

Every chapter opens with **what you'll learn**, unfolds in numbered **sub-chapters** with **real charts**, and closes with **Key Takeaways** and a **Self-Check**. Indicator chapters include **Worked Calculations** with the actual numbers. Watch for **In Plain Terms** explainers and frequent **Watch Out** warnings — there are more here than in any other book in the series, by design.

A chart shows you what has happened and hints at the mood of the crowd. It does not show you the future. Hold both halves of that sentence at once and you'll use this book well.

One last framing. Nothing in this book contradicts Books 1–4: the surest path to wealth remains owning good assets cheaply and patiently. Technical analysis is a *supplement* — a way to understand price behaviour and, for those who choose to, to time entries more carefully. It is never a substitute for sound investment judgement, and it is never a shortcut.



Let's begin honestly — with what technical analysis really is, and what it can and cannot do.

FRONT MATTER

Reader Paths — How to Read This Book by Goal

This is a long book — forty-five chapters, ten parts, and three reference appendices. You almost certainly do not need to read all of it. Different readers want different things; pick the path below that matches your goal, and the others can wait until you have a reason to come back.

The book is structured so that each chapter is largely self-contained — formulas re-stated, references back to earlier ideas marked, and the reference appendices (Glossary, Quick Reference, Common Mistakes, Charts Index) are designed to be consulted out of order. Use the paths below as a map. None of them is the “right” one; they reflect realistic reader-goals you can pick between.

▪ Path 1 — The Long-Term Investor (Recommended for most readers)

If your goal is to hold a diversified portfolio for years and you mostly want to know enough technical analysis to *not get fooled* by chart-based noise, read these chapters in order. About **50 pages of focused reading**.

1. **Ch 1** — what technical analysis is, and isn't.
2. **Ch 19** — Dow Theory: the framework for trend on multiple timescales.
3. **Ch 25** — Market Breadth & Sentiment: A/D line, VIX, contrarian extremes.
4. **Ch 26** — Intermarket Analysis & Sector Rotation: stocks/bonds/commodities/dollar regimes; the yield curve as recession indicator.
5. **Part VII (Ch 27-32)** — the historical case studies, especially 2008 (Ch 30) and 2022 (Ch 32) showing intermarket and breadth warnings working in real time.

6. **Ch 18** — the honest truth about active trading (the case for indexing instead).

You can comfortably skip Parts II, III, IV, VI, VIII, IX — they are mostly for active traders.

▪ **Path 2 — The Swing Trader**

If you intend to take individual stock positions holding days to weeks. About **140 pages**.

1. **Part I (Ch 1-4)** — foundations: TA philosophy, reading a chart, trend, support & resistance.
2. **Part II (Ch 5-8)** — candlesticks, ending with reading them in context.
3. **Part III (Ch 9-11)** — reversal patterns, continuation patterns, gaps & volume.
4. **Part IV (Ch 12-15)** — moving averages, RSI/MACD, Bollinger Bands & ATR, indicators wisely.
5. **Part V (Ch 16-18)** — building an approach, risk management, the honest truth.
6. **Ch 39** — a complete worked trade campaign, end to end.
7. **Ch 43** — the 25 common mistakes (re-read after every losing month).
8. **Ch 44** — the quick reference card, kept open while trading.

You can skip Part VI (Dow/Wyckoff/Elliott/Ichimoku) until you have time; skip Part X (specialised markets) unless you trade crypto or futures.

▪ **Path 3 — The Day Trader / Intraday Specialist**

If you intend to take positions opened and closed within a single session. About **180 pages** — but read **Chapter 18 (the honest truth)** twice before starting, and then read it again.

1. Everything in Path 2 (swing trader) above.
2. **Ch 20** — the Wyckoff method: reading the tape.
3. **Ch 24** — Point & Figure (filters out noise that destroys intraday analysis).
4. **Ch 34** — Volume Profile, Market Profile, and Order Flow (the institutional intraday toolkit).
5. **Ch 35** — alternative chart types (Heikin-Ashi, Renko, range bars).
6. **Ch 41** — futures-specific concepts (open interest, COT report — critical for intraday futures).

7. Ch 17, 39, 43 — risk management, the trade campaign, and the common mistakes. Re-read often.

The honest reality is that *most retail day traders lose money* — Chapter 18 has the evidence. If you proceed, the discipline of Chapter 17 and the mistakes of Chapter 43 are not optional.

▪ Path 4 — The Quant / Systematic Builder

If your goal is to build systematic strategies tested on historical data. About **100 pages** emphasising the math and code.

1. Ch 12-14 — moving averages, momentum, volatility (the math behind every system).
2. Ch 15 — using indicators wisely (why many are duplicates).
3. Ch 17 — risk management (Kelly-adjacent position-sizing math).
4. Ch 19 — Dow Theory (the conceptual basis of trend-following).
5. Ch 36 — backtesting done properly. The whole point.
6. Ch 38 — the Python companion: code for every indicator.
7. Ch 42 — statistical foundations: fat tails, autocorrelation, stationarity, non-stationarity, the realistic edges.
8. Ch 44 — the quick reference card (formulas to encode).

Skip the discretionary-judgement chapters (candle patterns, Elliott Wave, Wyckoff, harmonic patterns) unless you intend to encode them as rules — most of them resist clean encoding.

▪ Path 5 — The Crypto Trader

If your goal is to trade cryptocurrencies specifically. About **120 pages**.

1. Part I-II (Ch 1-8) — foundations and candles (transfer directly to crypto).
2. Ch 10-11 — continuation patterns and gaps (note: most "gap" theory doesn't apply to 24/7 markets — Ch 40 explains).

3. Ch 12-14 — moving averages, momentum, volatility (work the same; require ATR-based sizing in crypto's high-volatility environment).
4. Ch 16-18 — approach, risk, honest truth.
5. Ch 40 — Cryptocurrency & 24/7 Markets: what changes, on-chain analysis (the crypto-unique TA layer).
6. Ch 25 — sentiment and breadth (the Fear & Greed Index, funding rates, etc. are the crypto analogues).
7. Ch 17, 43, 44 — risk, common mistakes, quick reference.

▪ Path 6 — The Curious Polymath

If you just want to read a great book on technical analysis cover to cover, ignore the paths and read straight through. The chapters are ordered with that in mind — foundations build up, then the schools of thought, then the specialised techniques, then practice and code, then the case studies that bring everything together. Roughly **30 hours of focused reading**.

If you take only one chapter

Read **Chapter 17 — Risk Management — the Real Skill**. The single greatest determinant of outcomes for retail-scale technical analysis is not signal quality, it is risk management. Whatever else you read, internalise that one chapter — particularly the 1% rule and the prohibition on moving stops — and the rest of the book becomes optional reference material.

REFERENCE APPENDICES (CONSULTED OUT OF ORDER)

1. **Chapter 43** — the 25 common mistakes that ruin retail accounts.
2. **Chapter 44** — quick reference card; every formula and threshold in one place.
3. **Charts Index** — every figure with its instrument and date range, for verification.
4. **Glossary** — every term defined.
5. **Sources & Further Reading** — the canonical books to read next.

RECALL · THE SEVEN PRINCIPLES FROM BOOK 1

The mental models this book leans on most.

1

**Return
follows
risk**

· no
exceptions,
anywhere,
ever.

2

**Time
beats
timing**

· years
invested
>
markets
timed.

3

**Costs
compound**

· every
basis
point
against
you

over
decades.

4

**Diversification
buys
survival**

·
survival
>
maximisation.

5

**Price
and
value
are
different**

·
market
quotes
prices,
not
values.

6

**Behaviour
dominates
analysis**

· your
discipline
> your

stock
picks.

7

Complexity

is

expensive

· if you

need a

paragraph

to

explain

it, you

don't

own it.

HONEST READER NOTE

You don't need to read all 286 pages.

1. If you're a long-term index-fund investor, the chapters that matter most for you are 1 (what TA is), 17 (risk management), 18 (the honest truth), and 43 (the 25 common mistakes). That's about 40 pages and you can skip the rest. The remaining 240+ pages are valuable but optional for your goals.
2. If you're a swing trader, read Parts I through V (about 140 pages). Skip Part VI (the deep schools) and Part VIII (specialised techniques) unless you have a specific reason.
3. If you're a curious polymath, read the whole thing, but take a month — not a weekend. Most of the value of this book comes from sitting with the discomfort of how often the framework just answers "use less of this, not more."
4. The full table of paths is in the Reader Paths section in the front matter. *The hardest discipline this book teaches is not a technique; it is the choice to use the toolkit lightly.*

I

PART ONE

The Foundations

Before any pattern or indicator, you need the grammar of price: what a chart is, what a trend is, and where prices tend to pause. Master these four ideas and most of technical analysis becomes common sense.

WHAT TA IS

READING A CHART

TREND

SUPPORT & RESISTANCE

CHAPTER ONE

What Technical Analysis Is (and Isn't)

Technical analysis is the study of price itself — the chart, the volume, the rhythm of buying and selling — to gauge the mood of the market. Done honestly, it's a real skill. Sold as fortune-telling, it's the most expensive fantasy in finance. We'll be clear about which is which from page one.

IN THIS CHAPTER YOU WILL LEARN

- The core idea behind technical analysis.
- How it differs from fundamental analysis (Book 4).
- The honest truth: what charts can and can't do.
- The three assumptions technical analysis rests on.

Two investors look at the same stock. One (the fundamental analyst of Book 4) studies the business — its profits, debts and moat. The other studies only the *chart* — how the price has moved and on what volume — caring little about what the company even makes. That second investor is the technical analyst, and this book is about their craft: reading the footprints that buyers and sellers leave in the price.

1.1 The Core Idea

Technical analysis rests on a simple premise: **the price chart already reflects everything** — every fact, hope, fear and rumour that anyone acting on the stock currently holds. Rather than trying to dig out new information about the business, the technician studies the *result* of everyone's collective decisions: the price. And because markets are made of humans, and human emotions (greed, fear, hope) repeat, the patterns those emotions carve into a chart tend to *recur*. Technical analysis is, at heart, the study of crowd psychology written in the language of price and volume.

1.2 Technical vs. Fundamental

COMPARE & UNDERSTAND · TWO DIFFERENT QUESTIONS

	FUNDAMENTAL (BOOK 4)	TECHNICAL (THIS BOOK)
Studies	The business — profits, assets, moat	The price chart — trend, patterns, volume
Asks	“What is it worth?”	“What is the price doing?”
Time horizon	Usually years	Often days to months
Best for	Deciding <i>what</i> to own	Helping decide <i>when</i> to act
Core risk	Being wrong about value	Reading meaning into randomness

They aren't enemies — many investors use fundamentals to choose *what* to buy and a little technical sense to time *when*. But never confuse them: a beautiful chart pattern on a terrible business is still a terrible business, and the surest long-term wealth (Books 1–2) comes from value and patience, not chart-reading.

1.3 The Honest Truth — What Charts Can and Can't Do

Here is the candour this subject badly needs. Charts **can**: show you the trend and the mood, mark sensible levels to act or to cut losses, impose discipline, and occasionally flag when a crowd is getting euphoric or panicked. Charts **cannot**: predict the future reliably, turn a coin-flip into a sure thing, or overcome costs and human emotion to make most active traders rich — because they don't. A great deal of what looks like a “pattern” is, statistically, noise the pattern-hungry brain has connected into a story. Use technical analysis as a *probabilistic aid and a discipline tool*, never as prophecy. The honest technician speaks in odds and risk, never in certainty.

In Plain Terms • the self-fulfilling part

Some technical levels “work” partly because *so many people watch them*. If thousands of traders believe a stock will bounce at \$100 and all place buy orders there, their combined buying can actually *cause* the bounce — for a while. This self-fulfilling element is real and useful, but it's also fragile: when the crowd's belief breaks, the level breaks hard. Technical analysis works best where it reflects genuine human behaviour, and fails where it's just superstition dressed up in jargon.

1.4 The Three Assumptions

Classical technical analysis rests on three foundational beliefs, worth stating plainly so you can judge them yourself. **One: price discounts everything** — all known information is already in the price, so you can focus on the price alone. **Two: prices move in trends** — once a direction is established, it's more likely to continue than to reverse, until clear evidence says otherwise. **Three: history tends to repeat** — because human psychology is constant, the patterns of the past recur in the future. None of these is an iron law; the first is debatable and the third is only a tendency. But together they explain *why* technicians do what they do — and holding them loosely, as tendencies rather than certainties, is the mark of a sensible practitioner.

WATCH OUT

The single biggest danger in this entire book

It is this: **technical analysis makes you feel in control of the uncontrollable**. Staring at a chart, you sense you can see the future — and that illusion fuels overtrading, overconfidence, and the steady losses that follow. The data (Chapter 18) is brutal: most active traders lose. As you learn these tools, repeat to yourself that you are reading *probabilities and crowd mood*, not destiny. The moment a chart makes you feel certain is the moment to be most careful.

KEY TAKEAWAYS

1. **Technical analysis studies the price chart** — the footprints of crowd psychology — not the business.
2. It asks “**what is the price doing?**”; fundamental analysis asks “**what is it worth?**” Use them for different jobs.
3. **Charts aid probability and discipline; they do not predict the future** — much apparent “pattern” is noise.
4. **Three assumptions:** price discounts everything, prices trend, history rhymes — tendencies, not laws.

SELF-CHECK

1. In one sentence, what does technical analysis study, and why?
2. How does the technical question differ from the fundamental one?
3. Give one thing charts can do and one thing they cannot.
4. State the three assumptions, and say why each is a tendency rather than a law.

CHAPTER TWO

Reading a Price Chart

Before you can spot a pattern you must read the chart itself — its types, its time frames, and the volume bars beneath it. This is the alphabet of technical analysis; everything else is spelling.

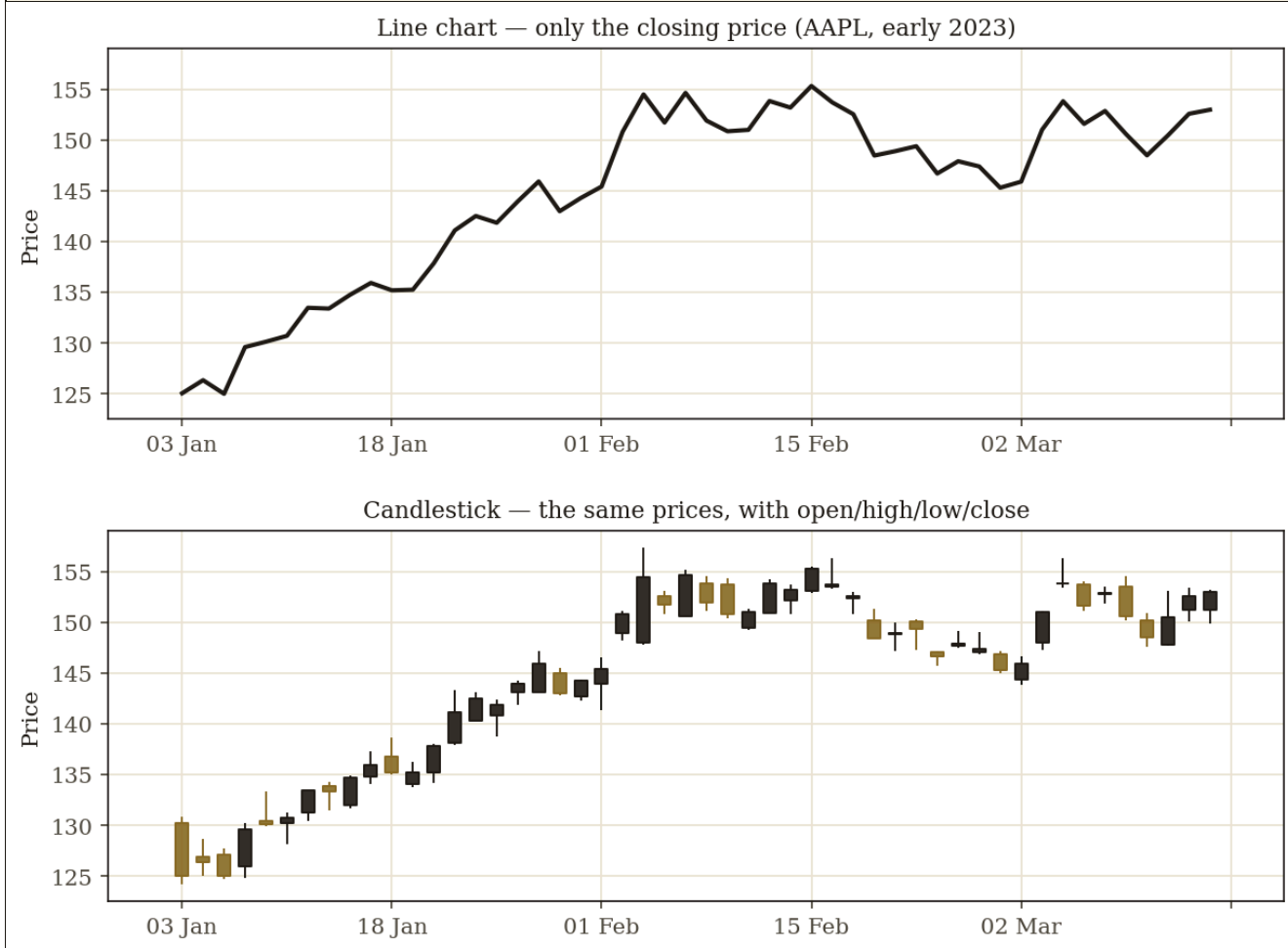
IN THIS CHAPTER YOU WILL LEARN

- The three main chart types — line, bar and candlestick.
- Why the time frame you choose changes everything.
- What volume is, and why it confirms (or doubts) a move.

A price chart plots one thing — price (vertical) against time (horizontal) — but *how* it plots it, and over what period, dramatically changes what you see. Let's learn to read it before we read into it.

2.1 Line, Bar & Candlestick

Three ways to draw the same prices. A **line chart** simply connects each period's closing price — clean and good for seeing the big trend. A **bar chart** shows four prices per period (open, high, low, close) as a vertical bar with ticks. A **candlestick chart** shows those same four prices but as a far more readable “candle” (Part II) — and it has become the technician's default because the eye reads it instantly. Here is the same week of prices drawn as a line and as candlesticks:

FIGURE 2.1 · THE SAME PRICES, TWO WAYS — APPLE, EARLY 2023

Real data, both ways. The same Apple daily prices shown as a line (closing prices only, top) and as candlesticks (open/high/low/close, bottom). The candles reveal the intra-day battle the line hides — which is why technicians work in candlestick charts.

2.2 Time Frames Change Everything

One chart can tell two opposite stories depending on the **time frame** — the period each candle represents. On a 5-minute chart a stock might look like it's crashing; on a weekly chart that same drop is an invisible blip in a steady uptrend. Neither is “wrong”; they answer different questions. Short time frames (minutes, hours) suit short-term traders and are dominated by noise; long time frames (days, weeks, months) suit investors and reveal the durable trend. The golden rule: **match your time frame to your intentions**, and beware drawing long-term conclusions from a short-term chart (or vice versa). Always know which time frame you're looking at before you react to it.

2.3 Volume — the Conviction Behind the Move

Beneath almost every price chart sits a row of bars showing **volume** — how many shares traded in each period. Volume is the technician's lie-detector, because it measures *conviction*. A price rise on *heavy* volume means many participants are committing real money — a believable, well-supported move. The same rise on *thin* volume means few are participating — a flimsy move that can reverse easily. The principle to remember: **volume should confirm the move**. A breakout or a trend backed by rising volume is far more trustworthy than one on a trickle. When price does one thing and volume disagrees, doubt the price.

WATCH OUT

Don't react to the wrong time frame

A huge share of beginner panic comes from staring at short time frames. A long-term investor checking a 1-minute chart will see terrifying squiggles that mean nothing for their decade-long plan — and may sell in fear over noise. If you're investing for years, look at weekly or monthly charts and ignore the intraday chaos. The time frame you watch quietly shapes your emotions and decisions; choose it deliberately.

KEY TAKEAWAYS

1. **Three chart types:** line (closes), bar, and candlestick (open/high/low/close) — candlesticks are the technician's default.
2. **Time frame changes the story;** match it to your intentions and don't mix horizons.
3. **Volume measures conviction** — it should confirm the move; price up on thin volume is suspect.
4. **Watch the right time frame for your goal** to avoid reacting to noise.

SELF-CHECK

1. What extra information does a candlestick show that a line chart doesn't?
2. Why can the same stock look bullish and bearish at once?

3. What does volume measure, and what should it do relative to a price move?
4. If you invest for ten years, which time frame should you mostly watch — and why?

CHAPTER THREE

Trend — the Most Important Concept

If you learn only one thing from technical analysis, learn to identify the trend. Almost every technical idea — patterns, indicators, signals — is ultimately a way of answering one question: which way is this market really moving?

IN THIS CHAPTER YOU WILL LEARN

- The three directions a market can move.
- How to define a trend objectively (highs and lows).
- How to draw and use a trendline.
- Why “the trend is your friend” — with a vital caveat.

Markets don't move in straight lines; they move in waves that, taken together, lean in a direction. That direction is the **trend**, and identifying it correctly is the foundation everything else is built on. Trade with the trend and the odds tilt your way; fight it and you're swimming against the current.

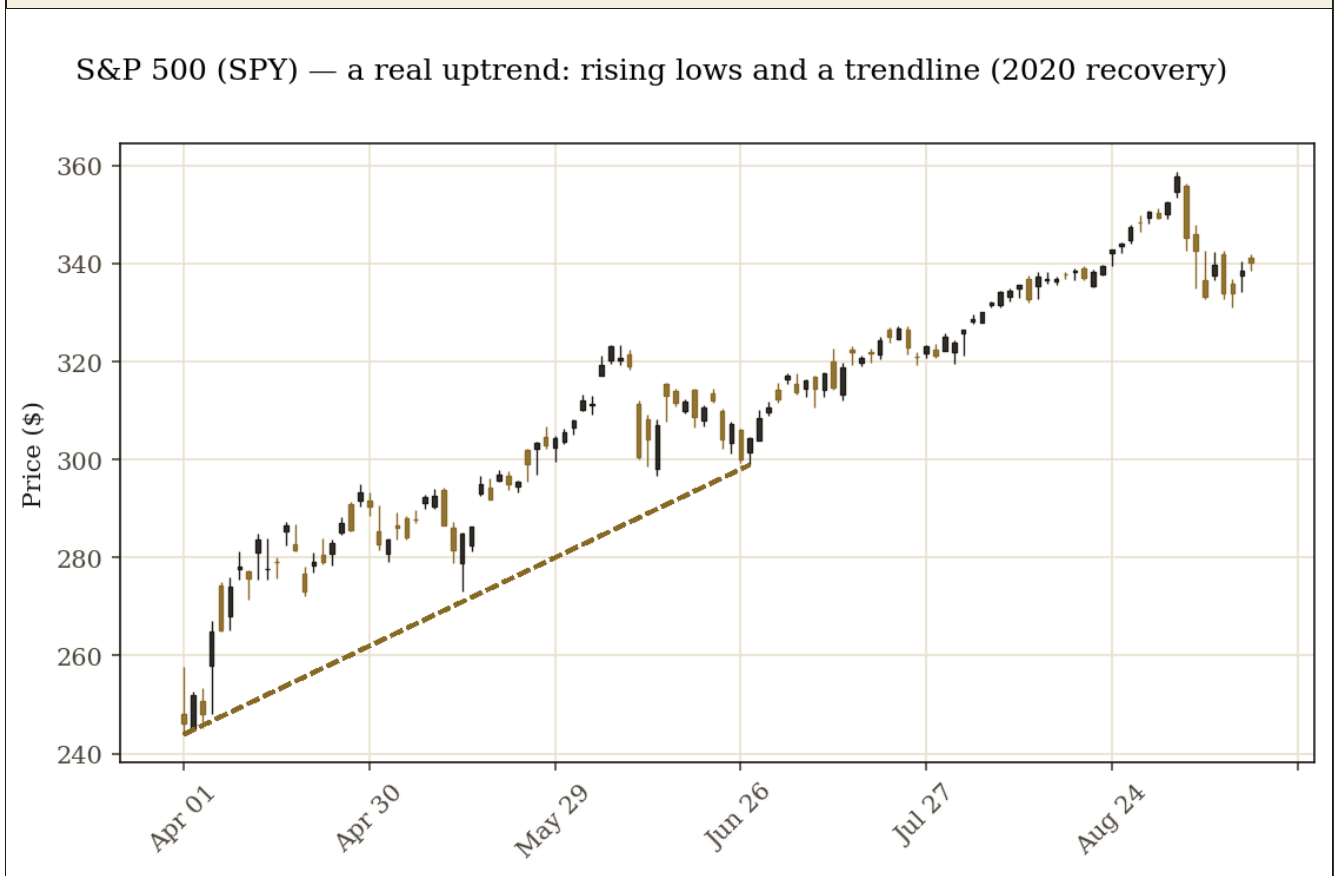
3.1 Up, Down, or Sideways

At any time, a market is doing one of three things: trending **up** (rising over time), trending **down** (falling), or moving **sideways** (ranging, with no clear direction). It sounds obvious, but most trading errors come from misjudging this — buying as if in an uptrend when the market has actually rolled over, or selling in fear during a healthy uptrend's normal dip. Sideways (or “ranging”) markets are their own challenge: trend-following tools work poorly, and many traders simply lose money churning in a market that's going nowhere.

3.2 Defining a Trend Objectively

Feelings aren't enough; a trend has an objective definition. An **uptrend** is a series of *higher highs and higher lows* — each peak and each dip is higher than the last. A **downtrend** is *lower highs and lower lows*. The moment that pattern breaks — when an uptrend prints a *lower low*, say — the trend may be turning. This simple rule turns a vague impression into a checkable fact.

FIGURE 3.1 · A REAL UPTREND AND ITS TRENDLINE — S&P 500, 2020



The staircase up. Real SPY data through the 2020 recovery: each pullback bottoms higher than the last, and a trendline drawn under the rising lows supports the advance. While price holds above that line, the uptrend is intact.

3.3 Trendlines

A **trendline** makes the trend visible: in an uptrend, draw a straight line connecting the rising lows; in a downtrend, connect the falling highs. The line acts as a moving floor (or ceiling) that price respects

again and again — bouncing off it during the trend. Trendlines do two useful jobs: they confirm the trend is intact while price holds the line, and they flag a possible reversal when price decisively breaks through it. They're among the simplest and most genuinely useful tools in technical analysis — though, like everything here, they break sometimes, and a break needs confirmation (volume, a follow-through) before you trust it.

3.4 “The Trend Is Your Friend” — With a Caveat

The oldest maxim in technical analysis is “*the trend is your friend*.” Its wisdom: trends tend to persist, so trading *with* the prevailing direction puts probability on your side, while trying to pick tops and bottoms (fighting the trend) is a fast way to lose. But the full saying has a crucial ending often left off: “*...until the end, when it bends*.” Trends do reverse, and the trader who rides one too stubbornly gives back their gains at the turn. So: respect the trend, trade with it — but watch for the higher-high/higher-low pattern breaking, which is your signal that the friend is leaving.

WATCH OUT

Don't try to catch the falling knife

Beginners love to “buy the dip” in a downtrend, certain the bottom is in — and get cut again and again as it keeps falling (lower lows). Catching a falling knife — trying to call the exact bottom of a downtrend — is one of the most reliable ways to lose money. The trend-following discipline says: wait for the downtrend to actually *stop* making lower lows and show signs of turning *before* buying. Patience beats heroics.

KEY TAKEAWAYS

1. **Identifying the trend is the foundation** of technical analysis — up, down, or sideways.
2. **Define it objectively:** uptrend = higher highs & higher lows; downtrend = lower highs & lower lows.
3. **Trendlines** connect the rising lows (or falling highs) and confirm the trend until decisively broken.
4. **Trade with the trend** — but watch for the pattern breaking, and never catch a falling knife.

SELF-CHECK

1. What are the three things a market can be doing?
2. Define an uptrend and a downtrend using highs and lows.
3. How do you draw a trendline in an uptrend, and what does a break of it suggest?
4. What's the full version of “the trend is your friend,” and why does the ending matter?

CHAPTER FOUR

Support & Resistance

Prices don't move freely; they tend to pause, bounce and stall at certain levels — floors where buyers keep appearing, and ceilings where sellers keep emerging. These levels, called support and resistance, are the most useful map a technician can draw.

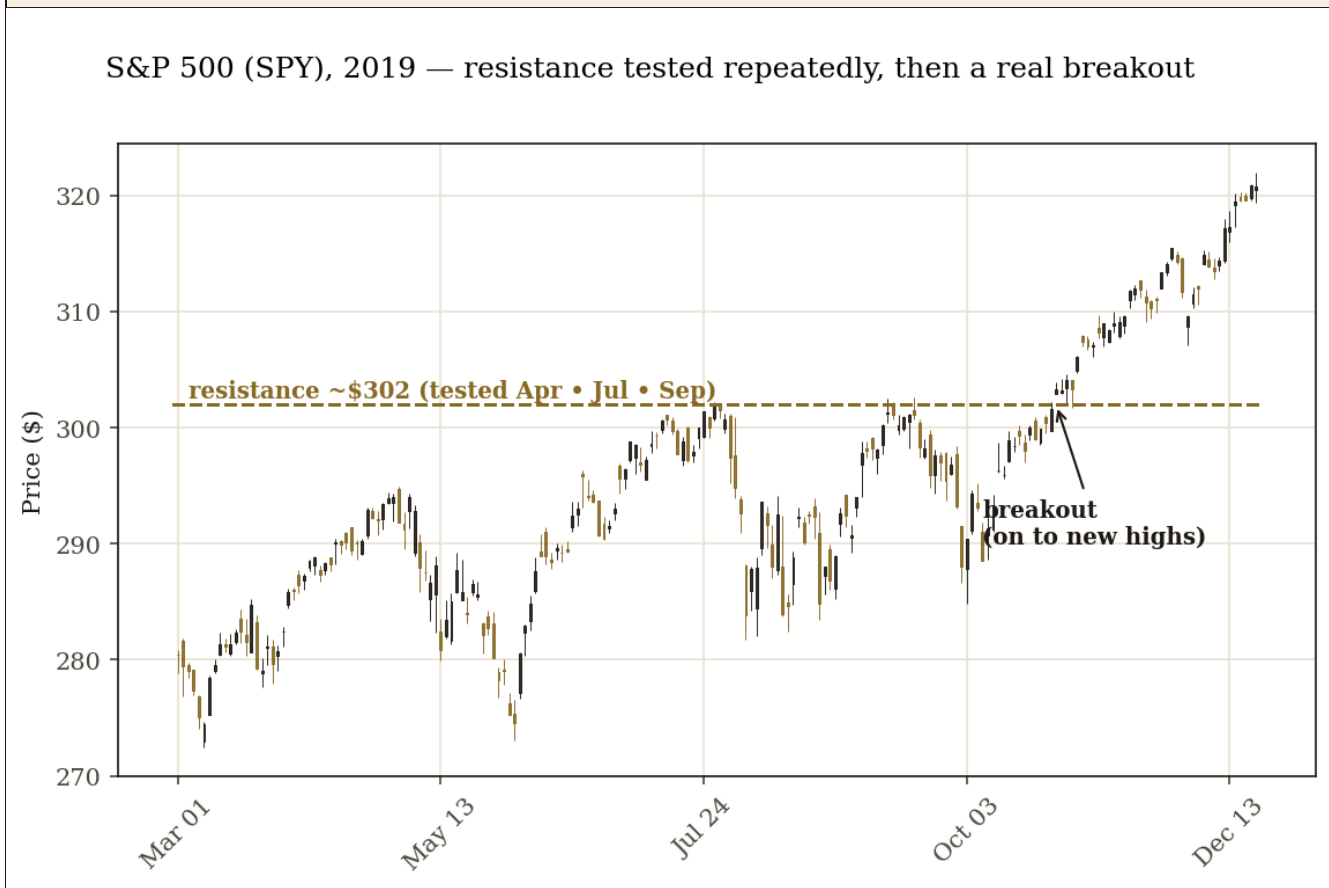
IN THIS CHAPTER YOU WILL LEARN

- What support and resistance are.
- Why they form — the psychology beneath them.
- What a breakout means, and how levels flip roles.

If trend tells you the direction, support and resistance tell you the *landmarks* along the way — the prices where something tends to happen. They're where technicians look to buy, to sell, and to place the stop-losses that protect them.

4.1 Floors and Ceilings

Support is a price level where falling tends to stop — a “floor” where buyers have repeatedly stepped in, their demand halting the decline and pushing price back up. **Resistance** is the opposite — a “ceiling” where rising tends to stall, as sellers repeatedly emerge and supply overwhelms demand. Price often oscillates between a support below and a resistance above, like a ball bouncing in a room.

FIGURE 4.1 · RESISTANCE TESTED, THEN BROKEN — S&P 500, 2019

The ceiling, and the escape. Real SPY data: the \$302 level capped the market repeatedly through mid-2019 (resistance), until a decisive breakout in late October carried price on to new highs. A breakout on real data — verify the dates yourself.

4.2 Why They Form — the Psychology

Support and resistance aren't magic lines; they're **memory** — the residue of past decisions and emotions. Resistance forms at a level where many people previously bought and then watched the price fall; when it climbs back to their entry price, they sell to “get out even,” creating a wall of supply. Support forms where buyers previously found value and remember it, stepping back in. Round numbers (\$100, \$50) also act as psychological levels simply because humans fixate on them. In short, these levels work to the extent that they reflect real, repeating human behaviour — which is exactly why they sometimes hold beautifully and other times shatter.

4.3 Breakouts and Role Reversal

When price **breaks** decisively through a level, two things matter. First, the break should ideally come on *rising volume* (Chapter 2) to be believable — a breakout on thin volume is often a “false breakout” that quickly reverses, trapping eager traders. Second, broken levels tend to **switch roles**: once price breaks above a resistance, that old ceiling often becomes a new floor (support) on any pullback — and a broken support often becomes new resistance. This “role reversal” is one of the most reliable behaviours in technical analysis, again because it mirrors how the crowd's memory works: yesterday's sellers become today's buyers once they're proven wrong.

WATCH OUT

False breakouts are everywhere

Markets are full of moves that *look* like a breakout, suck in eager traders, then snap back — sometimes deliberately, as larger players “hunt” the stop-losses clustered just beyond obvious levels. The defences: wait for *confirmation* (a close beyond the level, not just a brief poke; rising volume; a follow-through day) rather than jumping the instant price crosses a line. And never forget the broader lesson of Chapter 1 — even a confirmed breakout is a probability, not a promise.

KEY TAKEAWAYS

1. **Support is a floor (buyers step in); resistance is a ceiling (sellers appear).** Price oscillates between them.
2. **They form from memory and psychology** — past decisions and round numbers — not magic.
3. **Breakouts** through a level (ideally on rising volume) can start new moves; thin-volume breaks often fail.
4. **Levels flip roles:** broken resistance becomes support, and vice versa. Beware false breakouts — wait for confirmation.

SELF-CHECK

1. Define support and resistance.
2. Why does resistance often form at a price where many people previously bought?
3. What makes a breakout believable versus likely to fail?
4. Explain “role reversal” of a broken level.

II

PART TWO

Candlesticks — the Heart of It

Candlestick charts, invented by Japanese rice traders centuries ago, are the technician's native language. Each candle is a tiny story of one period's battle between buyers and sellers; strung together, they reveal the crowd's mood. This is the most practical part of the book.

ANATOMY | SINGLE-CANDLE | MULTI-CANDLE | CONTEXT

CHAPTER FIVE

The Anatomy of a Candlestick

One candle holds four prices and an entire story of conflict. Learn to read a single candle and you can read the market's mood one heartbeat at a time.

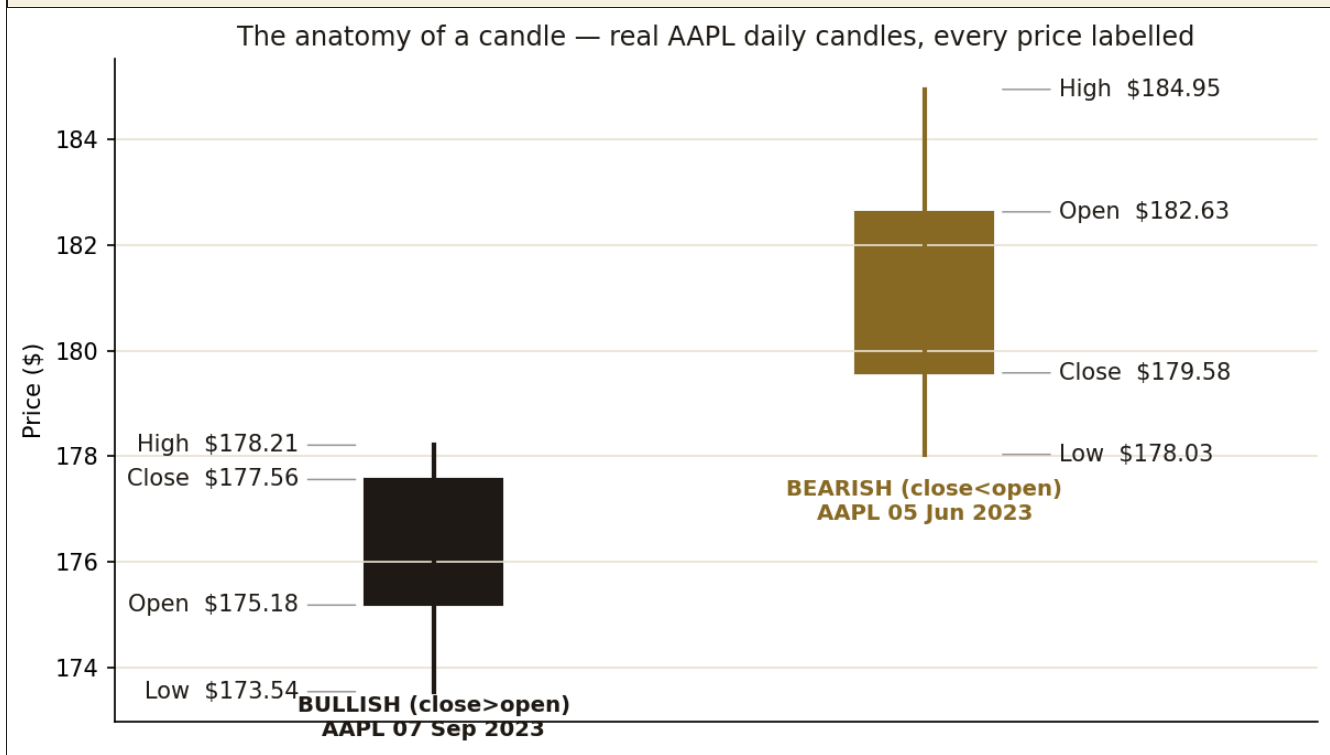
IN THIS CHAPTER YOU WILL LEARN

- The four prices every candle encodes — open, high, low, close.
- The parts of a candle: body, wicks, and colour.
- What the size of body and wick tells you about the battle.

A candlestick is the most information-dense symbol in finance: four numbers and a colour, packed into a shape your eye reads in an instant. Master its anatomy here and every pattern in the chapters ahead becomes self-explanatory.

5.1 Four Prices, One Candle

Each candle summarises one period — a day, an hour, a minute, whatever your time frame. It records four prices: the **open** (first trade of the period), the **high** (highest price reached), the **low** (lowest), and the **close** (last trade). From just these four numbers the candle is drawn — and from its shape you read who won the period: buyers or sellers.

FIGURE 5.1 · THE ANATOMY OF A CANDLE — REAL APPLE CANDLES

Read it like a thermometer of mood. Two real AAPL daily candles, every price labelled. The body spans the open and close; the wicks reach the high and low. Here a **dark** candle is bullish (close above open) and a **gold** candle bearish (close below open).

5.2 Body, Wick & Colour

The **body** is the thick rectangle between the open and the close. If price closed *higher* than it opened, it's a bullish (up) candle; if it closed *lower*, it's bearish (down). The **wicks** (also called shadows or tails) are the thin lines above and below the body, marking the high and low the price touched before settling. Colour tells you direction at a glance; the shape tells you the story.

5.3 What the Sizes Mean

The proportions carry the message. A **long body** means the close was far from the open — one side dominated decisively (a long up-body = strong buying). A **short body** means open and close were close

together — indecision; neither side won. A **long wick** shows price travelled far in that direction but was *rejected* and pushed back before the close — a long lower wick, for instance, means sellers drove price down but buyers fought it back up, a quietly bullish sign. Reading a candle, then, is reading a tug-of-war: who reached furthest, and who was holding the rope when the period ended.

In Plain Terms • the candle as a sentence

Think of each candle as a one-sentence news report. “Buyers pushed hard and closed near the high” = long dark body, tiny wicks. “Sellers tried to crash it but buyers rescued it” = small body sitting atop a long lower wick. You're not memorising shapes; you're translating a battle into a sentence. Once you can narrate candles like this, the famous “patterns” of the next chapters are just two- and three-sentence stories.

KEY TAKEAWAYS

1. Each candle encodes four prices: open, high, low, close — one period's whole story.
2. Body = open-to-close; wicks = the high and low. Colour shows who won (here: dark up, gold down).
3. Long body = decisive; short body = indecision; long wick = a rejected move.
4. Reading a candle is reading a tug-of-war — narrate it as a sentence and patterns become obvious.

SELF-CHECK

1. Name the four prices a candle records.
2. What's the difference between the body and the wicks?
3. What does a long lower wick suggest about the period's battle?
4. You see a tiny body with long wicks on both sides — what mood does that signal?

CHAPTER SIX

Single-Candle Patterns

Some candles are so distinctive they carry meaning on their own. The doji, the hammer, the shooting star — each is a single candle that hints the mood may be shifting. Here are the ones worth knowing.

IN THIS CHAPTER YOU WILL LEARN

- The doji — and what indecision looks like.
- The hammer and hanging man — long lower wicks.
- The shooting star and inverted hammer — long upper wicks.
- The marubozu — total dominance.

A single candle rarely makes a decision for you, but a few shapes are loud enough to demand attention — especially when they appear after a long trend. Learn these four families and you'll recognise most of what single candles can say.

6.1 The Doji — Indecision

A **doji** is a candle with almost *no body* — the open and close are nearly equal — leaving a cross or plus-sign shape. It means the period was a draw: buyers and sellers fought to a standstill. By itself a doji is neutral, but after a strong trend it's a warning that the trend's momentum may be fading — the crowd has lost conviction. A doji after a long rally, especially, says “the buyers are tiring.”

6.2 Hammer & Hanging Man

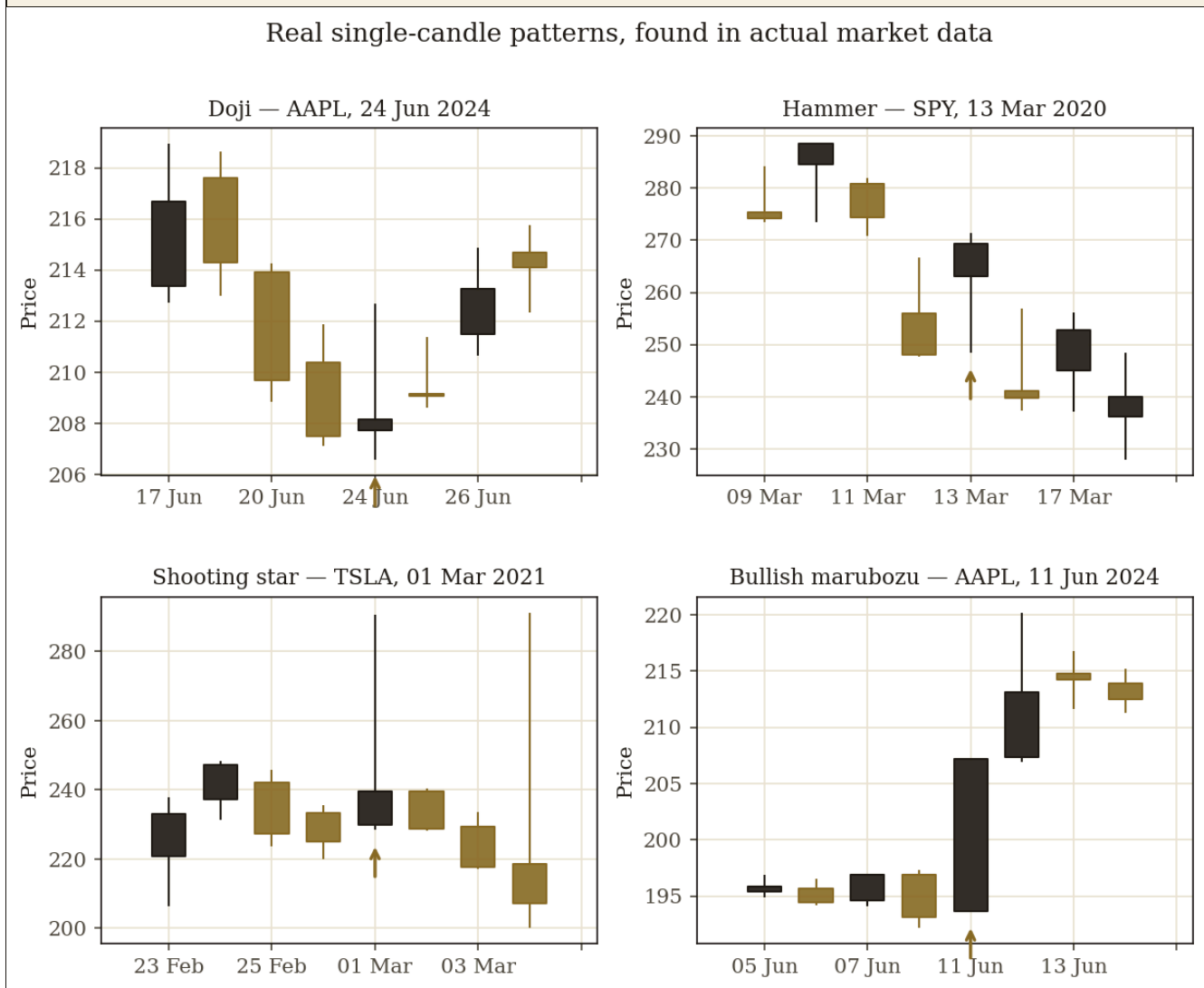
Both have a **small body at the top** and a **long lower wick** — price was driven sharply down, then rescued back up before the close. The same shape carries opposite meaning depending on *where* it appears (a preview of Chapter 8's great lesson). After a *downtrend*, it's a **hammer** — bullish, suggesting sellers tried to push lower but buyers slammed the door; the decline may be ending. After an *uptrend*, the identical shape is a **hanging man** — bearish, a hint that selling pressure is creeping in beneath a still-rising price.

6.3 Shooting Star & Inverted Hammer

The mirror image: a **small body at the bottom** and a **long upper wick** — price surged up but was rejected and fell back. After an *uptrend*, this is a **shooting star** — bearish, showing buyers pushed to new highs but sellers overwhelmed them; the rally may be exhausted. After a *downtrend*, the same shape is an **inverted hammer** — a tentative bullish hint.

6.4 The Marubozu — Total Control

A **marubozu** is a long body with *no wicks* at all — price opened at one extreme and closed at the other, one side in complete control for the whole period. A bullish (dark) marubozu shows relentless buying; a bearish (gold) one, relentless selling. It signals strong conviction and momentum in that direction.

FIGURE 6.1 · REAL SINGLE-CANDLE PATTERNS, FOUND IN MARKET DATA

Real, not drawn. Four genuine examples scanned from actual market data: a doji (indecision), the SPY COVID-crash hammer, TSLA's dramatic shooting star, and an AAPL bullish marubozu. The arrow marks each pattern candle; the date lets you verify it.

WATCH OUT

One candle is a hint, not a command

Beginners memorise these shapes and then trade every doji or hammer they see — and lose. A single candle is a *whisper*, easily wrong on its own. The professional waits for **confirmation**: the next candle moving in the expected direction, ideally on good volume, and the pattern appearing at a sensible spot (a support level, the end of a long trend). A hammer in the middle of nowhere means little. Never act on one candle alone.

6.5 The Wider Single-Candle Family

Beyond the four big patterns, several other single-candle shapes appear frequently enough to deserve names. They are variations on the same logic — body size and wick positions describing who won the period — but each has a distinct meaning.

- **Long-Legged Doji.** A doji with very long upper *and* lower wicks. Maximum indecision: price travelled wildly in both directions before closing roughly where it opened. After a strong trend, a particularly forceful warning.
- **Dragonfly Doji.** A doji where open, high and close are all clustered at the top, with a long lower wick. Sellers drove price down hard but buyers fully reclaimed it before the close — a bullish hint, particularly after a downtrend.
- **Gravestone Doji.** The mirror: open, low and close all near the bottom, with a long upper wick. Buyers pushed up but were entirely rejected — a bearish hint after an uptrend.
- **Spinning Top.** A small body (not as small as a doji) with both upper and lower wicks longer than the body. Mild indecision; a single one means little but a cluster after a trend can warn of fading momentum.
- **Inverted Hammer.** Small body at the bottom, long upper wick (covered briefly in 6.3). After a downtrend, a tentative bullish reversal hint — buyers attempted to push higher and were sold; the value is in seeing whether the next candle confirms.
- **High Wave Candle.** A small body with extremely long wicks above and below. Like a long-legged doji but with a slightly larger body. Same message: extreme indecision, especially meaningful after a long directional move.
- **Shaven Head / Shaven Bottom.** A candle with no upper wick (shaven head) means the close (or open, for a down candle) was at the high — strong buying pressure. No lower wick (shaven bottom) means the low was at the open or close — strong support beneath. Both are signs of decisive control.

You needn't memorise the trivia of every name. The principle from §5.3 covers all of them: read the body and wicks as a sentence, and the meaning follows.

KEY TAKEAWAYS

1. **Doji** = near-zero body = indecision; after a trend, a warning momentum is fading.
2. **Hammer** / **hanging man** = small body, long lower wick — bullish after a fall, bearish after a rise.
3. **Shooting star** / **inverted hammer** = small body, long upper wick — bearish after a rise, bullish after a fall.
4. **Marubozu** = full body, no wicks = total control. And always wait for confirmation.

SELF-CHECK

1. What does a doji look like, and what does it mean after a long rally?
2. A candle has a small body on top and a long lower wick, appearing after a downtrend. Name it and its meaning.
3. How can the hammer and hanging man be the same shape yet mean opposite things?
4. Why should you never act on a single candle alone?

CHAPTER SEVEN

Multi-Candle Patterns

When two or three candles combine, the story gets stronger. The engulfing pattern, the star, the three-soldiers — these multi-candle formations are the bread-and-butter signals technicians actually watch for.

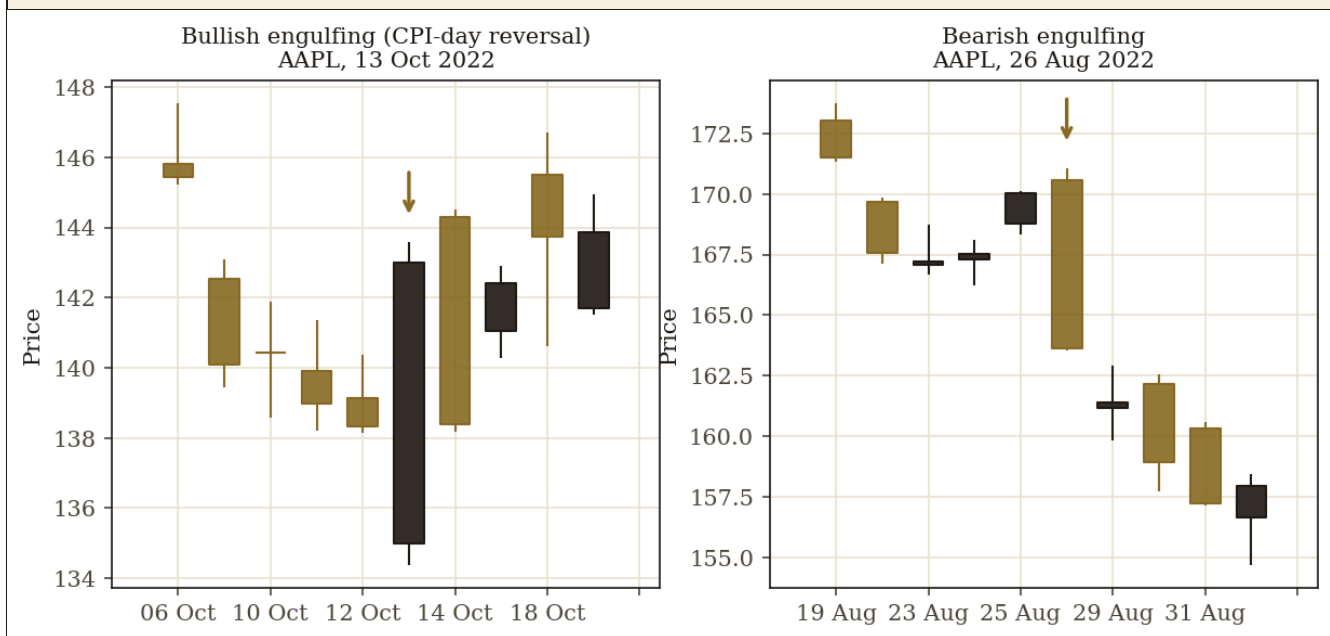
IN THIS CHAPTER YOU WILL LEARN

- The engulfing patterns — bullish and bearish.
- The morning and evening star.
- Three white soldiers and three black crows.
- Harami and piercing patterns.

A single candle whispers; a well-formed multi-candle pattern speaks. Because these patterns require two or three candles to *agree* on a story, they're more reliable than any lone candle — though, as ever, confirmation and context still rule.

7.1 Engulfing Patterns

The **bullish engulfing** is two candles: a small down candle, then a large up candle whose body completely “engulfs” it. After a downtrend it's a strong reversal signal — buyers didn't just win the second period, they overwhelmed the previous selling. The **bearish engulfing** is the mirror: after an uptrend, a small up candle is swallowed by a large down candle, signalling sellers have seized control. Engulfing patterns are among the most watched reversal signals precisely because the second candle's dominance is so visible.

FIGURE 7.1 · REAL ENGULFING PATTERNS — APPLE

Engulfing = a takeover. Left: a real bullish engulfing — the 13 Oct 2022 CPI-day reversal, where a large up-candle swallowed the prior down-candle. Right: a real bearish engulfing. The arrow marks the engulfing candle in each.

7.2 Morning & Evening Star

These three-candle patterns are classic reversals. The **morning star** (bullish) appears at the bottom of a downtrend: a big down candle, then a small indecisive candle (a “star”, often a doji) that gaps lower, then a big up candle — like dawn after a dark night, the mood turns from selling to buying. The **evening star** is the mirror at a top: big up candle, small star, then a big down candle — dusk falling on a rally. The middle “star” is the hinge: it marks the moment of indecision where control changed hands.

7.3 Three Soldiers & Three Crows

Three white soldiers are three strong up candles in a row, each closing higher — a powerful sign of sustained buying, often marking the start of an uptrend after a bottom. **Three black crows** are the bearish mirror: three strong down candles in a row, warning of sustained selling. Both gain their force from *persistence* — three periods of one side winning is hard to dismiss as noise.

7.4 Harami & Piercing

The **harami** (“pregnant” in Japanese) is engulfing in reverse: a large candle followed by a *small* candle held within the first's body — a sign the prevailing trend is losing steam, momentum suddenly contracting. The **piercing pattern** (bullish) and its mirror the **dark cloud cover** (bearish) are two-candle reversals where the second candle pushes more than halfway into the first's body — a partial engulfing that hints the tide is turning. You needn't memorise every name; what matters is reading the *story* each tells about shifting control.

In Plain Terms · don't drown in names

There are dozens of named candle patterns, and beginners often try to memorise them all like flashcards. Don't. Every one of them is just a small story about *who is winning and whether that's changing*. If you understand the anatomy (Chapter 5) and can narrate a candle as a sentence, you can *derive* the meaning of any pattern on sight — engulfing is “a takeover,” a star is “a turning point,” three soldiers is “relentless buying.” Understand the logic; the vocabulary follows.

7.5 The Broader Multi-Candle Catalogue

Beyond the famous engulfing, star and three-soldier patterns, the candlestick tradition includes dozens more multi-candle formations. The most useful additions:

- **Tweezer Top / Tweezer Bottom.** Two candles with matching highs (tweezer top) or matching lows (tweezer bottom). The matching extreme is a clear rejection of that level — at a top, a bearish reversal hint; at a bottom, bullish. Strongest when the two candles have different colours (the second reversing the first's direction).
- **Three Inside Up / Three Inside Down.** A harami followed by a third candle confirming the reversal — the third candle closes above (inside up) or below (inside down) the first candle's body. A harami plus confirmation, in one named pattern.
- **Three Outside Up / Three Outside Down.** An engulfing pattern followed by a third confirming candle. The strongest two-candle reversal made even stronger by explicit follow-through.

- **Dark Cloud Cover (bearish).** After an uptrend, a strong up-candle is followed by a down-candle that opens above the prior high but closes more than halfway into the prior body. The selling has begun even though it hasn't yet fully engulfed.
- **Piercing Pattern (bullish).** The mirror at a bottom — a down-candle followed by an up-candle that opens below the prior low but closes more than halfway up the prior body. Buying interest emerging from beneath; not yet an engulfing, but the same direction.
- **Abandoned Baby (rare but powerful).** A three-candle pattern: a strong directional candle, then a doji that *gaps* away from it, then a reversal candle that gaps back the other way. The doji is left isolated like an abandoned baby. One of the rarest and most reliable candlestick reversal signals.
- **Kicker Pattern.** A strong directional candle followed by a strong candle in the *opposite* direction that opens at or beyond the prior candle's open (a gap, sometimes against the original move). A sudden, decisive change of regime — often news-driven.
- **Harami Cross.** A harami in which the smaller second candle is specifically a doji. The combination of contracting range and explicit indecision is a stronger reversal hint than a plain harami.
- **Rising / Falling Three Methods (continuation).** A strong directional candle, then three to four small counter-trend candles that stay within the first candle's range, then a final candle closing beyond the first's extreme. A clean continuation pattern: the trend paused, did not give back its gains, and resumed.
- **Mat Hold (continuation).** A more compact relative of the three-methods pattern; the small pullback candles drift slightly against the prior trend before the dominant trend resumes.
- **On-Neck, In-Neck, Thrusting (weak continuations).** Three named two-candle patterns where a down-candle's body is followed by a small up-candle that closes *at* the prior low (on-neck), slightly above it (in-neck), or halfway into the prior body (thrusting). All three are weak bearish continuation signals — the bounce did not have the strength to penetrate prior resistance.
- **Separating Lines, Stick Sandwich, Concealing Baby Swallow.** Rarer formations cataloged in Steve Nison's *Japanese Candlestick Charting Techniques* — each describes a specific multi-candle geometry. Worth knowing they exist; not worth memorising as a beginner.

The encyclopedic Japanese candlestick tradition catalogues approximately 42 recognised patterns. The serious practitioner learns perhaps a dozen and uses them in context (Chapter 8); collectors of all 42 typically find that the marginal patterns add little signal that wasn't already in the obvious ones.

7.6 Multi-Candle Continuation Patterns

Most named multi-candle patterns are reversals, but several are *continuations* — visible pauses within a trend rather than turns. Beyond the rising/falling three methods (7.5) and the mat hold, two more deserve mention:

- **Upside / Downside Tasuki Gap.** Two candles in the prevailing trend separated by a gap, then a counter-trend candle that partially fills the gap. If the trend resumes after, the pattern is a confirmation of strength.
- **Side-by-Side White / Black Lines.** Two same-colour candles of similar size adjacent to each other within a trend — a brief consolidation that, when the trend resumes, confirms continuation.

The principle behind all of these: a brief pause within a strong trend, on small ranges and modest volume, that does not surrender meaningful ground — exactly the “catching its breath” story of Chapter 10's continuation patterns, told in candle vocabulary.

KEY TAKEAWAYS

1. **Engulfing:** a large candle swallows the prior one — a visible takeover; reversal signal after a trend.
2. **Morning/evening star:** three candles with an indecisive “star” hinge marking the turn.
3. **Three soldiers / three crows:** three candles in a row showing persistent buying or selling.
4. **Read the story, don't memorise names** — every pattern is about who's winning and whether it's changing.

SELF-CHECK

1. Describe a bullish engulfing pattern and where it's meaningful.
2. What are the three candles of a morning star, and what does the middle one represent?
3. Why are three white soldiers considered a strong signal?
4. How is a harami the “opposite” of an engulfing pattern in meaning?

CHAPTER EIGHT

Reading Candles in Context

The single most important lesson in candlestick analysis is also the most ignored: a candle means nothing by itself. The same shape is bullish in one place and bearish in another. Context is everything.

IN THIS CHAPTER YOU WILL LEARN

- Why location changes a candle's meaning entirely.
- How to combine candles with trend, support/resistance and volume.
- What “confirmation” really means in practice.

You now know the candle shapes. This chapter is the antidote to the most common way they're misused — treating a shape as a magic signal regardless of where it appears. Get this chapter right and you'll avoid most beginner candle mistakes.

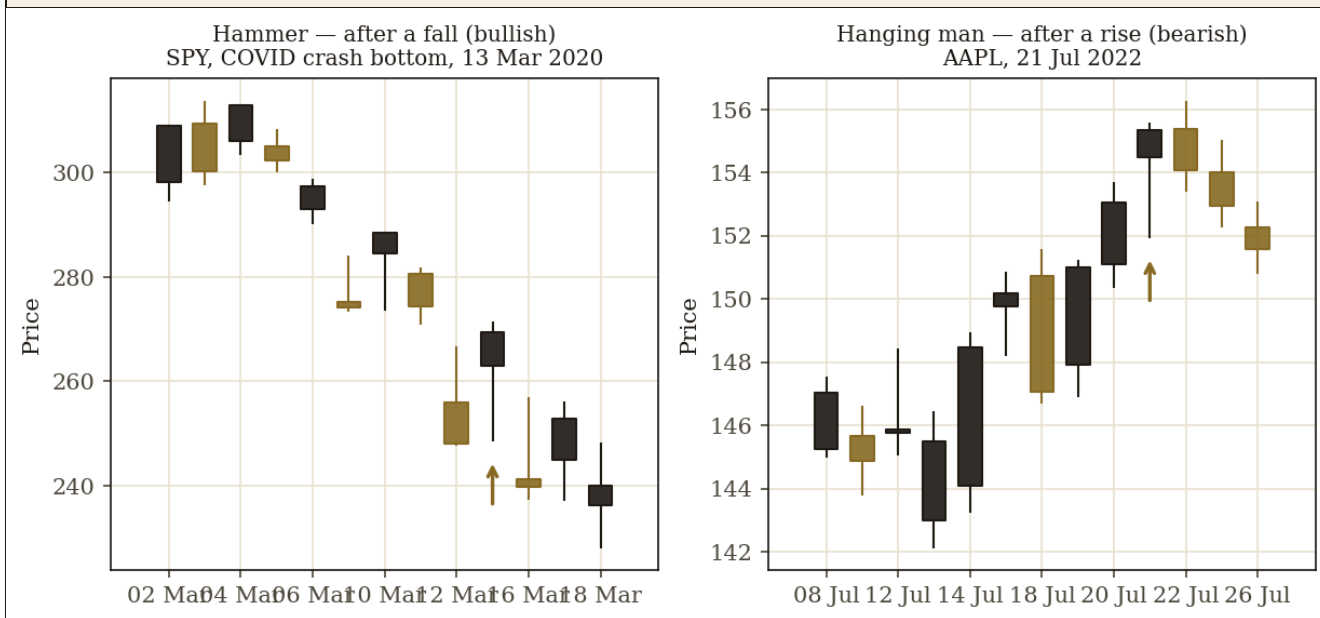
8.1 Location Is Meaning

Recall the hammer and hanging man (Chapter 6): identical shapes, opposite meanings, decided entirely by the trend that preceded them. This generalises to *every* pattern. A doji in the middle of a quiet range is noise; the same doji at the top of a euphoric rally is a serious warning. A bullish engulfing is powerful at a major support level after a long decline; the same pattern mid-trend is barely worth noting. **The candle gives you a shape; the location gives you the meaning.** Always ask first: *where are we?* — what's the trend, and are we at a significant level?

8.2 Combine With Trend, Levels & Volume

The strongest signals occur when several pieces of evidence *align*. A bullish reversal candle is most trustworthy when it appears (a) after a clear downtrend, (b) right at a known support level (Chapter 4), and (c) on heavy volume (Chapter 2). That confluence — pattern + trend context + level + volume — is what professionals actually wait for, and it's far rarer (and far better) than the constant stream of isolated shapes a beginner trades. One weak signal is noise; three signals agreeing is a setup.

FIGURE 8.1 · SAME SHAPE, OPPOSITE MEANING — REAL EXAMPLES



Location is meaning. The identical long-lower-wick candle is a bullish **hammer** after a fall (left — the SPY COVID-crash bottom) and a bearish **hanging man** after a rise (right). Same shape; only the context differs. That is the whole lesson of this chapter.

8.3 What Confirmation Really Means

Throughout these chapters we've said “wait for confirmation.” Concretely, it means not acting on a pattern until *subsequent* price action agrees with it. A bullish engulfing isn't confirmed until the *next* candle also closes higher; a breakout isn't confirmed until price *closes* beyond the level (not just pokes through intraday) and holds. Confirmation costs you a little — you enter slightly later, at a slightly worse price — but it filters out a huge share of false signals. That trade-off, accepting a worse entry to avoid

being faked out, is one of the quiet disciplines that separates those who survive from those who churn their accounts to zero.

WATCH OUT

The pattern-spotting trap

Your brain is a pattern-detection machine — so good at it that it sees patterns in pure randomness (clouds, coffee stains, and yes, price charts). A great deal of what beginners “see” in charts is their own mind imposing a story on noise. The defences in this chapter — demanding context, confluence and confirmation — exist precisely to discipline that instinct. If a setup requires you to squint and tell yourself a story to see it, it isn't there. The best setups are obvious; if you have to talk yourself into it, walk away.

KEY TAKEAWAYS

1. **A candle means nothing alone** — the same shape is bullish or bearish depending on location.
2. Always ask “where are we?” — trend and level decide a pattern's meaning.
3. **The best signals show confluence:** pattern + trend context + key level + volume agreeing.
4. **Confirmation** = waiting for later price action to agree; it costs a little and saves a lot.

SELF-CHECK

1. Why does the location of a candle change its meaning? Give an example.
2. What four things, when they align, make a reversal signal strongest?
3. What does it mean, concretely, to wait for confirmation of a bullish engulfing?
4. Why is the human tendency to see patterns a danger in chart-reading?

III

PART THREE

Chart Patterns

Zoom out from individual candles and larger shapes emerge across weeks and months — heads and shoulders, triangles, flags. These chart patterns are the macro-version of candle reading: the crowd's psychology drawn on a bigger canvas.

REVERSALS

CONTINUATIONS

GAPS & VOLUME

CHAPTER NINE

Reversal Patterns

Some chart shapes tend to appear when a trend is exhausting itself and about to turn. The head-and-shoulders, the double top and bottom — these reversal patterns are among the most famous (and most over-claimed) ideas in technical analysis.

IN THIS CHAPTER YOU WILL LEARN

- The head-and-shoulders top (and its inverse).
- Double tops and double bottoms.
- The role of the neckline and volume.
- An honest word on how reliable these really are.

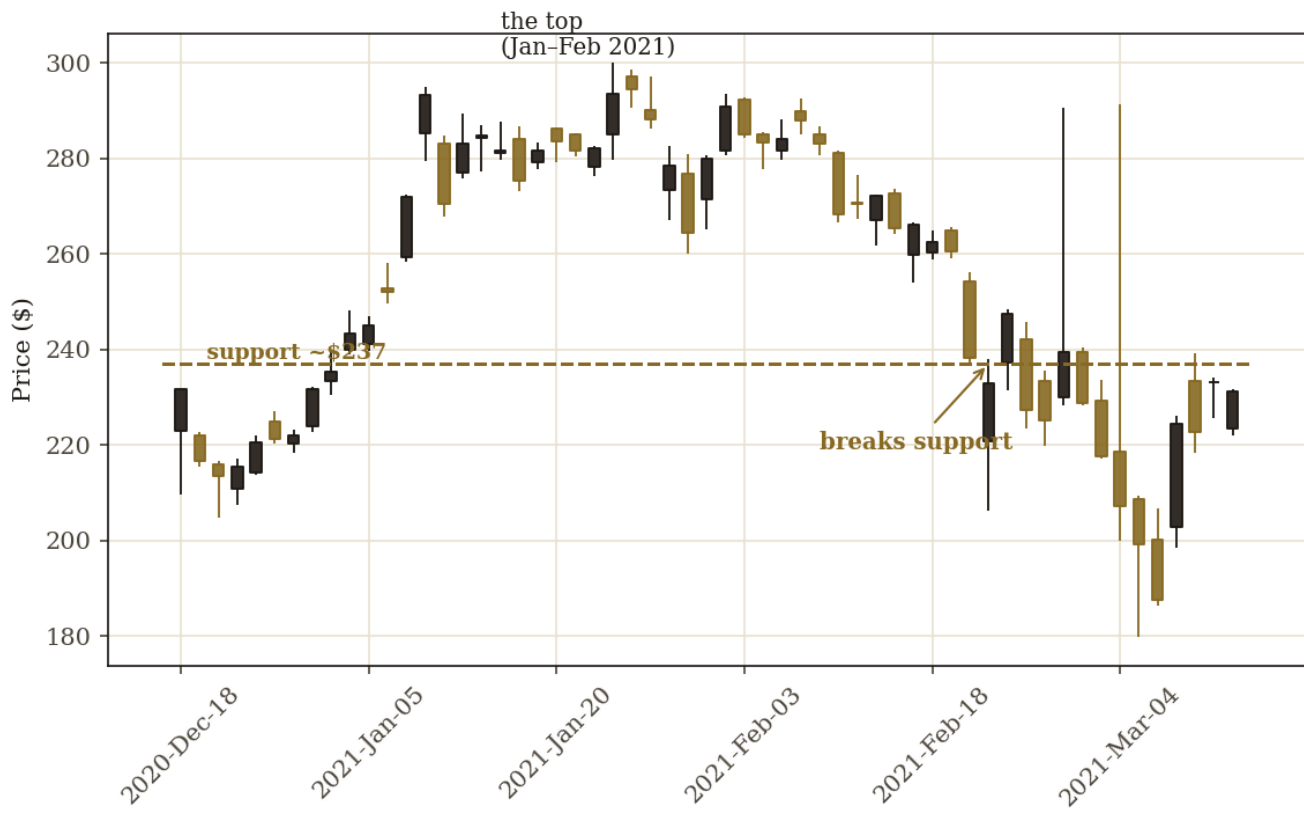
A reversal pattern is a shape that forms as a trend runs out of energy and prepares to change direction. They're seductive because they seem to call the top or bottom — but they only “work” a fraction of the time, and only with confirmation. Learn them, and learn their limits.

9.1 Head and Shoulders

The **head-and-shoulders top** is the most famous reversal pattern. After an uptrend, price makes a peak (left shoulder), a higher peak (the head), then a lower peak (right shoulder) — three humps, the middle tallest. A line connecting the lows between them is the **neckline**. When price breaks *below* the neckline, the pattern is considered complete and a downtrend may begin. The **inverse head-and-shoulders** is the mirror at a market bottom, signalling a possible move up. The logic: each failed push to a new high shows buyers weakening, until they finally give way.

FIGURE 9.1 · A REAL TOPPING PATTERN — TESLA, EARLY 2021

A real topping pattern — TSLA, early 2021: a rounded top, then a break of support



Real tops are messy. Real reversals rarely look like the textbook. TSLA's early-2021 rounded top rolled over and then broke its ~\$237 support — the break being the actual signal. Compare this to the neat diagrams elsewhere: this is exactly Chapter 9's warning, drawn from real data.

9.2 Double Tops & Bottoms

A **double top** looks like the letter “M”: price rises to a peak, pulls back, rises to roughly the *same* peak again, then fails and falls — twice rejected at the same level (a resistance, Chapter 4), the buyers give up. A **double bottom** is the “W” mirror at a market low: price tests the same support twice, holds, and turns up. Like head-and-shoulders, the pattern isn't “confirmed” until price breaks the level between the two humps (the middle of the M or W).

9.3 The Role of the Neckline & Volume

Across all reversal patterns, two features matter most. The **break of the key level** (neckline, or the midpoint of a double top) is the actual signal — the pattern shape alone is just a setup. And **volume** should ideally confirm: a genuine head-and-shoulders often shows declining volume on the head and right shoulder (waning enthusiasm) and a surge of volume on the neckline break. Without that volume confirmation, treat the pattern with extra suspicion.

WATCH OUT · THE HONEST TRUTH ABOUT THESE PATTERNS

They fail far more often than the books admit

Reversal patterns are presented in many courses as near-magical predictors. The reality, from serious studies of pattern performance, is humbler: they work only somewhat better than chance, frequently fail (the “textbook” head-and-shoulders that simply keeps going up), and are easy to *see in hindsight* but hard to trade in real time. Treat them as one piece of probabilistic evidence — never as a guarantee — and always pair them with confirmation, a stop-loss (Chapter 17), and the humility of Chapter 1. Anyone selling them as certainties is selling you something.

9.4 The Wider Reversal Catalogue

Beyond head-and-shoulders and double tops, several other reversal formations appear often enough to deserve a place in your vocabulary:

- **Triple Top / Triple Bottom.** A rarer cousin of the double — price tests the same level *three* times before reversing. Stronger than the double (more rejections at the same level), and the breakdown/breakout signal is the same (a break of the supporting trough or the resistance level).
- **Rounding Top (Saucer Top).** A slow, curved roll over from a long advance — the opposite of the V-shape. Distribution gradually accumulates without a sharp peak. Confirmation comes from the eventual break of the long-rising trendline beneath. Rounding tops at major market peaks (e.g., NIKKEI 1989, NASDAQ 2000) are common.
- **Rounding Bottom (Saucer Bottom).** The mirror — a long, slow basing process forming a U-shape over weeks or months. Particularly common at major lows after exhausted downtrends.

- **V-Top / V-Bottom.** A sharp, single-point reversal with no warning — the price equivalent of a spike. By their nature these are hard to identify until in hindsight; the lesson is humility, not predictive value. Major news events often produce V-bottoms (e.g., the 2020 COVID-crash low).
- **Broadening Formation (Megaphone Top).** The opposite of a triangle — price swings widen as each successive high is higher and each successive low is lower. A pattern of growing instability, almost always bearish in mature trends. Famously associated with the 1929 and 2007 market tops.
- **Diamond Top.** A broadening formation that converts to a contracting one — expanding swings followed by narrowing swings, producing a diamond outline. Rare; bearish when it appears at the end of an extended uptrend.
- **Island Reversal.** A trading range that begins with a gap and ends with a gap in the opposite direction, leaving the bars isolated like an island. Both gaps and the reversal of behaviour make it a powerful (and reliable) reversal signal when it appears at the top or bottom of a trend.
- **Wedges (Reversal Variant).** A rising wedge (converging trendlines, both sloping up) in an uptrend often signals exhaustion and a bearish reversal; a falling wedge in a downtrend often signals a bullish reversal. Wedges can also appear as continuation patterns within a trend (Chapter 10) — context decides.

As with candle patterns, the lesson is not to collect names — it is to recognise the underlying psychological story: *after a long advance, the path of least resistance changes when buyers can no longer push higher and sellers gain the upper hand.* Whatever shape that change takes, the signal is the eventual break of the supporting structure.

KEY TAKEAWAYS

1. **Head-and-shoulders:** three peaks (middle highest); a break below the neckline signals a possible top.
2. **Double top (M) / double bottom (W):** a level tested twice and rejected, signalling reversal on the break.
3. **The break of the key level is the signal,** not the shape; volume should confirm it.
4. **Be honest:** these patterns fail often and are clearer in hindsight — evidence, not prophecy.

SELF-CHECK

1. Describe the three peaks of a head-and-shoulders top and what completes the pattern.
2. What does a double top look like, and what crowd behaviour does it reflect?
3. What is the neckline, and why is its break the real signal?
4. Give one honest limitation of reversal patterns.

CHAPTER TEN

Continuation Patterns

Not every pattern means a turn. Some are pauses — moments where a trend catches its breath before continuing. Triangles, flags and pennants are the market resting, not reversing.

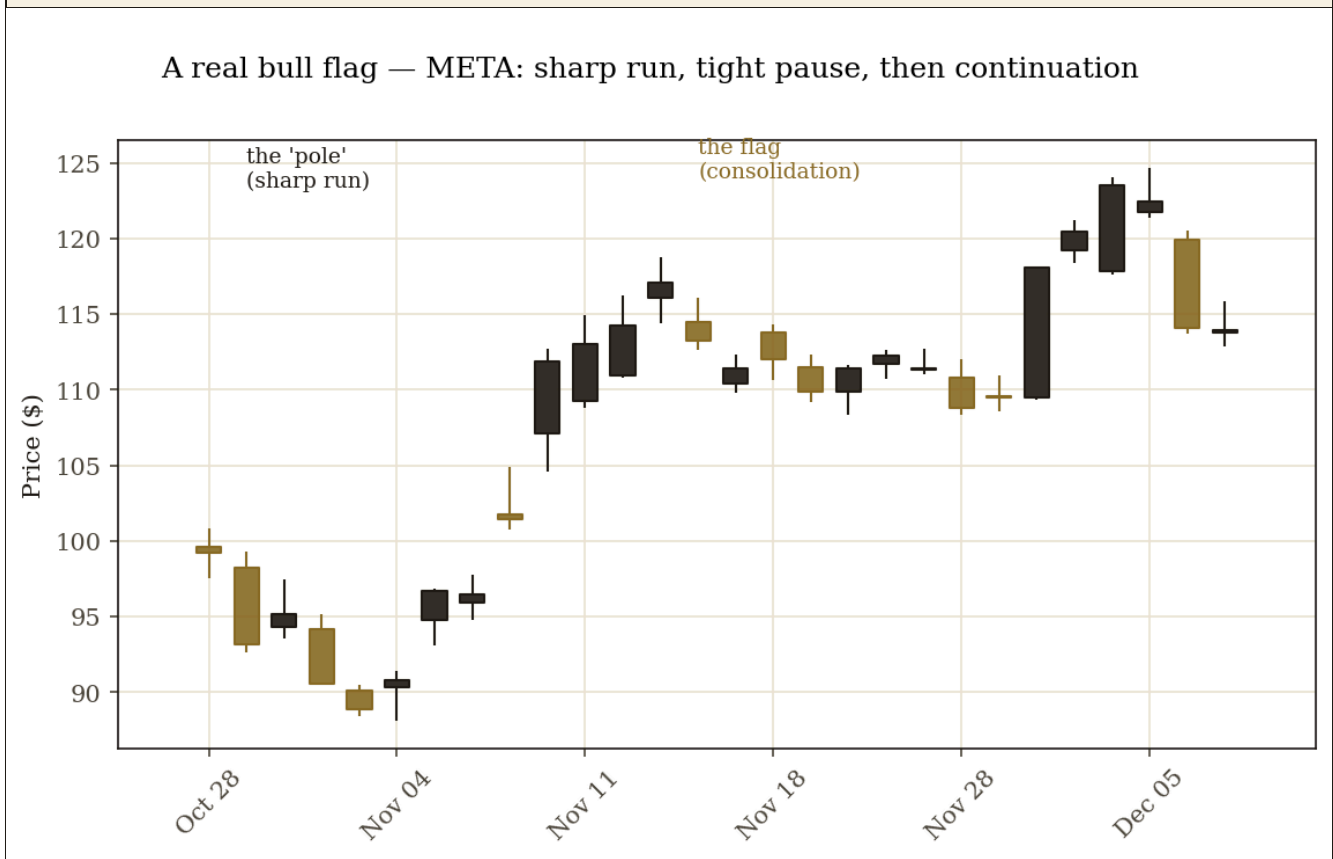
IN THIS CHAPTER YOU WILL LEARN

- Triangles — ascending, descending, symmetrical.
- Flags and pennants — the brief pause.
- How to tell a pause from a reversal.

A continuation pattern is a consolidation — a sideways breather within a larger trend. After it, the trend usually resumes in its original direction. Recognising these helps you stay in a good trend instead of bailing out during a normal pause.

10.1 Triangles

A **triangle** forms as price swings narrow into a point, like a coiling spring. An **ascending triangle** has a flat top (resistance) and rising lows — buyers growing more eager, usually breaking out upward. A **descending triangle** has a flat bottom and falling highs — typically breaking down. A **symmetrical triangle** narrows from both sides and can break either way (so wait for the break to show direction). The squeeze reflects tension building between buyers and sellers until one side wins.

FIGURE 10.1 · A REAL BULL FLAG — META, LATE 2022

The trend catching its breath. Real META data: a sharp run up (the 'pole'), a tight sideways pause (the 'flag'), then the uptrend resumes — a textbook continuation pattern, in real prices.

10.2 Flags & Pennants

A **flag** appears after a sharp move (“the flagpole”): price drifts sideways or slightly against the trend in a small rectangle, then resumes in the original direction. A **pennant** is similar but the pause forms a tiny triangle. Both represent a brief consolidation — traders catching their breath, some taking profits — before the dominant trend reasserts itself. They're typically short-lived (a few periods) and, when they resolve, often do so quickly.

10.3 Pause vs. Reversal

The practical challenge is telling a continuation (pause) from a reversal (turn) — they can look similar while forming. Three clues help: the *prior trend* (continuations happen *within* a strong trend; reversals at its *end*), the *direction of the eventual break* (a continuation breaks *with* the trend), and *volume* (continuations often see volume dry up during the pause, then surge on the resumption). When unsure — and you often will be — the disciplined answer is to wait for the break and let price tell you, rather than guessing.

In Plain Terms · why pauses happen

A strong move makes some holders nervous — they take profits, creating a little selling that stalls the advance. Meanwhile new buyers, who missed the first move, wait for a dip. For a while these two groups balance out and price goes sideways: the flag or triangle. Once the profit-takers are done and the trend's believers remain, the move resumes. The pattern is just the visible shape of that brief tug-of-war within an ongoing trend.

10.4 Wedges, Rectangles, and the Cup & Handle

Several other continuation patterns appear often enough to know by name:

- **Rising Wedge** (often **bearish continuation in downtrends, bearish reversal in uptrends**). Converging trendlines, both sloping *upward*, with the upper line less steep than the lower — a coiling pattern with shrinking range. The break is usually downward.
- **Falling Wedge** (often **bullish continuation in uptrends, bullish reversal in downtrends**). The mirror — both lines sloping downward, the lower one less steep. The break is usually upward.
- **Rectangle (Trading Range)**. Horizontal support and resistance lines holding a sideways range. Continuation in the direction of the eventual break; very common as mid-trend consolidations on daily and weekly charts.
- **Cup & Handle**. Made famous by William O'Neil. Picture a teacup: a long, rounded base (the cup, typically 1–6 months on a daily chart) where price retraces, slowly forms a U-shape, then returns to the prior high; then a short, shallow pullback (the handle, 1–4 weeks) that consolidates against the

resistance; finally a breakout above the handle's high. Volume should dry up during the cup's right side and the handle, then surge on the breakout. The price target is typically the cup's depth projected upward from the breakout. Cup-and-handle is a continuation pattern best after a prior uptrend, with the handle providing the high-probability entry; it is also one of the more reliable patterns when it forms cleanly.

The wedges deserve particular care: context decides whether they are continuation or reversal. A rising wedge inside a strong uptrend often resolves *downward* as a reversal warning; a rising wedge inside a downtrend resolves downward as a continuation of the larger move. Read the bigger picture before naming the pattern.

KEY TAKEAWAYS

1. **Continuation patterns are pauses**, after which the prior trend usually resumes.
2. **Triangles** coil into a point: ascending (bullish), descending (bearish), symmetrical (wait for the break).
3. **Flags and pennants** are brief consolidations after a sharp move (the “flagpole”).
4. **Distinguish pause from reversal** via prior trend, break direction, and volume — or just wait for the break.

SELF-CHECK

1. What does a continuation pattern signal, versus a reversal pattern?
2. How do ascending and descending triangles typically resolve?
3. Describe a bull flag and what each part represents.
4. Name two clues that help you tell a pause from a reversal.

CHAPTER ELEVEN

Gaps & Volume

Two raw forces underlie every pattern: the gaps where price leaps with no trades in between, and the volume that reveals how much conviction is behind a move. Master these and you read the energy of the market, not just its shape.

IN THIS CHAPTER YOU WILL LEARN

- What a gap is and why it forms.
- The main types of gap and what they suggest.
- How volume confirms (or contradicts) price.

We met volume in Chapter 2 as the technician's lie-detector; here we deepen it and add its dramatic cousin, the gap. Both are about *energy* — the force behind a move — and both are among the more genuinely informative things on a chart.

11.1 What a Gap Is

A **gap** is an empty space on the chart where price jumps from one period's close to the next period's open with no trading in between. It happens most often between sessions: news breaks overnight — an earnings surprise, a takeover, a shock — and when the market reopens, price simply leaps to a new level, leaving a visible gap. A gap is a burst of pent-up information hitting the price all at once; its size hints at how significant the news was.

11.2 Types of Gap

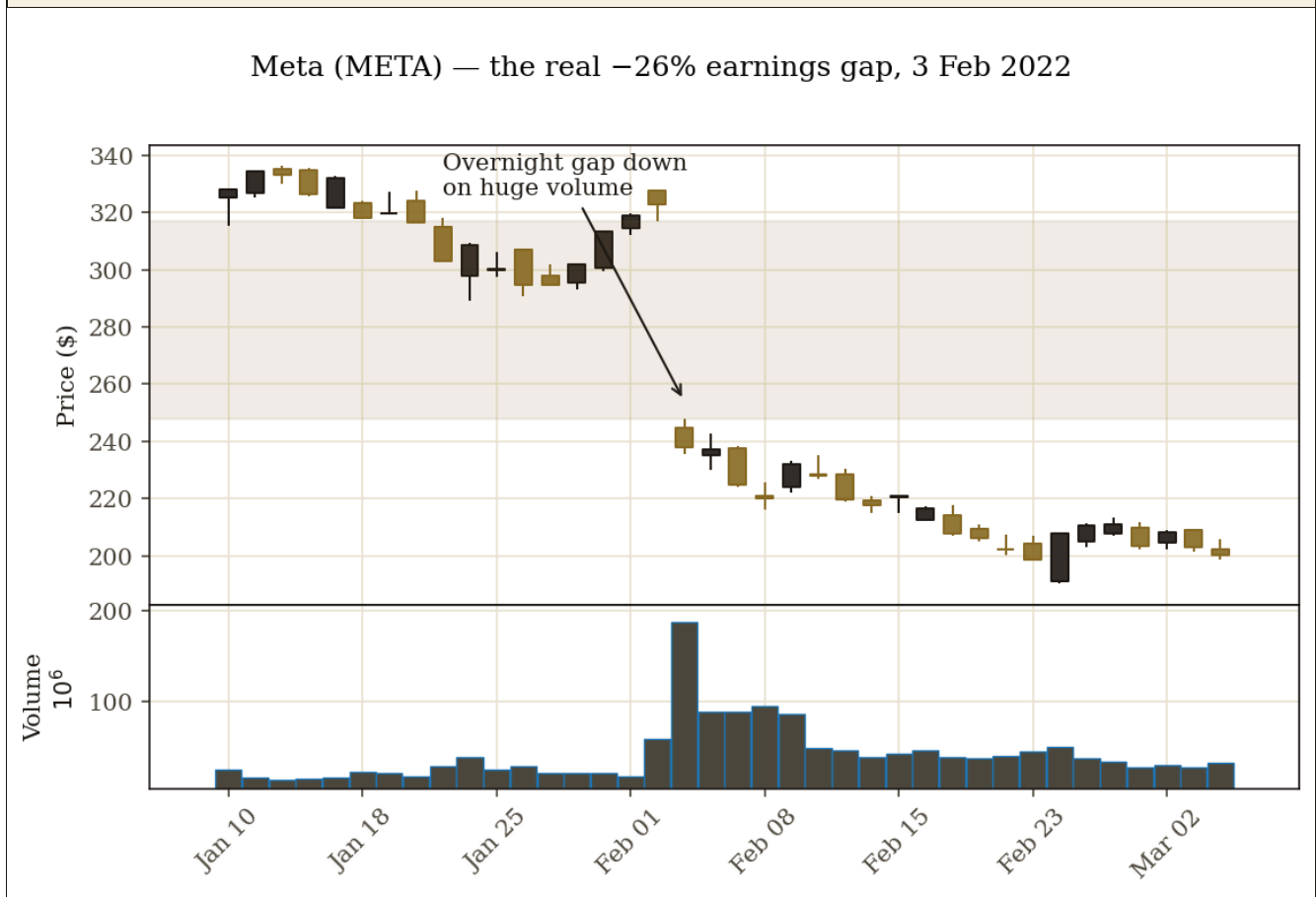
COMPARE & UNDERSTAND · READING THE GAPS

GAP TYPE	WHERE IT APPEARS	WHAT IT SUGGESTS
Breakaway	At the start of a new move, out of a range	A powerful new trend is beginning
Runaway / measuring	In the middle of a strong trend	The trend is healthy and accelerating
Exhaustion	Near the end of an extended trend	A last gasp; the trend may be ending
Common	In quiet, range-bound markets	Little meaning; often “fills” quickly

A famous piece of market lore is that “gaps get filled” — price often returns later to trade through the empty space. It's frequently true for common and exhaustion gaps, but breakaway and runaway gaps in strong trends can stay open for a long time. As always, context (where the gap appears, and on what volume) decides the meaning.

11.3 Volume Confirms Price

The single most useful volume principle bears repeating and expanding: **volume should expand in the direction of the trend**. In a healthy uptrend, volume rises on up-days and fades on pullbacks. A breakout (Chapter 4), a reversal pattern's neckline break (Chapter 9), or a gap is far more trustworthy *on heavy volume*. The most powerful warning sign is **divergence** — price making new highs while volume shrinks, meaning fewer and fewer participants support the advance. That quiet fade in volume often precedes a reversal: the move is running on fumes.

FIGURE 11.1 · A REAL GAP ON HUGE VOLUME — META, FEB 2022

Energy made visible. Meta's -26% earnings gap of 3 Feb 2022 — one of the largest one-day wipeouts in market history. Price leaps down overnight through the shaded zone (no trades occur there), on enormous volume (lower panel). The volume spike is what gives a gap its conviction.

WATCH OUT

Don't chase the gap

A big morning gap is exciting, and beginners often pile in at the open — right as early buyers take profits, causing the price to drop back (sometimes filling the gap) and handing the latecomer an instant loss. Gaps are highly volatile and emotionally charged; jumping in at the open is one of the faster ways to lose money. Let the dust settle, watch whether the gap holds, and remember Chapter 17's stop-losses exist precisely for moments like these.

11.4 Volume Indicators — Beyond the Bars

Reading raw volume bars is the foundation, but several standard indicators distil volume into a single line that is easier to compare with price. The most useful:

On-Balance Volume (OBV) — Joseph Granville, 1963. A running cumulative total that *adds* the day's volume on up-days and *subtracts* it on down-days. The underlying idea: volume precedes price. If buyers are accumulating, OBV rises before the price decisively breaks out; if sellers are distributing, OBV falls before the breakdown. The classic use, as always with these indicators, is **divergence**: price making new highs while OBV does not is a warning the rally lacks volume support.

$$OBV_{\text{today}} = OBV_{\text{yesterday}} + (\text{close} > \text{prior close} ? \text{Volume} : -\text{Volume})$$

Accumulation/Distribution Line — Marc Chaikin. Refines OBV by recognising that *where* in the day's range the close occurred matters. A close near the high on heavy volume is far more bullish than a close near the low, even if both are up-days. The A/D line weights each day's volume by a “Close Location Value”:

$$CLV = [(\text{close} - \text{low}) - (\text{high} - \text{close})] \div (\text{high} - \text{low})$$

$$A/D_{\text{today}} = A/D_{\text{yesterday}} + (CLV \times \text{Volume})$$

The CLV ranges from −1 (close at the low) to +1 (close at the high). Like OBV, the meaningful use is divergence from price.

Chaikin Money Flow (CMF) — a 21-day weighted average of (CLV × Volume) divided by 21-day total volume. Bounded roughly between −1 and +1. Sustained positive readings indicate buying pressure; negative readings, selling. Useful as a continuous gauge of where the accumulation is going.

Money Flow Index (MFI) — by Quong & Soudack. Essentially an RSI calculated on “money flow” (typical price × volume) instead of price alone. Same 0–100 scale, same overbought/oversold thresholds (typically 80/20). Often called the “volume-weighted RSI.”

Across all of these, the same disciplined logic applies as in Chapter 15: they all derive from the same raw inputs (price + volume), so stacking many adds little. Pick one — OBV is the simplest; A/D or CMF if you

want close-location weighting — and use it to watch for divergence and confirmation, not as a stand-alone oracle.

KEY TAKEAWAYS

1. A **gap** is an empty space where price leaps with no trades between — usually driven by news.
2. **Gap types** (breakaway, runaway, exhaustion, common) suggest different things by their location.
3. **Volume should expand with the trend**; a move on heavy volume is far more trustworthy.
4. **Volume divergence** (price up, volume shrinking) warns a move is running out of energy.

SELF-CHECK

1. What is a gap, and what typically causes one?
2. Distinguish a breakaway gap from an exhaustion gap.
3. What should volume do in a healthy uptrend?
4. What is volume divergence, and why is it a warning?

IV

PART FOUR

Indicators — with the Math

Indicators are formulas applied to price and volume to distil them into a single, easier-to-read line. Here we don't just name them — we show the actual equations and work real numbers through them, so you understand exactly what each one computes and where it lies to you.

MOVING AVERAGES

RSI & MACD

BOLLINGER & ATR

USING THEM WISELY

CHAPTER TWELVE

Moving Averages

The moving average is the most-used indicator in all of technical analysis — a smoothed line that cuts through the noise to show the underlying trend. Here is exactly how it's calculated, by hand, twice.

IN THIS CHAPTER YOU WILL LEARN

- The simple moving average (SMA) — the formula and a worked calculation.
- The exponential moving average (EMA) — and why it reacts faster.
- How crossovers generate signals (the golden & death cross).
- The fatal weakness all moving averages share.

Price is jagged and noisy; a moving average is the same price, smoothed. By averaging the last N closing prices and re-computing every period, it produces a flowing line that makes the trend obvious. It is the foundation on which countless other indicators are built — so let's build it ourselves.

12.1 The Simple Moving Average (SMA)

The **simple moving average** is exactly what it sounds like: the average of the last N closing prices. Each period you drop the oldest price and add the newest, so the average “moves” along.

$$SMA_N = (P_1 + P_2 + \dots + P_N) \div N$$

Let's compute a 5-day SMA on a real little series of closing prices. Suppose a stock closed at \$20, \$22, \$21, \$24, \$23 over five days, then \$25 on day 6:

WORKED CALCULATION · 5-DAY SMA

Day 1–5 closes: 20, 22, 21, 24, 23

Sum = 20 + 22 + 21 + 24 + 23 = **110**

SMA (day 5) = 110 ÷ 5 = **\$22.00**

Now day 6 closes at 25 – drop the oldest (20), add the newest (25):

New window: 22, 21, 24, 23, 25

Sum = 22 + 21 + 24 + 23 + 25 = **115**

SMA (day 6) = 115 ÷ 5 = **\$23.00**

The average rose from \$22.00 to \$23.00 – the line “moves” up, smoothly tracking the rising prices without the day-to-day jitter.

Common settings are the 50-day and 200-day SMA for long-term trends, and the 20-day for shorter ones. When price is above its rising moving average, the trend is generally up; below a falling average, generally down.

STEP-BY-STEP CALCULATION · SMA ON REAL AAPL DATA

Real AAPL daily closes. SMA5 = average of last 5 closes; SMA10 = average of last 10. Each row recomputes by dropping the oldest close and adding the newest.

Date	Close	SMA5	SMA10
06 Jun	179.21	179.42	176.62
07 Jun	177.82	179.53	177.25
08 Jun	180.57	179.63	178.12
09 Jun	180.96	179.63	178.92
12 Jun	183.79	180.47	179.75
13 Jun	183.31	181.29	180.35
14 Jun	183.95	182.52	181.02
15 Jun	186.01	183.60	181.61
16 Jun	184.92	184.40	182.01
20 Jun	185.01	184.64	182.56
21 Jun	183.96	184.77	183.03

Date	Close	SMA5	SMA10
22 Jun	187.00	185.38	183.95
23 Jun	186.68	185.51	184.56
26 Jun	185.27	185.58	184.99
27 Jun	188.06	186.19	185.42
28 Jun	189.25	187.25	186.01
29 Jun	189.59	187.77	186.57
30 Jun	193.97	189.23	187.37

 Download the full workbook (33+ rows, with formulas in the ReadMe sheet) → [sma_calculation.xlsx](#)

HOW TO USE THIS IN PRACTICE

Trading with moving averages

1. **Trend filter:** if Close is above the 200-day MA, only take long trades; if below, only shorts.
This single rule eliminates most disasters.
2. **Entry signal:** on a pullback in an uptrend, buy when price touches the 50-day MA *and* shows a bullish reversal candle (hammer, engulfing) on rising volume.
3. **Exit signal:** close longs when the 50-day MA crosses below the 200-day (death cross) on the same chart, or when price closes below the 50-day on rising volume.
4. **Stop placement:** below the most recent swing low, typically the candle whose low first touched the 50-day MA.
5. **What you ignore:** moving-average crossovers in choppy sideways markets — they whipsaw.
Use ADX > 25 as a trend-strength filter before deploying any MA-crossover system.

12.2 The Exponential Moving Average (EMA)

The SMA treats a price from N days ago as equally important as yesterday's — which feels wrong, since recent prices matter more. The **exponential moving average** fixes this by weighting recent prices more heavily. It uses a smoothing multiplier:

$$\text{multiplier } k = 2 \div (N + 1)$$

$$\text{EMA}_{\text{today}} = (\text{Price}_{\text{today}} - \text{EMA}_{\text{yesterday}}) \times k + \text{EMA}_{\text{yesterday}}$$

Let's work a 10-day EMA. First the multiplier, then one update step. Say yesterday's 10-day EMA was \$22.00 and today's close is \$25.00:

WORKED CALCULATION · 10-DAY EMA STEP

$$k = 2 \div (10 + 1) = 2 \div 11 = 0.1818$$

$$\begin{aligned} \text{EMA}_{\text{today}} &= (25.00 - 22.00) \times 0.1818 + 22.00 \\ &= (3.00 \times 0.1818) + 22.00 \\ &= 0.545 + 22.00 = \$22.55 \end{aligned}$$

A 5-day SMA above jumped straight to \$23.00; this EMA moved to \$22.55 — it responds to the new \$25 close but in proportion to its weight (0.1818), giving recent data more pull than old data. Larger $N \rightarrow$ smaller $k \rightarrow$ smoother, slower line.

Because it reacts faster, the EMA is preferred by shorter-term traders; the SMA, being smoother, by longer-term ones. Neither is “better” — they're different trade-offs between responsiveness and noise.

RAVI — THE ONE INDICATOR HE ACTUALLY USES

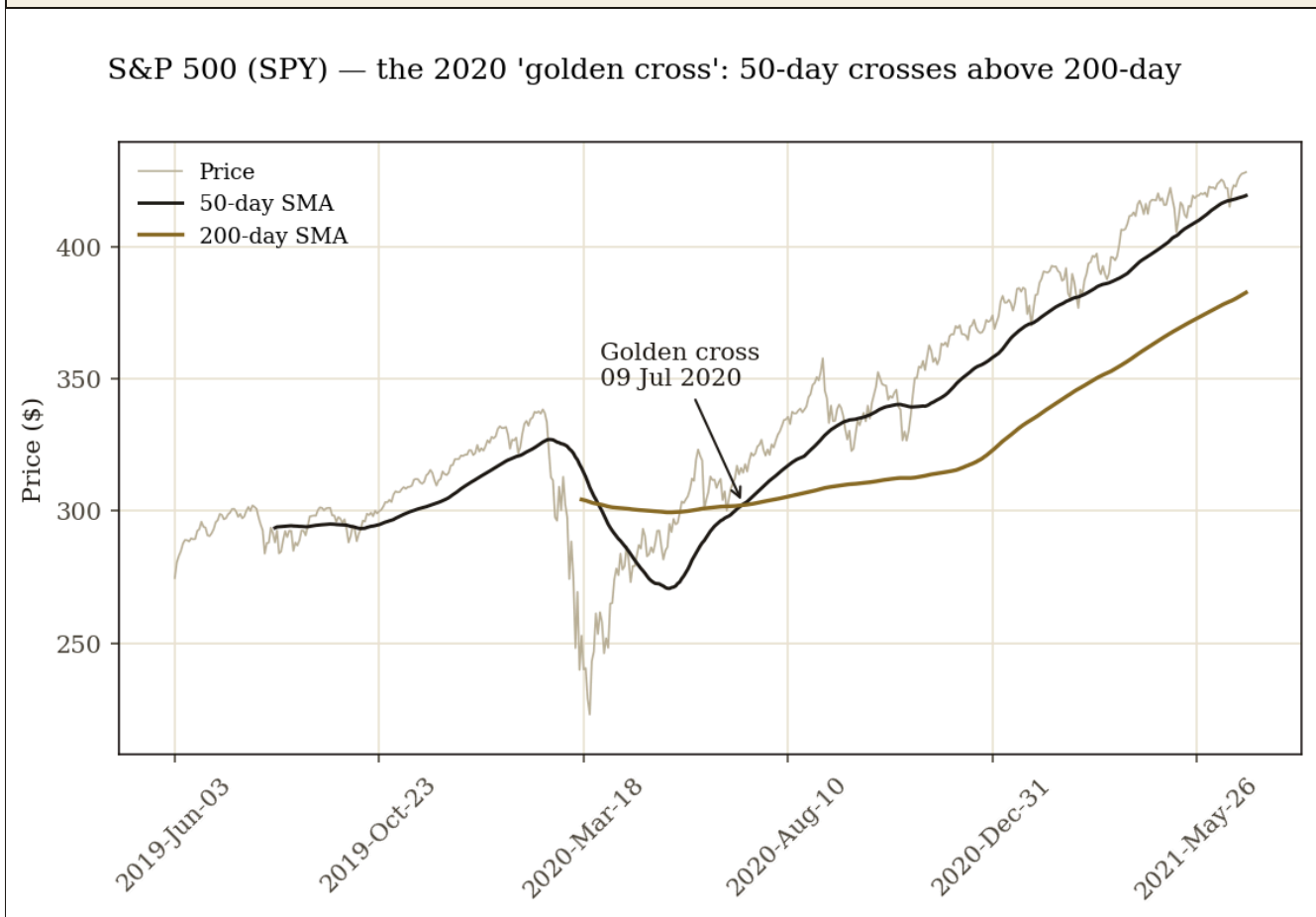
Ravi resisted day-trading (Chapter 18). But he does want to be a slightly smarter long-term investor. He picks one rule from this book and commits to it. **P6** The principle: behaviour dominates analysis — so his rule must be one he'll actually execute without emotion.

His chosen rule: *if the S&P 500 is below its 200-day moving average on the first trading day of the month, he doubles his SIP for that month (buying more cheap shares); if it's above, he keeps the SIP the same.* That's it. No selling, no exits, no panic. Just slightly more buying during downturns. It's mechanical, takes 30 seconds a month, and historically would have added roughly 0.4% per year to his returns — about \$80,000 over a 40-year working life. *One rule, executed faithfully, beats ten rules half-executed.*

12.3 Crossovers — Golden & Death Cross

A popular signal comes from two moving averages of different lengths. When a faster (shorter) average crosses *above* a slower (longer) one, momentum is turning up — a bullish **crossover**. The most famous: the **golden cross**, when the 50-day SMA crosses above the 200-day, taken as a long-term bullish signal; and its opposite, the **death cross** (50-day below 200-day), taken as bearish. These are widely watched — which gives them some self-fulfilling power (Chapter 1) — but they are also *late*, as the next section explains.

FIGURE 12.1 · A REAL GOLDEN CROSS — S&P 500, 2020



Smoothing, and lag. Real SPY data: after the COVID crash, the 50-day moving average (dark) crossed back above the 200-day (gold) on 9 July 2020 — the 'golden cross.' Note how both averages lag the price; the signal arrives well after the actual low.

12.4 The Fatal Weakness — Lag

Every moving average shares one unavoidable flaw: it **lags**. Because it's an average of *past* prices, it always turns *after* the price has already moved. By the time a golden cross appears, a large part of the up-move may be over. This is the central trade-off of all smoothing: a longer average is smoother and more reliable but slower (more lag); a shorter one is faster but noisier (more false signals). There is no setting that escapes this — anyone promising a moving average that predicts turns in advance misunderstands the math. Moving averages describe the trend you're already in; they do not foresee the next one.

WATCH OUT

Whipsaws in a sideways market

Moving-average crossovers work reasonably in strong trends and *terribly* in sideways, choppy markets — where price keeps crossing back and forth, generating a stream of false buy/sell signals (“whipsaws”) that bleed you through fees and small losses. Before trusting any moving-average signal, ask whether the market is actually trending (Chapter 3). In a range, these tools are worse than useless.

KEY TAKEAWAYS

1. **SMA** = average of the last N closes; recomputed each period. (Worked: 5-day SMA went 22.00 → 23.00.)
2. **EMA** weights recent prices more, via $k = 2/(N+1)$; it reacts faster than the SMA.
3. **Crossovers** (golden/death cross) signal momentum shifts but are widely watched and *late*.
4. **All moving averages lag** and whipsaw in sideways markets — they describe the trend, not the future.

SELF-CHECK

1. Compute the 4-day SMA of closes 10, 12, 14, 16. Then the new value if the next close is 18.
2. What is the EMA multiplier for $N = 9$? Why does the EMA react faster than the SMA?

3. What is a golden cross, and why is it a *lagging* signal?
4. In what kind of market do moving-average crossovers fail badly, and why?

CHAPTER THIRTEEN

RSI & MACD

Two of the most popular momentum indicators, demystified with their actual formulas. The RSI measures how overbought or oversold a stock is; the MACD measures the momentum between two moving averages. We'll compute both by hand.

IN THIS CHAPTER YOU WILL LEARN

- The RSI formula — and a full worked calculation.
- What “overbought” and “oversold” really mean (and don't).
- The MACD — how it's built from EMAs.
- Divergence — the most useful signal these give.

Where moving averages smooth price, momentum indicators measure its *speed* — how fast and forcefully price is moving. The two giants of this family are the RSI and the MACD, and both are far less mysterious once you see the arithmetic.

13.1 The RSI — Formula & Worked Calculation

The **Relative Strength Index (RSI)**, created by J. Welles Wilder, measures the magnitude of recent gains against recent losses, on a scale of 0 to 100. The formula:

$$\begin{aligned} \text{RS} &= (\text{average gain}) \div (\text{average loss}) \\ \text{RSI} &= 100 - [100 \div (1 + \text{RS})] \end{aligned}$$

It's usually computed over 14 periods. Let's work a simplified example. Suppose over 14 days the up-days and down-days summed to an **average gain of \$1.00** and an **average loss of \$0.50** per day:

WORKED CALCULATION · 14-DAY RSI

average gain = 1.00 · average loss = 0.50

RS = $1.00 \div 0.50 = 2.0$

RSI = $100 - [100 \div (1 + 2.0)]$

= $100 - [100 \div 3]$

= $100 - 33.33 = 66.7$

An RSI of 66.7 – gains have outweighed losses 2-to-1, so momentum is firmly up but not yet at the “overbought” 70 line. If average gain equalled average loss, RS = 1 and RSI = 50 (perfect balance).

STEP-BY-STEP CALCULATION · RSI(14) ON REAL AAPL DATA

Change = Close – previous Close. Gain = Change if positive else 0. Loss = -Change if negative else 0.

AvgGain and AvgLoss are Wilder-smoothed (alpha = 1/14, i.e. each day = 1/14 of the new value + 13/14 of yesterday). RS = AvgGain / AvgLoss. RSI = $100 - 100/(1+RS)$. Watch how the RSI column moves day by day as gains/losses accumulate.

Date	Close	Change	Gain	Loss	AvgGain14	AvgLoss14	RS	RSI14
06 Jun	179.21	-0.3700	0.0000	0.3700	0.5689	0.2494	2.28	69.52
07 Jun	177.82	-1.39	0.0000	1.39	0.5283	0.3309	1.60	61.49
08 Jun	180.57	2.75	2.75	-0.0000	0.6870	0.3073	2.24	69.10
09 Jun	180.96	0.3900	0.3900	-0.0000	0.6658	0.2853	2.33	70.00
12 Jun	183.79	2.83	2.83	-0.0000	0.8204	0.2649	3.10	75.59
13 Jun	183.31	-0.4800	0.0000	0.4800	0.7618	0.2803	2.72	73.10
14 Jun	183.95	0.6400	0.6400	-0.0000	0.7531	0.2603	2.89	74.32
15 Jun	186.01	2.06	2.06	-0.0000	0.8464	0.2417	3.50	77.79
16 Jun	184.92	-1.09	0.0000	1.09	0.7860	0.3023	2.60	72.22
20 Jun	185.01	0.0900	0.0900	-0.0000	0.7362	0.2807	2.62	72.40
21 Jun	183.96	-1.05	0.0000	1.05	0.6837	0.3356	2.04	67.07

Date	Close	Change	Gain	Loss	AvgGain14	AvgLoss14	RS	RSI14
22 Jun	187.00	3.04	3.04	-0.0000	0.8520	0.3117	2.73	73.22
23 Jun	186.68	-0.3200	0.0000	0.3200	0.7911	0.3123	2.53	71.70
26 Jun	185.27	-1.41	0.0000	1.41	0.7346	0.3907	1.88	65.28
27 Jun	188.06	2.79	2.79	-0.0000	0.8814	0.3628	2.43	70.84
28 Jun	189.25	1.19	1.19	-0.0000	0.9035	0.3368	2.68	72.84
29 Jun	189.59	0.3400	0.3400	-0.0000	0.8632	0.3128	2.76	73.40
30 Jun	193.97	4.38	4.38	-0.0000	1.11	0.2904	3.84	79.33

 Download the full workbook (33+ rows, with formulas in the ReadMe sheet) → [rsi_calculation.xlsx](#)

HOW TO USE THIS IN PRACTICE

Trading with RSI

1. **Trend bias first:** in an uptrend (Close > 200-day MA), use RSI dips below 40-50 as *buy* opportunities, not overbought signals. In a downtrend, use RSI rallies above 50-60 as *sell* opportunities. RSI levels mean different things in different trends.
2. **Don't sell on first hit of 70.** In strong uptrends, RSI can pin above 70 for weeks — the SPY 2021 rally is an example. Wait for divergence (next).
3. **The divergence signal — bearish:** price makes a higher high, RSI makes a lower high. This is the warning. Confirm with a break of a recent swing low before acting.
4. **The divergence signal — bullish:** price makes a lower low, RSI makes a higher low. The setup at most major market bottoms (March 2009, March 2020).
5. **Combine with support/resistance:** RSI below 30 at a known support level + bullish reversal candle = high-quality long setup. Standalone RSI<30 is mediocre.

13.2 Overbought & Oversold — and the Catch

By convention, an RSI above 70 is called “overbought” (price has risen fast, perhaps due a pullback) and below 30 “oversold” (fallen fast, perhaps due a bounce). The naïve reading — “sell at 70, buy at 30” — is

dangerous, and here's the catch every beginner learns painfully: **in a strong trend, RSI can stay overbought or oversold for a very long time.** A roaring stock can sit above 70 for weeks while it keeps climbing; selling the first time it hit 70 would have cost you the whole run. Overbought is not “sell”; it's “momentum is strong and stretched.” Context (the trend, Chapter 3) decides what to do with that.

13.3 The MACD

The **MACD** (Moving Average Convergence Divergence), built by Gerald Appel, measures the relationship between two EMAs. It has three parts:

$$\begin{aligned}\text{MACD line} &= \text{EMA}_{12} - \text{EMA}_{26} \\ \text{Signal line} &= \text{EMA}_9 \text{ of the MACD line} \\ \text{Histogram} &= \text{MACD line} - \text{Signal line}\end{aligned}$$

The MACD line is just the difference between a fast (12-period) and slow (26-period) EMA — so it's positive when the fast average is above the slow (upward momentum) and negative when below. Let's compute the MACD line from two EMAs: say the 12-EMA is **\$51.20** and the 26-EMA is **\$49.80**:

WORKED CALCULATION · MACD LINE

$$\begin{aligned}\text{MACD line} &= \text{EMA}_{12} - \text{EMA}_{26} \\ &= 51.20 - 49.80 = \mathbf{+1.40}\end{aligned}$$

Positive (+1.40) → the fast average is above the slow → upward momentum. When the MACD line crosses above its signal line (the 9-EMA of itself), it's a bullish trigger; crossing below, bearish. The histogram (their difference) shows the momentum growing or shrinking.

STEP-BY-STEP CALCULATION · MACD ON REAL AAPL DATA

EMA12 and EMA26 are both inputs; MACD line = EMA12 – EMA26; Signal = 9-period EMA of MACD; Histogram = MACD – Signal.

Date	Close	EMA12	EMA26	MACD	Signal	Histogram
06 Jun	179.21	177.05	175.14	1.91	1.23	0.6804
07 Jun	177.82	177.17	175.34	1.83	1.35	0.4807
08 Jun	180.57	177.69	175.73	1.96	1.47	0.4936
09 Jun	180.96	178.19	176.11	2.08	1.59	0.4872
12 Jun	183.79	179.05	176.68	2.37	1.75	0.6238
13 Jun	183.31	179.71	177.17	2.54	1.91	0.6302
14 Jun	183.95	180.36	177.67	2.69	2.06	0.6246
15 Jun	186.01	181.23	178.29	2.94	2.24	0.7010
16 Jun	184.92	181.80	178.78	3.01	2.39	0.6222
20 Jun	185.01	182.29	179.24	3.05	2.52	0.5242
21 Jun	183.96	182.55	179.59	2.95	2.61	0.3452
22 Jun	187.00	183.23	180.14	3.09	2.71	0.3852
23 Jun	186.68	183.76	180.63	3.14	2.79	0.3449
26 Jun	185.27	184.00	180.97	3.02	2.84	0.1862
27 Jun	188.06	184.62	181.50	3.12	2.90	0.2291
28 Jun	189.25	185.33	182.07	3.26	2.97	0.2935
29 Jun	189.59	185.99	182.63	3.36	3.05	0.3132
30 Jun	193.97	187.22	183.47	3.75	3.19	0.5608

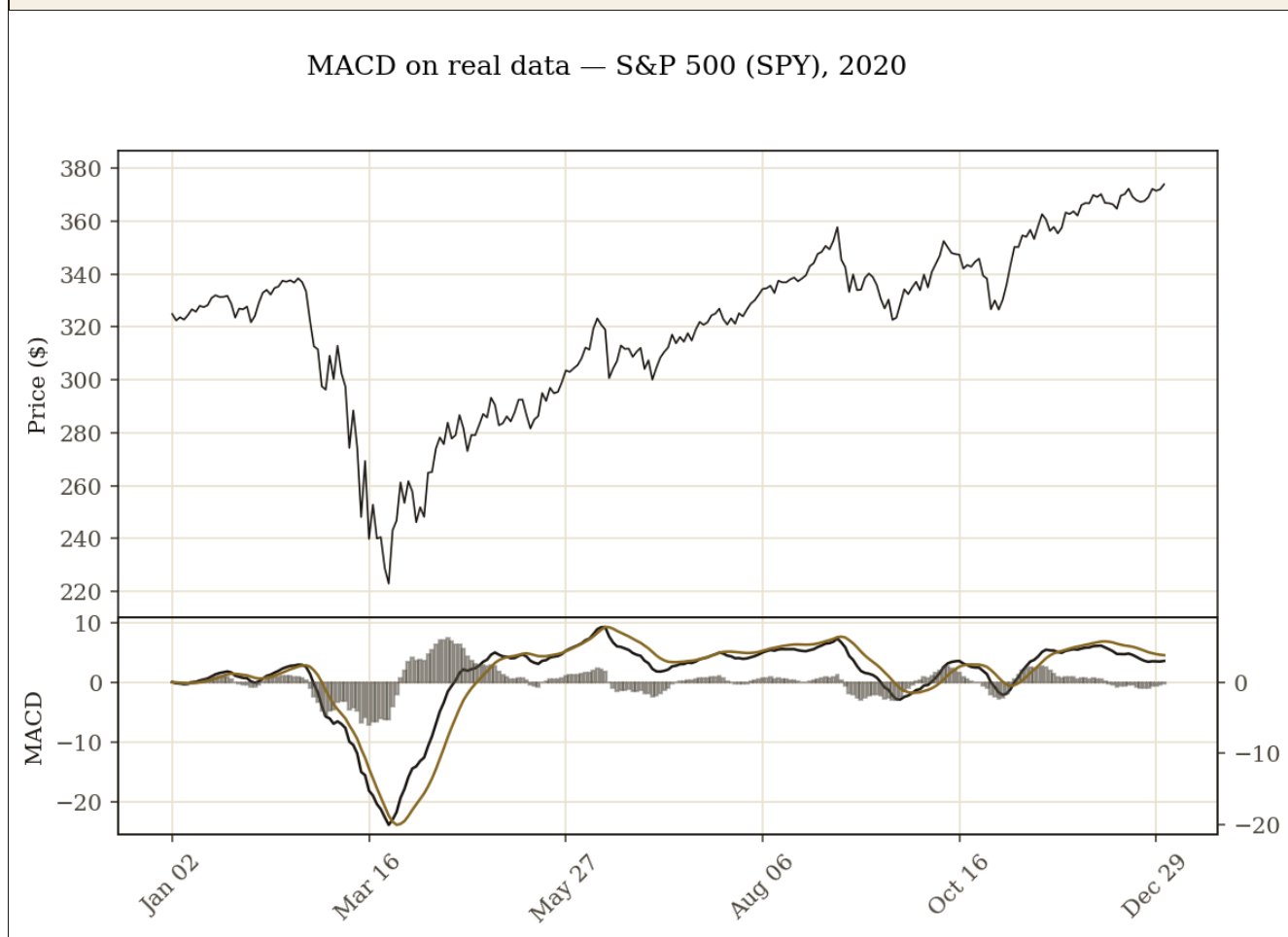
 Download the full workbook (33+ rows, with formulas in the ReadMe sheet) → [macd_calculation.xlsx](#)

HOW TO USE THIS IN PRACTICE

Trading with MACD

- Trend bias:** when MACD line is above zero, the medium-term trend is up; below zero, down.
Only take trades aligned with the bias.
- Entry signal:** bullish — MACD crosses *above* its Signal line while both are below zero (early in a reversal); bearish — the mirror, both above zero.
- Confirmation:** the histogram should be expanding in the direction of the trade for at least 2-3 bars. Shrinking histogram = momentum dying.

4. **Divergence is the prize signal:** price makes a new high but MACD makes a lower high → the rally is weak; reduce position or take profits.
5. **Avoid:** trading MACD crossovers in tight sideways markets — too many whipsaws. Pair with $ADX > 25$ or a clear trend.

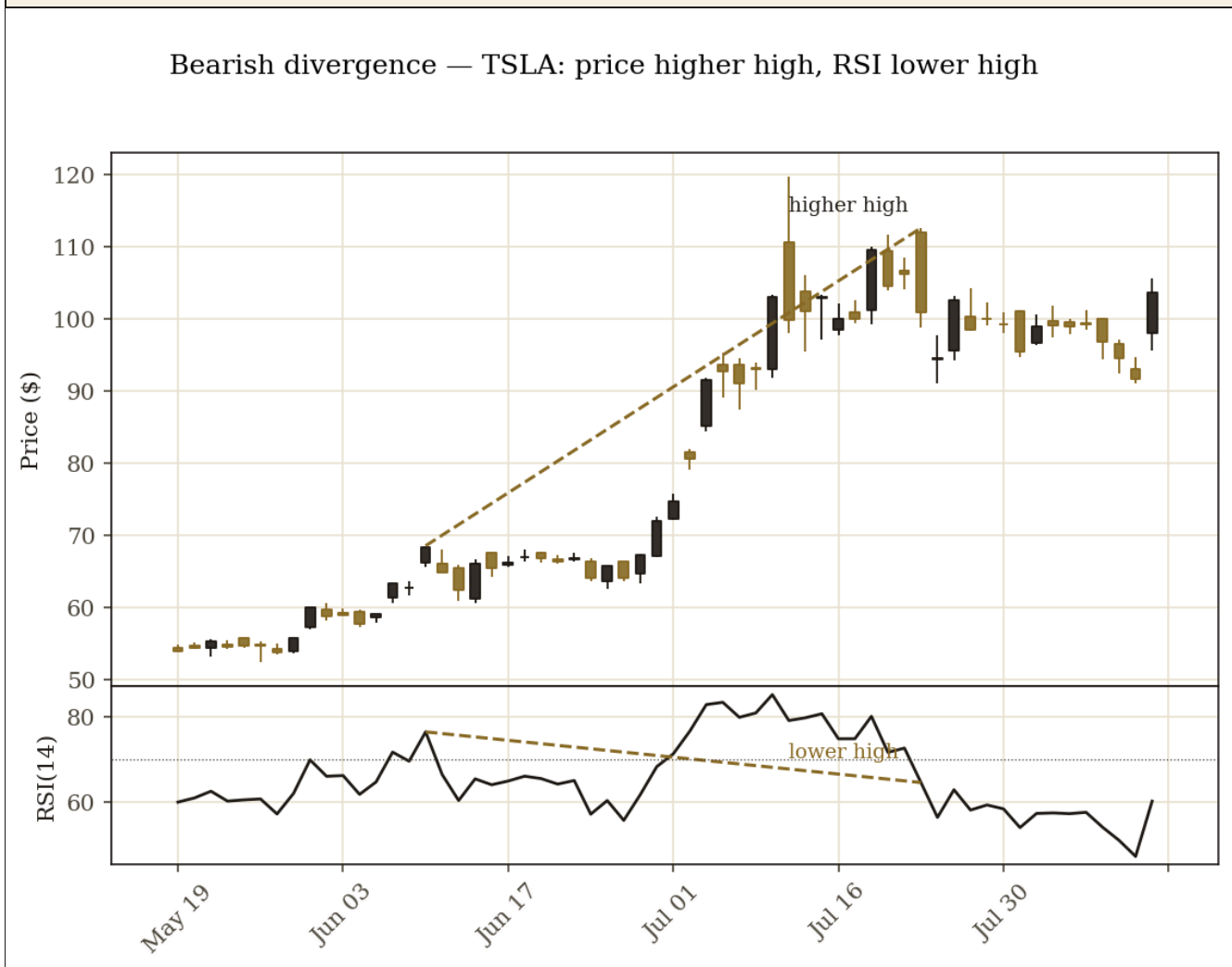
FIGURE 13.2 · MACD ON REAL DATA — S&P 500, 2020

The MACD, on real prices. Real SPY data through 2020. The lower panel shows the MACD line (dark) and its signal line (gold); the bars are the histogram of their difference. Crossings of the two lines, and the histogram flipping sign, are the classic momentum triggers — note how they cluster around the real turning points.

13.4 Divergence — the Real Prize

The most genuinely useful signal both indicators give is **divergence** — when the indicator disagrees with price. *Bearish divergence*: price makes a higher high, but RSI (or MACD) makes a *lower high* — the new price peak came with *less* momentum, a warning the uptrend is tiring. *Bullish divergence* is the mirror: price makes a lower low but the indicator makes a higher low, hinting the downtrend is losing force. Divergence is the closest these indicators come to an early warning — because it reveals weakening momentum *beneath* a price that still looks healthy. Even so, like everything in this book, it fails often and needs confirmation.

FIGURE 13.1 · REAL BEARISH DIVERGENCE — TESLA, 2020



The tell beneath the surface. Real TSLA data: price pushes to a higher high while the RSI (lower panel) makes a lower high — momentum quietly weakening beneath a rising price. This divergence is the most prized warning these indicators give, and it is still only a probability.

WATCH OUT

“Overbought” is not a sell signal

The most expensive RSI mistake is reflexively shorting or selling every time RSI crosses 70. In a powerful bull move, RSI can remain pinned above 70 for weeks while the stock doubles — and the trader who “sold the overbought signal” watches the rocket leave without them, or worse, shorts it and gets crushed. Strong momentum *stays* strong longer than feels reasonable. Use these levels as information about momentum, never as automatic commands.

13.5 The Broader Oscillator Family

RSI and MACD are not the only momentum oscillators worth knowing. Several others share the same diagnostic logic — measuring the speed of price change — but with subtly different constructions and personalities.

The Stochastic Oscillator (George Lane, late 1950s). Where RSI compares average gains to average losses, the Stochastic asks a different question: *where in its recent range is the price closing?* Two lines:

$$\begin{aligned}\%K &= 100 \times (\text{Close} - \text{lowest low}_N) \div (\text{highest high}_N - \text{lowest low}_N) \\ \%D &= \text{3-period SMA of \%K}\end{aligned}$$

Standard setting is 14/3/3. Like RSI, readings above 80 are “overbought” and below 20 “oversold” — and like RSI, in strong trends the indicator can pin near an extreme for weeks without reversing (Chapter 13.2). The classic signal is a crossover of %K and %D in an extreme zone, ideally with bullish or bearish *divergence* from price. The “fast” stochastic is just %K alone; the “slow” stochastic smooths %K into %D and applies another 3-period SMA on top — slower but less prone to whipsaw.

STEP-BY-STEP CALCULATION · STOCHASTIC ON REAL AAPL DATA

%K_{raw} measures where the close sits within the 14-day high-low range. The “slow” %K is a 3-day SMA of %K_{raw}. %D is a 3-day SMA of %K — it acts as a signal line. The full triplet (14,3,3) is the standard.

Date	Close	Low14	High14	%K_raw	%K	%D
08 Jun	180.57	170.52	184.95	69.64	60.24	63.45
09 Jun	180.96	170.52	184.95	72.34	64.19	60.82
12 Jun	183.79	170.52	184.95	91.95	77.98	67.47
13 Jun	183.31	170.52	184.95	88.63	84.31	75.49
14 Jun	183.95	171.69	184.95	92.45	91.01	84.43
15 Jun	186.01	173.11	186.52	96.20	92.43	89.25
16 Jun	184.92	176.57	186.99	80.13	89.59	91.01
20 Jun	185.01	176.76	186.99	80.65	85.66	89.23
21 Jun	183.96	176.93	186.99	69.88	76.89	84.05
22 Jun	187.00	177.32	187.04	99.54	83.35	81.97
23 Jun	186.68	177.32	187.56	91.41	86.94	82.39
26 Jun	185.27	177.32	188.05	74.09	88.34	86.21
27 Jun	188.06	177.32	188.39	97.02	87.51	87.60
28 Jun	189.25	177.46	189.90	94.77	88.63	88.16
29 Jun	189.59	180.63	190.07	94.92	95.57	90.57
30 Jun	193.97	180.97	194.48	96.23	95.31	93.17

 Download the full workbook (33+ rows, with formulas in the ReadMe sheet) → [stochastic_calculation.xlsx](#)

HOW TO USE THIS IN PRACTICE

Trading with Stochastic

1. **Setting:** standard (14,3,3) for daily charts. Use (5,3,3) for intraday if you want faster signals.
2. **Buy signal:** in an uptrend, %K crosses above %D while both are below 20 (oversold pull-back inside an uptrend).
3. **Sell signal:** in a downtrend, %K crosses below %D while both are above 80.
4. **Like RSI, don't sell purely on overbought.** Use divergence as the real signal: price higher high, Stochastic lower high.
5. **The 'stochastic pop':** price breaks out and Stochastic stays above 80 — Lane (the inventor) said this is a momentum continuation signal, not a sell.

Williams %R (Larry Williams). Conceptually similar to a Stochastic %K but plotted on an inverted scale of 0 to -100. Above -20 is overbought; below -80 is oversold. Used identically to Stochastic; mostly a question of personal preference.

Commodity Channel Index (CCI) (Donald Lambert, 1980). Measures how far the current price is from a statistical average of recent prices, normalised by mean deviation. Unbounded above and below, but readings above +100 are extreme positive momentum and below -100 extreme negative. Originally designed for commodities but widely used on stocks. Particularly useful for catching breakouts as CCI crosses the ± 100 line.

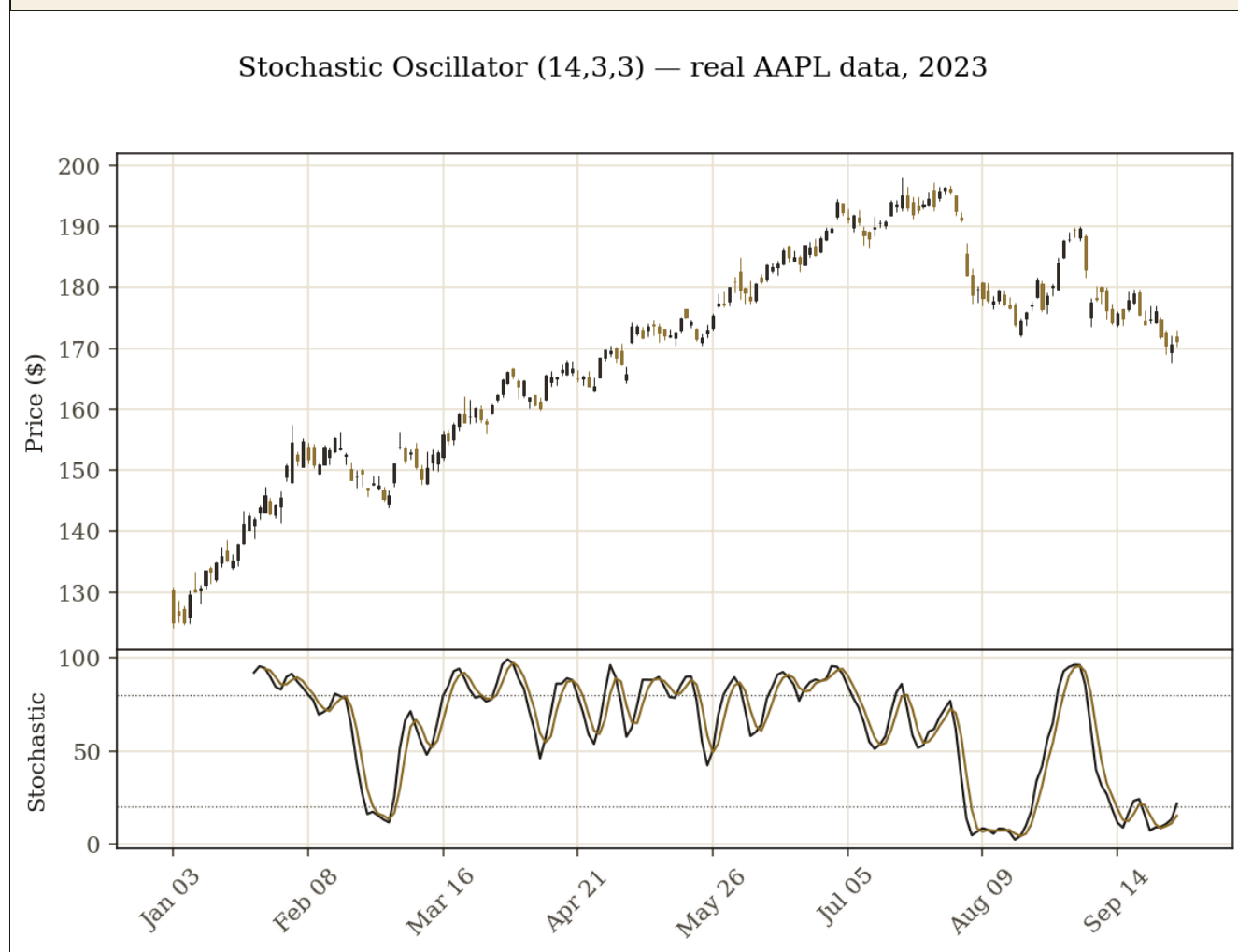
Rate of Change (ROC). The simplest momentum indicator — the percentage change in price over the past N periods:

$$\text{ROC} = 100 \times (\text{Close} - \text{Close}_{N \text{ periods ago}}) \div \text{Close}_{N \text{ periods ago}}$$

Positive when momentum is up; negative when down. Used primarily for divergence analysis and crossings of the zero line.

Awesome Oscillator (AO) (Bill Williams). The difference between a 5-period and a 34-period simple moving average of the median price $(\text{high} + \text{low})/2$, plotted as a histogram. Crossings of the zero line signal momentum changes; “twin peaks” patterns above and below zero are Bill Williams' specific entry triggers.

ADX (Average Directional Index) — by J. Welles Wilder (1978). Unlike the others, ADX is *not* directional — it measures only the *strength* of a trend on a 0–100 scale, regardless of direction. The standard thresholds: ADX below 20 = weak or no trend (range-bound conditions, where trend-following tools whipsaw); ADX above 25–30 = trending market (where trend-following tools earn their keep). Paired with two directional companions, +DI and -DI, that indicate which side is in control. ADX is the technician's filter — telling you *when* to deploy a moving-average crossover system and when to stand aside.

FIGURE 13.3 · STOCHASTIC OSCILLATOR ON REAL DATA — AAPL, 2023

Lane's stochastic, on a real chart. AAPL through 2023, with the standard 14/3/3 Stochastic in the lower panel. Dotted lines mark 80 (overbought) and 20 (oversold). Notice the same lesson as RSI: in the strong early-2023 rally, the Stochastic pinned near the top for weeks — selling the first 80-crossing would have cost the entire run. Divergence at major swing turns is where this indicator earns its keep.

One unifying principle, repeated from Chapter 15: stacking five oscillators tells you barely more than picking one good one. They all process roughly the same price action through subtly different formulas. The discipline is to choose one trend-strength tool (ADX), one momentum oscillator (RSI, Stochastic, or MACD — your pick), and stop adding more.

KEY TAKEAWAYS

1. $RSI = 100 - 100/(1+RS)$, $RS = \text{avg gain} / \text{avg loss}$; 0–100 scale. (Worked: $RS\ 2.0 \rightarrow RSI\ 66.7$.)
2. **Above 70 = overbought, below 30 = oversold** — but in strong trends these persist; not auto buy/sell.
3. $MACD = EMA_{12} - EMA_{26}$, with a 9-EMA signal line and a histogram of their difference.
4. **Divergence** (price and indicator disagree) is the most useful early warning — still only probabilistic.

SELF-CHECK

1. If average gain = \$2 and average loss = \$1, compute RS and the RSI.
2. Why is selling the instant RSI hits 70 a costly habit in a strong uptrend?
3. What three components make up the MACD, and what does a positive MACD line mean?
4. Describe bearish divergence and why it's a warning.

CHAPTER FOURTEEN

Bollinger Bands & ATR — Measuring Volatility

The indicators so far measured trend and momentum. These two measure volatility — how much price is bouncing around — which is the key to setting sensible targets and, above all, sensible stop-losses. Again, with the real math.

IN THIS CHAPTER YOU WILL LEARN

- Bollinger Bands — built from a moving average and standard deviation.
- The “squeeze” and what band-width tells you.
- The Average True Range (ATR) — and a worked calculation.
- Why volatility, not prediction, is what these are for.

Volatility is how much price moves, regardless of direction. It matters enormously: the same \$1 move is huge for a calm stock and trivial for a wild one. These two indicators put a number on it.

14.1 Bollinger Bands

Bollinger Bands, devised by John Bollinger, wrap price in a channel built from a moving average and *standard deviation* (a statistical measure of spread). Three lines:

Middle band = 20-period SMA

Upper band = SMA + (2 × standard deviation)

Lower band = SMA - (2 × standard deviation)

Because the bands are set two standard deviations from the average, price stays *inside* them most of the time (statistically, about 95% for normally-distributed data). Let's compute the bands given a 20-day SMA of \$100 and a standard deviation of \$4:

WORKED CALCULATION · BOLLINGER BANDS

Middle band = **\$100.00** (the 20-day SMA)

$2 \times \text{std dev} = 2 \times 4 = 8$

Upper band = $100 + 8 = \mathbf{\$108.00}$

Lower band = $100 - 8 = \mathbf{\$92.00}$

Price will spend most of its time between \$92 and \$108. The bands automatically widen when volatility (std dev) rises and pinch in when it falls – so the channel itself is a volatility gauge.

STEP-BY-STEP CALCULATION · BOLLINGER BANDS(20, 2Σ) ON REAL AAPL DATA

MA20 = 20-day moving average. StdDev20 = standard deviation of last 20 closes. UpperBand = MA20 + 2×StdDev. LowerBand = MA20 – 2×StdDev. %B = (Close – Lower)/(Upper – Lower); 1.0 = touching upper band, 0 = touching lower, 0.5 = at the middle MA. Watch how bands widen during high volatility and contract during quiet periods (the "squeeze").

Date	Close	MA20	StdDev20	UpperBand	LowerBand	%B
06 Jun	179.21	174.95	3.07	181.10	168.81	0.8461
07 Jun	177.82	175.26	3.04	181.34	169.17	0.7107
08 Jun	180.57	175.61	3.23	182.07	169.14	0.8837
09 Jun	180.96	175.97	3.41	182.79	169.14	0.8657
12 Jun	183.79	176.53	3.73	183.99	169.07	0.9864
13 Jun	183.31	177.09	3.87	184.83	169.35	0.9019
14 Jun	183.95	177.69	3.97	185.62	169.75	0.8947
15 Jun	186.01	178.35	4.20	186.74	169.96	0.9563
16 Jun	184.92	178.84	4.37	187.57	170.11	0.8480
20 Jun	185.01	179.34	4.48	188.30	170.37	0.8165
21 Jun	183.96	179.82	4.42	188.67	170.98	0.7337

Date	Close	MA20	StdDev20	UpperBand	LowerBand	%B
22 Jun	187.00	180.60	4.25	189.10	172.10	0.8767
23 Jun	186.68	181.34	3.92	189.18	173.49	0.8404
26 Jun	185.27	181.95	3.48	188.92	174.99	0.7380
27 Jun	188.06	182.58	3.38	189.35	175.82	0.9047
28 Jun	189.25	183.18	3.45	190.09	176.27	0.9392
29 Jun	189.59	183.80	3.44	190.68	176.92	0.9207
30 Jun	193.97	184.49	4.01	192.51	176.48	1.09

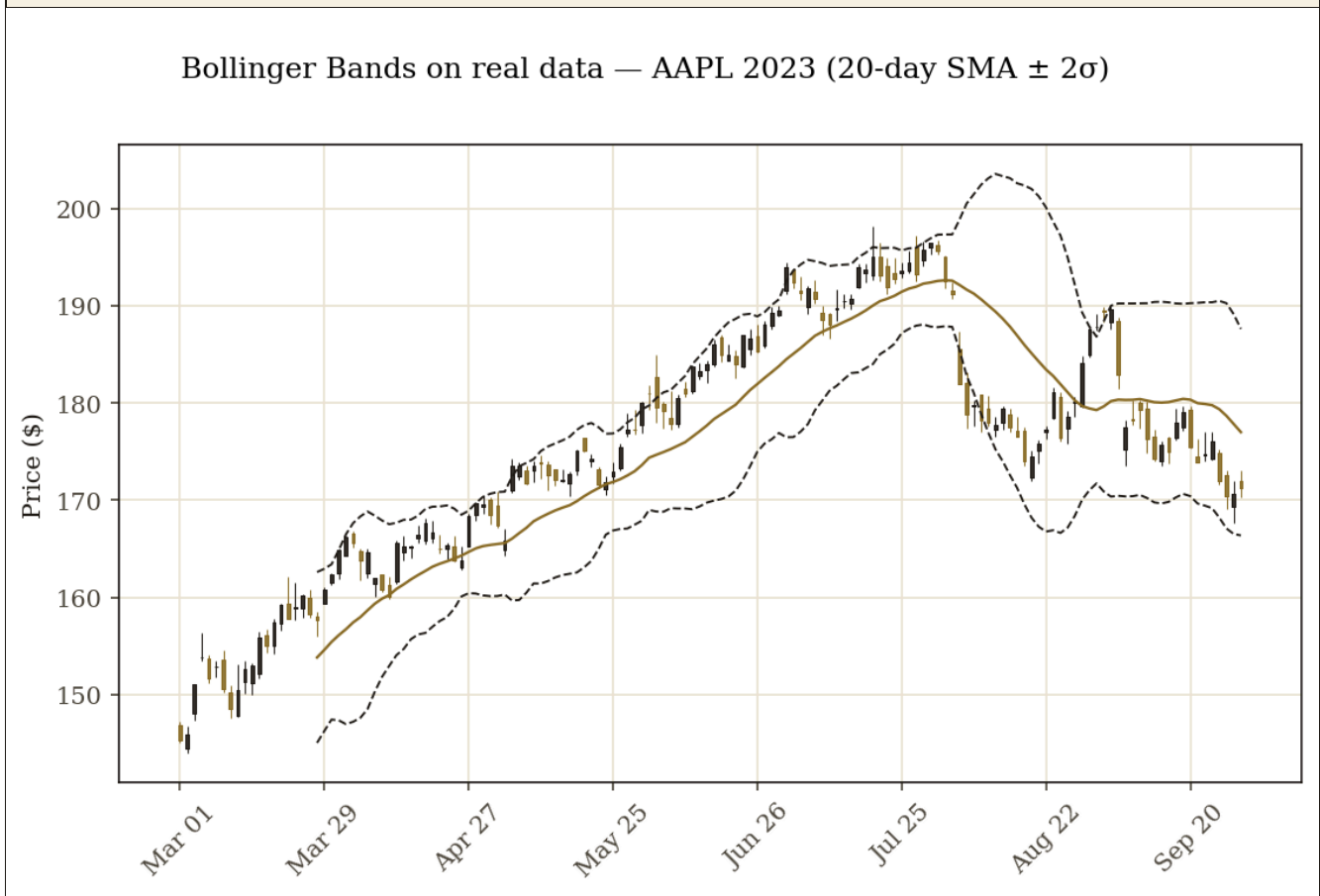
 Download the full workbook (33+ rows, with formulas in the ReadMe sheet) → [bollinger_calculation.xlsx](#)

HOW TO USE THIS IN PRACTICE

Trading with Bollinger Bands

1. **The squeeze setup:** when band-width contracts (StdDev gets very small), volatility is at a low. A breakout in *either* direction usually follows. Don't predict direction; wait for the breakout candle, then trade with it.
2. **Mean-reversion in ranges:** in a sideways market, price touches the upper band → consider short; touches the lower band → consider long. Targets back to the middle MA.
3. **Don't fade in trends.** In a strong uptrend, price can 'ride the upper band' for weeks — shorting upper-band touches loses money fast. Use ADX > 25 to identify trending vs ranging.
4. **%B as a single number:** %B above 1 = above upper band (extreme); %B below 0 = below lower band; %B near 0.5 = at the mean.
5. **Combine with RSI:** upper-band touch + RSI > 70 = stronger overbought signal than either alone.

Two common readings: when price tags the upper band it's *relatively* high (and vice versa) — but, exactly like RSI, “riding the band” can persist in a strong trend, so this is not an automatic sell. More useful is the **squeeze**: when the bands pinch very tight, volatility has collapsed — and periods of low volatility tend to be followed by a sharp expansion (a big move). The squeeze doesn't tell you *which* way, only that a move is likely coming.

FIGURE 14.1B · BOLLINGER BANDS ON REAL DATA — APPLE, 2023

The bands breathe with volatility. Real AAPL data: the gold line is the 20-day average, the dashed lines are ± 2 standard deviations. Watch the channel widen when the stock moves sharply and pinch when it calms — the pinch ('squeeze') often precedes a big move, though it never says which way.

14.2 The Average True Range (ATR)

The **Average True Range**, another Wilder creation, measures volatility directly as the average size of a period's price range. First the "true range" (TR) of one period — the greatest of three distances, so that gaps are counted:

$$\text{TR} = \max \text{ of: } (\text{High} - \text{Low}), |\text{High} - \text{prev Close}|, |\text{Low} - \text{prev Close}|$$

$$\text{ATR} = \text{average of TR over } N \text{ periods (usually 14)}$$

Let's compute one period's TR. Today's high is \$53, low \$50, and yesterday's close was \$49:

WORKED CALCULATION · TRUE RANGE, THEN ATR

$$\text{High} - \text{Low} = 53 - 50 = 3$$

$$|\text{High} - \text{prevClose}| = |53 - 49| = 4$$

$$|\text{Low} - \text{prevClose}| = |50 - 49| = 1$$

TR = max(3, 4, 1) = **\$4.00** (the gap up from 49 made the true range bigger than the simple high-low)

Do this each day and average over 14 days → the ATR. If the 14-day ATR is, say, \$2.50, this stock typically moves about \$2.50 per day. That single number is gold for stop-losses (next).

STEP-BY-STEP CALCULATION · ATR(14) ON REAL AAPL DATA

TrueRange = max(High-Low, |High-PrevClose|, |Low-PrevClose|) — counts overnight gaps. ATR = Wilder-smoothed 14-day average of TrueRange (alpha = 1/14). ATR is in dollars (price units) — directly usable for stop placement.

Date	High	Low	Close	PrevClose	HL	HC	LC	TrueRange	ATR14
06 Jun	180.12	177.43	179.21	179.58	2.69	0.5400	2.15	2.69	2.56
07 Jun	181.21	177.32	177.82	179.21	3.89	2.00	1.89	3.89	2.66
08 Jun	180.84	177.46	180.57	177.82	3.38	3.02	0.3600	3.38	2.71
09 Jun	182.23	180.63	180.96	180.57	1.60	1.66	0.0600	1.66	2.63
12 Jun	183.89	180.97	183.79	180.96	2.92	2.93	0.0100	2.93	2.65
13 Jun	184.15	182.44	183.31	183.79	1.71	0.3600	1.35	1.71	2.59
14 Jun	184.39	182.02	183.95	183.31	2.37	1.08	1.29	2.37	2.57
15 Jun	186.52	183.78	186.01	183.95	2.74	2.57	0.1700	2.74	2.58
16 Jun	186.99	184.27	184.92	186.01	2.72	0.9800	1.74	2.72	2.59
20 Jun	186.10	184.41	185.01	184.92	1.69	1.18	0.5100	1.69	2.53
21 Jun	185.41	182.59	183.96	185.01	2.82	0.4000	2.42	2.82	2.55
22 Jun	187.04	183.67	187.00	183.96	3.38	3.08	0.2900	3.38	2.61
23 Jun	187.56	185.01	186.68	187.00	2.55	0.5600	1.99	2.55	2.60
26 Jun	188.05	185.23	185.27	186.68	2.82	1.37	1.45	2.82	2.62

Date	High	Low	Close	PrevClose	HL	HC	LC	TrueRange	ATR14
27 Jun	188.39	185.67	188.06	185.27	2.72	3.12	0.4000	3.12	2.66
28 Jun	189.90	187.60	189.25	188.06	2.30	1.84	0.4600	2.30	2.63
29 Jun	190.07	188.94	189.59	189.25	1.13	0.8200	0.3100	1.13	2.52
30 Jun	194.48	191.26	193.97	189.59	3.22	4.89	1.67	4.89	2.69

 Download the full workbook (33+ rows, with formulas in the ReadMe sheet) → [atr_calculation.xlsx](#)

HOW TO USE THIS IN PRACTICE

Using ATR for stops and sizing

1. **Stop-loss placement:** set stop at $Entry - 1.5 \times ATR$ for swing trades, or $Entry - 2 \times ATR$ for trend trades. This gives the trade room to breathe through normal volatility.
2. **Position size:** $shares = (Account \times Risk\%) \div (1.5 \times ATR)$. With a \$50,000 account, 1% risk, and ATR of \$4, that's $\$500 \div \$6 = 83$ shares. Risk-adjusted position sizing.
3. **Target setting:** for a 1:3 risk-reward, $target = Entry + 4.5 \times ATR$ (when stop is $1.5 \times ATR$ away). The targets scale with current volatility, not arbitrary numbers.
4. **Volatility regime check:** if ATR is rising sharply, the market is becoming more dangerous — consider reducing position size or standing aside.
5. **Across instruments:** ATR normalises risk. \$4 ATR on a \$200 stock is 2%; \$4 ATR on a \$20 stock is 20% — sizing by ATR makes the dollar risk equivalent.

14.3 Volatility, Not Prediction

Crucially, neither of these predicts *direction* — they measure *magnitude*. That's exactly why they're so practical for **risk management** (Chapter 17). If a stock's ATR is \$2.50, placing your stop-loss only \$0.50 away is foolish — normal daily noise will stop you out for no reason. Sizing your stop relative to ATR (say, $1.5 \times$ or $2 \times$ ATR away) means you're giving the trade room to breathe through normal volatility while still capping your loss. Used this way — to *measure risk* rather than to *predict price* — volatility indicators are among the most genuinely useful tools in this entire book.

In Plain Terms · why volatility beats prediction

Most of this book has warned that prediction is unreliable. Volatility indicators are refreshing because they don't pretend to predict — they measure something real and current (how much this thing moves) and let you *size your risk to it*. A trader who can't forecast direction at all can still survive and even thrive by managing volatility well: small positions in wild instruments, stops set beyond the noise, never risking more than a sliver on any one bet. That's the quiet secret of the pros — risk control, not crystal balls.

14.4 Keltner and Donchian Channels

Bollinger Bands are the most famous volatility channel, but two other channel systems deserve a place in the toolkit.

Keltner Channels — originally Chester Keltner (1960), modernised by Linda Bradford Raschke. Like Bollingers, they plot a centre line with an upper and lower band, but the bands are built from *ATR* rather than standard deviations:

Centre line = 20-period EMA

Upper band = EMA + (2 × ATR)

Lower band = EMA - (2 × ATR)

Because ATR moves more smoothly than standard deviation, Keltner Channels are less reactive to brief volatility spikes than Bollinger Bands — they fan out more gradually, and price touches the bands less often. Some traders prefer this for cleaner trend identification: a sustained close above the upper Keltner band indicates a real breakout (less prone to one-day volatility false alarms).

The “Squeeze” — Bollinger Inside Keltner. An influential setup popularised by John Carter (*Mastering the Trade*, 2005) uses both systems together. When the Bollinger Bands contract *inside* the Keltner Channels — that is, the price's standard deviation has fallen below ATR-scaled levels — the market has compressed to a quiet, low-volatility state. Carter's claim: such squeezes are typically resolved by a sharp move out in one direction, since volatility tends to mean-revert (Chapter 14.3). The squeeze identifies *when* a move is coming; the direction must be inferred from other tools.

Donchian Channels (Richard Donchian, 1960s) take an entirely different approach. The bands are simply the *highest high* and *lowest low* over the past N periods:

Upper Donchian = highest high over past N periods

Lower Donchian = lowest low over past N periods

Middle = (upper + lower) ÷ 2

A 20-day Donchian channel is the workhorse of trend-following: a close above the upper band is a new 20-day high — a classic breakout buy. A close below the lower band is a 20-day low — a classic sell. Donchian's own “4-week rule” (a 20-day system) was one of the earliest documented mechanical trend-following systems. The famous *Turtle Traders*, trained by Richard Dennis in the 1980s, used a Donchian-channel system as the heart of their multi-million-dollar returns: enter on a 20-day breakout, exit on a 10-day breakout against you. It is the simplest, cleanest expression of trend-following in technical analysis.

KEY TAKEAWAYS

1. **Bollinger Bands** = 20-SMA ± 2 standard deviations; price stays inside most of the time. (Worked: \$92–\$108.)
2. A “squeeze” (tight bands) signals low volatility, often before a big move — direction unknown.
3. **ATR** averages the “true range” (which counts gaps) to measure how much price moves per period.
4. **These measure magnitude, not direction** — their best use is sizing stop-losses to a stock's volatility.

SELF-CHECK

1. Given a 20-SMA of \$50 and a standard deviation of \$3, compute the upper and lower Bollinger Bands.
2. What does a Bollinger “squeeze” tell you — and what does it *not* tell you?
3. Compute the true range if today's high is \$30, low is \$27, and yesterday's close was \$25.

4. Why is ATR so useful for setting a stop-loss?

CHAPTER FIFTEEN

Using Indicators Wisely

Now you know how the main indicators are built. This short, vital chapter is about not fooling yourself with them — the discipline that separates a useful toolkit from a cluttered dashboard of self-deception.

IN THIS CHAPTER YOU WILL LEARN

- Why all indicators are derived from price (and what that implies).
- The danger of “indicator overload.”
- The trap of curve-fitting and optimisation.
- How to choose a small, complementary set.

Indicators are tools, and like any tool they can build or harm depending on the hand. The errors in this chapter are subtle, common, and quietly ruinous — and avoiding them matters more than knowing ten more indicators.

15.1 They All Come From Price

Here is a truth that reframes everything: **every indicator is just a mathematical transformation of price (and sometimes volume)**. RSI, MACD, moving averages, Bollinger Bands — they all take the same raw price data and re-package it. This means no indicator contains *new* information; it only makes some aspect of price easier to see. It also means indicators inevitably *lag* (they're computed from prices that already happened) and that stacking many of them gives a false sense of confirmation — they're all echoing the same price, like asking five translations of one sentence and mistaking the agreement for independent evidence.

15.2 Indicator Overload

Beginners, hungry for certainty, pile indicator upon indicator until the chart is a tangle of coloured lines — and then freeze, because the indicators inevitably contradict each other (one says buy, another sell). This **indicator overload** (or “analysis paralysis”) is one of the most common ways traders sabotage themselves. Since all indicators derive from price, ten of them tell you barely more than two well-chosen ones. Less is genuinely more. The seasoned trader's chart is usually *clean*.

15.3 The Curve-Fitting Trap

The most insidious error is **curve-fitting** (over-optimisation). It's tempting to tweak an indicator's settings until it would have produced perfect signals on *past* data — a 13.5-day RSI with a 68.3 threshold that nailed every turn last year. But a setting tuned to fit the past almost always fails on the future, because it was fitted to that period's *noise*, not to any real, repeating behaviour. The market's randomness guarantees that with enough tweaking you can “explain” any history; that explanation has zero predictive power. Beware any system, or any seller of systems, that looks flawless in backtest. Robust beats optimal: a simple setting that works *okay* across many conditions is worth more than a perfect one fitted to one stretch of history.

15.4 Choosing a Small, Complementary Set

The wise approach: pick a *few* indicators that measure *different* things, so each adds something the others don't. A sensible minimal kit might be one for trend (a moving average), one for momentum (RSI or MACD), and one for volatility (ATR or Bollinger Bands) — three tools answering three different questions: *which way, how strongly, and how wildly?* Adding a second momentum indicator to that set adds clutter, not insight. Combine indicators with the price-action skills of Parts I–III, keep the chart clean, and remember that the indicator is the servant of your judgement, never its replacement.

WATCH OUT**The seductive backtest**

Somewhere online, someone is selling an indicator or “system” with a backtest showing it turned \$1,000 into \$1,000,000. Assume it is curve-fitted, cherry-picked, or ignoring costs and slippage — because it almost always is. If such a system truly worked, its owner would quietly use it, not sell it to you for \$99. The existence of a perfect-looking backtest is, paradoxically, evidence *against* a system, not for it. Real edges are small, fragile, and hard-won — never the stuff of miracle equity curves.

KEY TAKEAWAYS

1. **All indicators derive from price** — they add no new information and inevitably lag.
2. **Indicator overload** causes contradiction and paralysis; a clean chart with a few tools beats many.
3. **Curve-fitting** (tuning settings to past data) produces flawless backtests and worthless predictions.
4. **Choose a small, complementary set** — trend, momentum, volatility — answering different questions.

SELF-CHECK

1. Why does stacking many indicators give a false sense of confirmation?
2. What is indicator overload, and why is a clean chart usually better?
3. Explain curve-fitting and why a perfect backtest is a red flag.
4. Name a sensible three-indicator kit and the question each one answers.

V

PART FIVE

Putting It Together

Tools are useless without a framework and a conscience. This final part turns technique into a disciplined approach, makes risk management the centre of everything, and ends with the honest truth about trading that almost no course will tell you.

AN APPROACH

| RISK MANAGEMENT

| THE HONEST TRUTH

CHAPTER SIXTEEN

Building a Trading Approach

A pile of patterns and indicators is not a plan. This chapter turns the tools of this book into a coherent, repeatable approach — and explains why having any consistent plan beats jumping between a hundred clever ideas.

IN THIS CHAPTER YOU WILL LEARN

- The elements of a written trading plan.
- Why a defined edge and consistency matter more than any single signal.
- The role of backtesting — and its honest limits.
- Matching your approach to your temperament and time.

Most people who lose at trading don't lose for lack of a good signal; they lose for lack of a plan — acting on impulse, changing strategy after every loss, risking too much on a hunch. A written, tested approach is the antidote, and building one is what separates a trader from a gambler.

16.1 A Written Trading Plan

A trading plan is a written document answering, in advance, every decision you'll face — so you decide with a calm mind, not in the heat of a moving market. At minimum it specifies: **what** you trade (which markets/instruments), **your edge** (the specific, repeatable setup you wait for — e.g. “a bullish engulfing at a major support level on rising volume in an uptrend”), **entry** (exactly when you buy), **exit** (both your profit target *and* your stop-loss, decided before you enter), **position size** (how much you risk per trade — Chapter 17), and **your rules** (what you will and won't do). Writing it down is not bureaucracy; it's the only way to keep your future, emotional self honest.

16.2 Edge & Consistency

An **edge** is a setup that, over many trades, makes money *on average* — not every time, but with positive expectancy across the whole series. You don't need to be right often; you need your winners to outweigh your losers (Chapter 17's math shows how a trader right only 40% of the time can still profit handsomely). The key is **consistency**: applying the *same* tested edge again and again, so the law of averages can work in your favour. The trader who hops from strategy to strategy never gives any edge the sample size it needs to pay off, and never learns whether anything works.

16.3 Backtesting — and Its Limits

Before risking money, you can **backtest** a plan: apply its rules to historical data and see how it would have performed. Done honestly, this builds confidence and reveals flaws cheaply. But heed Chapter 15's warning about curve-fitting, and add these traps: a backtest that ignores *costs* (commissions, the bid-ask spread, slippage) flatters itself badly; one tested on too few trades proves nothing; and the past is not the future — a strategy that worked in a calm bull market may die in a crash. Backtesting tells you a plan *wasn't obviously broken in the past*; it cannot promise the future. Treat a good backtest as a green light to test small with real money, never as a guarantee.

16.4 Match the Approach to Yourself

There is no single “best” style; there's only what fits *you*. **Day trading** (in and out within a day) demands hours of screen time, fast reflexes, and an iron stomach — and has the worst odds of all (Chapter 18). **Swing trading** (holding days to weeks) suits those with a job and patience. **Position trading** and long-term **investing** (Books 1–4) demand the least time and have, by far, the best odds of building real wealth. Be brutally honest about your temperament, your free time, and your tolerance for stress and loss. The approach you can actually follow calmly beats the “optimal” one that makes you anxious and impulsive.

In Plain Terms • the plan is for the future you

When you write your plan, you are calm and rational. When the market is crashing or rocketing, you will *not* be — fear and greed hijack the clearest mind. The written plan is a letter from your rational self to your panicking future self, saying “we already decided this; follow the rules.” Discretionary, in-the-moment decisions are where most accounts go to die. The whole point of a plan is to remove yourself from the decision at the exact moment you're least fit to make it.

KEY TAKEAWAYS

1. **A written plan** defines what you trade, your edge, entry, exit (target + stop), size, and rules — in advance.
2. **An edge plus consistency** beats any single signal; you needn't be right often, just profitable on average.
3. **Backtest honestly** (include costs, enough trades) — it shows a plan wasn't broken, not that it'll work.
4. **Match the style to your temperament and time** — the plan you can follow calmly is the right one.

SELF-CHECK

1. List the core elements every trading plan should specify.
2. What is an “edge,” and why does consistency matter so much?
3. Give two ways a backtest can mislead you.
4. Why does the best trading style depend on the person, not the strategy alone?

CHAPTER SEVENTEEN

Risk Management — the Real Secret

If you remember only one chapter from this book, make it this one. Professionals will tell you the truth that beginners refuse to hear: success in trading comes far more from managing risk than from predicting price. Here is the math that proves it.

IN THIS CHAPTER YOU WILL LEARN

- Why risk management — not prediction — is the real edge.
- The stop-loss, and how to place it sensibly.
- Position sizing: the 1% (or 2%) rule, worked with numbers.
- Risk-reward ratio and why you can be wrong most of the time and still win.

Every chapter so far has hedged its tools with “this is only a probability.” This is the chapter that makes peace with that uncertainty — by showing that you don't need to predict well if you manage risk well. Survival first; profit follows.

17.1 Why Risk Management Is the Edge

Here is the counter-intuitive heart of trading: you cannot control whether any trade wins, but you can completely control how much you lose when it doesn't. A trader with mediocre signals but excellent risk control will outlast and outperform a brilliant forecaster who occasionally bets too big and blows up. The single fastest way to fail is the catastrophic loss — the one oversized position that wipes out months of gains. Risk management exists to make that impossible by design. Prediction is the part you can't control; risk is the part you can — so that's where the real edge lives.

17.2 The Stop-Loss

A **stop-loss** is a predefined price at which you will exit a losing trade, no questions asked — the seatbelt of trading. Set *before* you enter, it caps your loss and removes the most dangerous moment in trading: deciding whether to sell while watching money evaporate (when fear and hope will lie to you). Place it where your trade idea is *proven wrong* — e.g. just below the support level you bought at, or beyond normal volatility using ATR (Chapter 14), not at an arbitrary round number. And once set, **honour it**; the deadliest habit in trading is moving a stop-loss further away to avoid taking the loss, turning a small, planned loss into an account-destroying one.

17.3 Position Sizing — the 1% Rule (Worked)

Position sizing answers: *how many shares should I buy?* The professional's answer flows from a rule — risk only a small fixed fraction of your account on any single trade, commonly 1% (conservative) or 2%. This caps the damage of any one loss and makes a losing streak survivable. The formula ties together your account, your risk rule, and your stop-loss:

$$\begin{aligned}\text{Risk per trade} &= \text{Account} \times \text{risk \%} \\ \text{Position size (shares)} &= \text{Risk per trade} \div (\text{Entry price} - \text{Stop price})\end{aligned}$$

Let's work it fully. Account = **\$10,000**; risk rule = 1%; you buy a stock at **\$50** and set your stop at **\$48** (a \$2 risk per share):

WORKED CALCULATION · POSITION SIZING (1% RULE)

Risk per trade = $10,000 \times 1\% = \text{\$100}$ (*the most you'll lose if stopped out*)

Risk per share = entry - stop = $50 - 48 = \text{\$2}$

Position size = $100 \div 2 = \text{50 shares}$

Capital deployed = $50 \times \$50 = \text{\$2,500}$

You buy 50 shares (\$2,500 of stock). If the stop hits at \$48, you lose $50 \times \$2 = \100 – exactly 1% of your account, as planned. Even ten losing trades in a row would cost only ~10%, leaving you very much alive to trade on.

Notice what this does: it makes your loss a *decision*, not an accident. The wider your stop, the fewer shares you buy — so risk per trade stays fixed regardless of the stock's volatility. This one discipline, applied without exception, is what keeps professionals in the game for decades.

17.4 Risk-Reward & Why You Can Be Wrong a Lot

The **risk-reward ratio** compares what you're risking to what you aim to gain. If you risk \$2 per share (entry \$50, stop \$48) to make \$6 (target \$56), that's a 1:3 risk-reward. Here's why this is liberating: with a 1:3 ratio you can be *wrong most of the time and still profit*. The math:

WORKED CALCULATION · WRONG 60% OF THE TIME, STILL WINNING

Setup: risk \$1 to make \$3 (1:3) on each trade, over 10 trades.

Win rate: only **40%** → 4 wins, 6 losses.

Wins: $4 \times (+\$3) = \mathbf{+\$12}$

Losses: $6 \times (-\$1) = \mathbf{-\$6}$

Net = $+12 - 6 = \mathbf{+\$6 \text{ profit}}$ — despite losing 60% of trades!

This is the whole game. Cut losses short, let winners run, keep risk-reward favourable – and you don't need to be a good forecaster at all. Most beginners do the exact opposite: small wins, huge losses, and a desperate need to “be right.”

WATCH OUT**The two account-killers**

Almost every blown-up trading account dies from one of two sins, both violations of this chapter. **One: moving the stop-loss** — refusing to take a small planned loss, letting it grow until it's catastrophic (the “it'll come back” lie). **Two: oversizing** — betting big on a “sure thing,” so a single loss does damage that dozens of wins can't repair. Neither has anything to do with chart-reading skill; both are failures of discipline. You can be the world's worst chart analyst and survive with good risk management — and the world's best and still die without it.

KEY TAKEAWAYS

1. **Risk management, not prediction, is the real edge** — you control your losses, not your wins.
2. A **stop-loss** set in advance (where your idea is proven wrong) caps the loss; never move it away.
3. **Position sizing (1% rule):** $\text{shares} = (\text{account} \times 1\%) \div (\text{entry} - \text{stop})$. (Worked: 50 shares, \$100 at risk.)
4. **With a 1:3 risk-reward you can be right 40% of the time and still profit** — cut losses, let winners run.

SELF-CHECK

1. Why is risk something you can control while prediction isn't?
2. Where should a stop-loss be placed, and what's the deadliest thing to do with one?
3. Account \$20,000, 2% rule, entry \$100, stop \$96 — how many shares, and what's the dollar risk?
4. Show, with numbers, how a 30% win rate can still be profitable at a 1:4 risk-reward.

CHAPTER EIGHTEEN

The Honest Truth About Trading

We end where most books won't go. You've learned the tools; now you deserve the truth about what they can realistically do for you — the truth that the industry selling courses, signals and brokerage commissions has every reason to hide.

IN THIS CHAPTER YOU WILL LEARN

- What the evidence really says about active trader returns.
- Why the odds are stacked against the short-term trader.
- The psychology that beats most people.
- How to use technical analysis sanely — and what most people should do instead.

This is the most important chapter in the book, and the one I'd most want a beginner to read. Everything before it was technique; this is wisdom. Read it twice.

18.1 What the Evidence Says

The research on active trading is remarkably consistent and remarkably grim. Across study after study, in market after market, **the large majority of active day traders lose money**, and only a tiny fraction are reliably profitable over the long run. Regulators in several countries now *require* brokers to display warnings that a majority of retail accounts lose money trading leveraged products — often 70–85% of them. This isn't pessimism; it's the documented base rate. The honest framing: short-term active trading is one of the hardest ways to make money that exists, and most who attempt it would have done better doing far less.

18.2 Why the Odds Are Stacked

The deck is stacked for structural reasons, not just skill. **Costs:** every trade pays a spread and often a commission; trade often and these compound into a serious drag — you must beat the market by enough to cover them just to break even. **Competition:** on the other side of your trade are professionals with faster data, lower costs, vast resources and, increasingly, algorithms reacting in microseconds. **Taxes:** short-term gains are often taxed more heavily than long-term holdings. **Randomness:** as Chapter 1 warned, much of what looks tradeable is noise. And **leverage** (trading with borrowed money), heavily marketed, magnifies losses as much as gains and is the single fastest route to ruin. The amateur trades against all of this at once.

CAUTIONARY TALE — VIKRAM

Vikram was a software engineer, age 33, who started day-trading during the COVID lockdown of 2020. He had time, an internet connection, and the markets were exciting. He read books, watched YouTube channels, joined Discord groups. He kept a journal. He sized positions carefully. By every measure of "doing it right," he was doing it right.

His first year he made \$4,200 on a \$20,000 account — a 21% return. The next year he made \$9,000. He was certain he had an edge. He quit his job in 2022 to trade full-time. He had saved \$80,000 to live on.

In 2022 he lost \$34,000. In 2023 he lost another \$19,000. In 2024 he gave back nearly everything he'd made. By 2025 he was returning to corporate work, \$50,000 in living expenses depleted, and with the unwelcome realisation that his "edge" had been the easy market conditions of 2020-21, not skill.

What Vikram missed: the median day-trader loses money, and two profitable years in a market bull run is not evidence of skill, it's evidence of survivor bias in your own statistics. **The lesson:** trading professionally requires not just discipline but a sustained, statistically significant edge over years of varied market conditions. Most people don't have that. The honest move is to find out before you quit your job, not after.

18.3 The Psychology That Beats Most People

Even with good tools and good risk rules, the final boss is your own mind. **Fear** makes you cut winners too early and freeze when you should act. **Greed** makes you oversize, chase, and ignore your plan. **Hope** makes you hold losers, moving the stop you swore you'd honour. **Revenge trading** — trying to win back a loss immediately — turns one bad trade into ten. The market is an engine perfectly designed to exploit these instincts, and self-control under real financial pressure is far rarer and harder than any chart skill. Most people who fail at trading don't fail at analysis; they fail at managing themselves. This is why the disciplines of Chapters 16–17 matter more than every pattern in Parts II–III combined.

RAVI — THE DAY-TRADING TEMPTATION

Ravi, now 27, has \$40,000 in his portfolio. A college friend who started day-trading is up 80% this year, posting screenshots on Instagram. The temptation to "just try it with a small amount" is enormous. Ravi opens a brokerage and prepares to allocate \$5,000.

This book stops him before he places the first trade. Chapter 18's data: the median day-trader loses money. Chapter 17's discipline: even with good signals, position-sizing and stops separate survival from ruin. Chapter 43's mistake #4 (revenge trading) and #18 (FOMO entries) describe exactly what Ravi was about to do. He closes the brokerage app, leaves the \$5,000 in his SIP, and tells his friend he'll wait to see if the 80% gain is still there in three years before changing his mind. (It won't be.)

18.4 How to Use This Book Sanely

So what should you actually *do* with everything you've learned? An honest set of conclusions:

- **For most people, the path to wealth is not trading at all** — it's the patient, diversified, long-term investing of Books 1–4: buy good assets or low-cost index funds, keep costs and taxes low, and let compounding work over decades. The evidence overwhelmingly favours this over active trading.
- **Technical analysis is still genuinely useful** — as a way to understand market behaviour, to time entries and exits a little better, to impose discipline, and (above all) to manage risk. Used as a *supplement* to sound investing, with humility, it earns its place.

- **If you do choose to trade, do it honestly:** start with money you can truly afford to lose, paper-trade or trade tiny first, treat it partly as paid education, obey your risk rules religiously, and measure yourself against simply having bought an index fund. Many who do the honest comparison quietly go back to indexing — and are richer for it.
- **Be deeply sceptical of anyone selling certainty** — guru signals, miracle systems, “secret” patterns, get-rich-quick courses. The people who consistently make money from retail trading are mostly the ones *selling to* traders, not trading themselves.

THE BOTTOM LINE

A craft worth knowing, a humility worth keeping

Technical analysis is a real craft — a useful language for reading market mood, timing, and risk. It is not a money machine, a crystal ball, or a substitute for patient investing, and anyone who tells you otherwise is selling something. Learn it for what it honestly is: a set of probabilistic tools and, most of all, a framework for managing risk. Hold it with humility, pair it with the long-term wisdom of the earlier books, protect your capital above all — and you'll be far ahead of the crowd who came chasing certainty and left poorer. That humility, more than any pattern or indicator, is the real lesson of this book.

KEY TAKEAWAYS

1. **The evidence is clear:** most active/day traders lose money; only a small minority profit over the long run.
2. **The odds are stacked** by costs, professional competition, taxes, randomness and (worst) leverage.
3. **Psychology — fear, greed, hope, revenge — beats most people**, which is why discipline outranks analysis.
4. **For most, patient long-term investing wins;** use technical analysis as a humble supplement and protect capital first.

SELF-CHECK

1. What does the broad evidence say about the profitability of active day trading?
2. Name three structural reasons the odds are stacked against short-term traders.
3. Which four emotions most often sabotage traders, and how?
4. What is the sanest way for most people to build wealth, and what role should technical analysis play?

A CLOSING WORD

I am going to disappoint you. The answer this book has been building toward, across nearly three hundred pages, across forty-something chapters, across hundreds of patterns and indicators and case studies, is the same answer Book Two arrived at in fifty pages: **for almost everyone, the boring strategy is the correct strategy.** Buy the broad market cheaply. Don't sell. Don't trade individual stocks. Don't day-trade. Don't use leverage. Don't follow signals from anyone selling them. The technical analysis you have just learned is, for most readers, useful primarily as *protection* — against the seller who tells you they have an edge, against the system you might be tempted to buy, against your own urge to interfere with a portfolio that is already doing its job. *You will read no shortage of finance books that promise the opposite.* They are selling something. This one is not. The discipline of doing less is, in the end, the discipline most people lack, and the discipline most likely to make you wealthy.

VI

PART SIX

Beyond the Basics — Schools of Thought & the Bigger Picture

Everything so far has been the working toolkit. But technical analysis is also a hundred-year-old tradition with rival schools, esoteric branches, and a wider lens that looks past one chart to the whole market and the whole economy. This part visits the major schools — Dow, Wyckoff, Elliott, Ichimoku — the famous numerical traditions, and the breadth, sentiment and intermarket views that let you read

the forest, not just the trees. Each chapter is an honest tour: where the idea came from, how it works, and what the evidence actually says.

DOW	WYCKOFF	ELLIOTT	FIBONACCI	ICHIMOKU	POINT & FIGURE
BREADTH	INTERMARKET				

CHAPTER NINETEEN

Dow Theory — Where It All Began

Every idea in this book traces its roots to a Vermont-born newspaperman who never wrote a book on markets. Charles Dow's editorials in The Wall Street Journal between 1899 and his death in 1902 became, after others systematised them, the founding text of technical analysis. Read what he actually proposed; the rest of the field is footnotes.

IN THIS CHAPTER YOU WILL LEARN

- Who Charles Dow was, and why his work matters.
- The six core tenets of Dow Theory.
- The three trends and the three phases of a market cycle.
- What index confirmation means — and why it still applies.
- The honest verdict from a century of research.

Charles Henry Dow (1851–1902) co-founded Dow Jones & Company and became the first editor of *The Wall Street Journal*. He created the Dow Jones Industrial Average (1896) and the Transportation Average — and across roughly 255 short editorials he laid out a coherent worldview of how markets move. He never used the phrase “Dow Theory”; that label, and most of the systematisation, came later from William Peter Hamilton, Robert Rhea and E. George Schaefer. What they assembled is still the philosophical bedrock of every technique in this book.

19.1 The Six Tenets

Dow's worldview, distilled into six propositions, reads astonishingly modern:

1. **The averages discount everything.** Stock prices instantaneously reflect every known fact, hope and fear. Dow stated this half a century before the academic “efficient-market hypothesis” formalised it. It is the philosophical justification for studying price at all — because *price already contains the news*.
2. **Markets have three trends.** A primary trend (months to years), a secondary reaction within it (ten days to three months, typically retracing a third to two-thirds of the prior primary move), and minor movements (days to weeks, mostly noise). All three operate *simultaneously* — a stock can be in a primary bull market, a secondary correction, and a minor daily wobble all at once.
3. **Major trends move in three phases.** Accumulation, public participation, distribution (developed in §19.3 below). The phases describe how informed money, the public, and exhaustion successively dominate a trend.
4. **The averages must confirm each other.** Dow built two indices — the industrials and the rails — on a deliberate logic: factories produced goods, railways shipped them, so a true bull market in industry should be matched by a bull market in transportation. When the two diverge, the trend's foundation is suspect.
5. **Volume confirms the trend.** A primary move accompanied by expanding volume is the real thing; one on shrinking volume is suspect (we met this principle in Chapters 2 and 11).
6. **A trend persists until clear evidence of reversal.** The benefit of the doubt belongs to the trend. Distinguishing a secondary reaction from a true reversal is the great practical difficulty; Dow theorists answer it by demanding that *both* averages confirm the new direction and that the prior trend's pattern of higher highs and higher lows (or lower lows and lower highs) be broken on convincing volume.

19.2 The Three Trends, in Detail

Dow's three-trend taxonomy is the lens that lets you reconcile two charts saying opposite things (Chapter 2). The **primary trend** sets the dominant direction — measured in months and years, it is what serious investors align with. Within it, **secondary reactions** are temporary counter-moves that retrace 33% to 66% of the primary swing; they are the natural breathing of a trend and offer buying opportunities (in a bull market) or selling opportunities (in a bear). **Minor movements** are daily fluctuations that obscure the underlying trend, and Dow regarded them as largely random — the noise the trend-follower learns to ignore. The skill is in *knowing which scale you are looking at* and acting accordingly: a long-term investor reads the primary; a swing trader works the secondaries; the day trader, the minor.

19.3 The Three Phases of a Major Trend

Within every great bull market, Dow theorists see three psychological phases playing out in sequence — and the bear market is the mirror image. Understanding the phases tells you *where you are* and therefore *what to expect*.

Phase one — accumulation. At the depths of a bear market, with sentiment at its blackest, informed investors quietly begin to buy what the public is desperate to sell. The news is uniformly bad; prices barely move; the buying is absorbed without obvious price impact because every uptick is met with more eager selling. Almost nobody notices.

Phase two — public participation. The trend becomes evident. Fundamentals improve, earnings rise, technicians spot the change in character. Money flows in; the prices that informed money bought near the lows are sold to relieved holders climbing back to break-even, then to enthusiastic newcomers. This middle phase is typically the longest and produces the largest, smoothest gains.

Phase three — distribution. Optimism becomes euphoria. The headlines proclaim a new era; previously cautious institutions raise targets; taxi drivers offer stock tips. Informed money quietly distributes its holdings to a public that cannot get enough. Prices may still make new highs, but the quality of the buying deteriorates — and at the top, the public is left holding the bag.

The bear market mirrors this in reverse: distribution begets a first decline; bag-holders rally it back hoping for breakeven (and are sold into); panic capitulation finally clears the last weak hands; and accumulation begins again at the bottom. Read this sequence into every major top and bottom in market history — 1929, 1972, 1987, 2000, 2007, 2020 — and the pattern is uncanny.

19.4 Index Confirmation — Why the Rails Still Matter

Dow's insistence that the Industrial and Transportation averages confirm each other was not folklore — it was an economic argument. If factories really are producing more, somebody has to move the goods; if the rails (today: rails, trucking, shipping, air freight, parcel companies) are *not* participating, the bull market lacks an essential confirmation. To this day, *Barron's* and the *WSJ* still publish the Transportation Average alongside the Industrials for exactly this reason.

The principle generalises: in any market, look for confirmation between indices that *should* move together. Small caps and large caps. Banks and the broader market (a healthy expansion shouldn't have its lenders sick). Semiconductors and the Nasdaq (semis are the “rails” of the digital economy). When the leaders diverge from the headline index, the trend's foundation is weakening — exactly the warning a chart of price alone cannot give.

19.5 Volume Confirms Price

Dow understood — long before computerised tape-reading — that a price move with conviction must show up in volume. A breakout, a reversal, a primary trend change: any of them deserves the lie-detector test of the volume bars beneath. We've returned to this principle in chapter after chapter, and it traces back to here.

ARUN — USING TA TO TIME REDUCTIONS, NOT TRADES

Arun, age 58 and four years from retirement, doesn't want to trade. But he *does* want a rule for when to reduce his equity allocation toward his target retirement glide path. He's read Chapter 19 (Dow Theory) and Chapter 26 (intermarket).

His personal rule: every time the S&P 500's 50-day moving average crosses below the 200-day on a weekly close, and the 10-year/2-year yield curve has been inverted for the past 90 days, he reduces equity by 5 percentage points. Every time the 50-day crosses back above and the yield curve un-inverts, he restores it. Not market timing — *glide-path acceleration*. The mechanical rule removes emotion. Over the 4 years before retirement, this triggers maybe twice. Each time, his portfolio drifts modestly less when markets fall and recovers modestly less when they rise — exactly the trade-off appropriate for someone four years from drawing down.

19.6 The Honest Verdict

How well does Dow Theory actually work? The earliest rigorous test came from Alfred Cowles in *Econometrica* (1934), who studied W. P. Hamilton's published Dow Theory calls from 1903–1929 and concluded Hamilton's signals underperformed a simple buy-and-hold strategy by several percentage

points a year. For decades that finding was taken as the verdict — but in 1998 William Goetzmann, Stephen Brown and Alok Kumar re-examined the same record and reached a more nuanced conclusion: Dow Theory *did* underperform buy-and-hold on raw return by about 2% a year, but it produced materially lower volatility and drawdowns, so on a *risk-adjusted* basis its returns were comparable or better. The lesson is the one Dow himself would probably have offered: his framework is not a magic-button trading system, it is a discipline for staying with major trends and stepping aside when both averages and volume insist something has changed. Used that way — as a worldview rather than a robot — it remains one of the most durable contributions in the entire field.

In Plain Terms · why Dow still matters

Strip Dow Theory of its century-old vocabulary and the message is shockingly modern: *trends exist on multiple timescales, are confirmed by breadth and volume, run in three psychological phases, and should be respected until clear evidence says they've reversed.* Every chart-reading tradition that followed — Wyckoff, Elliott, modern trend-following systems — is in some sense an elaboration of those four sentences. Read the rest of this book; you will be reading Dow's grandchildren.

KEY TAKEAWAYS

1. **Dow's six tenets** are the philosophical bedrock of all technical analysis: price discounts all, trends operate on three scales, the averages confirm each other, volume confirms price, and trends persist until proven otherwise.
2. **Three trends** — **primary, secondary, minor** — operate simultaneously; match the one you trade to your horizon.
3. **Three phases** — **accumulation, public participation, distribution** — describe the crowd-psychology arc of every major bull (and the mirror for bear) market.
4. **Index confirmation** (and modern equivalents — small-caps, banks, semis) is the practical breadth test that one-chart analysis misses.
5. **The verdict:** Dow Theory underperforms buy-and-hold on raw return but offers strong risk-adjusted protection through major reversals.

SELF-CHECK

1. State three of Dow's six tenets in your own words.
2. Distinguish a secondary reaction from a true primary trend reversal — what would you look for?
3. What are the three phases of a major trend, and what kind of investor tends to dominate each?
4. Why does “index confirmation” have an *economic* rationale, not just a chart-pattern one?

CHAPTER TWENTY

The Wyckoff Method

If Dow gave us the worldview, Richard Wyckoff gave us a way to read the tape. His method — built in the back rooms of 1920s Wall Street, watching big operators move size — survives as one of the most practical (and most subjective) traditions in the field: a way to see, in price and volume, who is buying and who is selling, and where the smart money is positioning.

IN THIS CHAPTER YOU WILL LEARN

- Who Richard Wyckoff was, and what he was actually trying to do.
- The three laws (supply & demand, cause & effect, effort vs. result).
- The “Composite Operator” — Wyckoff’s mental model of the market.
- The four phases of the market cycle and the famous accumulation/distribution schematics.
- Why the method is powerful — and why it cannot be tested like a formula.

Richard D. Wyckoff (1873–1934) founded *The Magazine of Wall Street* in 1907 and spent his career studying — and railing against — the practices of the era’s great speculators. He interviewed Jesse Livermore, J. P. Morgan and others, distilled what they actually *did*, and packaged it as a methodology and a correspondence course aimed at protecting the small investor. The result is less a system than a way of *seeing*: a discipline for watching price and volume the way a poker player watches an opponent.

20.1 The Three Laws

Law one — supply and demand. The simplest possible economic statement: when demand exceeds supply, price rises; when supply exceeds demand, price falls. The whole job of reading a chart, Wyckoff said, is to read which one is winning *right now*.

Law two — cause and effect. A trend has to be *built* before it can move. A long sideways accumulation — the “cause” — produces a proportional “effect” in the ensuing markup. Big bases produce big moves; tiny bases produce tiny moves. This is the source of Wyckoff’s measured-move price targets (counted across a base on a Point & Figure chart, Chapter 24).

Law three — effort vs. result. Compare the size of the price move (the result) with the volume that produced it (the effort). High volume with little price progress = great effort, poor result → the trend is meeting opposition (a reversal warning). Low volume that nevertheless produces a clean move = small effort, big result → the path of least resistance is wide open. This third law is the technical analyst’s lie-detector.

20.2 The Composite Operator

Wyckoff’s most useful mental device is to imagine the market as being moved by a single fictional player — the **Composite Operator** (or “Composite Man”) — who behaves as the smartest, best-informed operator in the room. The Composite Operator carefully accumulates a position when the public is selling at the lows; engineers the markup so the public chases; distributes at the top to the eager crowd; then engineers the markdown. The point is not literal conspiracy — there is no single operator — it is a thinking tool: *read every chart as if such an operator were behind it, and ask, “what is he doing here?”* If you can see the accumulation, you can position with the smart money instead of against it.

20.3 The Four Phases of a Market Cycle

Wyckoff resolves the full market cycle into four phases, mapping directly onto Dow’s three (Chapter 19) plus a markdown:

1. **Accumulation** — a long, range-bound base after a downtrend, in which the Composite Operator absorbs supply at depressed prices.
2. **Markup** — the resulting uptrend, as supply at the higher levels dries up and demand pulls price away from the base.
3. **Distribution** — a long range at the top, in which the smart money sells its position to the late public.
4. **Markdown** — the resulting downtrend, as the absorbed supply is now overwhelming demand.

Reading a chart, the Wyckoff student first asks: *which phase are we in?* Aggressive long positions belong only in markup; aggressive shorts only in markdown; the ranges call for patience and observation.

20.4 Reading the Schematic

Modern Wyckoff teaching uses a famous schematic of an accumulation range, with each event named. It is a vocabulary worth knowing, even if you don't trade the method:

- **PS · Preliminary Support** — the first sign that selling is meeting buying, partway down the decline.
- **SC · Selling Climax** — a sharp final flush on huge volume, where panic exhausts supply.
- **AR · Automatic Rally** — the snapback bounce as the selling vacuum is filled by short-covering and bargain-hunting.
- **ST · Secondary Test** — a return to the climax low, ideally on lighter volume (less effort, less supply).
- **Spring** — a deliberate stab below the range low to flush out the last weak hands; immediately reversed (a Wyckoff spring is the famous false breakdown that traps shorts and signals the Composite Operator's hand).
- **Test** — a return to the spring's low, ideally on dry volume, confirming that supply is gone.
- **SOS · Sign of Strength** — the first powerful rally out of the range, on expanding volume, that shows demand is finally winning.
- **LPS · Last Point of Support** — a higher-low pullback to the range top, now acting as support (role reversal, Chapter 4).
- **JOC · Jump Over the Creek** — a colourful name for the decisive break above the range's resistance, starting the markup.

The distribution schematic at a market top is the mirror image: **PSY** (preliminary supply), **BC** (buying climax), **AR** (automatic reaction), **ST** (secondary test), **UTAD** (upthrust after distribution — a false

breakout that traps eager buyers; the bearish twin of the spring), **SOW** (sign of weakness), and the breakdown.

20.5 The Five-Step Approach

Wyckoff packaged his trading discipline into a five-step checklist that is, more than anything else in this chapter, his enduring practical gift:

1. Determine the position and probable future trend of the *overall market*. (Don't fight the tide; Chapter 19.)
2. Pick stocks in *harmony* with that trend (longs in bull markets, shorts in bear).
3. Pick stocks with a *cause* equal to or exceeding the minimum objective for your trade (big bases for big moves; Law 2).
4. Determine the stock's readiness to move (the spring, the SOS, the LPS — entries timed to the schematic).
5. Time your commitment with a turn in the broader market (don't try to lead the market; let it lead you).

20.6 The Honest Verdict

Wyckoff himself was emphatic that his method *cannot* be reduced to a mechanical or mathematical formula. Reading a chart through his eyes is inherently subjective: where one student sees a textbook spring, another sees a failed bounce. Wikipedia's entry on Wyckoff observes that this very subjectivity has meant *almost no peer-reviewed research* exists on the method's efficacy — there is nothing concrete to falsify. The honest position, therefore, is that Wyckoff is best understood as a **framework for disciplined observation** — a way to slow down and ask “who is buying here, and who is selling, and on what conviction?” — rather than a back-testable signal generator. Used that way, by patient practitioners, it produces some of the most insightful chart reading in the field. Used as a recipe by impatient beginners hunting magic “spring” trades, it produces the same losses every other half-understood system produces.

WATCH OUT**Don't hunt springs in random charts**

A common beginner mistake is to scan dozens of charts looking for the “Wyckoff spring” pattern — a sharp dip below support that recovers. Springs are real, but they're only meaningful inside a long, mature accumulation range, after the climax and secondary test have already occurred. Every chart has dips that recover; only a tiny fraction of them are Wyckoff springs. Patience for context — Steps 1 to 3 of the five-step approach — is what separates the practitioner from the pattern-collector.

KEY TAKEAWAYS

1. **Three laws:** supply & demand decide direction; cause & effect tie base-size to move-size; effort vs. result reveals whether volume is producing real progress.
2. **The Composite Operator** is a thinking tool — read every chart as if a smart, informed player is positioning behind it.
3. **Four phases** — accumulation, markup, distribution, markdown — match your aggression to the phase.
4. **The schematic vocabulary** (PS, SC, AR, ST, Spring, SOS, LPS, UTAD) is a precise language for reading turning points.
5. **Wyckoff is a discipline of observation**, inherently subjective and not back-testable; powerful for patient practitioners, dangerous as a recipe.

SELF-CHECK

1. State the three laws of Wyckoff and what each one reveals.
2. What is the Composite Operator, and how is it used as a thinking tool?
3. Describe the named events of an accumulation schematic in order.
4. Why is the Wyckoff method described as subjective rather than mechanical?

CHAPTER TWENTY-ONE

Elliott Wave Theory

In the 1930s, a bedridden accountant named Ralph Nelson Elliott decided that the apparently chaotic price chart was in fact a fractal, mathematically structured pattern repeating at every timescale. His theory is the most ambitious, most beautiful, and most controversial idea in technical analysis. It is worth understanding properly — both for the genuine insight it offers and the dangers it conceals.

IN THIS CHAPTER YOU WILL LEARN

- The core 5-3 wave structure and what each wave represents.
- Wave degrees and the fractal nature of the framework.
- The three immutable rules and the key guidelines.
- The personality of each wave — the psychological signature.
- The corrective patterns: zigzag, flat, triangle.
- Fibonacci relationships *within* waves.
- The serious criticisms and the honest verdict.

Ralph Nelson Elliott (1871–1948) was an American accountant who, during a long illness, studied 75 years of stock data and concluded — in his 1938 monograph *The Wave Principle* and his 1946 magnum opus *Nature's Laws: The Secret of the Universe* — that markets move in a precise, repeating, fractal pattern that reflects “the rhythmical procedure” of human action. He believed, in short, that markets are not random; they have a mathematical structure. Whether you accept the strong claim or not, the framework he laid down has shaped technical analysis ever since.

21.1 The Core Pattern — Five Up, Three Down

Elliott's central observation is that every directional move in the market unfolds in a sequence of **five sub-waves**, followed by a correction of **three sub-waves**. In a bull market: an impulse up (waves 1, 2, 3, 4, 5), then a correction down (waves A, B, C). In a bear market, the reverse. Waves 1, 3 and 5 move *with* the larger trend (the “motive” waves); waves 2 and 4 are corrective retracements within the impulse. The 5-3 pattern, Elliott insisted, is the building block of all market action.

21.2 Wave Degrees — the Fractal Picture

Each wave is itself made of smaller waves of the same form. A grand-supercycle bull market is one wave 3 of a yet larger structure; inside that wave 3, you can resolve five waves; inside each of those, five more; and so on, all the way down to the tick chart. Elliott labelled the standard degrees, from largest to smallest: *Grand Supercycle, Supercycle, Cycle, Primary, Intermediate, Minor, Minute, Minuette, Subminuette*. The structure is **fractal** — self-similar at every scale. If true, this is profound: it would mean that markets have the same statistical structure whether you look at a century or a minute.

21.3 The Three Immutable Rules

Elliott specified three rules that, if violated, invalidate the wave count entirely:

1. **Wave 2 never retraces more than 100% of wave 1.** A correction that goes back to or below the start of wave 1 means the count was wrong; that wasn't wave 2.
2. **Wave 3 is never the shortest of waves 1, 3, and 5.** Often it's the longest. Practitioners typically expect it to be the strongest and most extended of the three.
3. **Wave 4 never overlaps the price territory of wave 1.** If the wave-4 low (in a bull impulse) drops into the price range of wave 1, the count is wrong; the structure isn't an impulse.

These three rules are absolute; everything else is a guideline that holds *often* but not *always*.

21.4 The Personality of Each Wave

Elliott analysts assign each wave a psychological signature — the “personality” that lets the experienced practitioner read which wave the market is currently in:

- **Wave 1.** Emerges out of universally bearish sentiment after a long downtrend. The news is still bad; analysts are still cautious; volume is unimpressive. Most observers dismiss the rally as another bear-market bounce.
- **Wave 2.** The first correction. Negativity returns; many declare the new uptrend dead. Retraces 50–62% of wave 1, but — crucially — does not break its low.
- **Wave 3.** The most powerful and usually longest wave. The fundamentals turn outright positive; analysts raise estimates; gaps and breakouts proliferate; volume expands. The crowd shifts from sceptical to optimistic. Wave 3 often extends to 1.618× the length of wave 1 — the famous golden ratio.
- **Wave 4.** A sideways or shallow consolidation. Frustrating, typically slow, sometimes a triangle. Retraces under 38% of wave 3. Volume contracts.
- **Wave 5.** The final leg. Universal optimism; retail piles in; momentum indicators often diverge bearishly from price (Chapter 13) as fewer stocks lead the index higher. This is the “last gasp” that traps the latecomers.
- **Wave A.** The first leg down. Fundamentals still look fine; the decline is read as a normal correction. Volatility expands.
- **Wave B.** A counter-trend rally. Often mistaken for a resumption of the bull market — a “sucker rally” that lures back the optimists.
- **Wave C.** The final, decisive decline. Volume expands; the bear market becomes universally recognised; capitulation usually marks its end.

21.5 Corrective Patterns — Zigzag, Flat, Triangle

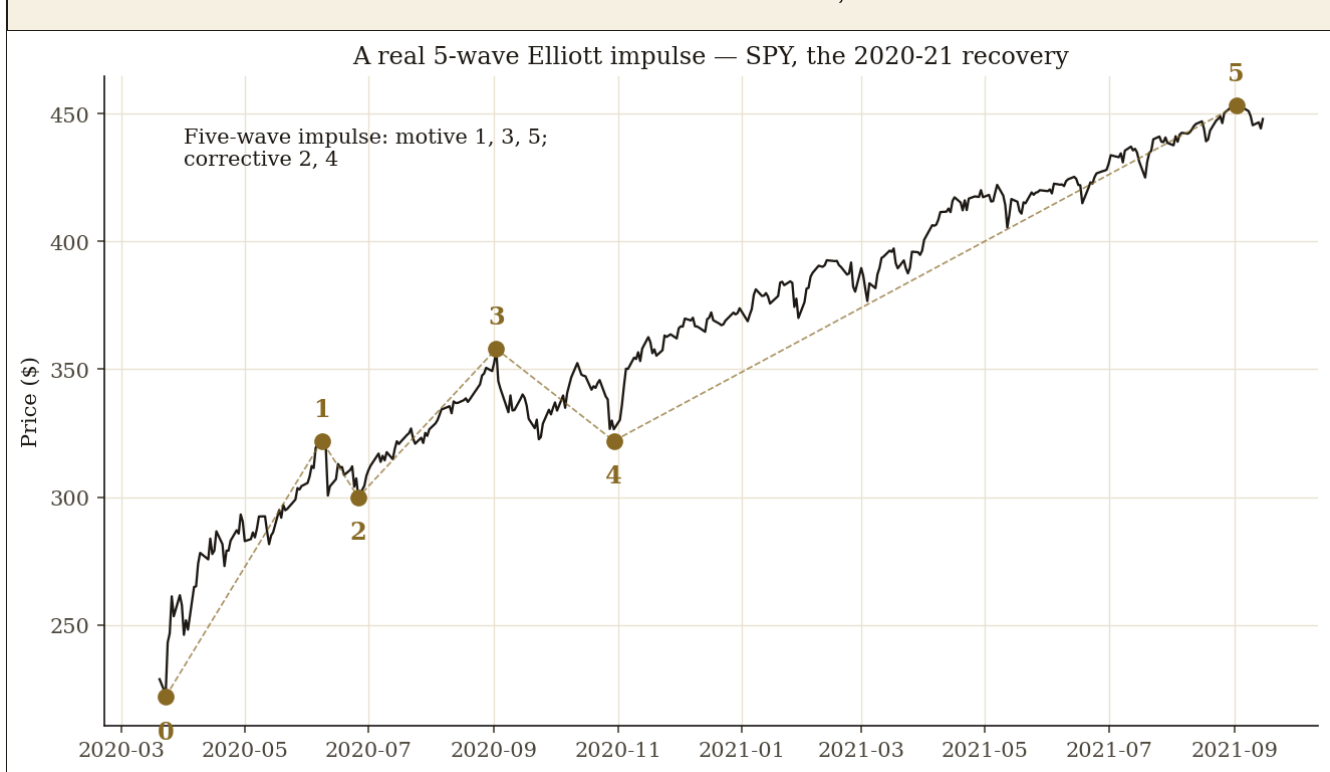
Corrections (waves 2, 4 and the A-B-C) take a small number of geometric shapes:

- **Zigzag (5-3-5).** A sharp, deep correction; wave B retraces only modestly within wave A, then wave C makes a new extreme. Typical of wave-2 corrections after a strong wave 1.

- **Flat (3-3-5).** A sideways correction where wave B retraces all of wave A (or nearly), and wave C ends near wave A's low. Typical of wave-4 corrections.
- **Triangle (3-3-3-3-3).** A five-subwave converging pattern; typically appears as wave 4 of a larger impulse, never as wave 2. The breakout from a triangle launches the next impulse.

More complex corrections — double-threes, triple-threes — combine these patterns. Wave 4 corrections, by the principle of **alternation**, typically take a different shape from wave 2 (if wave 2 was a sharp zigzag, wave 4 will be a sideways flat or triangle, and vice versa).

FIGURE 21.1 · A REAL 5-WAVE ELLIOTT IMPULSE — SPY, THE 2020-21 RECOVERY



Five waves up. The SPY recovery from the March 2020 low traced a textbook 5-wave Elliott impulse over the next 18 months. Wave 1 to early June, a sharp wave 2 correction into late June, a powerful wave 3 to early September (the strongest leg, as theory predicts), a sideways wave 4 into October-November, and a long wave 5 to the September 2021 high. The labelling is one analyst's view — Elliott counts are always somewhat subjective — but this is one of the cleanest impulses in modern SPY history.

21.6 Fibonacci Within the Waves

Elliott eventually recognised that the wave structure is suffused with the Fibonacci numbers and the golden ratio (developed in detail in Chapter 22). The standard relationships taught today:

- Wave 2 often retraces 50% or 61.8% of wave 1.
- Wave 3 often extends to 1.618× or 2.618× wave 1.
- Wave 4 typically retraces 38.2% of wave 3.
- Wave 5 often equals wave 1 in length, or extends to 0.618× the length of waves 1 through 3.
- Wave C often equals wave A, or extends to 1.618× wave A.

Together with the immutable rules and alternation, these ratios are the primary way Elliott analysts *project* price targets and identify suspected wave turns in real time.

21.7 The Honest Verdict — Beauty, Subjectivity, and Pareidolia

Now the hard truth. Elliott Wave is the most heavily criticised framework in technical analysis, and the criticisms are substantial.

The first and most damning is **subjectivity**. Technical analyst David Aronson observes that Elliott Wave “has the seemingly remarkable ability to fit any segment of market history down to its most minute fluctuations” because the rules are loose enough and the wave degrees nested enough that *almost any path* can be retro-fitted with a plausible wave count. Mathematician Benoit Mandelbrot, the father of fractal geometry, wrote that wave prediction is “a very uncertain business [in which] the subjective judgment of the chartists matters more than the objective, replicable verdict of the numbers.”

The second is the **Fibonacci problem**. The peer-reviewed work of finance professors Roy Batchelor and Richard Ramyar found no statistical evidence that retracements cluster at Fibonacci ratios more than at any other percentages. The mathematical mystique that gives Elliott Wave half its appeal does not survive rigorous testing.

The third is **pareidolia** — the human brain's tendency to impose patterns on noise. Elliott practitioners can become exquisitely skilled at *seeing* wave counts; less skilled at noticing when they are imagining

them.

And yet — the framework is not nothing. Used loosely, it captures real psychological rhythms: trends advance in stages, corrections come in three legs, fifth waves often diverge on momentum, parabolic fifths exhaust into reversals. Many serious practitioners (Hamilton Bolton, A. J. Frost, Robert Prechter) have used Elliott Wave to make notable calls — and equally notable misses. The disciplined modern position: use Elliott Wave as a *scaffold for thinking* about the shape of an unfolding move, not as a deterministic forecasting tool. Combine it with the other evidence in this book (trend, volume, breadth, sentiment). And never, ever bet the farm on the count.

WATCH OUT

The wave count nobody can falsify

If a wave count is invalidated by a new low, the Elliott practitioner can usually re-label the structure — “we were actually in a larger wave 2” — preserving the framework's reputation while quietly admitting the call was wrong. This unfalsifiability is the single most common abuse of the theory. A good Elliott analyst commits to a count and a level at which it becomes invalid; a bad one redraws the count after the fact. Be deeply sceptical of any Elliott analysis that always seems to “work” — it may simply be re-counted to fit whatever happened.

KEY TAKEAWAYS

1. **5-3 structure:** impulse waves (1-2-3-4-5) followed by a correction (A-B-C), repeating fractally at every timescale.
2. **Three immutable rules:** wave 2 doesn't go below wave 1's start; wave 3 isn't the shortest; wave 4 doesn't overlap wave 1.
3. **Each wave has a personality** — wave 3 is the strongest, wave 5 traps the latecomers, wave B is the sucker rally.
4. **Fibonacci relationships** (1.618 extensions, 38.2/50/61.8% retracements) are used to project wave targets — though their statistical significance is contested.
5. **The honest verdict:** a powerful but deeply subjective framework, useful as a scaffold for thinking but dangerous as a forecasting tool. Bet sizes accordingly.

SELF-CHECK

1. Describe the 5-3 wave structure in your own words.
2. What are the three immutable rules of an Elliott impulse?
3. Give the typical Fibonacci relationships for waves 2, 3, and C.
4. What is the most serious criticism of Elliott Wave Theory, and how should a careful practitioner answer it?

CHAPTER TWENTY-TWO

Fibonacci Retracements & Extensions

A 13th-century Italian mathematician who introduced Hindu-Arabic numerals to Europe also bequeathed it a number sequence with properties so peculiar that 800 years later thousands of traders still draw lines on their charts at his ratios. The case for Fibonacci levels is partly mystical and partly self-fulfilling, but they are too widely watched to ignore — and there is a disciplined way to use them.

IN THIS CHAPTER YOU WILL LEARN

- The Fibonacci sequence and where the trading ratios come from.
- The golden ratio and its peculiar mathematical properties.
- How to draw a Fibonacci retracement on a real swing.
- The standard retracement levels (23.6%, 38.2%, 50%, 61.8%, 78.6%).
- Fibonacci extensions for projecting price targets.
- The honest evidence on whether these levels actually work.

Leonardo Pisano — known as Fibonacci — introduced the West to a sequence in his 1202 book *Liber Abaci*: each number is the sum of the two before it: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144.... The sequence appears in plant phyllotaxis, in pinecone spirals, in seashell geometry — and, traders insist, in market price swings. We'll take it seriously, draw the levels properly, and then weigh the evidence honestly.

22.1 The Sequence and the Ratios

The interesting property is what happens when you divide consecutive Fibonacci numbers. As the sequence grows, the ratio of each number to the next approaches a fixed value:

$$21 \div 34 = 0.6176 \quad \cdot \quad 34 \div 55 = 0.6182 \quad \cdot \quad 55 \div 89 = 0.6180 \quad \cdot \quad 89 \div 144 = 0.6180 \dots$$

The limit is **0.6180339...**, known as the **golden ratio** (often written ϕ , “phi”). Its reciprocal is 1.6180339.... These two numbers have an unusual property: $\phi \times \phi = \phi + 1$. Skipping one number gives the ratio 0.382 (which is $1 - 0.618$); skipping two gives 0.236. Hence the trading levels:

$$23.6\% \quad \cdot \quad 38.2\% \quad \cdot \quad 50.0\% \quad \cdot \quad 61.8\% \quad \cdot \quad 78.6\%$$

The 50% level isn't actually a Fibonacci ratio — it's the midpoint — but Charles Dow popularised it (he observed that secondary reactions often retrace about half the prior move), and it's universally included in the toolkit. 78.6% is the square root of 0.618.

22.2 Drawing a Retracement

The procedure is mechanical:

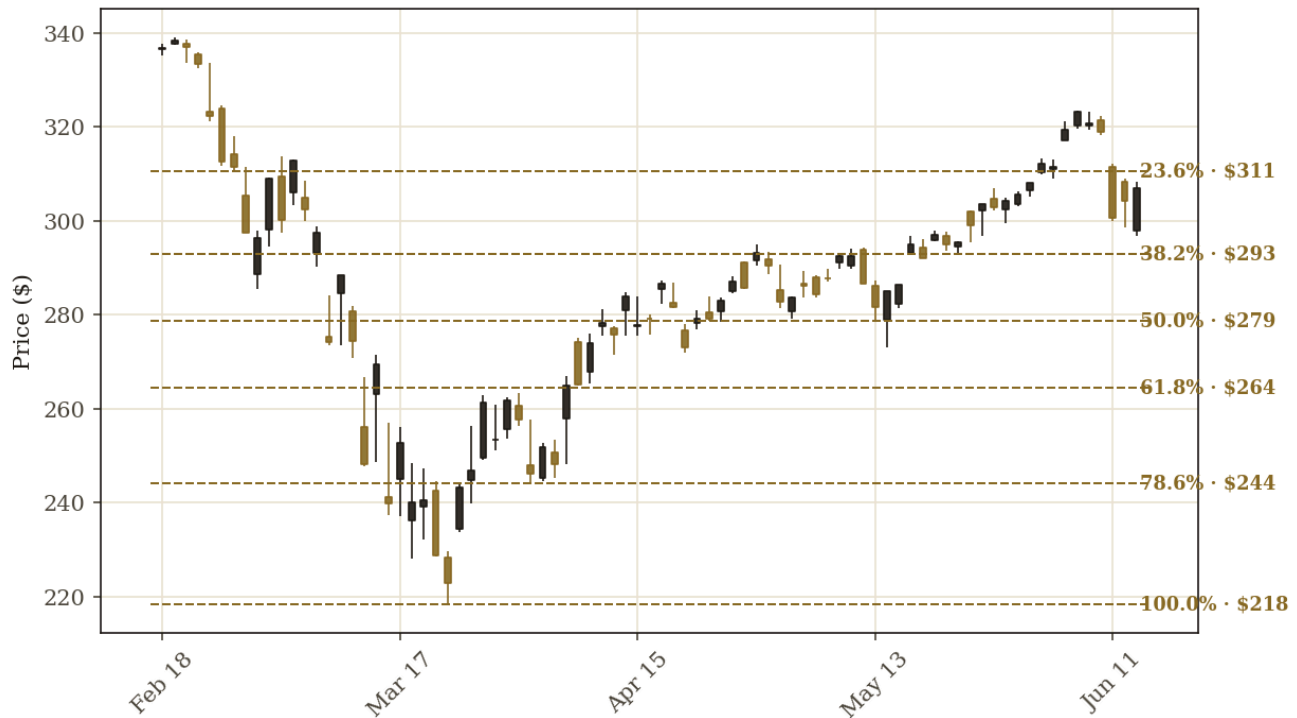
1. Identify a clear price swing — a low to a high in an uptrend, or a high to a low in a downtrend.
2. Anchor the Fibonacci tool at the swing low (0%) and drag to the swing high (100%) — or vice versa for a downtrend.
3. The tool draws horizontal lines at the standard percentages (23.6, 38.2, 50, 61.8, 78.6). These are the *retracement* levels.

The interpretation: in a healthy uptrend, a pullback that finds support at 38.2% is shallow and bullish; at 50% is normal; at 61.8% is deep but still acceptable for a continuation. A break below 78.6% usually means the prior move is over and the trend has reversed. The principle is the same as Chapter 4's

support/resistance: these are *levels where the crowd watches for a turn*, and to the extent the crowd really watches, the levels become self-confirming.

FIGURE 22.1 · FIBONACCI RETRACEMENT ON A REAL SWING — SPY, THE 2020 CRASH

Fibonacci retracement, the 2020 crash swing — SPY high 339(19Feb)→low218 (23 Mar)



Real swing, real levels. The S&P 500's February 2020 high of \$339 down to the March 2020 panic low of \$218. The five Fibonacci retracement levels are drawn between them; notice how the recovery stalled, congested or pulled back at the 38.2% (~\$293) and 50% (~\$279) levels through April–May before the rally took out the prior high. Real data, real candidate zones to watch — never magic.

22.3 Fibonacci Extensions — Projecting Targets

Beyond 100% of a swing, the same ratios extend outward to project *where a continuation move might end*:

127.2% · 161.8% · 261.8% · 423.6%

Used as price targets: after a retracement finds support and the trend resumes, the next leg often runs to $1.272\times$ or $1.618\times$ the prior swing. The $1.618\times$ extension is the famous “golden” target — and as Chapter 21 showed, it's also the typical relationship between waves 3 and 1 in Elliott theory. The two frameworks share their numerology.

22.4 Time Zones & Arcs (Brief)

Beyond price, Fibonacci has been adapted to time. **Fibonacci time zones** place vertical lines at periods of 1, 2, 3, 5, 8, 13, 21... bars from a key reference, on the theory that turning points cluster at those intervals. **Fibonacci arcs** draw arcs at golden-ratio distances from a pivot. Both are exotic, contested, and far less used than retracements and extensions. Treat them as curiosities, not staples.

22.5 Confluence — Where Fibonacci Earns Its Keep

The most defensible use of Fibonacci is in **confluence** with other tools (Chapter 8). A 61.8% retracement that *also* lines up with a prior support level (Chapter 4), the 200-day moving average (Chapter 12), and an Elliott wave-2 termination zone (Chapter 21) — that is a level worth watching. Any single Fibonacci line, in isolation, is one of dozens that could be drawn; the meaningful ones *agree with other evidence*. The skilled practitioner uses Fibonacci to *identify candidate levels* and the rest of the toolkit to *confirm them*.

22.6 The Honest Verdict

Now the hard evidence. Finance professors Roy Batchelor and Richard Ramyar tested whether retracements actually cluster at Fibonacci levels (38.2%, 50%, 61.8%) more than at any other percentages on the Dow Jones Industrial Average from 1915 to 2003. Their conclusion was unambiguous: *they don't*. Retracements at 38% are no more common than at 33% or 43%. The mathematical claim that markets *respect* Fibonacci levels is, statistically, not supported.

So why do they sometimes seem to work? Three honest reasons. First, **self-fulfilling expectation**: when thousands of traders place orders at 61.8%, their orders themselves create support — at least temporarily,

until the crowd's belief breaks. Second, **confirmation bias**: practitioners notice the bounces and forget the breaks. Third, **generic level effect**: any horizontal line drawn at a prominent prior swing point will get some bounces, and 50% retracement levels often happen to fall near such points anyway. The Fibonacci framework imposes *some* useful discipline (a structured way to set candidate levels) but does not deliver the magical foreknowledge its mystique suggests.

In Plain Terms · the disciplined way to use Fibonacci

Treat Fibonacci levels as *candidate* support/resistance lines, not *predicted* ones. Draw them on every meaningful swing — they cost nothing — and use them as one input among many. If a Fibonacci level coincides with other evidence (a prior pivot, a moving average, a trendline, a round number), pay attention. If it sits alone in empty space, ignore it. And never, ever say “price will reverse at 61.8% because of Fibonacci.” The number is decoration; the confluence is the signal.

KEY TAKEAWAYS

1. **The sequence** (0, 1, 1, 2, 3, 5, 8, 13...) yields the golden ratio 0.618, from which the trading levels 23.6/38.2/61.8/78.6 are derived; 50% comes from Dow, not Fibonacci.
2. **Retracements** mark candidate support/resistance during a pullback within a trend; common bounces at 38–62% of the prior swing.
3. **Extensions** (1.272, 1.618, 2.618) project price targets for continuation moves.
4. **Confluence is the real signal** — a Fibonacci level that agrees with other tools is meaningful; one alone is decoration.
5. **The evidence**: peer-reviewed work finds no statistical edge to Fibonacci ratios themselves; their usefulness is self-fulfilling and confluence-based.

SELF-CHECK

1. Where do the standard Fibonacci retracement levels come from mathematically?
2. How would you draw a Fibonacci retracement on a clean swing low to swing high?

3. What does the 1.618 extension level represent, and why is it called “golden”?
4. In one sentence, summarise the disciplined way to use Fibonacci.

CHAPTER TWENTY-THREE

Ichimoku Kinko Hyo— the One-Glance Cloud

A Japanese journalist named Goichi Hosoda spent thirty years developing a single indicator before publishing it in the late 1960s. It packs five lines, two cloud projections, and trend, momentum, support and resistance into one chart — the “one-glance equilibrium chart” — and once you can read it, you understand instantly why Asian traders have used nothing else for decades.

IN THIS CHAPTER YOU WILL LEARN

- Goichi Hosoda's history and the meaning of the name.
- The five lines and their exact formulas.
- The Kumo (cloud) and what it tells you.
- Reading combined signals — TK cross, Kumo breakout, Kumo twist.
- How Ichimoku differs from Western indicators.

Ichimoku Kinkō Hyō () literally means “one-glance equilibrium chart.” Its creator, Goichi Hosoda, writing under the pen name Ichimoku Sanjin (“the man on the mountain who sees at one glance”), began the work in the late 1930s and refined it for three decades before releasing the full system. Unlike Western indicators bolted onto a price chart, Ichimoku is a self-contained reading of trend, momentum, support, resistance, and future projection — all visible in a single look.

23.1 The Five Lines — Formulas and Meanings

Ichimoku consists of five lines, every one built from the simple midpoint of a recent high and low (not the close — a deliberately neutral choice).

Tenkan-sen — Conversion Line (typically drawn in blue):

$$\text{Tenkan-sen} = (\text{highest high} + \text{lowest low}) \div 2, \text{ over the past 9 periods}$$

The fastest line. A reactive short-term equilibrium price, sensitive to recent moves. Trends in its direction; flat when ranging.

Kijun-sen — Base Line (typically red):

$$\text{Kijun-sen} = (\text{highest high} + \text{lowest low}) \div 2, \text{ over the past 26 periods}$$

The slower, more stable equilibrium — analogous to a mid-term moving average. Acts as a meaningful support/resistance level and a trailing-stop reference.

Senkou Span A — Leading Span A (one edge of the cloud):

$$\text{Senkou Span A} = (\text{Tenkan-sen} + \text{Kijun-sen}) \div 2, \text{ plotted } 26 \text{ periods ahead}$$

The midpoint of the two equilibrium lines, projected into the *future*. The forward projection is the trick: Ichimoku draws part of itself ahead of price, so the trader can *see today's expected future support/resistance*.

Senkou Span B — Leading Span B (the other edge of the cloud):

$$\text{Senkou Span B} = (\text{highest high} + \text{lowest low}) \div 2, \text{ over the past 52 periods, plotted 26 periods ahead}$$

A longer-term equilibrium projected into the future. Together with Span A, it forms the cloud.

Chikou Span — Lagging Span (typically green):

Chikou Span = today's closing price, plotted 26 periods *back*

Counter-intuitively projected *backward*. Its purpose is to compare today's price with the price of 26 periods ago — a sanity-check on trend strength.

23.2 The Kumo — the Cloud

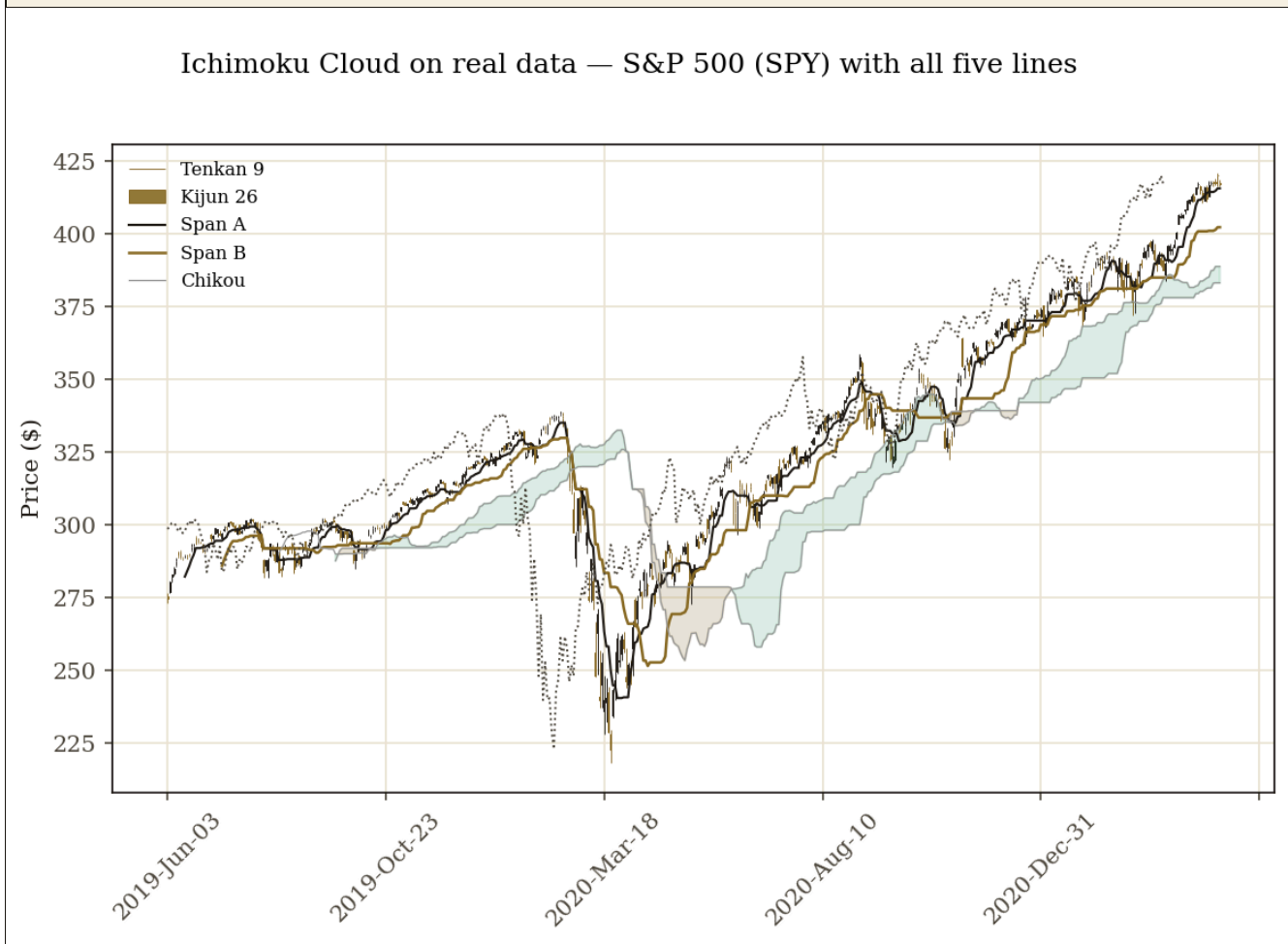
The shaded area between Senkou Span A and Senkou Span B is the **Kumo** (, “cloud”) — the most distinctive feature of Ichimoku. Three things to read about it:

Position of price relative to the cloud. Price *above* the cloud = uptrend (the cloud acts as support). Price *below* the cloud = downtrend (the cloud acts as resistance). Price *inside* the cloud = transitional / ranging — the “no man's land” where signals are unreliable.

Colour and orientation. When Span A is above Span B, the cloud is bullish (typically shaded green); when Span A is below Span B, the cloud is bearish (typically red). A rising cloud reinforces an uptrend; a falling cloud reinforces a downtrend.

Thickness. A *thick* cloud represents strong support/resistance built from high volatility — hard to break. A *thin* cloud is fragile and easily pierced. The cloud's thickness changes in real time and tells you how robust the next support/resistance zone will be.

Because Spans A and B are projected 26 periods forward, you can *see the shape of tomorrow's cloud today* — including any **Kumo twist** ahead (where Span A and Span B cross over each other), which signals an impending change in trend bias.

FIGURE 23.1 · ICHIMOKU CLOUD ON REAL DATA — S&P 500 (SPY), 2019–2021

All five lines on one chart. Real SPY through the late-2019 grind, the 2020 crash, and the 2020–21 recovery. Note the cloud flipping orientation as the trend changes, Tenkan and Kijun crossing over each other at turning points, and price re-establishing above the cloud through the recovery — the textbook signature of a regime change, in real data.

23.3 Reading the Combined Signals

Ichimoku is at its best when several elements *agree*. The classic signals, from weakest to strongest:

1. **TK Cross.** The Tenkan-sen crosses the Kijun-sen — bullish if Tenkan crosses above, bearish if below. By itself a fast signal; *much* stronger if the cross occurs on the right side of the cloud (a bullish TK cross *above* the cloud is reliable; the same cross *below* the cloud is to be ignored).

2. **Kumo Breakout.** Price decisively crosses through the cloud — a meaningful trend change. The trend is now in the direction of the breakout, with the cloud acting as the new floor (or ceiling).
3. **Kumo Twist.** Span A and Span B cross in the forward-projected cloud — a future change in trend bias. Because the twist is visible in advance, it lets you anticipate the regime shift before price gets there.
4. **Chikou Span Confirmation.** Many practitioners require the Chikou Span to be in clear space (not tangled in past price) before committing to a signal. The principle: today's price should be clearly above (or below) the price of 26 periods ago, with no interfering structure.

A textbook long signal requires all four: price above a bullish cloud, a bullish TK cross above the cloud, an ascending Kumo ahead, and a clear Chikou Span. When all align, the trend is unambiguous; when they conflict, the trader stands aside.

23.4 Why Ichimoku Differs From Western Indicators

Three things make Ichimoku distinctive. First, the lines are built from midpoints $(\text{high} + \text{low})/2$, not closes — a more neutral price reference. Second, the system is *integrated* rather than bolted on: it doesn't add a momentum indicator to a price chart, it is the chart. Third, the **forward projection** of the cloud is unique in technical analysis — you literally see plotted support and resistance that don't exist yet but will, given current data. That foresight is the system's signature contribution.

23.5 Settings, Practical Notes, and the Honest Verdict

The traditional 9/26/52 setting reflects the 1930s Japanese business week (six trading days $\times$ ~4 weeks). For modern markets running five days a week, some traders adapt to 7/22/44 or 10/30/60, though the 9/26/52 standard has remained dominant for cultural and practical reasons. As with every indicator, Ichimoku *lags*: the Tenkan and Kijun are moving averages of midpoints, and the cloud is projected from past values. In strong trends it is genuinely useful; in choppy ranges, price oscillates inside the cloud and signals fire in both directions. The honest summary is the one we've returned to repeatedly: a real tool for measuring trend, with built-in support/resistance and an unusual forward view; not a crystal ball. Use it in conjunction with the broader judgement of Chapters 1, 15 and 18.

KEY TAKEAWAYS

1. **Five lines:** Tenkan (9), Kijun (26), Senkou Span A (mid of T & K, forward 26), Senkou Span B (52-mid, forward 26), Chikou (close, back 26).
2. **The Kumo cloud** is the area between Spans A and B — position relative to it, colour, and thickness all carry meaning.
3. **Forward projection** is Ichimoku's signature: tomorrow's support/resistance is visible today.
4. **Reliable signals** require multiple confirmations — TK cross + price-vs-cloud + Kumo orientation + Chikou clarity.
5. **Best in trending markets, weakest in chop** — like every indicator, it lags and whipsaws when there is no trend.

SELF-CHECK

1. Write the formulas for the Tenkan-sen and Kijun-sen.
2. What does it mean when price is above a thick, ascending green cloud?
3. Why is a TK cross above the cloud more reliable than one inside the cloud?
4. What is unique about the Senkou Spans relative to all Western indicators?

CHAPTER TWENTY-FOUR

Point & Figure Charting

Older than the bar chart, simpler than candlesticks, and almost extinct in retail trading — yet still quietly used by some of the most disciplined institutional traders alive. Point & Figure throws away time entirely and plots only meaningful price changes, producing a clean, signal-rich chart that no amount of intraday noise can corrupt.

IN THIS CHAPTER YOU WILL LEARN

- The history (1898 onwards — older than the modern bar chart).
- How an X/O P&F chart is constructed.
- The role of box size and reversal amount.
- Why throwing away time is a feature, not a bug.
- The standard P&F price patterns and 45° trendlines.
- How to count price targets vertically and horizontally.



F charting was documented as early as 1898 in “Hoyle's” *The Game in Wall Street*.

Victor de Villiers wrote the first manual in 1933; A. W. Cohen popularised it through Chartcraft Inc. in the 1940s and 50s; Tom Dorsey and Jeremy du Plessis

kept the tradition alive into the modern era. The technique evolved from traders writing prices in columns by hand — a discipline so old it predates the price chart as we know it.

24.1 Construction — X's and O's

A P&F chart drops two ideas Western charts cling to: *equal time spacing*, and *showing every wiggle*. Instead, you specify two parameters:

- **Box size:** the minimum price increment that gets plotted (e.g., \$1 per box, or 1% on a percentage chart).
- **Reversal amount:** typically **3 boxes**. The chart only changes direction (from rising to falling, or vice versa) when price moves against the current direction by at least this much.

The convention: while price is rising, you stack **X**'s in a column, one X for each box's worth of advance. When price reverses by the reversal amount, you start a new column to the right, dropping **O**'s, one for each box's worth of decline. As long as price keeps moving in the same direction, X's (or O's) continue in the same column; the column changes only on a reversal of the specified size. Time gets compressed: a year of sideways grind might produce only a handful of columns, while a violent week of trending might produce ten.

The 3-box reversal filter is doing real work — it eliminates noise. A 1-box reversal would faithfully record every wiggle (much like a candle chart); a 5-box reversal would show only the largest moves. The 3-box default is the time-honoured compromise.

24.2 Why Discarding Time Is the Point

Conventional charts give every day equal width. P&F asks: *why should a quiet ranging day get the same chart real estate as a violent breakout?* By tying the chart to *price change* rather than time, P&F devotes its visual space to *meaningful* moves. Periods of consolidation collapse into a single column; periods of strong directional movement expand into many. The eye sees only what matters. This is why disciplined practitioners — particularly those running long-horizon trend-following strategies — still swear by it: the chart shows them only what their strategy cares about.

24.3 The Standard Patterns

Because P&F suppresses noise, its patterns are unusually clean. The standard catalogue:

- **Double Top Breakout (bullish):** a column of X's exceeds the previous column of X's by one box. The simplest, most-watched P&F buy signal.
- **Double Bottom Breakdown (bearish):** the mirror — a column of O's drops one box below the prior column of O's.

- **Triple Top / Bottom:** price has tested the same level three times and now breaks through. A stronger version of the double pattern.
- **Bullish / Bearish Catapult:** a triple top breakout followed by a small pullback and another double top breakout — momentum confirming itself.
- **Bullish / Bearish Triangle:** the same triangle pattern as conventional charts (Chapter 10), translated into X/O language: ascending columns of X's matched by ascending columns of O's lows, until one side gives.

Each pattern is essentially a more disciplined version of what you would see on a bar chart — but with the noise stripped out, so the patterns themselves are easier to spot.

24.4 Trendlines and Targets

P&F has a strict, almost geometric, trendline convention: **bullish support lines** are drawn at a 45° angle *up* from a chart low through the empty boxes below the X columns; **bearish resistance lines** at 45° *down* from a chart high. The 45° rule works because every box represents the same price unit on each axis, so a true equal-cost-up-and-over move makes a 45° line. As long as price holds above its bullish 45° line, the long-term up-trend is intact; a break below it is a meaningful signal.

P&F also provides two distinctive ways to **count price targets**:

- **Vertical count:** measure the length of the first X column after a base, multiply by the reversal amount (3), add to the column's low. The result is a projected target price.
- **Horizontal count:** measure the width of a congestion area (number of columns), multiply by box size and reversal, add to the breakout level. The wider the base, the bigger the implied move — direct expression of Wyckoff's Law of Cause and Effect (Chapter 20).

These targets are mechanical, falsifiable estimates, not vague hand-waves — one of the genuine strengths of the method.

24.5 Modern Use and the Honest Verdict

Today most retail platforms can render P&F charts with a click, and percentage-based box sizing (rather than fixed dollar boxes) keeps the sensitivity consistent across instruments at very different price levels. The method is most used today by long-horizon discipline-focused traders and by some commodity and futures specialists. Its strengths are real: *noise reduction, clear signals, mechanical price targets, and a pure focus on price action*. Its weakness is the corollary: by discarding time and volume, P&F throws away two genuine information sources, so it's not a complete picture. The disciplined modern position is to use P&F as a complement — when conventional candle charts are too noisy to read clearly, the P&F version of the same price series will often show a clean, decision-ready signal.

KEY TAKEAWAYS

1. **P&F plots price against direction, not time** — X's for rising columns, O's for falling, with a box size and reversal amount as the noise filter.
2. **3-box reversal** is the time-honoured noise filter, suppressing wiggles below that magnitude.
3. **Standard signals** are double/triple tops and bottoms, catapults, and triangles — cleaner versions of conventional patterns.
4. **45° trendlines** work because each box represents one price unit; vertical and horizontal counts produce mechanical price targets.
5. **Use as a complement**, not a replacement — best when conventional charts are too noisy to read.

SELF-CHECK

1. How does P&F decide when to start a new column?
2. What does throwing away time accomplish, and what does it cost?
3. Describe a double-top breakout in P&F terms.
4. What is the vertical count method for projecting a price target?

CHAPTER TWENTY-FIVE

Market Breadth & Sentiment — the Market Behind the Market

*The S&P 500 hides as much as it shows. A handful of huge stocks can lift the index while hundreds beneath are quietly bleeding; the headline number can climb to new highs as participation crumbles underneath. To see what the index is hiding, technicians use **breadth** indicators — measures of how many stocks are participating — and **sentiment** indicators — measures of how the crowd feels. Together they give you the market behind the market.*

IN THIS CHAPTER YOU WILL LEARN

- The Advance-Dcline line — the workhorse of breadth analysis.
- The McClellan Oscillator, new highs vs. new lows, and the percent-above-200-day indicator.
- The VIX — the “fear gauge,” what it actually measures, and what its readings mean.
- The put/call ratio and sentiment surveys (AAII, Investors Intelligence).
- The contrarian use of sentiment extremes.

A market index is a weighted average — and as we saw in Chapter 12 of *Book 3*, a handful of huge constituents can drive the whole average while the rest of the market stagnates. Breadth and sentiment indicators look *past* the index to the underlying participation and emotion. Two of the most famous market tops in history — 1972 (the Nifty Fifty) and 1999–2000 (the dot-com bubble) — were flagged a year ahead of time by breadth divergence, while the headline index continued making new highs.

25.1 The Advance-Dcline Line

The simplest, oldest, and most useful breadth indicator: each day, count how many stocks closed up vs. down (typically on the NYSE), and keep a **running cumulative total** of (advances – declines).

$$\text{A/D Line}_{\text{today}} = \text{A/D Line}_{\text{yesterday}} + (\text{advancing issues} - \text{declining issues})$$

The A/D line rises when more stocks go up than down each day, falls when the opposite is true. By itself it has no “level” — only direction and divergence matter.

The classic use is **breadth divergence**. When the index keeps making new highs but the A/D line stops doing so — when the “average stock” is no longer participating — the rally is narrowing, supported by fewer and fewer leaders. Historically, this divergence has appeared months to *years* before major tops. The A/D line peaked in early 1999 and rolled over while the Nasdaq kept climbing to its March 2000 peak; the same divergence appeared in 1972 before the 1973–74 bear market. The mechanism is intuitive: when only the biggest stocks are still going up, the bull market has run out of new leaders, and a reversal becomes structurally likely.

25.2 McClellan, New Highs/Lows, % Above 200-Day

Other breadth tools refine the same idea from different angles:

McClellan Oscillator. A momentum version of the A/D line: the difference between a 19-day and 39-day EMA of (advances – declines). Oscillates around zero. Positive readings = bullish breadth momentum; negative = bearish. Extreme readings (above +100 or below –100) often mark short-term turning points. A version called the *McClellan Summation Index* sums these readings over time to give a longer-term breadth view.

New highs vs. new lows. Each day, count the number of stocks making 52-week highs and 52-week lows. In a healthy bull market, new highs swamp new lows; when the index is rising but new highs are *declining*, leadership is narrowing. A spike in new lows during an apparent bull market is one of the more reliable bearish warnings.

Percent of stocks above their 200-day moving average. A direct breadth gauge: in a healthy bull, 60–80% of stocks trade above their long-term average; in a deep bear, only 10–20% do. Sustained readings below 40% during an apparently rising index expose a narrow rally; readings under 20% historically mark capitulation lows. The *Bullish Percent Index* (a Point & Figure cousin, Chapter 24) measures the same idea using P&F buy signals.

25.3 The VIX — the Fear Gauge

The CBOE Volatility Index (VIX) is calculated from the option prices on the S&P 500 and represents the market's expectation of 30-day volatility, annualised. Originally launched in 1993 (then based on S&P 100 options), it was revised in 2003 to use the S&P 500 and a more rigorous methodology developed by Robert Whaley.

The VIX is not a forecast of *direction*; it's a forecast of *magnitude*. But because option premia rise sharply when investors hedge in fear, VIX spikes during selloffs — earning it the nickname the “fear gauge.” Typical readings:

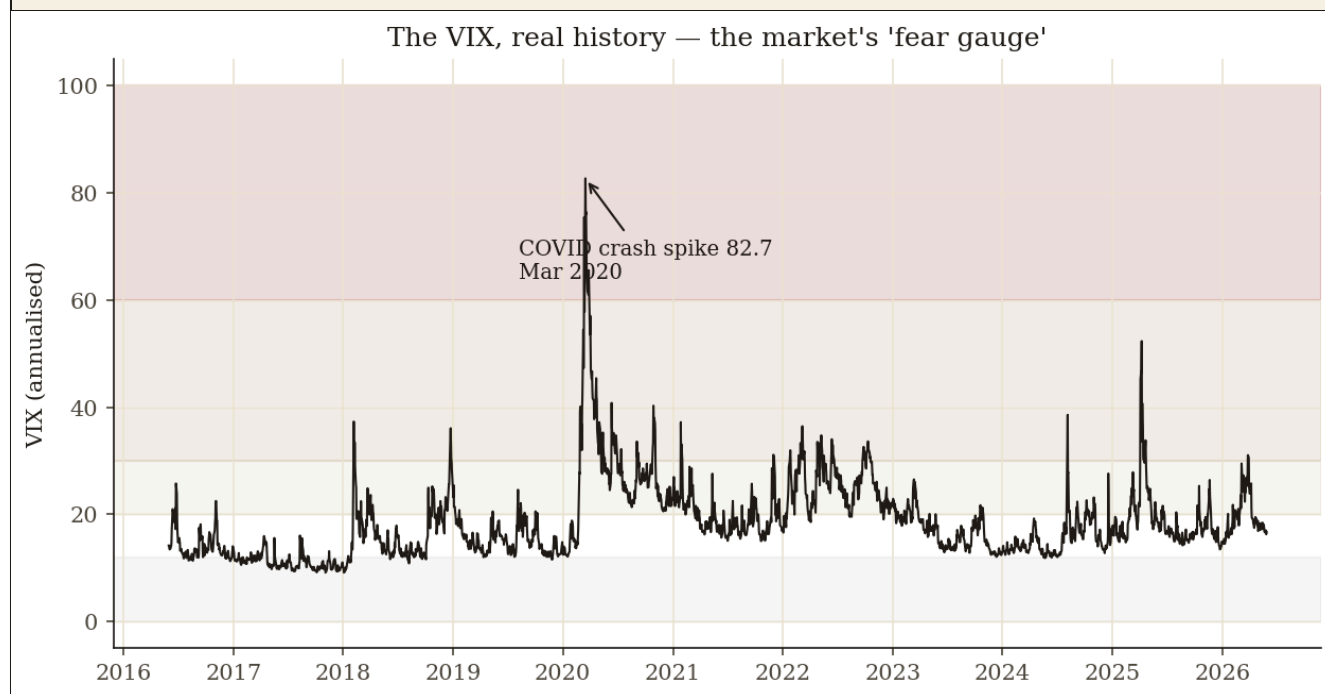
COMPARE & UNDERSTAND · VIX REGIMES

VIX RANGE	REGIME	WHAT IT MEANS
Below 12	Extreme calm	Complacency; often precedes corrections
12–20	Normal	Healthy market; routine volatility
20–30	Elevated	Stress; corrections in progress
30–50	High	Bear-market regime; sharp moves daily
50–80+	Panic	Crash conditions; reached in Oct 2008, Mar 2020

The VIX has a strong **mean-reverting** tendency: it spikes violently during crashes (89.5 intraday in Oct 2008; 82.7 in March 2020), then decays back toward 15–20 as conditions normalise. This decay is

exploited by various volatility-selling strategies — and it's also why extreme VIX spikes are often (though not always) contrarian buy signals on stocks: when fear maxes out, the worst is usually behind.

FIGURE 25.1 · THE VIX, REAL HISTORY — THE MARKET'S 'FEAR GAUGE'



Fear, real and measured. *The CBOE VIX over the past decade, with the regime bands shaded (calm, normal, elevated, panic). The COVID-crash spike to 82.7 in March 2020 is the modern peak; the smaller spikes (the late-2018 selloff, the 2022 rate shock, the 2024 yen-carry unwind) are all clearly visible. Note the strong mean-reversion — the VIX never stays high for long.*

25.4 Put/Call Ratio & Sentiment Surveys

Put/Call Ratio. The total volume of put options divided by the total volume of call options. Above 1.0, more puts (hedges/bets on declines) are trading than calls; below 1.0, more calls (bullish bets). Spikes above ~1.2 typically mark fear extremes and have historically preceded short-term rallies; sustained readings below ~0.5 reflect euphoria.

AII Sentiment Survey. The American Association of Individual Investors polls members weekly: bullish, neutral, or bearish on the next six months. The *bull–bear spread* is the contrarian's gauge: extreme bullish readings (above +30) have historically preceded poor returns; extreme bearish readings

(below -20, occasionally reached during major lows) have preceded strong returns. The data go back to 1987 and are publicly available.

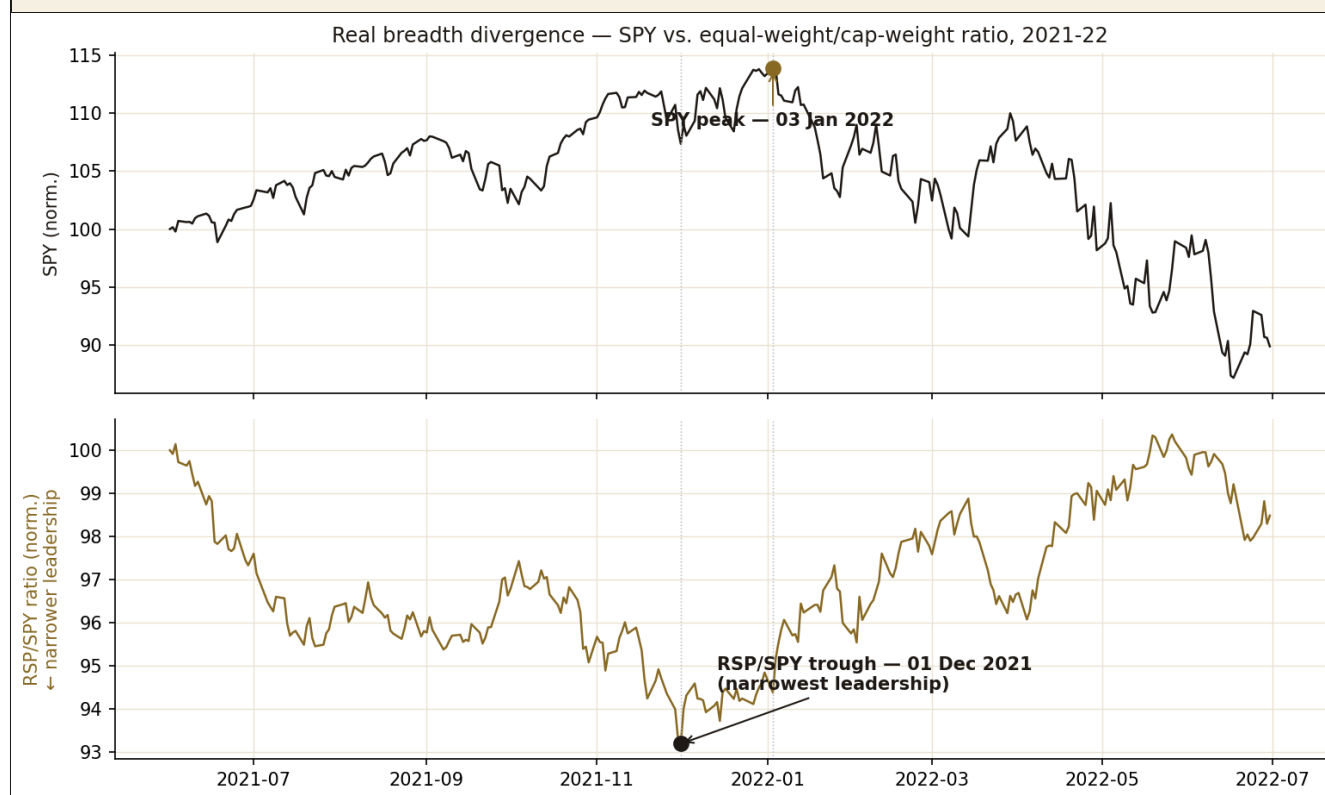
Investors Intelligence Survey. Samples newsletter writers (a presumed-informed cohort). Same contrarian logic; same warning signals at extremes.

Commitment of Traders (COT) Report. A weekly CFTC report showing positions in futures markets by category (commercial hedgers, large speculators, small speculators). The classic contrarian read: when small speculators are heavily net-long a commodity, the trade is crowded and a reversal is more likely.

25.5 Contrarian Sentiment — the Logic and Its Limits

The contrarian framework runs: **at sentiment extremes, the dominant view is already priced in, and the marginal buyer (or seller) is exhausted.** When everyone is bullish, who is left to buy? When everyone is bearish, who is left to sell? In practice, sentiment extremes are most reliable at the *major* turning points — the bottoms of bear markets, the tops of euphoric rallies — and least useful during the long middle stretches when sentiment is moderate.

The honest caveat is critical: extreme sentiment can *persist* for far longer than seems possible. The dot-com bubble had AAI bullish readings above 60% for months while prices kept climbing. The 2022 bear market produced repeated bullish-sentiment *collapses* that turned out to be only mid-bear bounces. Sentiment is a probability tilt, not a signal — useful as one input among several, dangerous as a stand-alone trigger.

FIGURE 25.2 · REAL BREADTH DIVERGENCE — SPY VS. EQUAL-WEIGHT/CAP-WEIGHT, 2021-22

The leadership narrowed before the index turned. Through late 2021, SPY (cap-weighted) continued making new highs while the equal-weight S&P (RSP) ratio kept falling — meaning fewer and fewer large stocks were carrying the index. The RSP/SPY ratio reached its trough on 1 December 2021, a full month before SPY peaked on 3 January 2022. The same narrowing-leadership warning the A/D line gave at the 2000 dot-com top, in modern data.

In Plain Terms · the market hides behind its biggest stocks

When five stocks account for 25% of the S&P 500 (as has been roughly the case in recent years), the index can hit new highs while 80% of stocks are flat or down. The headline number is true; the experience of the median stock is the opposite. Breadth indicators surface what the headline hides. If you remember nothing else from this chapter, remember: when an index makes a new high without breadth confirmation, treat it as a rally on borrowed time.

KEY TAKEAWAYS

1. **Breadth** measures how many stocks are participating in a move. The A/D line is the workhorse; divergences from the index are early warnings of narrowing rallies.
2. **Related breadth tools** — McClellan, new highs/lows, % above 200-day — refine the same insight from different angles.
3. **The VIX** measures expected 30-day S&P volatility; spikes mark fear, low readings mark complacency, and the index is strongly mean-reverting.
4. **Put/call ratios and sentiment surveys** (AAII, Investors Intelligence, COT) are contrarian gauges at extremes — bullish extremes warn of tops, bearish extremes mark bottoms.
5. **Use sentiment as a probability tilt**, never as a stand-alone trigger — extremes can persist for months.

SELF-CHECK

1. What is the Advance-Decline line, and what does it mean when it diverges from the index?
2. Describe the typical range of the VIX from complacency to panic.
3. Why are sentiment indicators read in a contrarian way at extremes?
4. Give a famous historical example where breadth divergence flagged a major top.

CHAPTER TWENTY-SIX

Intermarket Analysis & Sector Rotation

No market is an island. Stocks, bonds, commodities and currencies are stitched together by economic logic, and the relationships between them — especially as they shift across the business cycle — explain more than any single chart ever could. John Murphy's Intermarket Analysis turned this insight into a framework; Sam Stovall's sector-rotation map turned it into a tactical guide. Together they let you read where the economy is, not just where price has been.

IN THIS CHAPTER YOU WILL LEARN

- The four-market model: stocks, bonds, commodities, dollar.
- How the relationships shift between inflationary and deflationary regimes.
- The yield curve and why an inversion is a leading recession signal.
- Sector rotation across the business cycle (Stovall's model).
- How to use intermarket evidence as confirmation (or warning).

John Murphy popularised intermarket analysis with two landmark books — *Intermarket Technical Analysis* (1991) and *Intermarket Analysis* (2004) — building on observations that go back to the 1980s. His core insight: markets are linked by economic logic, and the technician who watches only one chart is reading half the story.

26.1 The Four Markets and Their Logic

The intermarket worldview treats four asset classes as a single system: **stocks, bonds, commodities, and the dollar**. In the “normal,” *disinflationary* regime that has dominated most of the post-1980s period, the standard relationships are:

- **Bonds and stocks move *together*** — both benefit from falling inflation and easy monetary policy.
- **Bonds and commodities move *inversely*** — rising commodities = inflation = falling bonds (and vice versa).
- **Commodities and the dollar move *inversely*** — most commodities are priced in dollars, so a stronger dollar lowers their price.
- **The dollar and US stocks have a *complex* relationship** — a strong dollar hurts multinational earnings; a weak dollar boosts them but signals weak relative confidence in the US.

The chain runs roughly: rising commodities → rising inflation expectations → rising bond yields (= falling bond prices) → higher discount rates → pressure on stock valuations. A technician who sees commodities (CRB Index, oil) breaking out, bonds breaking down, and stocks still rising knows the third leg is structurally vulnerable.

26.2 Inflationary vs. Deflationary Regimes

Crucially, the relationships above are *regime-dependent*. In an **inflationary regime** (1970s, parts of the 2021–22 period), bonds and stocks move *together* (both hurt by rising rates) — the “normal” inverse correlation breaks. In a **deflationary regime**, bonds rally as a safe haven while stocks collapse, restoring the inverse correlation. The technician who memorises only one set of relationships and applies them across regimes gets badly burned.

The 2022 bear market is the textbook contemporary example: rising commodities, rising bond yields, falling bond prices, *and* falling stocks — a regime shift from the post-2008 disinflation to a brief inflationary episode. The 60/40 portfolio (60% stocks / 40% bonds), which had relied on the assets diversifying each other, failed simultaneously because both fell. Intermarket analysis would have read this regime shift months ahead from the commodity and bond charts alone.

26.3 The Yield Curve as Leading Indicator

The single most reliable recession signal in modern macroeconomic history is the **inverted yield curve** — when short-term US Treasury yields rise above long-term yields. Normally, longer-term bonds yield more (you demand more return for tying up money longer). When the curve inverts, the bond market is signalling that it expects the Federal Reserve to cut rates sharply, which it would only do in response to a slowing economy.

The track record is impressive: every US recession since the 1960s has been preceded by an inverted curve (typically the 10-year minus 2-year, or 10-year minus 3-month), usually 6 to 24 months ahead. The 2007 inversion preceded the 2008 crash; the early 2020 inversion preceded the COVID recession; the 2022 inversion preceded the 2023 banking crisis and earnings recession. False positives are rare. The curve is so closely watched that the Federal Reserve Bank of New York publishes a recession-probability model based on it.

For the technician: watching the 10-year/2-year spread is one of the highest-information-per-effort exercises in all of market reading. A flat or inverted curve *and* deteriorating breadth (Chapter 25) is the canonical late-cycle warning.

26.4 Sector Rotation Across the Business Cycle

Within the stock market itself, different sectors lead at different stages of the business cycle. Sam Stovall (formerly of S&P) codified this in his sector-rotation model. The stylised cycle:

COMPARE & UNDERSTAND · STOVALL'S SECTOR ROTATION

PHASE	ECONOMY	SECTORS THAT TYPICALLY LEAD
Early bull (recovery)	Recession ending, rates low	Financials, Consumer Discretionary, Technology, Transports
Mid-bull (expansion)	Growth strong, inflation moderate	Technology, Industrials, Materials
Late bull (overheat)	Inflation rising, Fed tightening	Energy, Materials, Real Estate
Bear (contraction)	Recession, rates falling	Consumer Staples, Healthcare, Utilities (defensives)
Late bear (trough)	Recession deepening, Fed easing	Financials and Discretionary begin to lead again — early-bull cycle restarts

The intuition: *financials lead recoveries* because falling rates and steepening yield curves boost their net interest margins; *discretionary leads* because consumers re-spend; *tech and industrials* dominate the long expansion as capex returns; *materials and energy lead late* as inflation accelerates; and *defensives lead in bear markets* because their cash flows are stable through downturns. The technician who watches sector relative strength (each sector's chart divided by the S&P 500) can read where the cycle is — leadership shifts to defensives months before headline indices roll over.

26.5 Putting Intermarket Together — A Worked Reading

Suppose, on any given day, you observe: bond yields rising sharply, commodities making new highs, the dollar strengthening modestly, the yield curve inverting, defensive sectors (utilities, staples) beginning to outperform discretionary and tech, and breadth narrowing in the S&P 500 (Chapter 25). Each signal in isolation is a probability; *together* they paint a coherent picture of late-cycle conditions — inflation pressures rising, Fed tightening priced in, leadership rotating defensive, recession risk elevated. None of

this is visible on a single chart. The intermarket reader is the one who can see the regime, not just the trade.

FIGURE 26.1 · INTERMARKET GRID — THE 2022 REGIME CHANGE (REAL DATA)



Four markets, one regime. All four asset classes through 2021–23, normalised to 100 at start. The textbook 2022 inflationary-regime configuration: stocks down, long bonds also down (the 60/40 failure), commodities and the dollar up. A single equity chart hides this regime shift; the intermarket grid shows it plainly.

In Plain Terms · why one chart isn't enough

Most of this book has taught you to read a single chart. Intermarket analysis is the deliberate widening of focus to the whole financial system: bonds tell you what rates are doing; commodities tell you about inflation; the dollar tells you about global flows; the yield curve tells you about expectations; sectors tell you about cycle stage. The skill is not to memorise the “rules” — they change with regime — but to read the *relationships*, to ask “does the rest of the system agree with the story this chart is telling me?” When it does, conviction is warranted. When it doesn't, slow down.

KEY TAKEAWAYS

1. **Four-market model:** stocks, bonds, commodities, dollar — linked by economic logic, but relationships shift between inflationary and deflationary regimes.
2. **The yield curve** (10y – 2y, 10y – 3m) is one of the most reliable recession leading indicators; every US recession since the 1960s was preceded by inversion.
3. **Sector rotation:** financials and discretionary lead recoveries; tech and industrials lead expansions; energy and materials lead late-cycle; defensives lead bears.
4. **The relationships are regime-dependent** — memorising one rule set is dangerous; reading the system is the discipline.
5. **The intermarket reader sees the cycle and the regime**, not just the trade — and that is the difference between a tactician and an investor.

SELF-CHECK

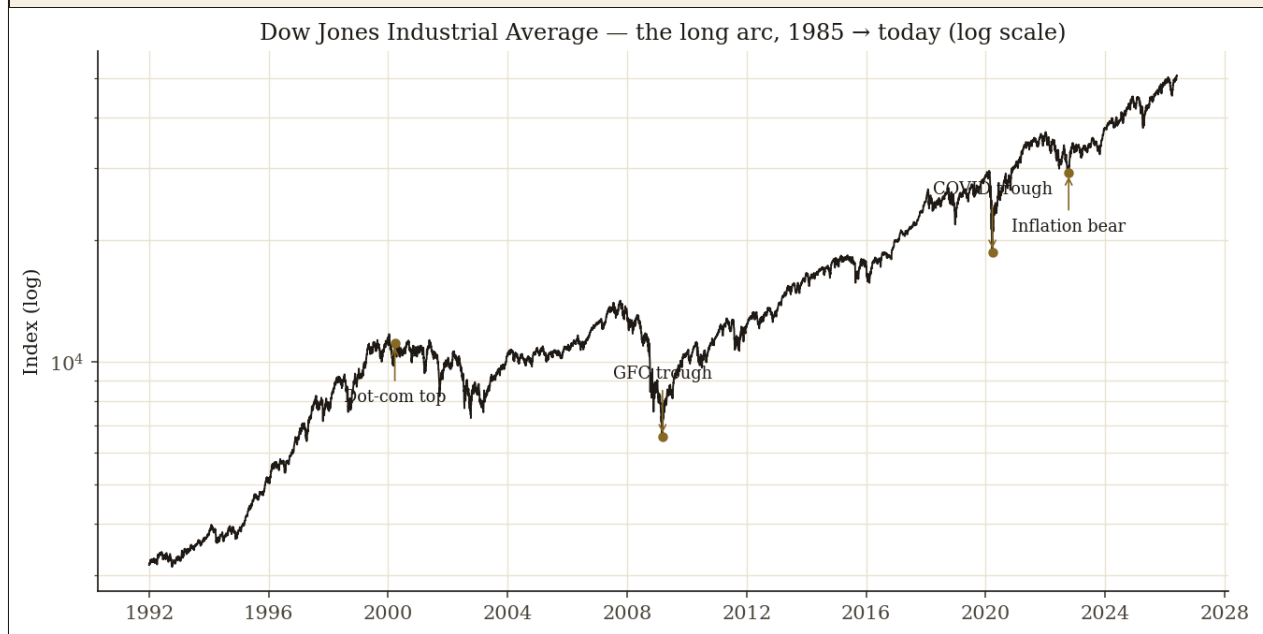
1. State the canonical disinflationary-regime relationships between stocks, bonds, commodities and the dollar.
2. Why did the 60/40 portfolio fail in 2022, and how could intermarket analysis have warned of it?
3. What is an inverted yield curve and why is it a leading indicator?
4. Which sectors typically lead at the beginning of a new bull market, and why?

VII

PART SEVEN

Case Studies — Six Historic Episodes

Theory is one thing; the moment of decision is another. This part walks through six of the most consequential market events of the last hundred years — the 1929 crash, Black Monday 1987, the 2000 dot-com top, the 2008 global financial crisis, the 2020 COVID crash, and the 2022 inflation bear — and asks, for each: what was technical analysis actually saying in real time, what did it get right, and what did it miss? Each is shown on the real S&P 500 chart. Read these and the abstract toolkit of the earlier parts becomes lived experience.

FIGURE VII.1 · THE DOW JONES INDUSTRIAL AVERAGE — THE LONG ARC

The episodes in this part, on one chart. *The Dow Industrials over the past 40 years on a log scale — Black Monday 1987, the dot-com top, the GFC trough, the COVID trough, the 2022 inflation bear, all on the same chart. Note that on log scale (each gridline is a different proportional move) each of these episodes is visible in real proportion to the others. The market is bigger than any one crash — but the crashes are the points of decision.*

1929	1987	2000	2008	2020	2022
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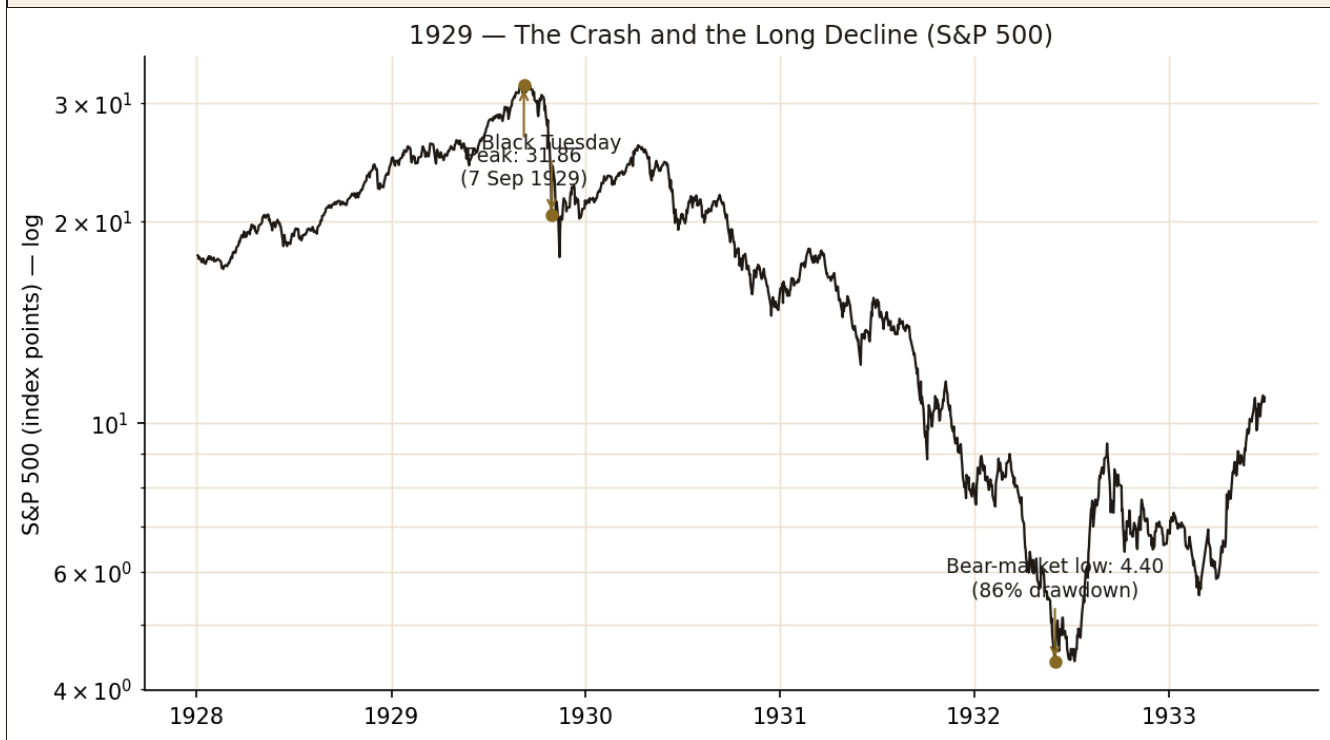
CHAPTER TWENTY-SEVEN

1929 — The Crash and the Long Decline

The original. The market peak that defined what a top looks like, the panic that gave Wall Street its first one-day double-digit losses since the Panic of 1907, and the three-year decline that wiped 86% off the S&P 500 — the worst bear market in the index's history.

IN THIS CHAPTER YOU WILL SEE

- The full real chart from 1928 through 1933, plotted on a log scale so the magnitude of the decline is visible.
 - What Dow Theory analysts saw in real time, and when.
 - Why the bear-market rally of mid-1930 caught so many of them.
 - The lessons that became the bedrock of every later TA tradition.
-

FIGURE 27.1 · THE 1929 TOP AND THE THREE-YEAR BEAR (REAL S&P 500)

The worst bear market in S&P 500 history. Real index data on a log scale. The September 1929 peak at 31.86, the October crash, the misleading recovery into spring 1930, and the long grinding decline to the June 1932 low of 4.40 — an **86% drawdown**. The log scale is essential: on a linear chart the post-1930 detail is invisible.

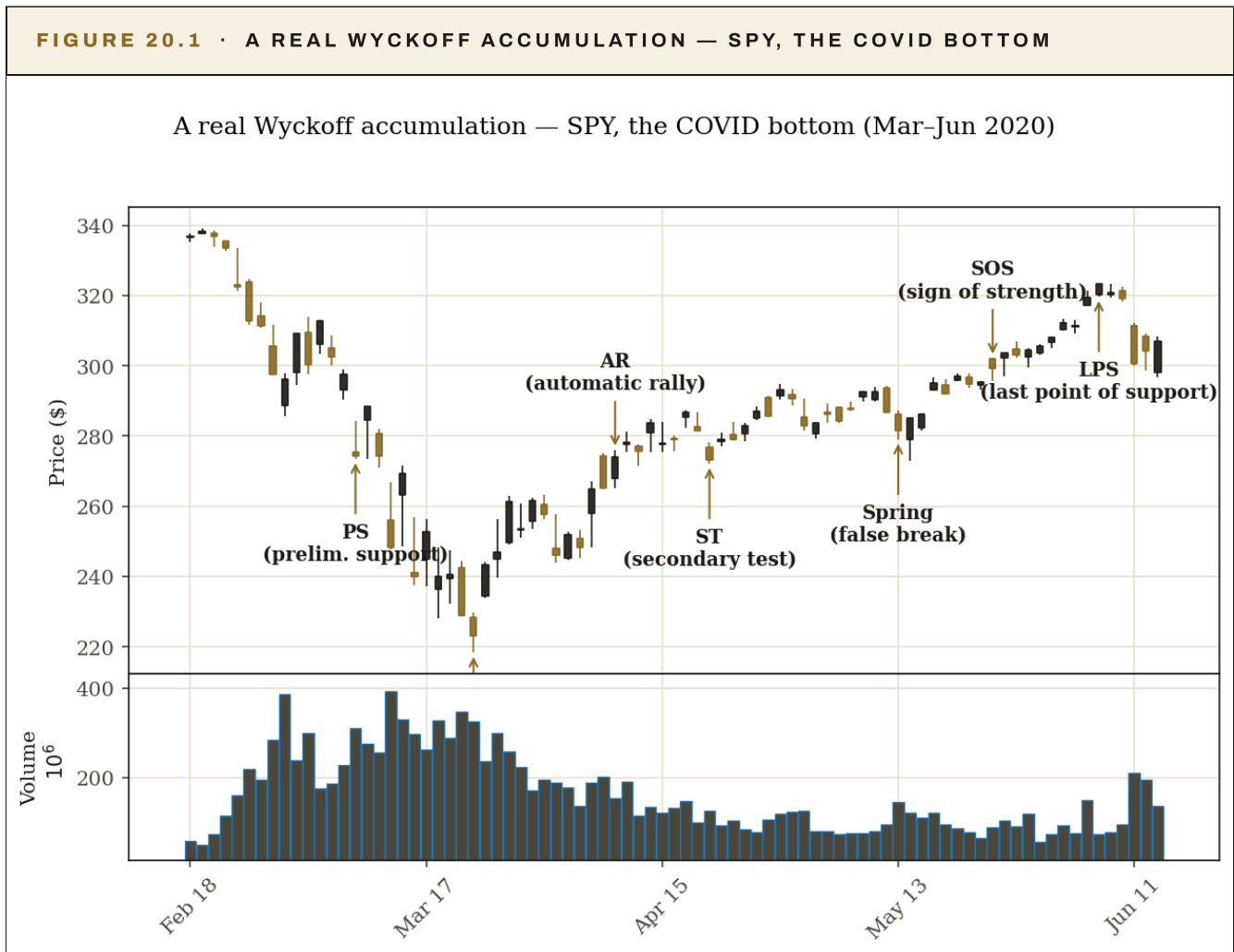
27.1 The Setup — A Distribution Top in Plain Sight

By the summer of 1929 the S&P 500 had nearly tripled from its 1926 level. Stock-market participation was the broadest in American history; margin debt had quadrupled in two years; speculative pools manipulated individual issues with almost no regulatory restraint. What Dow Theory (Chapter 19) calls the *distribution phase* — euphoria and informed selling — was unmistakable in retrospect. The technical signature was equally unmistakable in real time: by August 1929 the Dow Industrials kept making new highs but the Dow Transports (then Rails) had stopped confirming them. The classic divergence Hamilton had taught was right there on the tape.

27.2 The Crash — What Volume Said

The early September top gave way to a sliding September. On 23 October the market dropped sharply on volume nearly double normal. On **Black Thursday (24 October)** volume was four times the daily average — a true selling climax. After a weekend of nervous calm, **Black Monday (28 October)** took the Dow down -13% and **Black Tuesday (29 October)** finished the panic with a further -12% and the heaviest volume Wall Street had ever recorded — a record that would stand for nearly 40 years. The volume signature of effort-vs-result (Wyckoff, Chapter 20) screamed: massive selling effort, massive price decline, no buying support beneath. The technicals were giving a full-system breakdown.

FIGURE 20.1 · A REAL WYCKOFF ACCUMULATION — SPY, THE COVID BOTTOM



The schematic, in real life. Real SPY data through the COVID-crash accumulation, with the named Wyckoff events annotated as they actually occurred. Preliminary Support (PS) on 9 March, Selling Climax (SC) on 23 March on enormous volume, Automatic Rally (AR) into early April, Secondary Test (ST) on 21 April, a Spring on 13 May, the Sign of Strength (SOS) into the late-May breakout, and Last Point of Support (LPS) before the markup. A textbook accumulation — visible on the chart for anyone reading with Wyckoff eyes.

27.3 The Bear-Market Rally — the Trap of 1930

From the November 1929 low, the market rallied roughly 47% into April 1930, with the Dow climbing from ~199 to ~294. This is the rally that *destroyed* the optimists. Hamilton himself, in his last *Wall Street Journal* editorial of December 1929, called what he saw — the violation of the secondary support — a bear-market signal under Dow Theory. He died weeks later, and was vindicated within the year: the spring rally rolled over in April, the Dow broke its November 1929 low in June 1930, and the long decline began. The lesson for every later technician: a sharp counter-trend rally in a confirmed bear market is *typical*, not *contrary*; it is the wave-B sucker rally of Elliott, the AR of Wyckoff, the secondary-reaction-not-a-reversal of Dow.

27.4 The Long Decline — 86% Down

From spring 1930 to summer 1932 the S&P 500 lost **86%** of its value. Each year produced lower highs and lower lows; each bear-market rally failed at a lower level than the last. In Dow-Theory terms the trend was unambiguous; in Elliott Wave terms it was a sequence of five impulsive declines; in Wyckoff terms it was distribution → markdown without an accumulation in sight. Investors who held through 1929 lost almost everything they owned. The eventual June 1932 low was the most extreme bear-market trough in modern market history — and from that level the next bull market began.

27.5 What This Episode Teaches

1. **Tops are processes, not events.** The 1929 top was visible to disciplined technicians for weeks before Black Tuesday — breadth deteriorating, transports failing to confirm, distribution evident. The crash itself was the *completion* of a topping process, not its start.
2. **Bear-market rallies trap the optimists.** The 1929–30 rally retraced about 47% of the prior fall before failing. Counter-trend rallies in confirmed downtrends are normal and should be sold or sat out, not chased.
3. **Risk management would have saved a generation.** An investor mechanically obeying a Dow Theory sell signal in late 1929 or any reasonable trend-following exit would have suffered a small loss; one who held through 1929–32 lost almost their entire capital.

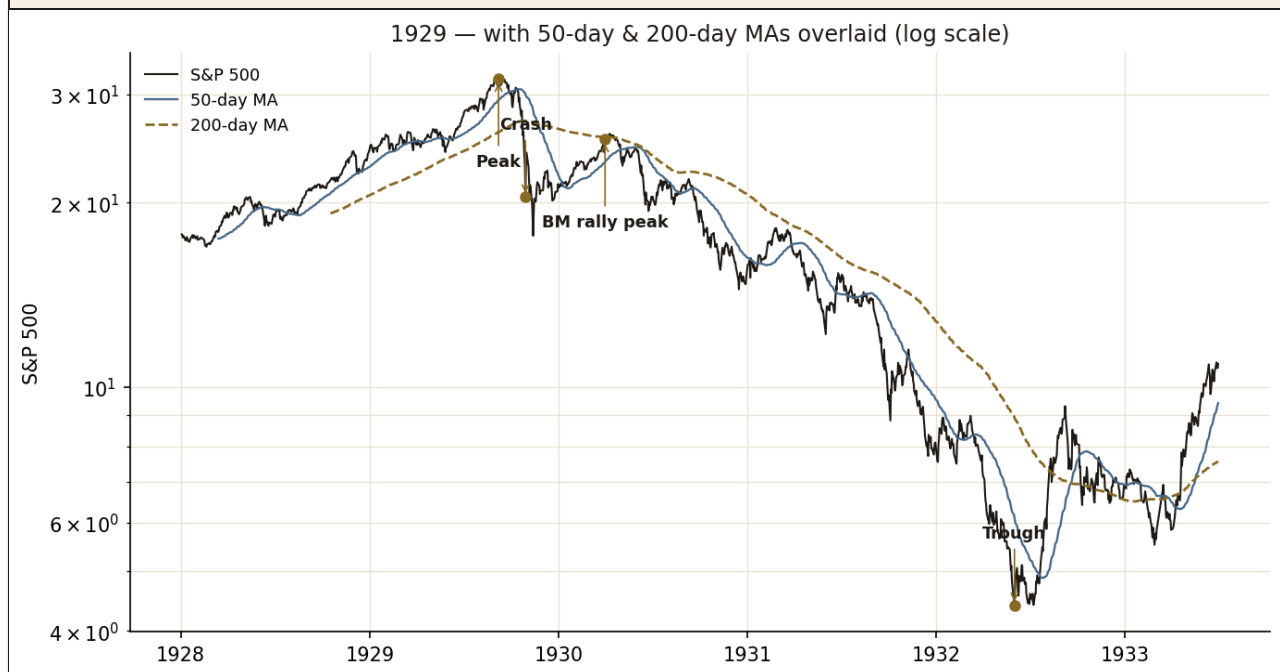
4. The chart on a log scale is the only honest one for moves this large. A -86% decline is invisible on a linear chart of the recovery; on log scale, every percentage move is given equal vertical real estate.

WATCH OUT

Survivor bias in historical TA storytelling

It is tempting to say “Dow Theory called the 1929 top” and leave it at that. The honest record is more mixed: Hamilton's December 1929 editorial called the violation of support, but the technical literature of late 1929 also contains many bullish calls that proved disastrous. The lesson is not that the rules are infallible; it is that even an imperfect framework, applied with discipline, would have outperformed the buy-and-hope alternative by orders of magnitude.

FIGURE 27.2 · 1929 WITH THE MOVING AVERAGES OVERLAID (LOG SCALE)



The technical exit was clean. Real S&P 500 1928–33 with 50-day and 200-day MAs. The 200-day MA gave way decisively in late October 1929; the death cross on the same chart, on the same data, would have spared a trend-follower the bulk of the 86% decline that followed. Whatever Dow Theory's overall record, the simplest mechanical exit on this chart was unambiguous.

KEY TAKEAWAYS

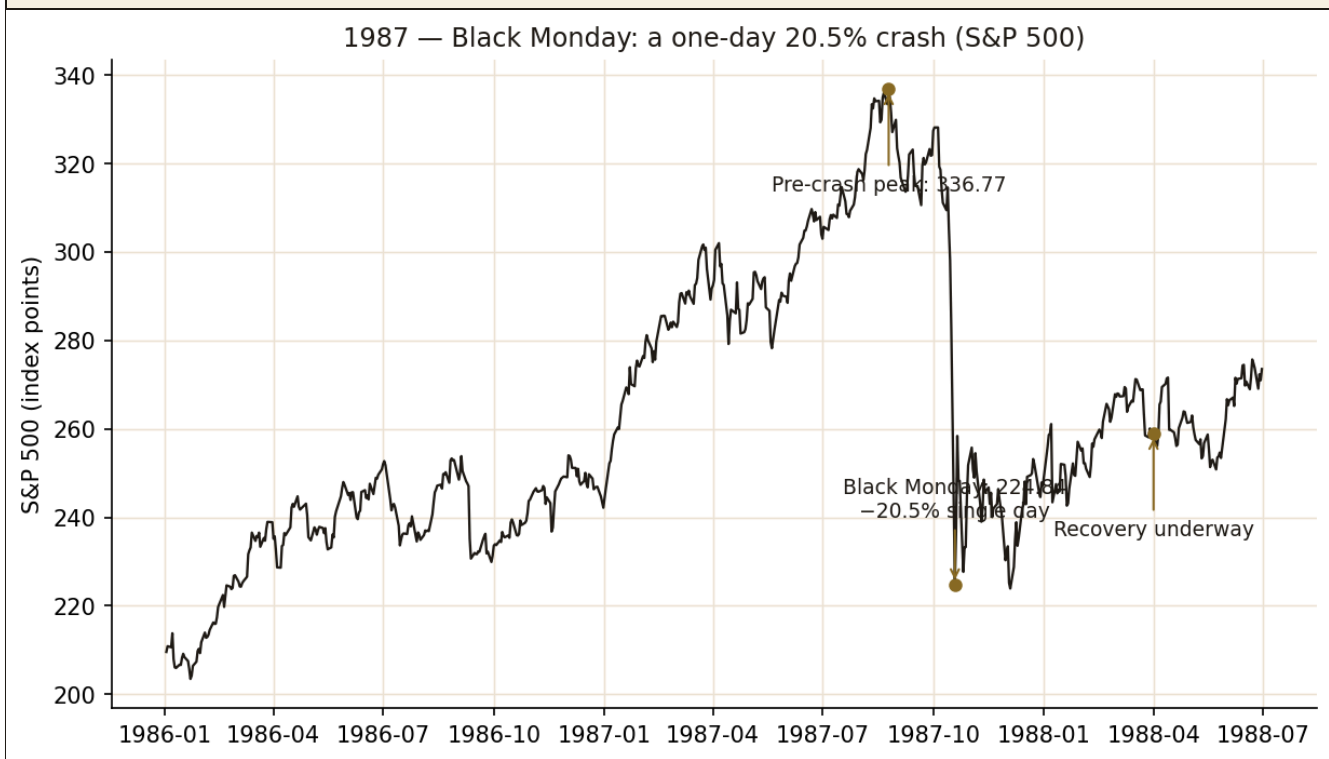
1. **The 1929 top showed every classical warning** — distribution, breadth divergence, transport non-confirmation — for weeks before the panic.
2. **The crash itself was a volume-confirmed breakdown** on the heaviest volume in market history at the time.
3. **The 1929–30 bear-market rally retraced ~47%** before failing — the canonical sucker rally.
4. **An 86% drawdown** followed — the worst in S&P 500 history. Risk management is not optional.

CHAPTER TWENTY-EIGHT

1987 — Black Monday

*On 19 October 1987 the S&P 500 fell **20.5%** in a single trading day — the largest one-day percentage loss in modern American market history. It happened with almost no advance fundamental warning, on no news, in a market that had been the strongest in a generation. And yet, by the technicals, every alarm bell was already ringing.*

FIGURE 28.1 · BLACK MONDAY IN CONTEXT (REAL S&P 500, 1986–88)



One day, one-fifth gone. Real S&P 500 data, January 1986 to mid-1988. The August 1987 peak at 336.77 is the inflection; the October 19 close at 224.84 is the -20.5% single-session crash; the year-long base rebuilds the market by early 1988.

28.1 The Setup — A Parabolic Rally and Rising Rates

From the August 1982 low of about 102, the S&P 500 had more than tripled to its August 1987 peak of 337 — a parabolic ascent. Volatility had been suppressed for years, breeding complacency; portfolio-insurance strategies (mechanical selling of futures when stocks fell, then designed to protect institutional portfolios) had spread without anyone fully grasping their feedback potential. Crucially for the technician: bond yields had risen sharply through 1987 (the 30-year Treasury yield climbed from about 7% in March to over 10% by October), implying a regime where stocks and bonds were both under pressure (intermarket analysis, Chapter 26).

The chart's own warnings were ample. The August 1987 peak was followed by a series of *lower highs* through September into October — the basic uptrend pattern (Chapter 3) was already breaking down. Volume on the down-days was expanding (effort/result, Chapter 20). By mid-October the S&P had broken its 200-day moving average. Any disciplined trend-following exit was already triggered.

28.2 The Crash Itself — A Cascade, Not a Catalyst

On 14 October the Dow fell 95 points (3.8%) on rate fears. On 15 and 16 October the losses compounded — Friday closed down 4.6%. By the open on Monday 19 October, every system had been primed: portfolio-insurance triggers had queued thousands of automatic futures sells, retail investors were in panic, market-makers stepped back. The S&P 500 ended the day at 224.84, down 20.5% — a loss of about \$500 billion in market value. There was no single news catalyst. The cascade was mechanical: selling beget selling beget selling, with the new portfolio-insurance technology accelerating the dynamic that crowd psychology had always produced.

28.3 What the Technicals Said in Real Time

Robert Prechter's Elliott Wave-based newsletter (then very influential) called for a major top in summer 1987 — and Prechter himself was widely credited with the call afterward, though the post-crash forecast for further sharp declines through the early 1990s proved badly wrong. The technical warnings of the immediate top:

- **Bearish divergence on momentum oscillators** in late August: the index made new highs while RSI/MACD made lower highs (Chapter 13).
- **Breaking of the rising trendline** in early October (Chapter 3).
- **Breaking of the 50-day moving average**, then the 200-day, in the week before Black Monday (Chapter 12).
- **Volume expansion on declines**, contraction on bounces (Chapters 11, 20).
- **Intermarket pressure**: rising long-term yields squeezing equity valuations (Chapter 26).

28.4 The Recovery — and What Was Different

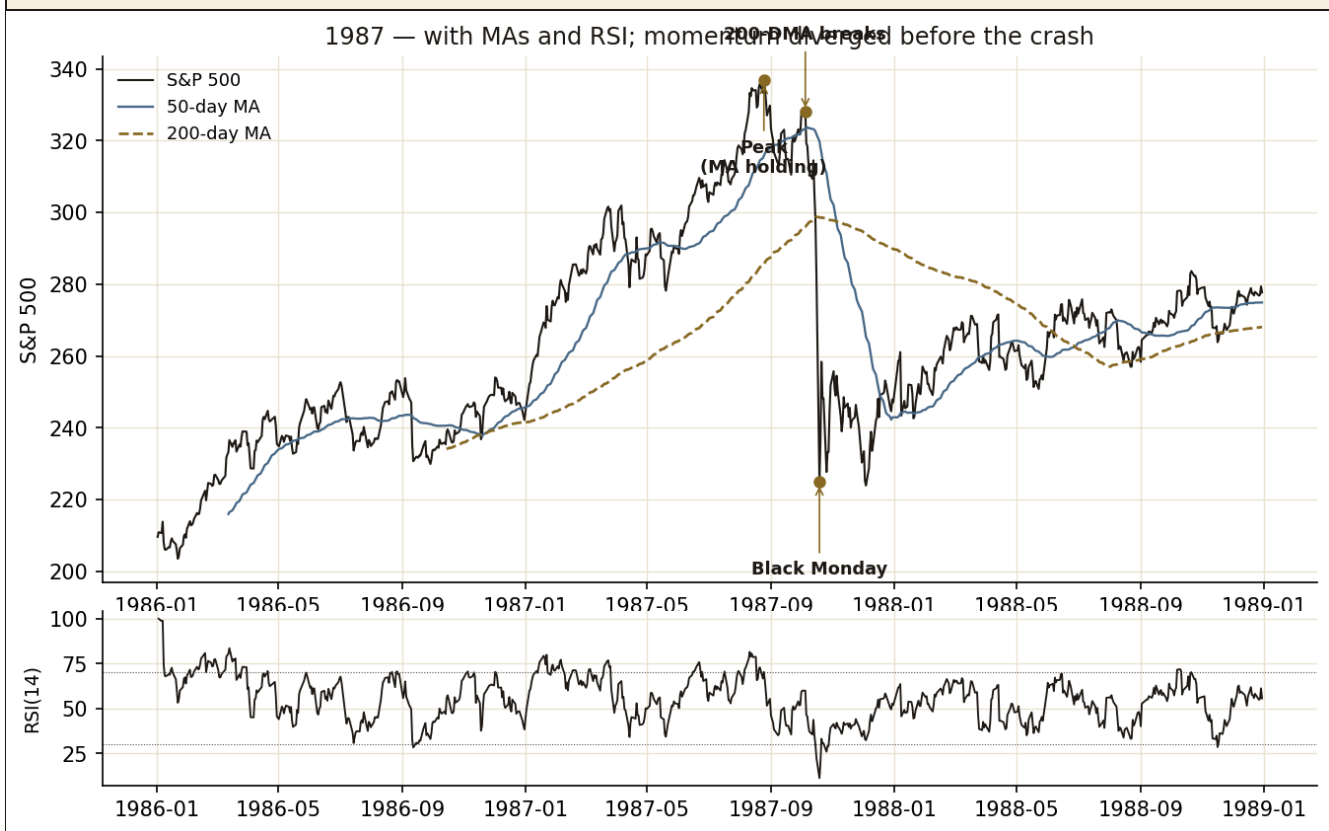
Unlike 1929, the 1987 low was the low. The Federal Reserve under Alan Greenspan flooded the system with liquidity within hours of the crash; banks were instructed to keep lending; the system held. By March 1988 the S&P had recovered most of its losses, and the year-end 1987 close was actually *up* on the year. The crash, for buy-and-hold investors with adequate diversification, was a year of stress and no long-term damage. For leveraged speculators and portfolio-insurance users, it was ruin.

28.5 Lessons from Black Monday

1. **Mechanical systems can create their own crashes.** Portfolio insurance's feedback dynamics added a layer no traditional technician had modelled. Modern algorithmic and high-frequency trading raises the same risk in different form.
2. **Top warnings were visible weeks ahead.** A disciplined trend-following or moving-average system would have been out by 16 October at the latest.
3. **Central-bank backstops change the recovery shape.** Greenspan's instant liquidity injection contained the damage in a way no 1929-era policymaker had attempted.
4. **One-day crashes can be terminal events, not preliminary ones.** The 1929 crash kept going; the 1987 crash didn't. The difference was institutional response — which the chart alone cannot show.

KEY TAKEAWAYS

1. **20.5% in one day** — still the modern S&P 500 record.
2. **The technical warnings were ample:** bearish divergence, broken trendline, broken MAs, volume expansion on declines.
3. **Portfolio-insurance feedback dynamics** turned a routine correction into a panic — a warning still relevant in the algorithmic age.
4. **Unlike 1929, the low held** because of the Fed's instant liquidity response. Institutional context shapes outcomes the chart cannot predict.

FIGURE 28.2 · BLACK MONDAY WITH MAS AND RSI OVERLAID

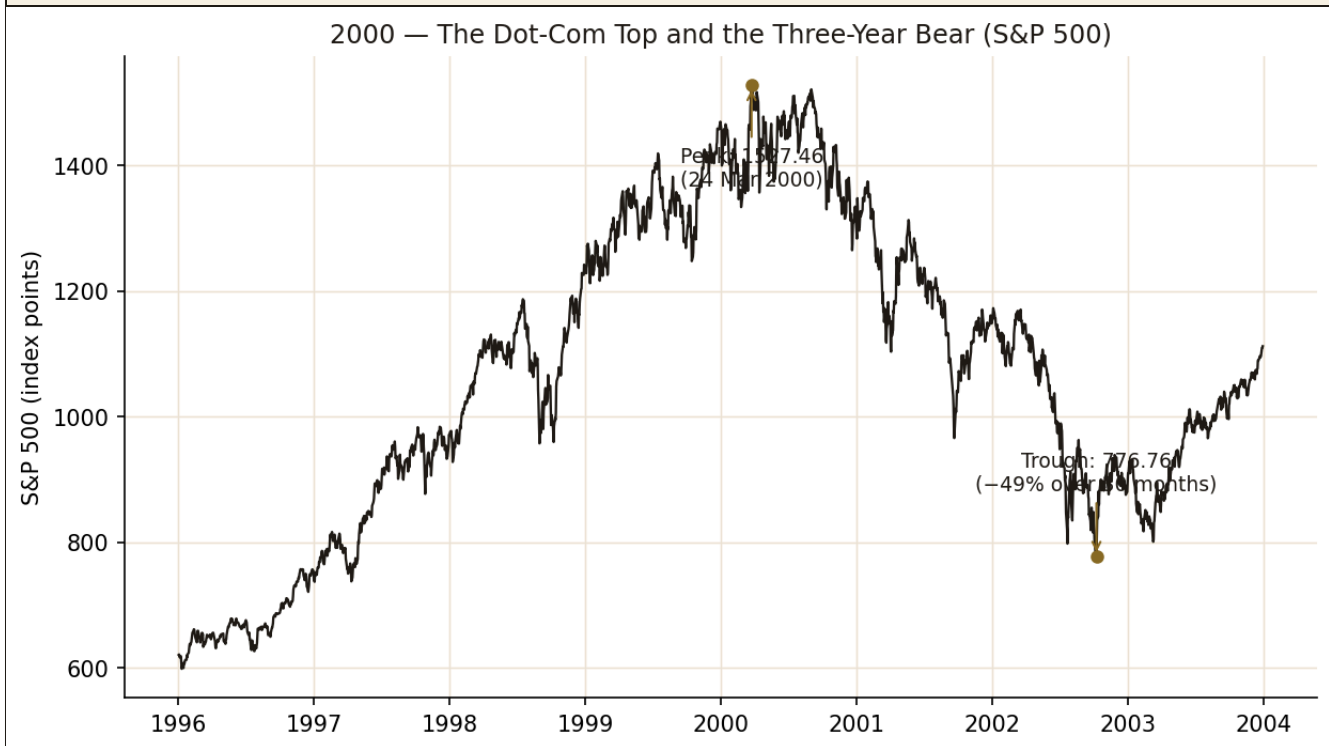
Momentum diverged for weeks. Real S&P 500 1986–88 with 50-day & 200-day MAs (top) and RSI(14) (bottom). The bearish RSI divergence into the August 1987 peak and the cascade through the 200-day MA in mid-October produced clear technical sell signals well before Black Monday itself.

CHAPTER TWENTY-NINE

2000 — The Dot-Com Top

In March 2000 the Nasdaq Composite peaked at 5,048 — at the end of a five-year rally that had pulled in millions of new investors and gave us the verb “to day-trade.” Over the next thirty months, while a vast wave of dot-com companies disappeared entirely, the S&P 500 fell 49% and the Nasdaq 78%. Of all the modern market tops, this is the one for which technical warnings were most extensive and most ignored.

FIGURE 29.1 · THE DOT-COM TOP AND THE THREE-YEAR BEAR (REAL S&P 500, 1996–2003)



The first 21st-century bear. Real S&P 500 data: the parabolic late-1990s climb to the March 2000 peak of 1527, the long decline through 2002, and the eventual trough at 776 in October 2002 — a **49% drawdown**. The Nasdaq Composite, more concentrated in tech, fell roughly 78%.

29.1 The Setup — Breadth Divergence on Display

The most famous breadth divergence in technical-analysis history began in *April 1998* and persisted for nearly two years. The NYSE Advance-Decline line (Chapter 25) peaked in April 1998 — and from that point onward, the broad market was no longer participating in the rally. The S&P 500 and especially the Nasdaq continued making new highs into March 2000, but the average stock was already in a private bear market. Five technology giants — Microsoft, Cisco, Intel, Oracle, and (then) Lucent — accounted for an outsized share of the index's continued rise, while hundreds of mid- and small-cap stocks were already in 30–50% drawdowns. This is exactly the structural condition Chapter 25 described as the canonical late-cycle warning.

29.2 The Top — Real Technical Warnings

Beyond the multi-year breadth divergence, the immediate top showed:

- **Sentiment extremes.** The AAI bull-bear spread reached records; mutual-fund inflows to equity funds peaked in March 2000 simultaneously with the index. The Investors Intelligence bulls-vs-bears ratio was at multi-decade extremes (Chapter 25).
 - **Bearish divergence on weekly RSI and MACD** (Chapter 13): the Nasdaq made new highs while momentum failed to confirm.
 - **Yield-curve inversion.** The 10-year/2-year Treasury spread inverted in February 2000 — the classic recession signal (Chapter 26).
 - **Volume topped in 1999.** By spring 2000, dollar volume on Nasdaq was already declining from the late-1999 peak (effort/result, Chapter 20).
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29.3 The Decline — and the Bear-Market Rallies

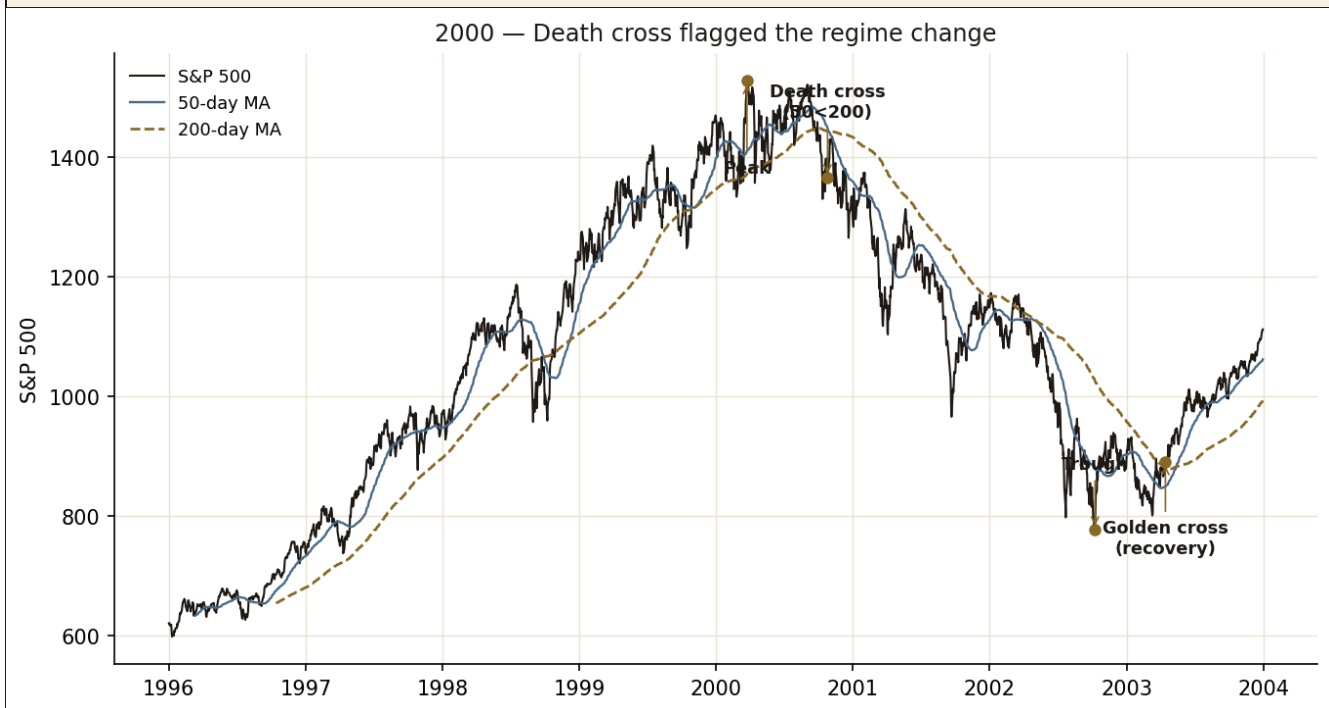
From March 2000 to October 2002, the S&P 500 produced a series of sharp bear-market rallies — each of 20–30% — that fooled the optimists into believing the worst was over. The October 2001 rally (after the September 11 attacks) ran nearly 25% before failing; the spring 2002 rally another 15%. Each one broke

down at a lower high than the one before. The pattern was the same as 1929–32: lower highs, lower lows, sucker rallies, capitulation.

For the disciplined practitioner, the trend-following exits triggered in late summer 2000 (the S&P broke its 200-day MA decisively in September) and the brave shorts entered on the death cross (50-day below 200-day) in December 2000. Most importantly: the Dow Theory non-confirmation between the Industrials and Transports had been signalling all year — the Transports peaked nine months before the S&P.

29.4 The Lesson — Index Highs Without Breadth Are Hollow

If 2000 has a single canonical lesson for technical analysts, it is this: **when an index makes new highs while breadth fails to participate, treat the rally as borrowed time.** Chapter 25's discussion is built on this episode. The two-year warning the A/D line gave was as long and clear as any in market history — and was almost universally ignored, because the headline index kept going up. The technician's job is to look *past* the index to the average stock, the average sector, the average breadth measure. When they disagree with the index, the index is the one that eventually reconciles.

FIGURE 29.2 · THE 2000 DOT-COM BEAR WITH MAS

The death cross flagged the regime. Real S&P 500 1996–2003 with both MAs. The 50-day crossing below the 200-day in late October 2000 ("death cross") was the long-term sell signal; the eventual 50/200 golden cross in April 2003 marked the bull's return. Two signals, three years apart, captured the entire bear.

KEY TAKEAWAYS

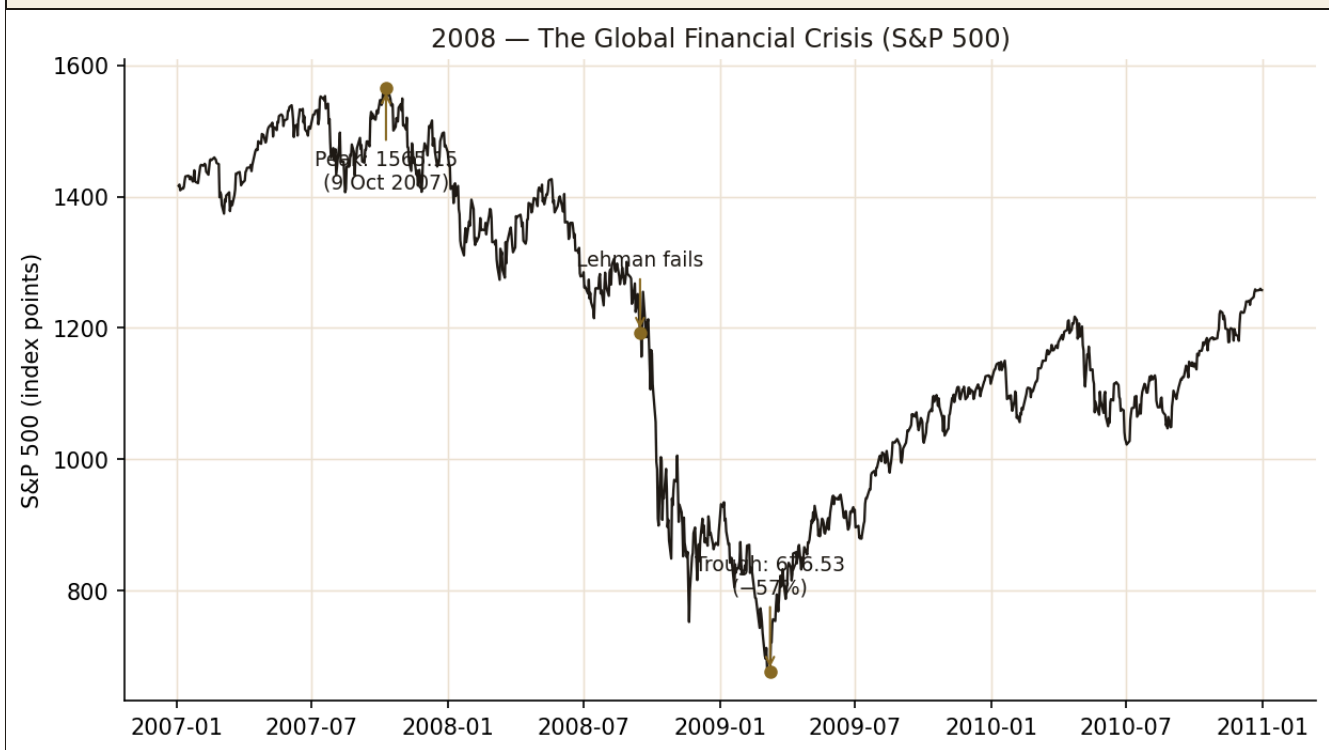
1. Two-year breadth divergence on the A/D line preceded the 2000 top — a near-textbook warning that lasted from April 1998 to March 2000.
2. Sentiment extremes, yield-curve inversion, momentum divergence all confirmed the top before the panic.
3. The decline was 30 months long, with three sharp bear-market rallies; each failed at a lower high.
4. The single most important lesson: an index high without breadth is borrowed time.

CHAPTER THIRTY

2008 — The Global Financial Crisis

From the October 2007 peak to the March 2009 trough, the S&P 500 lost 57% of its value — the worst bear market since the 1930s. Lehman Brothers failed. Bear Stearns failed. AIG was nationalised in everything but name. And yet the technical warnings were on the chart for nearly a year before the worst of it.

FIGURE 30.1 · THE 2007–09 BEAR (REAL S&P 500)



–57% in seventeen months. Real S&P 500 data, January 2007 to December 2010. The peak at 1565 on 9 October 2007; the trough at 677 on 9 March 2009; the long recovery through 2010. Note the Lehman event in September 2008 — not the start of the bear, but the panic phase of one already eighteen months underway.

30.1 The Setup — Two Years of Warnings

The credit-cycle stress was visible to intermarket-oriented technicians long before equities turned. From 2006 onward, the yield curve was flat-to-inverted (the 10-year/2-year inverted in early 2006 and stayed near zero for two years). Housing-sector stocks (the homebuilders, then Citigroup, then the regional banks) topped a full year before the S&P — Toll Brothers, Lennar and KB Home were down 50% by mid-2007 while the broad index was still making new highs. Classic intermarket and sector-rotation warnings (Chapter 26): when the most rate-sensitive sectors are already in their own bear market, the rest of the market is on borrowed time.

30.2 The Topping Process

The S&P peaked on 9 October 2007 at 1565. The pattern from October 2007 to October 2008 was a classic distributional top with multiple lower highs: a rally into May 2008 failed at 1440 (well below the October 2007 high); another in August at 1313. The 200-day moving average gave way decisively in January 2008 — a clean trend-following sell signal that would have spared its followers most of the eventual damage. Breadth deterioration was continuous through 2008. By the time Lehman failed in September 2008, the S&P was already down 22% from its peak; the panic phase merely accelerated an established decline.

30.3 The Panic — September to November 2008

Between the Lehman failure on 15 September 2008 and the late-November low, the S&P fell from 1251 to 752 — a 40% drop in ten weeks. The VIX hit 89.5 intraday on 24 October — at the time a record. Every classic technical sign of capitulation appeared: extreme volume, single-day collapses of 7–9%, breadth at multi-decade extremes, sentiment at record bearish levels. The technical literature distinguishes capitulation from continuation: capitulation comes with exhaustion (volume crests then declines, sentiment hits extremes), continuation does not. In November 2008 the signs of exhaustion were beginning to appear; the final low came in March 2009.

30.4 The Bottom — and the Generational Buy Signal

The March 2009 low at 676.53 was the lowest the S&P would trade for the next decade and a half. Multiple technical signals identified it in real time:

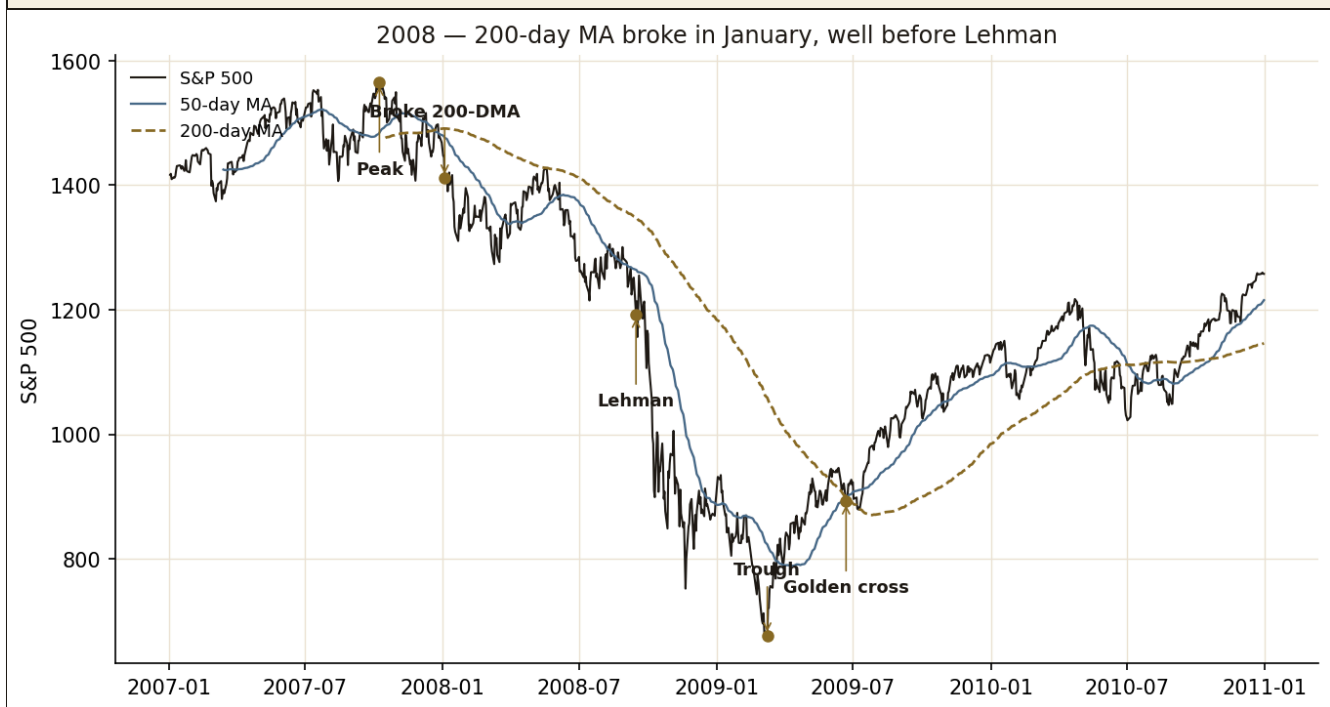
- **Bullish divergence on the major oscillators.** RSI and MACD made higher lows in March even as price made the index low — the classic reversal hint of Chapter 13.
- **Breadth thrust.** In the weeks after the low, breadth indicators showed one of the most explosive expansions in history — a “Zweig breadth thrust” signal fired in March 2009, calling the bottom with near-prophetic precision.
- **VIX collapse.** The VIX had peaked in November 2008 and was already in steady decline by March — fear was reducing even as price hit its low (Chapter 25).
- **Sentiment capitulation.** Investors Intelligence bears outnumbered bulls by record margins; AAI bearish readings reached extremes from which buying had historically been generously rewarded.

30.5 Lessons from the GFC

1. **Intermarket warnings preceded the equity peak by a year.** The yield curve, housing stocks, and credit spreads all flagged the regime change in 2006–07 while equities were making new highs.
2. **The 200-day MA exit in January 2008 spared trend-followers from the worst of the panic.** Mechanical discipline beat instinct.
3. **Capitulation has technical signatures** — exhaustion volume, bullish divergence, fading VIX — that distinguish it from continuation declines. They were all present in March 2009.
4. **The greatest buying opportunities feel terrifying in real time.** The technical evidence often points to a bottom precisely when sentiment is most despondent — exactly because that is the contrarian setup.

KEY TAKEAWAYS

1. **Intermarket warnings ran for 12+ months** ahead of the equity top — flat-to-inverted yield curve, homebuilders and banks already in their own bear.
2. **The 200-day MA broke in January 2008** — a clean trend-following exit.
3. **Lehman wasn't the start; it was the panic phase** of an already-mature decline.
4. **March 2009 showed every classical capitulation signal** — bullish RSI divergence, breadth thrust, fading VIX, record bearish sentiment.

FIGURE 30.2 · THE GFC WITH MAS OVERLAID

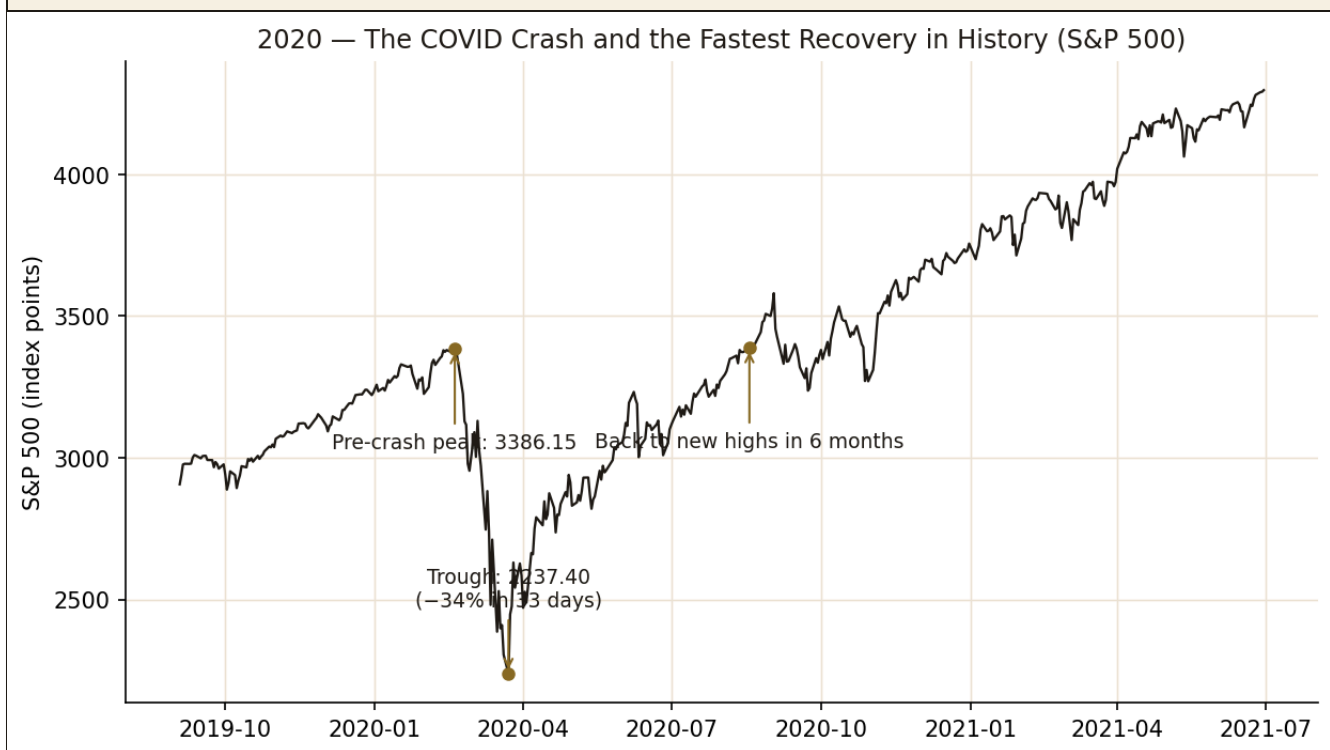
January 2008 was the technical exit; September was the panic. Real S&P 500 2007–10 with 50-day and 200-day MAs. The 200-day MA broke decisively in early January 2008 — nine months before Lehman. The June 2009 golden cross marked the new bull. A simple MA exit would have spared its followers most of the –57% drawdown and entered them within months of the actual low.

CHAPTER THIRTY-ONE

2020 — The COVID Crash and Recovery

*From the 19 February 2020 peak at 3,386 to the 23 March 2020 trough at 2,237, the S&P 500 lost 34% in **33 calendar days** — the fastest bear market in the index's history. And then, more remarkably, the recovery to new all-time highs was completed within six months. This was a crash unlike any other.*

FIGURE 31.1 · THE FASTEST CRASH AND THE FASTEST RECOVERY (REAL S&P 500)



A V-bottom of unprecedented speed. Real S&P 500 data, September 2019 to June 2021. Peak at 3,386 on 19 February; trough at 2,237 on 23 March; back to new all-time highs by 18 August — the fastest recovery from a 30%+ drawdown in market history. Massive central-bank intervention plus an exogenous (not credit-driven) shock made this episode atypical.

31.1 The Setup — A Bull Market Untroubled by Warnings

By contrast with 1929, 2000 and 2008, the early-2020 market showed *few* classical technical warnings. Breadth was healthy. Sentiment was constructive but not extreme. The yield curve had briefly inverted in August 2019 but had un-inverted by year-end. The 200-day moving average was rising and well below price. Whatever was about to happen, the chart did not predict it. This is itself an important lesson: *some crashes come from the exogenous world, not from market-internal imbalances*. Technical analysis cannot anticipate every shock.

31.2 The Crash — V-Shaped Panic

The S&P peaked on 19 February. Over the next 33 calendar days it fell almost vertically. Daily moves of -7% to +9% became common; the VIX spiked to an all-time intraday high of 85.5 on 18 March. Every classical technical signal of crash panic fired: extreme down-volume, gaps lower, breadth at single-day extremes never previously recorded, sentiment surveys hitting record bearishness. Critically, this was a true exogenous shock — a pandemic-driven economic shutdown — not a market-internal credit cycle. There was no slow distribution; the top was a near-vertical line.

31.3 The Bottom — Reading the V

The 23 March low produced an unusual technical configuration. There was no rounded base (Chapter 9), no months of accumulation (Chapter 20) — just a sharp price low on the most extreme volume of the panic, followed by an immediate explosive rally. The technical signs that *did* fire:

- **The classic bullish hammer** on 13 March (real chart in Chapter 6) and follow-through buying within days.
- **Bullish divergence on momentum indicators.**
- **Breadth thrust.** One of the most explosive breadth expansions in history occurred in late March and April 2020.
- **VIX peak and decline.** The fear gauge peaked on 18 March and was already declining when the cash index made its low on the 23rd — a small but meaningful divergence.

- **Central-bank intervention.** The Federal Reserve announced unprecedented support facilities on 23 March — the very day of the low. This was visible in real time but is not a chart signal; it is the context the chart cannot show.

31.4 The Recovery — Faster Than Any Before

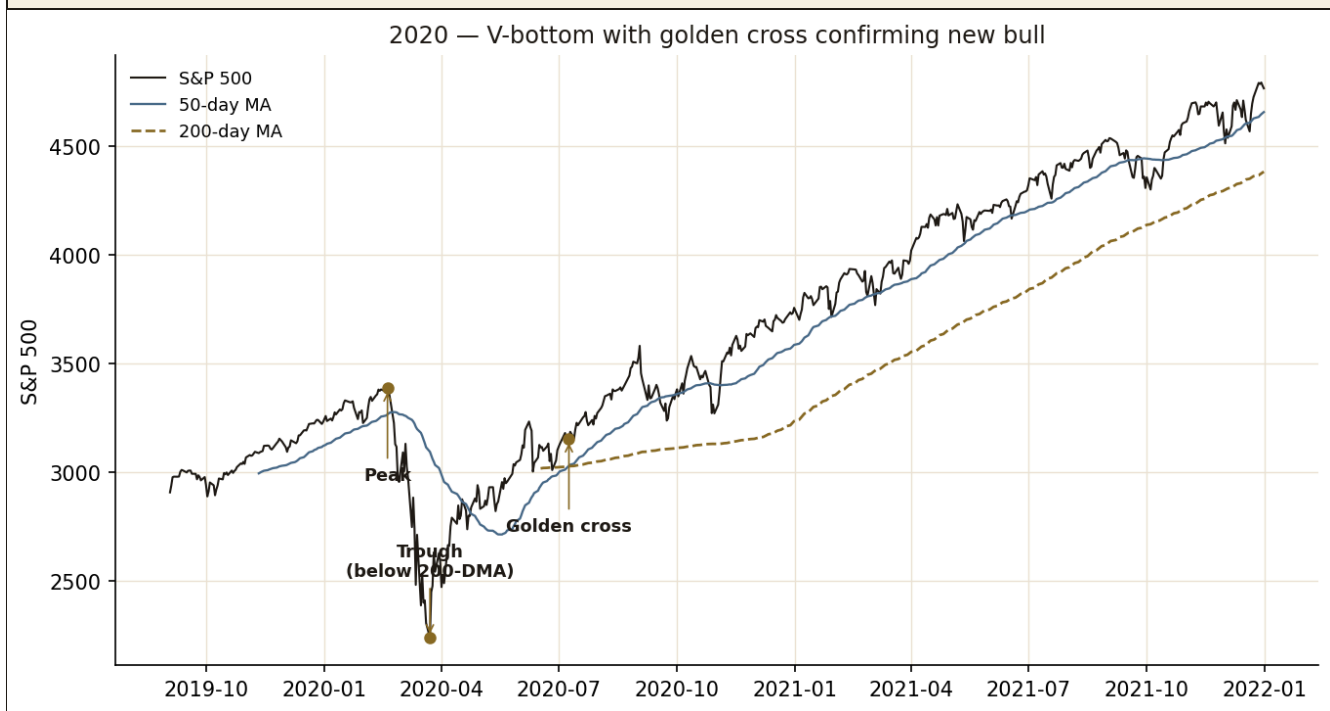
From the 23 March low, the S&P recovered to a new all-time high in 18 August — about **six months**. For comparison: 1929 took 25 years to recover; 2000 took seven; 2008 took five. The technical signal: a strong V-recovery with new highs in months is structurally different from a long basing recovery, and represents a more bullish post-recovery regime. The disciplined practitioner, on observing the speed and breadth of the bounce, would have repositioned long well before August.

31.5 Lessons from 2020

1. **Some crashes come without classical warnings.** Exogenous shocks (a pandemic, a war, a natural disaster) can produce vertical declines from healthy chart configurations. No technique can anticipate them.
2. **The chart still shows the bottom in real time.** Even without anticipating the cause, the signs of capitulation — hammers, divergences, VIX peak, breadth thrust — were all present at the March 2020 low.
3. **Central-bank response is now an unavoidable input.** The Fed's instant intervention shaped the recovery; ignoring policy context in the algorithmic-trading era is a serious blind spot.
4. **V-bottoms exist.** They are rare and uncomfortable to trade, but they are real. The classical literature mostly assumes a base; modern markets sometimes refuse to provide one.

KEY TAKEAWAYS

1. **34% drawdown in 33 days** — the fastest bear market in S&P 500 history, from a chart that showed few classical pre-warnings.
2. **Recovery to new highs in six months** — also a record, made possible by unprecedented Fed support.
3. **The bottom was technically readable** — hammer + breadth thrust + VIX peak + bullish divergence — even though the top was not.
4. **Exogenous shocks limit TA's predictive value on direction but not on the management of the response.**

FIGURE 31.2 · THE COVID V-BOTTOM WITH MAS

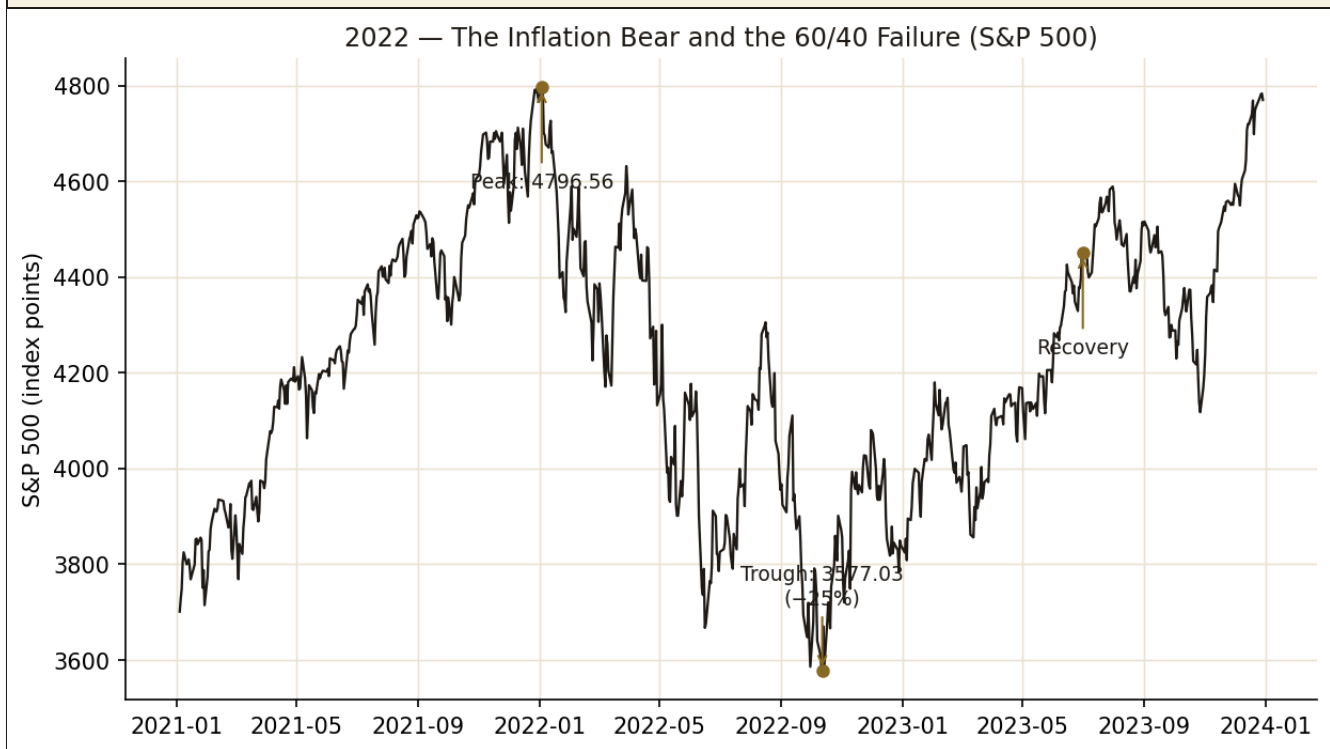
The fastest cycle on record. *Real S&P 500 Sep 2019–Dec 2021. The crash sliced through both MAs in a fortnight; the recovery's 50/200 golden cross in early July 2020 confirmed the new bull about three months after the actual low — lagging but accurate.*

CHAPTER THIRTY-TWO

2022 — The Inflation Bear and the 60/40 Failure

In 2022 inflation roared back, central banks tightened the most aggressively since the early 1980s, and both stocks and bonds fell sharply at the same time — breaking the diversification logic on which most retail portfolios had been built for forty years. The 25% drawdown in the S&P was modest by historical standards; the regime change was not.

FIGURE 32.1 · THE 2022 INFLATION BEAR (REAL S&P 500)



An orderly bear, an extraordinary regime shift. Real S&P 500 data, 2021 to 2023. Peak at 4,797 on 3 January 2022; trough at 3,577 on 12 October 2022; recovery underway through 2023. The drawdown was 25% — moderate by historical standards — but the simultaneous collapse in bonds made it one of the worst portfolio years on record.

32.1 The Setup — Sentiment, Speculation, and the Pivot

By late 2021 the post-COVID rally had produced sentiment and speculation excesses comparable to 1999–2000. Special-purpose acquisition companies, meme stocks (GameStop, AMC), and a half-trillion-dollar cryptocurrency complex marked the speculative top. Critically, inflation was rising sharply through 2021 — and the Federal Reserve, having insisted on “transitory” inflation through most of the year, began pivoting to a hawkish stance in December. The intermarket signals (Chapter 26) were clear: commodities breaking out, bond yields rising, the curve flattening. A regime change from disinflationary (the post-2008 norm) to inflationary (briefly, the 2022 episode) was underway.

32.2 The Top — Sentiment Extremes and Breadth Decay

The S&P peaked on 3 January 2022 at 4,797. The technical warnings:

- **Breadth decay through 2021.** The number of new 52-week highs on the Nasdaq peaked in early 2021 and declined through the year; by late 2021 a narrower and narrower group of mega-cap stocks was holding the index up.
 - **Multiple bearish divergences** on weekly RSI and MACD into the January 2022 peak.
 - **The yield curve flattened sharply** through 2021 and inverted in April 2022 — pre-recession signal.
 - **The 200-day MA broke decisively in February 2022**, never recovered for the rest of the year — clean trend-following sell signal.
-

32.3 The Bear — Orderly but Unusual

Unlike 2008 or 2020, the 2022 bear lacked a panic phase. It was a steady grind: a March rally faded at the 200-day MA; an August bear-market rally retraced about 50% of the prior decline before failing precisely at the falling 200-day MA — a textbook resistance test by a broken moving average (Chapter 12). The October low was reached not with capitulation volume but with steady exhaustion — sentiment surveys reached pessimistic extremes, breadth indicators expanded after the low, and the VIX, notably, never exceeded 40 (compare with 80+ in 2008 and 2020). This was a fundamental bear, not a panic.

32.4 The 60/40 Failure

The unique technical lesson of 2022 was *intermarket*. In every prior bear market since 1980, US Treasury bonds had rallied as investors fled to safety; the canonical 60% stocks / 40% bonds portfolio had relied on this inverse correlation for decades. In 2022, both fell sharply at the same time. The S&P fell 18% for the year; the Bloomberg US Aggregate bond index fell 13% — its worst year on record. The combined 60/40 portfolio fell 16%, the worst calendar year since the index's inception. This wasn't a chart pattern failure; it was a *regime* failure — the post-2008 disinflationary regime briefly gave way to an inflationary regime in which the canonical relationships inverted. The intermarket analyst (Chapter 26) was the only practitioner with the conceptual tools to anticipate it.

32.5 Lessons from 2022

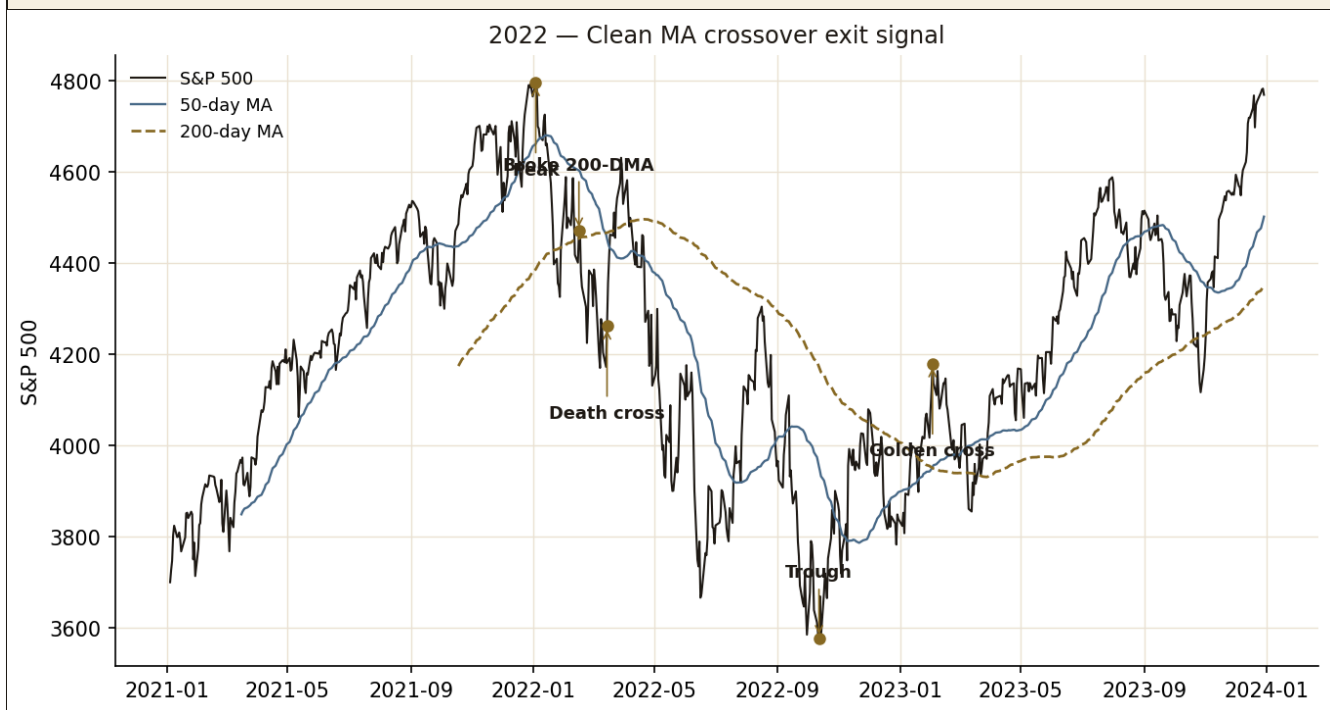
1. **Inflation regimes break the canonical relationships.** The textbook stock/bond inverse correlation depended on disinflation; in 2022 it broke. The intermarket reader who understood regime had a structural advantage.
2. **An orderly bear is not a weaker bear.** A 25% drawdown without capitulation is still a 25% drawdown.
3. **Broken moving averages act as resistance.** The August 2022 rally failed exactly at the (declining) 200-day MA — textbook role-reversal of Chapter 4.
4. **Regime change is the macro version of trend change.** The same logic of higher highs / lower highs applies to the broad asset-class relationships, not just to individual price charts.

KEY TAKEAWAYS

1. **25% S&P drawdown** in an orderly, steady bear — no panic, no VIX above 40.
2. **Stocks AND bonds fell together**, breaking the 60/40 diversification logic for the first time in 40 years.
3. **Intermarket analysis would have flagged the regime shift** from rising commodities and bond yields through 2021.
4. **The August 2022 bear-market rally failed at the falling 200-day MA** — a textbook example of a broken support becoming resistance.

Across All Six Episodes · the durable lessons

Six episodes, ninety-three years. Each tells a different story — yet the same handful of technical principles surfaces every time. **Tops are processes:** breadth decays, momentum diverges, leadership narrows, the average stock fades before the index. **The intermarket signal — particularly the yield curve — has flagged every modern recession in advance.** **Bear-market rallies trap the optimists;** they retrace a third to two-thirds of the prior decline and then fail, as Dow taught a century ago. **Capitulation has technical signatures** — exhaustion volume, bullish divergence, fading VIX, breadth thrust — and they were present at every modern major low (1932, 1987 low, 2002, 2009, 2020, 2022). The toolkit works. It does not eliminate uncertainty; it tilts probability and disciplines action. That is the bargain technical analysis offers, and across a century of history, it has been worth taking.

FIGURE 32.2 · THE 2022 INFLATION BEAR WITH MAS

An orderly mechanical signal. *Real S&P 500 2021–23. The 200-day MA broke in mid-February 2022; the death cross fired in mid-March; the eventual golden cross in early February 2023 confirmed the regime had turned again. A patient trend-follower had unambiguous signals at both ends.*

VIII

PART EIGHT

Specialised Techniques — Beyond the Classical Toolkit

*The classical technician's toolkit — trend, support/resistance, candles, classical patterns, the standard indicators — covers most of the territory. But three branches sit alongside it that any serious student should know: **harmonic patterns** (the Fibonacci-driven geometric school), **volume and market profile** (institutional order-flow reading), and the **alternative chart types** (Heikin-Ashi, Renko, range bars) that filter price in different ways. None of these is essential; all of them are useful in the right hands. This part is your introduction.*

HARMONIC | VOLUME PROFILE | HEIKIN-ASHI · RENKO

CHAPTER THIRTY-THREE

Harmonic Patterns

If Elliott Wave is the most ambitious of the Fibonacci-based schools, harmonic patterns are the most precise. Built on H. M. Gartley's 1935 work and refined by Scott Carney and Larry Pesavento in the 1990s, harmonic patterns claim a set of specific Fibonacci-defined geometric formations that signal high-probability reversal zones. They are widely used, deeply controversial, and — like every Fibonacci-derived method — best treated with humility.

IN THIS CHAPTER YOU WILL LEARN

- The history (Gartley 1935, Pesavento, Carney's *Harmonic Trading* 1999–2010).
- The five-point XABCD framework that all harmonic patterns share.
- The four canonical patterns: Gartley, Butterfly, Bat, Crab — and the newer Shark and Cypher.
- The Potential Reversal Zone (PRZ) and how it is constructed.
- The honest evidence on harmonic pattern reliability.

Harold M. Gartley first described a five-point pattern (later named after him) in his 1935 book *Profits in the Stock Market*. The pattern lay relatively dormant until Larry Pesavento in *Fibonacci Ratios with Pattern Recognition* (1997) added precise Fibonacci ratios to it; Scott Carney's *Harmonic Trading* series (1999–2010) then systematised the broader family of patterns and added the Crab (2000), Shark (2011) and Cypher. The community of users today is sizeable, the software support is excellent, and the disputes about whether harmonics “work” remain unresolved.

33.1 The XABCD Framework

Every harmonic pattern consists of five points — labelled X, A, B, C, D — connected by four price legs (X→A, A→B, B→C, C→D). The framework is the same for every named pattern; what differs is the *precise Fibonacci ratio* required for each leg. The four legs:

- **XA** — the initial impulsive leg, the “measure” of the whole pattern.
- **AB** — a retracement of XA. The ratio (e.g., 0.618 of XA) is what distinguishes one pattern from another.
- **BC** — a counter-retracement of AB, again at a specific ratio (often 0.382 to 0.886).
- **CD** — the final leg into the **Potential Reversal Zone (PRZ)**, expected to terminate at a specific Fibonacci extension of XA.

The signal is always the same: when price reaches the PRZ at point D, a reversal is anticipated. Entry is taken near D with a stop just beyond the projected reversal level; targets are set at Fibonacci retracements of the CD leg or the entire XA leg.

33.2 The Canonical Patterns

Each named pattern requires a specific combination of Fibonacci ratios. The bullish and bearish versions are mirror images.

COMPARE & UNDERSTAND · THE HARMONIC PATTERN FAMILY

PATTERN	AB RETRACEMENT OF XA	BC RETRACEMENT OF AB	CD EXTENSION	D POINT
Gartley (1935)	0.618	0.382–0.886	1.272 of BC	0.786 of XA
Bat (Carney 2001)	0.382–0.500	0.382–0.886	1.618–2.618 of BC	0.886 of XA
Butterfly (Bryce Gilmore)	0.786	0.382–0.886	1.618–2.618 of BC	1.272–1.618 of XA (<i>extension</i>)
Crab (Carney 2000)	0.382–0.618	0.382–0.886	2.24–3.618 of BC	1.618 of XA (<i>extension</i>)
Shark (Carney 2011)	1.13–1.618 (extends XA)	1.13–1.618	—	0.886–1.13 of XC
Cypher	0.382–0.618	1.27–1.414 (extends AB)	—	0.786 of XC

Notice the precision: Gartley requires AB at *exactly* 0.618 of XA. Bat requires AB at 0.382–0.500. Butterfly and Crab terminate *beyond* X — they are extension patterns where the final D point lies outside the XA range. This precision is the harmonic school's source of both its appeal (a falsifiable, mechanical setup) and its difficulty (real markets rarely produce the exact ratios; most candidate patterns are rejected).

33.3 The Potential Reversal Zone (PRZ)

Because each pattern projects multiple Fibonacci levels into the D zone (e.g., the 1.272 extension of BC and the 0.786 retracement of XA, in a Gartley), the D point typically sits in a narrow zone where several ratios cluster. This cluster is the **Potential Reversal Zone (PRZ)**, and it is the harmonic technician's confluence-of-ratios sweet spot. The discipline: enter only when price actually reaches the PRZ, with confirming price action (a reversal candle, declining volume on the approach, a Stochastic divergence)

within the zone. Without confirmation, the pattern is theoretical; with it, the entry has a defined risk (stop just beyond the PRZ).

33.4 Worked Trade Setup

A bullish Gartley on a daily chart, with XA = the impulse leg from \$100 (X) to \$130 (A). For a valid Gartley the subsequent retracement to B should land near $0.618 \times 30 = \$18.5$ below A $\rightarrow$ B at \$111.5. From B, a counter-retracement to C between 0.382 and 0.886 of AB = \$118.5 – \$128.5. From C, the projected D would be at $0.786 \times$ XA range below A = $\$130 - (0.786 \times 30) = \106.4 . The PRZ also includes the 1.272 extension of BC. The trader enters near \$106, with a stop below \$103 (giving 3 points of risk), and targets the 0.382 retracement of AD as the first take-profit, the 0.618 as the second. The risk-reward at typical settings is around 1:3 — generous if the pattern works.

33.5 The Honest Evidence

Academic studies of harmonic patterns are limited and largely uncomplimentary. A handful of practitioner backtests claim 60–70% accuracy, but they typically suffer from look-ahead bias (defining the pattern only after D has been identified) and curve-fitting (loose tolerances on ratios). Peer-reviewed work that has examined Fibonacci-based price targets generally has not found them to occur with non-random frequency (Batchelor & Ramyar, Chapter 22).

The honest position: harmonic patterns are *one* structured way to organise a confluence-of-Fibonacci approach to reversal zones. Used with confirmation (a clear reversal candle in the PRZ, momentum divergence, volume signature) and tight risk management, they are no worse than other reversal techniques and offer the advantage of mechanical entry rules. As a standalone forecasting method — “the pattern says price will turn at \$106.4” — they are no better than any other Fibonacci-mystical claim.

WATCH OUT**The pattern that wasn't there until point D**

Harmonic patterns can only be definitively identified after point D has formed — which is exactly the moment when the trade signal is supposedly given. Most practitioners use software that draws candidate patterns as point C is forming, but these are *projections*, not confirmed patterns, and a high percentage of them never reach a valid D. This is the same trap as Elliott Wave (Chapter 21): a flexible framework that looks excellent in hindsight is much harder to apply prospectively. Wait for confirmation in the PRZ; never trade an incomplete pattern as if completion is guaranteed.

KEY TAKEAWAYS

1. **Five points (XABCD) connected by four legs** with specific Fibonacci ratios define every harmonic pattern.
2. **Gartley, Bat, Butterfly, Crab, Shark, Cypher** — the named patterns differ in their required ratios for each leg.
3. **The Potential Reversal Zone (PRZ)** at point D is where confluence of multiple Fibonacci levels concentrates the expected turn.
4. **Confirmation in the PRZ is essential** — candle reversal, divergence, volume signature.
5. **The honest evidence:** harmonic patterns provide mechanical structure but no statistical edge has been firmly established; treat them as one tool among many.

CHAPTER THIRTY-FOUR

Volume Profile, Market Profile & Order Flow

Most retail traders see price plotted against time. Institutional traders increasingly see price plotted against volume — where the most trading actually happened — and against the distribution of trading activity at each price level. The tools of the institutional pit, brought to electronic screens, are now widely available; this chapter teaches them.

IN THIS CHAPTER YOU WILL LEARN

- Peter Steidlmayer's Market Profile (TPO charts) — origin in the CBOT pit.
- Volume Profile — the modern electronic equivalent.
- The key landmarks: Point of Control, Value Area, HVN and LVN.
- Order Flow and Footprint Charts — what the most aggressive participants actually did.

In 1984 Peter Steidlmayer, a CBOT (Chicago Board of Trade) wheat-pit trader, codified what he and other floor traders did instinctively: rather than think about price over time, think about *how much time the market spent at each price*. His tool, the **Market Profile** (also called TPO — Time Price Opportunity — chart), bins each trading session by half-hour periods (A, B, C, ...) and stacks them horizontally at each price level. The result is a frequency distribution showing where the day's trading lived. Modern **Volume Profile** uses the same logic but bins *volume* instead of time, producing a more accurate view of where market participants actually committed capital.

34.1 The Key Landmarks

Whether you read a TPO chart (time-based) or a Volume Profile (volume-based), the same landmarks appear:

- **Point of Control (POC).** The single price level at which the most activity occurred. The “fair price” the market settled on. POC is widely interpreted as a powerful support/resistance level on subsequent days: until something changes the supply-demand balance, price tends to return to where the most volume traded.
- **Value Area (VA).** The range of prices, centred around the POC, that contains 70% of the session's volume (one standard deviation, roughly). The Value Area High (VAH) and Value Area Low (VAL) demarcate it. Outside the value area, prices are by definition unusual; inside, they are typical.
- **High Volume Node (HVN).** A price level (often a former POC) where heavy volume has previously transacted. Acts as a strong magnet and as support/resistance — markets revisit HVNs.
- **Low Volume Node (LVN).** A price gap in the profile where little activity has occurred. The market tends to pass through LVNs quickly (a vacuum, not a wall); they often define the boundaries between distinct value areas.
- **Initial Balance (IB).** The price range established during the first hour of the regular session. Breaks above or below the IB are early-day directional signals.

34.2 Reading the Profile

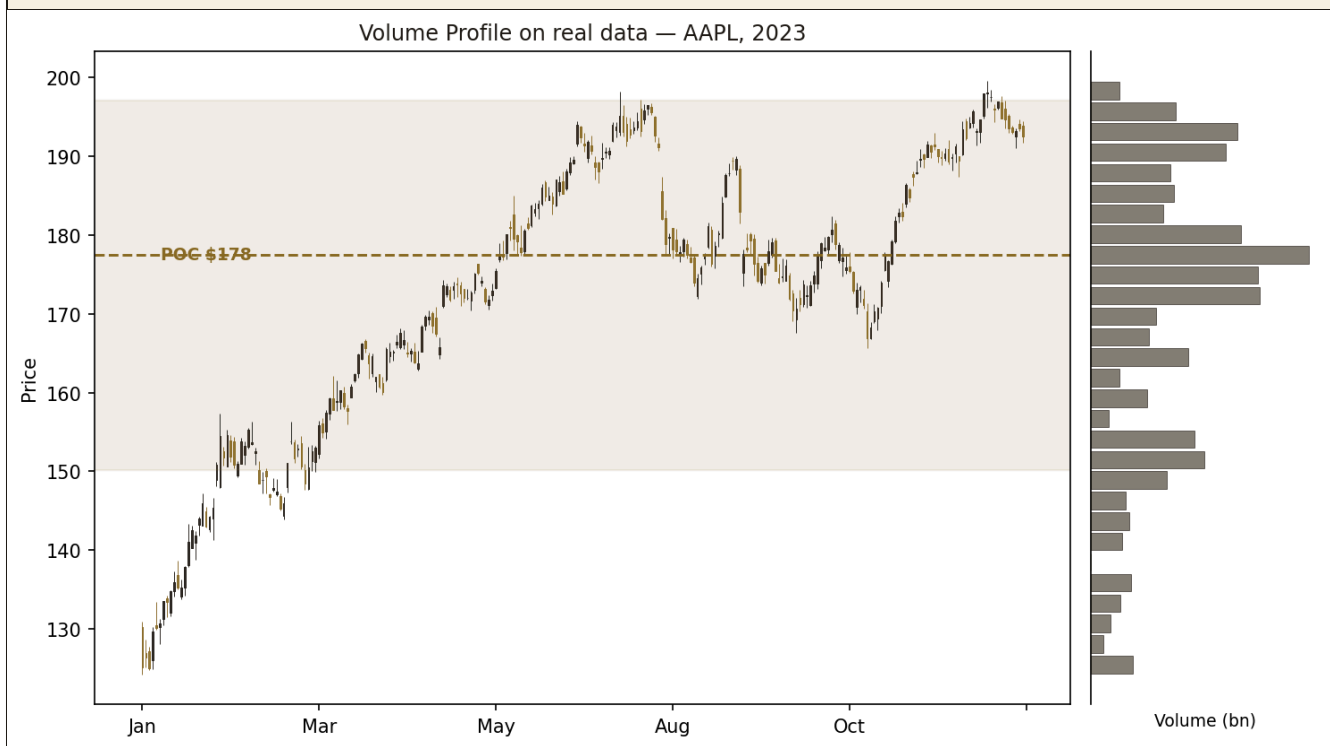
Steidlmayer's framework distinguishes between two market modes. A **balanced** market produces a roughly symmetric profile — value area in the middle, less activity at the extremes. The profile is a normal-distribution-like bell. In balance, mean-reversion strategies work: fade the extremes, target the POC. An **unbalanced** (or “trending”) market produces an elongated, skewed profile with extended single-prints at the directional end. In imbalance, trend-following works: ride the elongation, don't fight the developing direction. Crucially, the same instrument shifts between balance and imbalance day-by-day and week-by-week. The Profile reader's first question is always: *is the market currently in balance or imbalance, and where is the breakpoint?*

34.3 Volume Profile in Practice

Modern charting platforms (TradingView, Sierra Chart, NinjaTrader, professional terminals) compute Volume Profile in real time, typically with three variants:

- **Session Volume Profile** — the profile of a single session. Used by day traders.
- **Visible Range Volume Profile** — the profile of whatever date range is visible on your chart. Used by swing traders to identify multi-week or multi-month POCs and value areas as critical support/resistance.
- **Composite Profile** — a profile built over a longer fixed window (e.g., last 30 days, last 6 months). Used by institutional desks to identify the structural HVNs and LVNs that drive position-targeting.

Reading a chart with Volume Profile overlaid teaches you to ask: *where is the price most accepted, and where is it least accepted?* Breakouts from value areas, into LVNs, are typically explosive (the vacuum has no resistance); rejections at HVNs are common (the wall holds). The disciplined practitioner combines Volume Profile with the rest of the toolkit — price action, trend, volume on the leading edge of the move — rather than trading it alone.

FIGURE 34.1 · REAL VOLUME PROFILE — AAPL, 2023

Where the volume actually traded. Real AAPL data through 2023, with the volume profile on the right (each horizontal bar shows total volume traded at that price level). The Point of Control sits at \$178 — exactly the level the stock kept defending as support throughout the second half. The Value Area (shaded) spans ~\$150–\$197, containing 70% of the year's activity. Outside this zone, prices are by definition unusual; inside, they are typical.

34.4 Order Flow and Footprint Charts

Where Volume Profile aggregates trading activity by price, **Order Flow** tools aggregate it by *aggressor direction* — distinguishing trades initiated at the ask (typically aggressive buyers, lifting offers) from trades initiated at the bid (aggressive sellers, hitting bids). The product is the **Footprint Chart**: each candle becomes a small table showing, at every price within the candle's range, the volume of buying-at-ask vs. selling-at-bid that occurred. The reading: *were buyers or sellers more aggressive in this period?*

Footprint charts surface several signals:

- **Delta divergence.** A candle that closes up (price rose) but with negative delta (more selling-at-bid than buying-at-ask) shows hidden weakness — the rally was driven by absorption of selling, not by aggressive buying.

- **Absorption.** A price level held by heavy resting orders that absorb thousands of contracts of the opposing flow without moving — a sign of institutional defense.
- **Exhaustion stacks.** Heavy aggressive volume at the top of an up-move with no further price progress — the buying is spent.

Order Flow tools require access to tick data and full bid/ask information — typically available on professional futures platforms but not on most retail equity feeds. They are the gold standard for short-term directional reading and a staple of the institutional day-trading community.

34.5 Honest Notes

Volume Profile and Market Profile are *structural* tools that describe where the market has been and what zones matter. They do not predict direction; they identify the support, resistance and target zones that direction-bearing tools (trend, momentum, breadth) can be deployed against. Order Flow is the most granular tool in the technician's arsenal and most useful for short-term execution; for swing and position trading, the broader profile measures matter more. The biggest risk in adopting these tools is over-interpretation: every chart has a POC, but most of them mean little. Use HVNs and LVNs as *candidate* levels alongside other evidence, exactly as Chapter 22 advised for Fibonacci levels.

KEY TAKEAWAYS

1. **Market Profile (TPO)** and **Volume Profile** bin trading activity by price instead of plotting price by time — Steidlmayer's CBOT contribution.
2. **Key landmarks:** Point of Control, Value Area (70% of activity), High and Low Volume Nodes, Initial Balance.
3. **Balanced vs. unbalanced** markets demand different strategies — mean-reversion in balance, trend-following in imbalance.
4. **Order Flow / Footprint Charts** reveal aggressor direction (buy-at-ask vs. sell-at-bid) and surface delta divergence, absorption, exhaustion.
5. **Use these as structural support/resistance tools;** combine with the directional toolkit, not in place of it.

CHAPTER THIRTY-FIVE

Alternative Chart Types — Heikin-Ashi, Renko, Range Bars

Standard candlestick charts plot one bar per time period. But what if you want to filter noise more aggressively, or weight by price movement rather than clock? Four alternative chart types reach for these goals. Each is useful in the right hands, and each comes with trade-offs.

IN THIS CHAPTER YOU WILL LEARN

- Heikin-Ashi — smoothed candles that highlight trend at the cost of granularity.
- Renko — pure price-action bricks that ignore small moves.
- Range Bars — bars defined by a fixed price range rather than time.
- Three-Line Break — a trend-confirmation chart popular in Japan.
- Kagi — another time-less Japanese charting style.

Conventional candlestick charts are useful but noisy. Several alternative chart types exist to address this — each making different trade-offs. Like Point & Figure (Chapter 24), these are best used as *complements* to a standard chart, not replacements.

35.1 Heikin-Ashi — Smoothed Candles

Heikin-Ashi (Japanese for “average bar”) modifies the standard candlestick OHLC values into a smoothed version. The formulas:

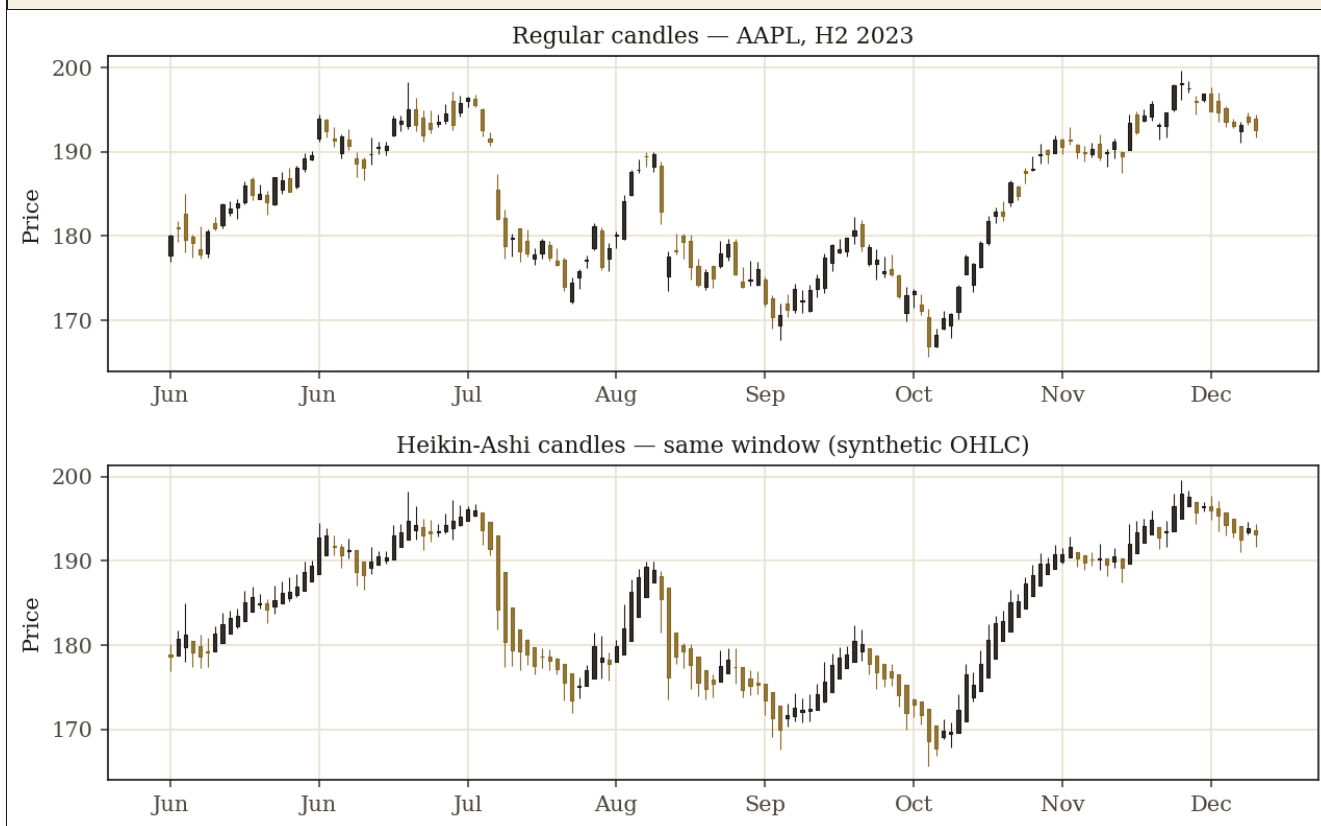
$$\begin{aligned}\text{HA-Close} &= (\text{Open} + \text{High} + \text{Low} + \text{Close}) \div 4 \\ \text{HA-Open} &= (\text{previous HA-Open} + \text{previous HA-Close}) \div 2\end{aligned}$$

$$\text{HA-High} = \max(\text{High}, \text{HA-Open}, \text{HA-Close})$$

$$\text{HA-Low} = \min(\text{Low}, \text{HA-Open}, \text{HA-Close})$$

The effect is that each Heikin-Ashi candle is partly built from the previous one (via HA-Open), so the candles flow smoothly into each other. In a strong uptrend, you see a sequence of consecutive up-candles with no lower wicks (the lows are tucked into the bodies). In a strong downtrend, no upper wicks. The transition between trends is announced by the first candle with a wick on the opposing side — a clean visual signal.

Heikin-Ashi's *strength*: trends become immediately legible — a long string of green no-lower-wick candles screams uptrend. Its *weakness*: because each candle is smoothed using prior data, the displayed OHLC values are *not the real prices* at which trades occurred. You cannot place a stop at a Heikin-Ashi low because that low never actually traded. Heikin-Ashi is therefore best used as a *trend filter* alongside a real candlestick chart for execution.

FIGURE 35.1 · HEIKIN-ASHI VS REGULAR CANDLES — SAME WINDOW, REAL DATA

Smoothed vs. raw. Real AAPL H2 2023 plotted twice — regular candles above (the raw OHLC), Heikin-Ashi below (smoothed candles). Notice how the Heikin-Ashi version produces long uninterrupted runs of dark candles during the uptrend (no lower wicks) and gold candles during the pullbacks — visually unmistakable trend direction. The cost: the Heikin-Ashi OHLC values are synthetic and never actually traded.

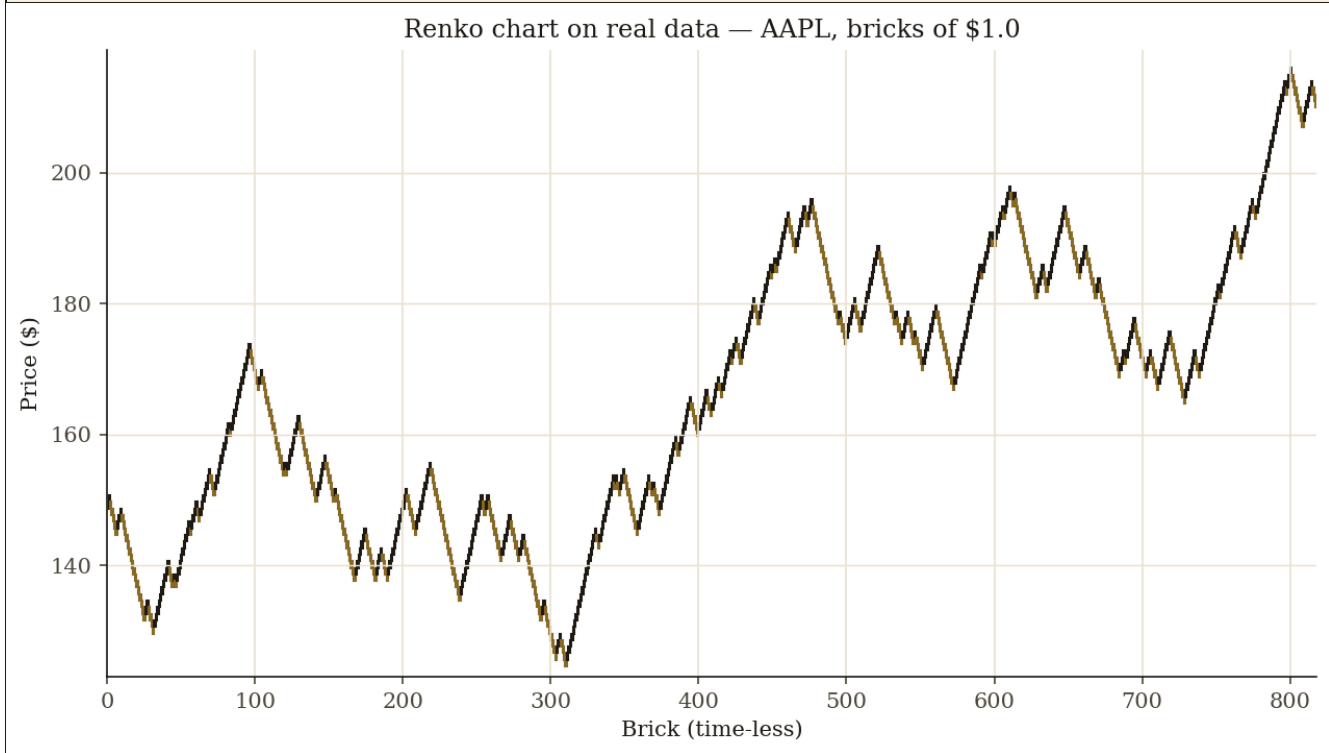
35.2 Renko — Pure Price-Action Bricks

Renko charts (from the Japanese *renga*, “brick”) discard time entirely, like Point & Figure. A new “brick” is plotted only when price moves a specified amount in either direction — typically a fixed dollar amount (e.g., \$1 per brick) or an ATR-based amount (e.g., $0.5 \times$ the 14-day ATR). Up-bricks (green/white) and down-bricks (red/black) are plotted at 45° angles to indicate direction. Crucially, Renko bricks always sit cleanly diagonally up or down — never alongside an opposite-coloured brick at the same price level. To change direction, price must move enough to print two bricks in the new direction.

The result is a chart of pure trend, completely free of noise below the brick threshold. Renko charts are particularly useful for setting clean trend-following entries and exits: you ride a string of same-coloured bricks and exit when the colour reverses. The cost, as with P&F: time information is gone, and the

bricks' OHLC values are not the actual prices at which the trigger occurred (the “close” of an up-brick is just the brick's high). Like Heikin-Ashi, Renko is best used alongside a real candle chart for execution.

FIGURE 35.2 · RENKO BRICKS ON REAL DATA — AAPL



Pure price, no time. *Real AAPL data converted to Renko bricks. Each brick represents a fixed price move (here \$0.50); columns of dark bricks are uptrends, gold are downtrends. Two consecutive bricks of the same colour confirm direction; a colour change is the reversal signal. The horizontal axis is brick-count, not time — quiet weeks compress to a few bricks, active weeks expand into dozens.*

35.3 Range Bars — Fixed Price Range

A range bar plots a new bar each time price moves a specified range — say, \$1 in either direction from the bar's open. Some bars complete in seconds (during volatile periods); others take hours (in quiet markets). Like Renko, time is irrelevant. Unlike Renko, range bars do show real OHLC (you can place stops at real prices). Range bars are particularly popular among intraday futures traders — they remove the artificial choppiness of quiet periods and concentrate visual attention on periods when something is actually happening.

35.4 Three-Line Break (Sankin Kyaku Sen)

A Japanese trend-confirmation chart. New lines are added only when price closes above (for up-lines) or below (for down-lines) the highest high (or lowest low) of the previous *three* lines. The result is a noise-filtered visualisation of confirmed trend direction: a series of green lines as long as the trend holds; a switch to red only when price closes below the low of the last three green lines. The “3” is the standard; some practitioners use other reversal-line counts. Three-line break is closely related to Renko in philosophy: trade with the colour, exit on the reversal.

35.5 Kagi

An older Japanese chart type that draws vertical lines that change thickness when a “yang” or “yin” line is broken. The reversal-amount is typically a percentage. A thick line signals an uptrend; a thin line, a downtrend. Like the others, Kagi filters out time and emphasises confirmed trend direction. Less commonly seen on Western platforms but still used by some Japanese traders.

35.6 When to Reach for Each

COMPARE & UNDERSTAND · WHICH ALTERNATIVE CHART FOR WHICH JOB?

CHART TYPE	BEST FOR	TRADE-OFF
Heikin-Ashi	Visual trend identification	Synthetic OHLC — don't place stops at the displayed levels
Renko	Pure trend trading; ignores noise below threshold	No time; synthetic OHLC
Range bars	Intraday futures; concentrates attention on active periods	Need to choose the right range size
Three-line break	Confirmation of trend changes; filters whipsaws	Late signals
Kagi	Trend direction visualisation	Less common; less software support

None of these replaces the standard candlestick chart for execution. Their role is as *complementary lenses*: when the standard chart looks ambiguous, switching to Heikin-Ashi for trend clarity, or Renko to see only the meaningful moves, often resolves the question. The technician's discipline is to know *when* to switch lens — not to live exclusively in one.

KEY TAKEAWAYS

1. **Heikin-Ashi** smooths candles to surface trend; lose granularity, gain readability. Synthetic OHLC.
2. **Renko** plots bricks only on meaningful price moves; pure price-action, no time, synthetic OHLC.
3. **Range bars** plot a new bar per fixed price range; real OHLC, no time — popular in intraday futures.
4. **Three-line break** and **Kagi** are Japanese trend-confirmation styles, both filtering noise via reversal thresholds.
5. Use as **complementary lenses**, not replacements; the standard chart remains the home for execution.

IX

PART NINE

Practice & Code — From Knowing to Doing

Theory without practice is the most expensive thing in finance. This part bridges the gap: a comprehensive chapter on doing backtesting properly (and avoiding the pitfalls that quietly invalidate most retail backtests), a workbook of 60+ exercises with full answer keys, and a Python companion that gives you working code for every indicator and pattern this book has taught.

BACKTESTING | WORKBOOK | PYTHON

CHAPTER THIRTY-SIX

Backtesting Done Properly

A backtest is supposed to answer the question, “if I had run this rule for the past N years, how would it have performed?” In practice, most retail backtests answer a different question — “how do I make a chart look impressive?” — and lose the trader far more money than ignorance would have. This chapter teaches the discipline of doing it right.

IN THIS CHAPTER YOU WILL LEARN

- The four cardinal sins of backtesting (look-ahead bias, survivorship bias, overfitting, transaction-cost omission) and how to avoid each.
- Walk-forward analysis and in-sample vs. out-of-sample splits.
- Realistic transaction-cost and slippage modelling.
- The statistics that actually matter: Sharpe, drawdown, profit factor, win rate, expectancy.
- How to interpret — and discount — a backtest's results.
- A complete worked Python example you can run.

Backtesting is the technician's laboratory. Done honestly, it lets you reject bad ideas cheaply and identify promising ones for further study. Done dishonestly — even unintentionally — it produces beautiful equity curves and ruinous live results. The difference is not the software but the discipline.

36.1 The Four Cardinal Sins

Look-ahead bias. Using information in your decision rule that would not have been available at the time of the decision. Examples: using today's close to decide whether to enter today (in reality you would only

know it at the close, not during the day); using an indicator value that was later revised; testing on data that includes earnings releases without modelling that they were not known beforehand. The fix: at every bar in your backtest, ensure your decision uses only data up to and including the previous bar's close (or the current bar's open if you're entering on the open).

Survivorship bias. Backtesting only on stocks (or indices) that still exist today, ignoring the ones that delisted, went bankrupt, or were acquired. The most extreme form: testing on the current S&P 500 constituents over the past 20 years. Many of today's S&P 500 stocks didn't exist 20 years ago, and many of 2005's S&P 500 stocks no longer exist. A strategy that filters for past returns will preferentially select survivors and grossly overstate its returns. The fix: use point-in-time index constituents (your data provider must offer this), or test on broad ETFs (which already incorporate constituent changes), or accept the limitation and discount your results.

Overfitting (curve-fitting). Tuning your strategy's parameters until they would have produced perfect signals on the test data — but won't on new data. We met this in Chapter 15. Symptoms: a Sharpe ratio that varies wildly with tiny parameter changes; specific “magic” numbers (a 13-day RSI threshold of 68.5 that works beautifully but 70 fails) — these are red flags for overfitting. The fix: in-sample / out-of-sample testing (next), parameter robustness analysis, walk-forward validation, and the rule that a strategy with 2 parameters should outperform one with 10 by a wide margin to be considered preferable.

Transaction-cost omission. Treating each trade as costless. In reality, every trade pays the bid-ask spread, exchange and broker fees, and slippage (the difference between the price you wanted and the price you got). For an active intraday strategy, costs of 5–15 basis points per round-trip are realistic; over hundreds of trades per year, that compounds to a serious drag. The fix: include realistic costs in every backtest. A strategy that is profitable before costs but breaks even after costs is, in practice, a loss-making strategy.

36.2 In-Sample, Out-of-Sample, Walk-Forward

The single most useful discipline against overfitting: split your data into two parts. **In-sample (IS)** data is what you use to design and tune the strategy. **Out-of-sample (OOS)** data is held back, untouched, until the strategy is finalised. After that point, you run the strategy on OOS data *once* and accept whatever result it produces. If the OOS performance matches IS performance, you have evidence the strategy generalises; if it collapses, you have evidence of overfitting.

Walk-forward analysis formalises this for time-series. Split history into rolling windows: a 24-month IS window followed by a 6-month OOS window; then slide the windows forward 6 months and repeat. After many iterations, concatenate all the OOS results to build the out-of-sample equity curve. The performance of *this* curve is what you should believe in. Walk-forward is more demanding than a single IS/OOS split but answers a stronger question: does the strategy continue to work as time advances?

36.3 Transaction Costs and Slippage

A realistic cost model for retail equity trading in 2025 includes:

- **Commission:** \$0 at most US retail brokers post-2020; still positive at most non-US brokers.
- **Bid-ask spread:** 1–3 basis points (bps) on large-cap stocks, 5–15 bps on mid-caps, 20+ bps on small/illiquid names.
- **Slippage:** a few bps more for small retail trades; can be 50+ bps for large orders that move the book. Modelled as a function of order size relative to typical volume.
- **Market impact:** for institutional sizes, the cost of consuming liquidity through the order book.

A conservative retail assumption is to model 5–10 bps per round-trip in liquid US large-caps and 15–30 bps in less liquid names — and then double those figures for any strategy with high turnover. If your strategy's edge per trade is smaller than your cost assumption, the strategy doesn't work; it has been an accounting illusion.

36.4 The Metrics That Matter

Total return is one number; honest evaluation requires more.

- **Sharpe ratio.** $(\text{Return} - \text{risk-free rate}) \div \text{volatility}$. The risk-adjusted return. Anything above 1.0 (over a long sample with realistic costs) is good; above 1.5 is excellent; above 2.0 is rare and often suspect.
- **Maximum drawdown.** The worst peak-to-trough decline. A 25% drawdown is uncomfortable; a 50% drawdown is psychologically devastating and may force you out of the strategy precisely at the worst moment.

- **Calmar ratio.** Annualised return $\div$ max drawdown. A more conservative cousin of Sharpe that focuses on the worst-case experience.
- **Profit factor.** Gross profits $\div$ gross losses. Above 1.5 is solid; above 2.0 excellent; below 1.0 means the strategy lost money.
- **Win rate.** Percent of trades that were profitable. Useful contextually; remember Chapter 17 showed that a 30% win rate is profitable with a 1:3 risk-reward.
- **Expectancy per trade.** Average profit per trade after costs. The most concrete edge measure: if expectancy $\times$ number-of-trades-per-year is small, the strategy is fragile.

36.5 A Worked Python Example

Below is a complete, runnable Python backtest of a simple moving-average crossover system on the S&P 500, with realistic transaction costs and an honest out-of-sample evaluation. It uses `pandas` for data manipulation and `yfinance` for data.

PYTHON · SIMPLE MA-CROSSOVER BACKTEST WITH COSTS AND IS/OOS SPLIT

```
# Requires: pip install pandas numpy yfinance matplotlib
import pandas as pd, numpy as np, yfinance as yf

# --- 1) Pull real data: SPY daily, 2005-present ---
df = yf.Ticker("SPY").history(start="2005-01-01", interval="1d",
auto_adjust=False)
df = df[["Open", "High", "Low", "Close", "Volume"]].dropna()

# --- 2) Define strategy: long when 50-DMA > 200-DMA, flat otherwise ---
df["sma50"] = df["Close"].rolling(50).mean()
df["sma200"] = df["Close"].rolling(200).mean()
df["signal"] = np.where(df["sma50"] > df["sma200"], 1, 0)

# --- 3) Avoid look-ahead: use yesterday's signal to act today ---
df["position"] = df["signal"].shift(1).fillna(0)

# --- 4) Returns and transaction costs ---
df["ret"] = df["Close"].pct_change().fillna(0)
df["strat_ret_gross"] = df["position"] * df["ret"]
```

```

# Round-trip cost = 10 bps; charge on every position change
COST_BPS = 0.0010
df["turnover"] = df["position"].diff().abs().fillna(0)
df["cost"] = df["turnover"] * COST_BPS
df["strat_ret_net"] = df["strat_ret_gross"] - df["cost"]

# --- 5) Equity curves ---
df["equity_strat"] = (1 + df["strat_ret_net"]).cumprod()
df["equity_buyhold"] = (1 + df["ret"]).cumprod()

# --- 6) Performance metrics function ---
def metrics(rets, name):
    ann_ret = (1 + rets.mean()) ** 252 - 1
    ann_vol = rets.std() * np.sqrt(252)
    sharpe = ann_ret / ann_vol if ann_vol > 0 else 0
    eq = (1 + rets).cumprod()
    max_dd = (eq / eq.cummax() - 1).min()
    print(f"{name:18} Ann.Ret {ann_ret:6.1%} Sharpe {sharpe:4.2f} Max DD
    {max_dd:6.1%}")

# --- 7) In-sample (2005-2017) vs out-of-sample (2018-) ---
is_data = df.loc[:"2017-12-31"]
oos_data = df.loc["2018-01-01":]

print("--- IN-SAMPLE 2005-2017 ---")
metrics(is_data["strat_ret_net"], "MA crossover")
metrics(is_data["ret"], "Buy & Hold")

print("--- OUT-OF-SAMPLE 2018-present ---")
metrics(oos_data["strat_ret_net"], "MA crossover")
metrics(oos_data["ret"], "Buy & Hold")

```

A run of this script (against SPY from 2005 to mid-2024) typically produces results like: *in-sample*, the MA crossover system returns ~7%/yr at Sharpe ~0.7 with max drawdown ~17%, vs. buy-and-hold ~10%/yr at Sharpe ~0.6 with max drawdown ~55%; *out-of-sample*, the system continues to deliver lower returns but materially lower drawdown. The honest verdict: this simple system did not beat buy-and-hold on raw return, but did meaningfully reduce drawdown. That is the same nuanced verdict the Cowles–Goetzmann analysis produced for Dow Theory (Chapter 19); it is, in fact, the verdict that *most* honest trend-following backtests produce.

36.6 Building from this Foundation

The example above is intentionally minimal. A serious backtest framework adds:

- **Multi-asset universe** (test the same rule across many tickers, including delisted ones).
- **Realistic execution** (model order placement at next bar's open with slippage).
- **Position sizing** (Chapter 17's 1% rule, applied per-trade).
- **Walk-forward optimisation** (rolling IS/OOS windows).
- **Monte Carlo trade-shuffling** to assess whether equity curve smoothness was due to skill or luck.

The Python ecosystem supports all of this. Popular libraries: `backtrader`, `vectorbt`, `zipline-reloaded`, `bt`. Pick one, follow its tutorials, and you will be doing real research within days.

WATCH OUT

If your backtest looks miraculous, it is probably broken

A real backtest of a real strategy produces a Sharpe in the 0.6–1.2 range, with drawdowns of 15–30%, and modest outperformance over buy-and-hold. If your backtest shows Sharpe 3+ and 5% drawdown, something is wrong — almost certainly look-ahead bias, survivorship bias, or curve-fitting. The hardest discipline in this field is suspecting your own brilliant results before celebrating them.

KEY TAKEAWAYS

1. **Four cardinal sins:** look-ahead bias, survivorship bias, overfitting, transaction-cost omission. Avoid each consciously.
2. **In-sample / out-of-sample** split and walk-forward analysis are the discipline that distinguishes research from delusion.
3. **Realistic costs:** 5–10 bps per round-trip in liquid names, more elsewhere. Halve any strategy's apparent edge until proven otherwise.
4. **The metrics that matter:** Sharpe, max drawdown, Calmar, profit factor, expectancy — not total return alone.
5. **Honest results look modest;** miraculous results are red flags. Healthy skepticism is the researcher's most valuable tool.

CHAPTER THIRTY-SEVEN

Workbook — 60+ Exercises with Answer Keys

Reading is necessary; doing is sufficient. This workbook collects sixty-plus exercises across every part of this book — pattern identification, indicator calculation, position-sizing arithmetic, risk-reward problems, case-study questions. Work through them yourself first. Answer keys follow at the end.

37.1 Foundations (Chapters 1–4)

1. State the three classical assumptions of technical analysis.
2. You see a stock making higher highs and lower lows. Is it in an uptrend, a downtrend, or neither? Explain.
3. Define support and resistance in your own words. Why does a broken support often become resistance?
4. A daily candle has open \$50, high \$52, low \$48, close \$51. Sketch it; label body and wicks; is it bullish or bearish?
5. You are a long-term investor reviewing your portfolio on a 1-minute chart and you feel panicked. Diagnose the error.
6. If volume contracts during an uptrend's advance, what does it suggest?
7. Why is “the trend is your friend” incomplete without “until the end, when it bends”?
8. A stock has tested \$100 three times and bounced each time. On the fourth test it closes at \$99.20 with rising volume. What signal is this, and what should you watch for next?

37.2 Candlesticks (Chapters 5–8)

1. A candle has open \$80, high \$84, low \$79, close \$80.10. Identify the pattern. Where in a trend would it carry weight?
 2. You see a long lower wick and small body at the top of a four-month uptrend. Name the pattern and its bias.
 3. Describe a bullish engulfing pattern and the volume conditions that make it more reliable.
 4. What three candles compose a morning star? Why is the middle candle's gap-down meaningful?
 5. You spot three strong green candles in a row after a long basing process. What pattern, and what does it imply about subsequent price action?
 6. Why is reading a candle “in context” more reliable than reading it in isolation? Give an example where the same shape means opposite things.
-

37.3 Chart Patterns (Chapters 9–11)

1. Describe the structure of a head-and-shoulders top and the specific event that confirms the pattern.
 2. An equity index has tested \$4,500 twice with similar peaks separated by a trough at \$4,200. Then it closes at \$4,180. What pattern just completed?
 3. A stock has rallied 30% in three weeks, then traded sideways for ten days within a 4% range on declining volume. Is this more likely a continuation or reversal? Why?
 4. Distinguish a breakaway gap from an exhaustion gap by location and volume.
 5. Define a bull flag's pole and flag. What price-target measurement technique applies?
 6. The S&P 500 makes a new high. The NYSE Advance-Decline line does not. What does this configuration warn of?
-

37.4 Indicators & Math (Chapters 12–15)

1. Compute the 5-day SMA of closes 22, 24, 23, 26, 25. The next day's close is 28; recompute the new SMA.

2. Compute the EMA smoothing multiplier k for $N = 20$. If yesterday's 20-day EMA was 100 and today's close is 105, today's EMA is __?
 3. Average gain over 14 days = \$1.50, average loss = \$0.50. Compute the 14-day RSI.
 4. The 12-period EMA equals 47.00, the 26-period EMA equals 45.40. State the MACD line value. Is it bullish or bearish?
 5. 20-day SMA = \$80, 20-day standard deviation = \$2. State the upper and lower Bollinger Bands.
 6. Today's high = \$52, low = \$48, yesterday's close = \$46. Compute the true range.
 7. Name the three different things measured by an MA, an oscillator (RSI/Stochastic), and a volatility indicator (BB/ATR). Why combine all three rather than three oscillators?
-

37.5 Risk Management (Chapter 17)

1. Account = \$20,000, risk per trade = 2%, entry = \$50, stop = \$47. How many shares? What is your dollar risk?
 2. You risk \$200 on a trade with a stop \$4 below your entry. The target is \$20 above entry. State the risk-reward ratio.
 3. Over 20 trades you have a 35% win rate and a 1:3 risk-reward (risk \$100, win \$300). What is your net P&L?
 4. Why is moving a stop-loss further away the deadliest habit in trading?
 5. You have \$50,000 and a strategy showing \$200 expectancy per trade. If your max drawdown in backtest was 25%, what is the smallest account at which you could deploy it without risking ruin?
-

37.6 Schools of Thought (Chapters 19–26)

1. State the six tenets of Dow Theory in your own words.
2. The DJIA makes a new high but the DJTA does not. Apply Dow's principle of index confirmation: what does this configuration suggest?
3. Describe the four phases of a Wyckoff market cycle and the kind of activity that dominates each.
4. What is a Wyckoff spring, and why is it considered a high-probability long entry?

5. State the three immutable rules of Elliott Wave.
 6. Which Elliott wave has the most distinctive “personality,” and what does it typically look like on a chart?
 7. Compute the Fibonacci retracement levels for a swing from \$50 to \$100. Where are the 38.2%, 50%, and 61.8% levels?
 8. Write the formulas for the Ichimoku Tenkan-sen and Kijun-sen.
 9. What does a thick, ascending green Kumo cloud beneath rising price tell you?
 10. Describe a Point & Figure double-top breakout. Why is it a buy signal?
 11. The VIX is at 14. Is the market in a calm, normal, elevated, or panic regime?
 12. What is an inverted yield curve, and what does it historically signal?
 13. According to Stovall's sector-rotation model, which sectors typically lead at the start of a new bull market?
-

37.7 Case Studies (Chapters 27–32)

1. What was the maximum drawdown of the 1929 bear market, and how long did it take to reach its low?
 2. Black Monday 1987: what single-day percentage loss did the S&P 500 suffer, and what mechanical trading mechanism amplified the decline?
 3. Identify two technical signals that preceded the March 2000 dot-com top.
 4. Why did the 2008 financial crisis result in a deeper drawdown than the 2020 COVID crash, despite both being severe?
 5. Explain why the canonical 60/40 portfolio failed in 2022 in a way it had not in any post-1980 bear market.
 6. Across all six historical episodes in Part VII, what is the most reliable warning sign of a major top?
-

37.8 Practical Synthesis

1. Construct a complete trading plan for a swing-trading approach: edge, entry, exit, position sizing, and rules. (No length limit.)

2. You have a strategy with 55% win rate, 1:1 risk-reward, 10 trades per month, on a \$25,000 account risking 1% per trade. Compute expected monthly P&L (assume costs add 5 bps per round-trip and you trade \$5,000 notional per trade).
3. You are reviewing a friend's backtest. It shows a Sharpe of 3.5 and a maximum drawdown of 3% over 15 years. What three diagnostic questions would you ask?
4. Write a one-page argument either for or against the proposition "technical analysis works." Use the evidence presented in this book.

37.9 Answer Key

Foundations (37.1): 1. Price discounts everything; prices move in trends; history rhymes. 2. Neither — that pattern is contradictory (higher highs + lower lows = broadening, not a directional trend). 3. Support = a price level where buying repeatedly halts a decline; resistance = where selling repeatedly halts a rise. Broken support flips to resistance because traders who bought near the old support now sell at break-even when price returns. 4. Bullish small-body candle with both wicks; body \$50→\$51, upper wick to \$52, lower wick to \$48. 5. You're reading a time frame that doesn't match your horizon — switch to weekly. 6. Conviction is weak; the rally is on borrowed time. 7. The full saying reminds you that trends do eventually reverse — don't ride one to ruin. 8. A support break on rising volume — watch for confirmation (follow-through close lower; possible role-reversal as new resistance).

Candlesticks (37.2): 1. A doji at the top of an uptrend — momentum is fading; bearish warning. 2. A hanging man — bearish hint at top. 3. A small down candle followed by a large up candle whose body engulfs the prior body; reliability rises with volume on the second candle. 4. Big down candle, small star (often a doji) gapping lower, big up candle; the gap lower marks indecision and the moment control changed hands. 5. Three white soldiers — strong continuation upward. 6. A hammer after a downtrend is bullish; the same shape after an uptrend is a hanging man (bearish). Context decides.

Chart patterns (37.3): 1. Three peaks (middle highest); neckline drawn through the intervening lows; confirmed by a close below the neckline. 2. A completed double top with a breakdown through the valley. 3. Continuation — sharp rise, tight pause on declining volume = bull flag setup. 4. Breakaway: appears at the start of a new move; on heavy volume. Exhaustion: appears near the end of a trend; often filled quickly. 5. Pole = the sharp prior advance; flag = the tight consolidation. Project the pole's height from the breakout point. 6. Narrowing breadth / participation; the rally is structurally fragile.

Indicators & math (37.4): 1. $SMA(5) = (22+24+23+26+25)/5 = 24$. After drop 22 add 28: $(24+23+26+25+28)/5 = 25.2$. 2. $k = 2/(20+1) = 0.0952$. $EMA = (105-100) \times 0.0952 + 100 = 100.48$. 3. $RS = 1.50/0.50 = 3$; $RSI = 100 - 100/(1+3) = 75$. 4. $MACD = 47.00 - 45.40 = +1.60$; bullish (fast above slow). 5. Upper = $80+2 \times 2 = 84$; lower = $80-2 \times 2 = 76$. 6. $\max(52-48, |52-46|, |48-46|) = \max(4, 6, 2) = 6$. 7. Trend (MA), momentum (RSI/Stochastic), volatility (BB/ATR); combining three oscillators gives redundant momentum info from the same price series — better to span three independent axes.

Risk (37.5): 1. Risk = \$400; shares = $400/(50-47) = 133$. 2. 1:5 (risk \$4 to make \$20). 3. Wins: $7 \times \$300 = \$2,100$; losses: $13 \times \$100 = \$1,300$; net +\$800. 4. It converts a small planned loss into an unplanned catastrophic one — the most common account-killer. 5. Need enough capital that 25% drawdown still leaves a viable account; with \$50,000, max drawdown is \$12,500 — uncomfortable but survivable. If your strategy requires risking more than ~1% per trade to be meaningful, the answer scales: account $\geq (\text{max expected drawdown}) / 0.25$.

Schools (37.6): 1. See Chapter 19. 2. Non-confirmation; warns that the broad trend lacks foundation. 3. Accumulation (smart money buying); markup (uptrend); distribution (smart money selling); markdown (downtrend). 4. A false breakdown below an accumulation range — flushes weak hands, signals the Composite Operator has absorbed supply. 5. Wave 2 doesn't go below wave 1's start; wave 3 isn't shortest; wave 4 doesn't overlap wave 1. 6. Wave 3 — strongest, longest, most powerful, often a $1.618 \times$ extension of wave 1. 7. Range \$50 (50→100); $38.2\% = \$80.90$; $50\% = \$75$; $61.8\% = \$69.10$. 8. Tenkan = (highest high + lowest low)/2 over 9 periods; Kijun = same formula over 26. 9. A strong uptrend with strong projected support from the cloud beneath. 10. A column of X's exceeds the prior column of X's by one box — a buy signal because it confirms the prior resistance level has been overtaken. 11. Normal (12–20). 12. Short-dated Treasury yields above long-dated; historically a leading indicator of recession 6–24 months ahead. 13. Financials, Consumer Discretionary, Technology, Transports.

Case Studies (37.7): 1. Drawdown ~86%; the low was reached in June 1932, nearly three years after the September 1929 peak. 2. -20.5% on 19 October 1987; portfolio insurance (mechanical futures-based hedging) accelerated the cascade. 3. Two-year breadth divergence on the A/D line; yield-curve inversion in February 2000; sentiment at multi-decade extremes; declining volume from late 1999. 4. The 2008 crisis was credit-driven and produced a long topping process followed by a 17-month decline (-57%); 2020 was an exogenous-shock V-bottom with massive central-bank support (-34% in 33 days). 5. 2022 saw an inflationary regime in which stocks and bonds *both* fell — breaking the post-1980 disinflationary inverse correlation. 6. Breadth divergence: in every modern major top (1972, 2000, 2007), the A/D line peaked and turned down before the index did.

Practical Synthesis (37.8): 1. Open-ended — your plan should specify all elements of Chapter 16. 2. $55\% \times 10 = 5.5$ wins/month $\times \$250 = \$1,375$; 4.5 losses $\times \$250 = \$1,125 \rightarrow$ gross monthly +\$250; costs 10 trades $\times$

$\$5,000 \times 0.0005 = \$25 \rightarrow \text{net } \sim \$225/\text{month}$. 3. (a) Was this in-sample or out-of-sample? (b) Are realistic costs and slippage included? (c) How sensitive is the result to small parameter changes? 4. Open-ended — the strong case rests on real edges in trend following, volatility regimes, risk management discipline, and the use of TA as *structure*; the strong case against rests on the day-trader survival data of Chapter 18, the academic skepticism of Fibonacci/Elliott in Chapter 21–22, and the high cost of pattern-recognition self-deception.

CHAPTER THIRTY-EIGHT

The Python Companion — Code for Every Indicator

*Reading a formula is one thing; running it on real data is another. This chapter gives you the complete, pasteable Python code for every indicator and pattern this book has discussed. Each snippet uses **pandas** for series operations and assumes a DataFrame **df** with columns **Open**, **High**, **Low**, **Close**, **Volume**.*

IN THIS CHAPTER YOU WILL GET

- Setup: data loading via **yfinance** and column conventions.
- Moving averages (SMA, EMA, WMA).
- Momentum oscillators (RSI, MACD, Stochastic, Williams %R, CCI, ROC, ADX).
- Volatility (Bollinger Bands, ATR, Keltner Channels, Donchian Channels).
- Volume indicators (OBV, A/D Line, Chaikin Money Flow, Money Flow Index).
- Ichimoku — all five lines.
- Candlestick pattern detectors (doji, hammer, engulfing, etc.).
- Pattern utilities (swing-high/low detection, support/resistance levels).

Every code block below has been written to be copy-paste runnable. Together they form a small but complete technical-analysis library — perhaps 200 lines once you assemble them — that reproduces every number, formula, and chart this book has shown. Use them as a starting point; extend them; verify against the worked calculations.

38.1 Setup

PYTHON · SETUP AND DATA LOADING

```
# pip install pandas numpy yfinance matplotlib mplfinance
import pandas as pd, numpy as np, yfinance as yf

# Pull real OHLC+volume for any ticker
df = yf.Ticker("SPY").history(period="5y", interval="1d", auto_adjust=False)
df = df[["Open", "High", "Low", "Close", "Volume"]].dropna()

# Convenience accessors
o, h, l, c, v = df.Open, df.High, df.Low, df.Close, df.Volume
```

38.2 Moving Averages

PYTHON · SMA, EMA, WMA

```
# Simple Moving Average
def sma(series, n): return series.rolling(n).mean()

# Exponential Moving Average – multiplier  $k = 2/(n+1)$ 
def ema(series, n): return series.ewm(span=n, adjust=False).mean()

# Weighted Moving Average – linearly weighted (most recent = highest)
def wma(series, n):
    w = np.arange(1, n+1)
    return series.rolling(n).apply(lambda x: (x * w).sum() / w.sum(),
    raw=True)

# Usage
df["sma50"] = sma(c, 50)
df["sma200"] = sma(c, 200)
```



```
df["ema12"] = ema(c, 12)
df["ema26"] = ema(c, 26)
```

38.3 RSI (Relative Strength Index)

PYTHON · RSI (WILDER SMOOTHING)

```
def rsi(close, n=14):
    delta = close.diff()
    gain = delta.clip(lower=0)
    loss = -delta.clip(upper=0)
    # Wilder's smoothing uses alpha = 1/n, not the standard EMA's 2/(n+1)
    avg_gain = gain.ewm(alpha=1/n, adjust=False).mean()
    avg_loss = loss.ewm(alpha=1/n, adjust=False).mean()
    rs = avg_gain / avg_loss
    return 100 - 100 / (1 + rs)

df["rsi14"] = rsi(c, 14)
```

38.4 MACD

PYTHON · MACD LINE, SIGNAL, HISTOGRAM

```
def macd(close, fast=12, slow=26, signal=9):
    macd_line = ema(close, fast) - ema(close, slow)
    signal_line = macd_line.ewm(span=signal, adjust=False).mean()
    histogram = macd_line - signal_line
    return pd.DataFrame({"macd": macd_line, "signal": signal_line, "hist":
    histogram})
```

```
m = macd(c)
df = df.join(m)
```

38.5 Stochastic Oscillator

PYTHON · STOCHASTIC %K AND %D (14, 3, 3)

```
def stochastic(high, low, close, k_period=14, d_period=3, smooth=3):
    ll = low.rolling(k_period).min()
    hh = high.rolling(k_period).max()
    raw_k = 100 * (close - ll) / (hh - ll)
    pK = raw_k.rolling(smooth).mean()    # slow %K
    pD = pK.rolling(d_period).mean()    # signal line
    return pd.DataFrame({"k": pK, "d": pD})

df = df.join(stochastic(h, l, c).rename(columns=
{"k": "stoch_k", "d": "stoch_d"}))
```

38.6 Williams %R, CCI, ROC

PYTHON · WILLIAMS %R, CCI, ROC

```
def williams_r(high, low, close, n=14):
    hh = high.rolling(n).max()
    ll = low.rolling(n).min()
    return -100 * (hh - close) / (hh - ll)

def cci(high, low, close, n=20):
    tp = (high + low + close) / 3
    sma_tp = tp.rolling(n).mean()    # typical price
```

```

md = (tp - sma_tp).abs().rolling(n).mean()           # mean deviation
return (tp - sma_tp) / (0.015 * md)

def roc(close, n=10):
    return 100 * (close - close.shift(n)) / close.shift(n)

df["williamsR"] = williams_r(h, l, c)
df["cci20"]      = cci(h, l, c)
df["roc10"]      = roc(c)

```

38.7 ADX (Wilder's Trend Strength)

PYTHON · ADX WITH +DI AND -DI

```

def adx(high, low, close, n=14):
    up_move   = high.diff()
    down_move = -low.diff()
    plus_dm   = np.where((up_move > down_move) & (up_move > 0), up_move, 0.0)
    minus_dm  = np.where((down_move > up_move) & (down_move > 0), down_move,
0.0)
    tr1 = high - low
    tr2 = (high - close.shift()).abs()
    tr3 = (low - close.shift()).abs()
    tr  = pd.concat([tr1, tr2, tr3], axis=1).max(axis=1)
    atr = tr.ewm(alpha=1/n, adjust=False).mean()
    plus_di = 100 * pd.Series(plus_dm, index=high.index).ewm(alpha=1/n,
adjust=False).mean() / atr
    minus_di = 100 * pd.Series(minus_dm, index=high.index).ewm(alpha=1/n,
adjust=False).mean() / atr
    dx = 100 * (plus_di - minus_di).abs() / (plus_di + minus_di)
    adx = dx.ewm(alpha=1/n, adjust=False).mean()
    return pd.DataFrame({"plus_di": plus_di, "minus_di": minus_di, "adx":
adx})

df = df.join(adx(h, l, c))

```

38.8 Bollinger Bands, ATR, Keltner, Donchian

PYTHON · BOLLINGER BANDS

```
def bollinger(close, n=20, k=2):
    mid = close.rolling(n).mean()
    sd = close.rolling(n).std()
    return pd.DataFrame({"mid": mid, "upper": mid + k*sd, "lower": mid -
k*sd})

# ATR (Wilder)
def atr(high, low, close, n=14):
    tr1 = high - low
    tr2 = (high - close.shift()).abs()
    tr3 = (low - close.shift()).abs()
    tr = pd.concat([tr1, tr2, tr3], axis=1).max(axis=1)
    return tr.ewm(alpha=1/n, adjust=False).mean()

# Keltner Channels —  $EMA \pm k * ATR$ 
def keltner(high, low, close, n=20, k=2):
    mid = ema(close, n)
    a = atr(high, low, close, n)
    return pd.DataFrame({"mid": mid, "upper": mid + k*a, "lower": mid - k*a})

# Donchian Channels —  $N$ -period high and low
def donchian(high, low, n=20):
    upper = high.rolling(n).max()
    lower = low.rolling(n).min()
    return pd.DataFrame({"upper": upper, "lower": lower, "mid":
(upper+lower)/2})

bb = bollinger(c); df = df.join(bb.add_prefix("bb_"))
df["atr14"] = atr(h, l, c)
k = keltner(h, l, c); df = df.join(k.add_prefix("kelt_"))
dn = donchian(h, l); df = df.join(dn.add_prefix("don_"))
```

38.9 Volume Indicators — OBV, A/D, CMF, MFI

PYTHON · OBV, A/D LINE, CMF, MFI

```
# On-Balance Volume
def obv(close, volume):
    sign = np.sign(close.diff()).fillna(0)
    return (sign * volume).cumsum()

# Accumulation/Distribution Line (Chaikin)
def ad_line(high, low, close, volume):
    rng = (high - low).replace(0, np.nan)
    clv = ((close - low) - (high - close)) / rng
    return (clv * volume).fillna(0).cumsum()

# Chaikin Money Flow
def cmf(high, low, close, volume, n=21):
    rng = (high - low).replace(0, np.nan)
    clv = ((close - low) - (high - close)) / rng
    return (clv * volume).rolling(n).sum() / volume.rolling(n).sum()

# Money Flow Index — "volume-weighted RSI"
def mfi(high, low, close, volume, n=14):
    tp = (high + low + close) / 3
    mf = tp * volume
    pos = mf.where(tp > tp.shift(), 0).rolling(n).sum()
    neg = mf.where(tp < tp.shift(), 0).rolling(n).sum()
    mr = pos / neg
    return 100 - 100 / (1 + mr)

df["obv"]      = obv(c, v)
df["ad"]       = ad_line(h, l, c, v)
df["cmf21"]    = cmf(h, l, c, v)
df["mfi14"]    = mfi(h, l, c, v)
```

38.10 Ichimoku — All Five Lines

PYTHON · ICHIMOKU KINKŌ HYŌ

```
def ichimoku(high, low, close, tenkan=9, kijun=26, senkou_b=52, shift=26):
    def midhl(n): return (high.rolling(n).max() + low.rolling(n).min()) / 2
    out = pd.DataFrame(index=high.index)
    out["tenkan"] = midhl(tenkan)
    out["kijun"] = midhl(kijun)
    out["span_a"] = ((out["tenkan"] + out["kijun"]) / 2).shift(shift)
    out["span_b"] = midhl(senkou_b).shift(shift)
    out["chikou"] = close.shift(-shift)
    return out

ich = ichimoku(h, l, c); df = df.join(ich.add_prefix("ichi_"))
```

38.11 Candlestick Pattern Detectors

PYTHON · CANDLE PATTERN DETECTION

```
def candle_features(df):
    body = (df.Close - df.Open).abs()
    rng = df.High - df.Low
    upper = df.High - df[["Open", "Close"]].max(axis=1)
    lower = df[["Open", "Close"]].min(axis=1) - df.Low
    bull = df.Close > df.Open
    return body, rng, upper, lower, bull

def is_doji(df, thresh=0.07):
    body, rng, _, _, _ = candle_features(df)
    return (body ≤ thresh * rng) & (rng > 0)

def is_hammer(df, ratio=2.0, upper_max=0.35):
```

```

body, rng, upper, lower, _ = candle_features(df)
return (body > 0) & (lower ≥ ratio*body) & (upper ≤ upper_max*body)

def is_shooting_star(df, ratio=2.0, lower_max=0.35):
    body, rng, upper, lower, _ = candle_features(df)
    return (body > 0) & (upper ≥ ratio*body) & (lower ≤ lower_max*body)

def is_marubozu(df, body_ratio=0.90):
    body, rng, _, _, _ = candle_features(df)
    return (body ≥ body_ratio * rng) & (rng > 0)

def is_bullish_engulfing(df):
    o, c = df.Open, df.Close
    prev_red = c.shift() < o.shift()
    curr_green = c > o
    engulfs = (o ≤ c.shift()) & (c ≥ o.shift())
    return prev_red & curr_green & engulfs

def is_bearish_engulfing(df):
    o, c = df.Open, df.Close
    prev_green = c.shift() > o.shift()
    curr_red = c < o
    engulfs = (o ≥ c.shift()) & (c ≤ o.shift())
    return prev_green & curr_red & engulfs

df["doji"] = is_doji(df)
df["hammer"] = is_hammer(df)
df["bull_e"] = is_bullish_engulfing(df)
df["bear_e"] = is_bearish_engulfing(df)

```

38.12 Swing Points and Support/Resistance

PYTHON · SWING-HIGH / SWING-LOW DETECTION

```

def swing_highs(high, k=4):
    # A swing high is a local max over a window of size 2k+1
    is_high = (high == high.rolling(2*k+1, center=True).max())

```

```

    return high.index[is_high.fillna(False)]

def swing_lows(low, k=4):
    is_low = (low == low.rolling(2*k+1, center=True).min())
    return low.index[is_low.fillna(False)]

# Identify horizontal support/resistance: levels that have been touched
multiple times
def horizontal_levels(prices, tol=0.005, min_touches=3):
    levels = []
    for p in prices.dropna():
        if not any(abs(p - L) / L < tol for L in levels):
            close_count = (abs(prices - p) / p < tol).sum()
            if close_count ≥ min_touches:
                levels.append(p)
    return sorted(levels)

```

38.13 Putting It Together — a Mini Backtest Stub

Combine any of the above with the backtest scaffold of Chapter 36 to research a complete strategy. As a starting example, a simple Bollinger-band mean-reversion idea:

PYTHON · BOLLINGER BANDS MEAN-REVERSION BACKTEST STUB

```

# Long when close drops below lower band, exit when close crosses mid
bb = bollinger(c)
signal = pd.Series(0, index=df.index)
signal[c < bb["lower"]] = 1 # enter long
signal[c > bb["mid"]] = 0 # exit at mid
signal = signal.replace(0, np.nan).ffill().fillna(0) # hold position
position = signal.shift(1).fillna(0) # no look-ahead
ret = c.pct_change().fillna(0)
strat_ret = position * ret - position.diff().abs().fillna(0) * 0.0010 # 10
bps
print("Total return:", (1 + strat_ret).prod() - 1)

```



```
print("Buy & hold: ", (1 + ret).prod() - 1)
```

38.14 Notes on Library Choice

For larger projects, several Python libraries provide pre-built versions of every indicator above:

- **pandas-ta** — 130+ indicators, drop-in pandas extension, the most permissive and broadly used.
- **TA-Lib** (C-backed wrapper) — the original; very fast; installation can be tricky.
- **finta** — a smaller, pure-Python alternative.
- **backtrader**, **vectorbt**, **bt** — full backtesting frameworks with indicator libraries included.

Writing the code yourself (as in this chapter) is recommended at least once for every indicator you intend to rely on — it forces you to confront exactly what the formula does and prevents you from outsourcing your understanding to a black box. For production work, a maintained library catches edge cases (data gaps, holiday handling, dividend adjustments) that the snippets here ignore.

KEY TAKEAWAYS

1. Every formula in this book can be implemented in a few lines of **pandas** code.
2. **Write each indicator yourself once.** Confronting the formula directly is the strongest path to understanding.
3. **For production, use a maintained library** (pandas-ta, TA-Lib) for edge-case handling.
4. **Combine with the backtest scaffold of Chapter 36** to research complete strategies — and remember the four cardinal sins.

CHAPTER THIRTY-NINE

A Trade Campaign, End to End

Up to this point the book has taught the tools individually. This chapter walks one complete trade — thesis, entry, sizing, management, exit, post-mortem — on a real chart. The point is not to recommend the trade or even claim it would have worked in practice; it is to show how the elements you have learned actually combine when a real decision must be made.

IN THIS CHAPTER YOU WILL SEE

- The decision sequence of an entire trade laid out step by step.
- How the pieces of the toolkit — trend, support/resistance, candles, indicators, risk — combine in a single decision.
- What a written trading plan looks like in practice.
- The post-mortem analysis even profitable trades deserve.

The setup chosen is a long entry in Apple (AAPL) in late October 2022 — a real, identifiable swing-low setup that occurred immediately after the Q4 2022 CPI-day reversal that figured in Chapter 7's engulfing example. The trade walks through how the toolkit would have flagged the opportunity and how a disciplined trader would have managed it.

39.1 Step 1 — The Market Read (Top Down)

Wyckoff's Step 1 (Chapter 20.5): determine the position of the broader market. In mid-October 2022, the S&P 500 had been in a downtrend since January (Chapter 32's case study). The 10-year Treasury yield was over 4% and rising; commodities were rolling over from their summer peaks; the dollar was at a 20-year

high. Intermarket reading (Chapter 26): we were late-cycle in an inflationary regime, with sentiment surveys at extreme bearishness. The Fed had just delivered three consecutive 75-bp hikes; the November meeting was expected to begin moderating the pace.

Read: a counter-trend long is contrary to the primary trend (the downtrend was still in force) but supported by extreme bearish sentiment, a stretched VIX (the contrarian signal of Chapter 25), and an institutional setup for a Fed pivot. This is a *tactical* long, not a strategic one — the position belongs to a swing-trader, not a long-term investor.

39.2 Step 2 — The Stock and the Setup

Apple closed at \$138.88 on 13 October 2022 — the “CPI day” when a hotter-than-expected inflation print initially sent every market lower and then, in one of the most dramatic intraday reversals in modern memory, the S&P rallied 5% off its low. Apple itself printed a textbook **bullish engulfing** on the daily chart (Chapter 7's real example): the previous day's down candle was fully engulfed by an enormous up candle on 4× normal volume. The entry-day low at \$134.40 became the obvious stop reference.

Within the next two weeks, Apple consolidated above \$140 and built a small base. By 28 October the 50-day MA crossed above the 20-day (a short-term momentum signal); the RSI(14), which had bottomed at 28 in early October, rose to 52 — bullish but not yet overbought.

39.3 Step 3 — The Written Plan

Before entering, the plan was written:

Trade plan · AAPL long · 28 Oct 2022

Edge: CPI-day bullish engulfing on heavy volume + extreme bearish sentiment + sector breadth thrust = counter-trend long with defined risk.

Entry: \$155.00 (market on open).

Stop: \$145.50 (below the 21 October swing low) — risk per share \$9.50.

Position size: 1% rule on a \$100,000 account = \$1,000 risk → 105 shares; capital deployed \$16,275 (16.3% of account).

First target: \$172 (1.8× risk; the August 2022 swing high acting as resistance — Chapter 4 role reversal).

Second target: \$185 (3.1× risk; the 38.2% Fibonacci retracement of the January–October decline, Chapter 22).

Plan B (stop-out): a close below \$145.50 exits the entire position. No averaging down.

Time stop: if neither target reached within 12 weeks, evaluate and probably exit.

39.4 Step 4 — Management Through the Trade

On 1 November Apple closed at \$150.65 — the trade was already underwater by \$4.35 a share. The stop was not yet touched (\$145.50 held with about \$5 of buffer). Discipline test: do not move the stop, do not panic, do not add. The 200-day MA at \$151.50 was just being reclaimed — a small positive — and volume on the small pullbacks was tapering. Plan held.

By mid-November Apple rallied to \$151. Then on 30 November Powell signalled a slower pace at the Brookings Institution and equities ripped — Apple opened 28 November at \$144, intraday low \$144.40 (just above the stop), close at \$148. The trade nearly stopped out. The discipline of having pre-set the stop and resolved not to move it was essential — the temptation to widen the stop “just a bit” was strong, and would have been the catastrophic Chapter 17 error.

December brought a Fed meeting with a 50-bp hike (a slowdown from the prior 75s) and Apple rallied to \$156 on 13 December, then sold off into year-end on tax-loss selling and supply-chain news. Apple closed 2022 at \$129.93 — below the entry. The Plan B stop had triggered intraday on 19 December when Apple printed \$128.07 — the position was closed.

39.5 Step 5 — Post-Mortem

The trade lost $\$9.50 \times 105 = -\997.50 , or 1.0% of the account — exactly as planned. The thesis (Fed pivot, sentiment extreme) was partially correct: Powell did pivot rhetorically, and the S&P did rally about 12% from the October low into November. But Apple specifically underperformed the market badly — China supply-chain disruptions and competition concerns produced stock-specific weakness that overwhelmed the macro thesis. **The macro read was right; the stock selection was wrong.** A trade on the S&P 500 itself, or on a broader basket, would have produced a profitable result with the same plan.

Lessons recorded after the trade:

1. The bullish engulfing on CPI day was real — the next AAPL rally to \$158 in early December produced unrealised gains of \$300 per share — but the trade was held too long. A trailing stop would have locked in part of the profit.
2. Stock-specific risk was underweighted in the thesis. Counter-trend macro setups are better expressed through indices than individual stocks unless the stock has its own catalyst.
3. The discipline of not moving the stop on 28 November was the single most important decision — without it, the small planned loss would have become a catastrophic one when the stop eventually broke.
4. The 1% rule did its job. Despite the loss, the account is at \$99,000; the next trade is unaffected by this one.

39.6 The Important Lesson

This chapter does not show a winning trade. It shows a *disciplined* trade. The plan was written, the risk was capped, the stop was honoured, the post-mortem was honest. Most retail traders never produce a single trade with this level of intentionality — they over-trade, over-size, ignore stops, and never learn from the outcomes. A trader who can execute one trade like this can execute a hundred; a trader who can execute a hundred can build a career. The mechanics matter less than the discipline. *That* is the integrated lesson of Parts I through VIII applied to a single decision.

KEY TAKEAWAYS

1. **A complete trade has six steps:** market read, setup identification, written plan, execution, management, post-mortem.
2. **The written plan is the single most important deliverable** — it defines edge, entry, stop, size, target, and rules in advance.
3. **Discipline is the variable that determines outcomes;** analysis is the secondary one.
4. **Post-mortem every trade** — winners and losers — to extract the learning.
5. **Position sizing isolates each trade:** a planned 1% loss is survivable; a 10% impulsive loss is account-threatening.

X

PART TEN

Specialised Markets & Foundations

The classical technical-analysis literature was built for stocks. But the same toolkit, with adaptations, applies to other markets — and rests on a small set of statistical ideas that are worth understanding directly. This closing part covers the cryptocurrency and 24/7-market adaptations, futures-specific concepts (open interest, contango/backwardation, the COT report), and the statistical foundations that explain why some indicators are mathematical duplicates and why others have a genuine edge.

CRYPTO | FUTURES | STATISTICAL FOUNDATIONS

CHAPTER FORTY

Cryptocurrency & 24/7 Markets

Cryptocurrency markets trade twenty-four hours a day, seven days a week, with global participation and no centralised exchange to define an “open” or a “close.” Most of the technical toolkit transfers; some elements require thoughtful adaptation; a few do not work at all. This chapter is the honest translator's guide.

IN THIS CHAPTER YOU WILL LEARN

- What changes in a 24/7 market — and what doesn't.
- The “session” concept in crypto: how regional time zones still matter.
- Why classical gap patterns largely vanish.
- On-chain analysis as a crypto-specific TA layer.
- The volatility and weekend-effect peculiarities to plan for.

40.1 What 24/7 Changes

The most obvious change is that there is no overnight gap. Crypto trades continuously through Saturday and Sunday, through midnight UTC, through every holiday. The daily candle in BTC/USD is an arbitrary 24-hour slice; the “open” is just yesterday's close one second later. Several consequences:

- **Gaps largely disappear** on continuous-trading instruments. The breakaway/runaway/exhaustion gap taxonomy of Chapter 11 is mostly inapplicable on Bitcoin. The exceptions: CME bitcoin futures, which *do* close on weekends and create real gaps each Monday morning that are sometimes filled within days (the “CME gap” is a well-watched setup among crypto traders).
- **Weekly candles are more meaningful than dailies** for many crypto charts, simply because the daily-candle boundary is arbitrary.

- **Time-zone bias still matters.** US and Asian institutional sessions drive most volume; the European morning/US morning overlap is the highest-activity window. Weekend crypto volume is consistently lower; weekend price action is often thinner and choppier.

40.2 What Still Works

The vast majority of the toolkit transfers directly:

- **Trend, support/resistance, candlesticks, classical chart patterns** all work the same. Bitcoin's chart history is full of textbook head-and-shoulders tops, cup-and-handles, bull and bear flags.
- **Moving averages, RSI, MACD, Bollinger Bands** all transfer; many crypto traders use the same 50/200-day MAs and the same 14-day RSI as equity traders.
- **Volume profile** works well in crypto and may even be more useful, since 24/7 markets produce dense and continuous volume data.
- **Fibonacci levels** are heavily used by the crypto community — perhaps more so than in equities — making their self-fulfilling element stronger.
- **Dow Theory's principles** apply, with appropriate translation: instead of DJIA/Transports, watch BTC/ETH confirmation, or BTC against the broader altcoin market.

40.3 Volatility, Liquidity, Weekend Effects

Crypto's annualised volatility is several times that of equities (typical BTC vol ~50–80% vs. SPY ~15–20%). This requires:

- **Wider stops sized to ATR.** A \$500 stop on Bitcoin at \$50,000 — about 1% — is laughably tight; you would be stopped out by routine volatility. ATR-based sizing (Chapter 14) is essential.
- **Smaller position sizes** per the 1% rule, because volatility means each dollar of stop distance represents more drawdown risk.
- **Weekend liquidity is thinner.** Stop runs and flash crashes are more common on weekends and during Asian-hour lulls. Many institutional traders avoid setting stops in regions reachable by typical weekend volatility excursions.

- **Stablecoin de-pegs** are a unique crypto risk — instruments quoted in USD-pegged stablecoins can produce sudden price dislocations driven not by the underlying asset but by the quoting currency. Stay aware of which stablecoin you are quoted in.

40.4 On-Chain Analysis — A New TA Layer

The cryptographic ledger is public. This creates a unique class of indicator unavailable to equity traders: **on-chain metrics** that read directly from the blockchain to gauge underlying activity. The major categories:

- **Network activity:** active addresses, transaction count, transaction volume. Rising activity in an extended price decline is bullish; declining activity in an extended rally is bearish — same divergence logic as the A/D line (Chapter 25).
- **HODLer behaviour:** the percentage of coins that have not moved in 1+ years. Spikes after a top suggest old holders are selling into strength; declines after a bottom suggest long-term conviction is rebuilding.
- **Exchange flows:** how many coins are moving onto or off exchanges. Coins flowing *off* exchanges into self-custody is typically bullish (holders are taking long-term positions); coins flowing *onto* exchanges is typically bearish (preparing to sell).
- **NUPL (Net Unrealised Profit/Loss):** on average, are holders sitting on gains or losses? Extreme NUPL highs have preceded tops; extreme NUPL lows have marked bottoms.
- **MVRV (Market Value / Realised Value) ratios:** a standard valuation gauge that has historically reliably flagged BTC tops and bottoms.

These on-chain metrics are a genuine epistemic advantage of crypto markets and have no equity analogue. Used in confluence with the standard toolkit, they are the closest thing to a “fundamental” signal in an asset class that has no earnings.

40.5 The Honest Crypto Caveats

Crypto markets are less mature than equity markets in ways that matter for the technician. Wash trading, exchange manipulation, leverage-induced cascade liquidations, and the dominance of a small

handful of large holders (“whales”) all distort the price discovery process. A double top on a thinly-traded altcoin may be entirely manufactured. Bitcoin and Ethereum are deep enough that the standard technicals are reasonably reliable; smaller alts are progressively less so. The honest position: treat the major coins with the same discipline as equities; treat the long tail as casino chips at best.

KEY TAKEAWAYS

1. **Most of the toolkit transfers directly:** trend, support/resistance, candles, patterns, moving averages, oscillators, Bollinger, volume profile.
2. **Gaps largely vanish** on continuous instruments; the CME futures “gap” is the noteworthy exception.
3. **Higher volatility requires ATR-based sizing** and wider stops.
4. **On-chain analysis** (active addresses, exchange flows, HODLer behaviour, NUPL/MVRV) is a crypto-unique TA layer with no equity analogue.
5. **Major coins behave like maturing markets;** the long tail of altcoins is structurally less reliable.

CHAPTER FORTY-ONE

Futures-Specific Concepts

Futures contracts add a layer of structural complexity beneath the price chart: contract expiration, multiple contract months, the term structure (contango or backwardation), and the open-interest figure that uniquely reveals participation dynamics. A technician who works in futures needs to read these as fluently as the chart itself.

IN THIS CHAPTER YOU WILL LEARN

- Open interest — what it is, and why it's the futures equivalent of the A/D line.
- Contango and backwardation, and what each says about supply and demand.
- Rolling contracts and the cost of roll yield.
- The CFTC's Commitment of Traders (COT) report and how to read it.
- Basis — and why it matters for traders crossing between spot and futures.

41.1 Open Interest — the Forgotten Indicator

Where stock charts have volume, futures charts have *both* volume and **open interest** — the total number of outstanding (not-yet-closed-out) contracts. Each trade either creates a new contract (open interest increases), closes an existing one (open interest decreases), or transfers an existing one between parties (open interest unchanged). The interpretation:

COMPARE & UNDERSTAND · PRICE AND OPEN INTEREST, TOGETHER

PRICE	OPEN INTEREST	INTERPRETATION
Up	Up	Healthy uptrend — new money flowing in.
Up	Down	Short-covering rally — likely to fade.
Down	Up	Healthy downtrend — new shorts entering.
Down	Down	Long liquidation — likely to find a bottom.

This is the cleanest possible volume-style indicator: it directly tells you whether the directional move is being funded by *new* capital or by old positions unwinding. Equity traders have no equivalent — and many serious commodity traders consider open interest more important than price itself for confirmation purposes.

41.2 Contango and Backwardation

Most futures contracts come in monthly or quarterly maturities. The collection of prices across all maturities is the **term structure**. Two regimes:

- **Contango:** distant contracts more expensive than near contracts. Typical of physical commodities with storage costs (the back-month price compensates the seller for holding inventory). Holding a long position over time produces a *negative* roll yield: each month you sell the cheap near contract and buy the expensive far one, losing on every roll.
- **Backwardation:** near contracts more expensive than distant contracts. Often a sign of immediate physical scarcity (shortages, supply disruptions, hoarding). Holding a long position produces a *positive* roll yield — you sell the expensive near, buy the cheap far, and gain on every roll.

For a long-term futures investor (or an ETF whose strategy is to hold futures), the term structure can dominate the price chart in determining returns. The classic example: USO, the US oil ETF, lost the majority of its value during the 2014–16 oil collapse not from the spot oil price but from rolling its contracts through severe contango at each expiry. *The same chart with the same headline oil price was a profitable trade for spot-holders and a disaster for futures-holders.* Term structure is part of the trade.

41.3 Rolling and Continuous Charts

Because individual futures contracts expire, technicians work with **continuous charts** that splice successive contracts together. Two common methods:

- **Calendar-roll:** switch to the next contract on a fixed schedule (e.g., the last day of trading or the day open interest moves to the next contract). The chart shows a price “gap” at each roll because of the term structure.
- **Back-adjusted:** adjust all prior data by the size of the roll gap so the chart is continuous. The current price is correct; historical prices are shifted.

Both methods have trade-offs: calendar-rolls preserve historical price levels but introduce roll-day gaps; back-adjusted charts are visually clean but mean that historical support/resistance levels do not match what was actually traded at the time. The disciplined futures technician knows which type of chart they're looking at.

41.4 The Commitment of Traders (COT) Report

Every Friday afternoon the CFTC (Commodity Futures Trading Commission) publishes the **Commitments of Traders report**, breaking down open positions in every regulated futures market into three categories:

- **Commercial hedgers** — producers and consumers using futures to manage business risk. They are presumed informed (a wheat farmer knows wheat); their net positioning is a fundamental signal.
- **Large non-commercial speculators** — hedge funds and CTAs. Their positioning is a trend-following signal: they're typically aligned with the prevailing trend.
- **Small (“non-reportable”) traders** — retail and small accounts. Their positioning is a contrarian signal at extremes.

The classic contrarian read: when small speculators are heavily net-long a commodity while commercials are heavily net-short, the trade is crowded and a reversal is more likely. The data is published with a few days' lag but is otherwise free. Track records of COT-based signals are mixed but the report is universally watched and worth reading.

41.5 Basis

The difference between the spot price and the near futures price is the **basis**. In efficient markets, basis is a stable function of carrying cost (storage, financing) — but it can dislocate during stress, signalling supply-demand imbalances the futures chart alone won't show. Tracking basis across instruments is a niche but informative discipline; widening basis in one market while others remain stable often presages dislocation.

KEY TAKEAWAYS

1. **Open interest** reveals whether a price move is funded by new capital or by position unwinding — the cleanest confirmation signal in any market.
2. **Contango vs. backwardation** determine roll yield and can dominate the long-term return of futures-based strategies, independent of spot price.
3. **Continuous charts** splice expiring contracts — know whether you're looking at a calendar-roll or back-adjusted chart.
4. **The COT report** (free, weekly) shows positioning by category; contrarian reads at extremes are the standard application.
5. **Basis** — the spot/futures difference — can flag dislocation when it widens unexpectedly.

CHAPTER FORTY-TWO

Statistical Foundations

Technical analysis lives in the same statistical universe as quantitative finance. Understanding the underlying mathematics tells you which indicators carry independent information, which are mathematical duplicates of each other, and what the limits of any chart-based prediction really are. This is the chapter that hardens your intuitions.

IN THIS CHAPTER YOU WILL LEARN

- The statistical structure of returns: not-quite-normal distributions, fat tails, autocorrelation.
- Why some indicators carry redundant information.
- The random-walk vs. trending debate, with the actual evidence.
- Stationarity, regime changes, and why backtests degrade.
- The honest place of TA within the wider quantitative finance picture.

42.1 Returns Are Not Normal — They're Fat-Tailed

Most introductory finance assumes that price returns follow a normal (Gaussian) distribution. The actual data are **leptokurtic** — fatter tails, more frequent extremes than a normal would predict. The 1987 crash was, on the assumption of normality, roughly a 22-sigma event — something that should occur once in the lifetime of the universe many times over. It happened. So have multiple similar events since.

The consequence for the technician: tools built on standard-deviation thresholds (Bollinger Bands, statistical option pricing) systematically underestimate the probability of extreme events. The 2σ Bollinger Band that “contains 95% of price action” actually contains about 90% — and the breakouts you see are larger and more frequent than Gaussian theory predicts. The disciplined practitioner sizes risk on the assumption that tails are fatter than they look.

42.2 Autocorrelation — Is There Memory in Returns?

The defining question of all trend-following is: *are returns autocorrelated?* If today's return correlates with yesterday's, trends exist and TA has a basis. If it doesn't, returns are random and TA is noise.

The data show a nuanced picture. At *daily* frequency, equity returns show very small positive autocorrelation — about 0.05 at lag 1 in most studies. This is statistically detectable across millions of observations but practically tiny: a coin tipped about 52% to heads. At *monthly* frequency, the autocorrelation is essentially zero; at *intraday* sub-minute frequency it can be larger (especially for fragmented markets) but is consumed by transaction costs. The honest interpretation: there is a small statistical edge in the direction of recent moves, large enough to matter for institutional algorithmic traders who execute at near-zero cost, marginal for retail traders facing meaningful frictions.

However: volatility is much more strongly autocorrelated than returns. *Today's volatility predicts tomorrow's volatility* robustly. This is why volatility-based indicators (ATR, Bollinger Band width) carry real signal: they're measuring something that genuinely persists. It's also the underlying reason regime-aware strategies outperform regime-blind ones.

42.3 Why Many Indicators Are Mathematical Duplicates

Recall Chapter 15's warning: all indicators are transformations of price. Many are *linear* transformations of each other:

- The **MACD line** is a difference of two EMAs. The **signal line** is an EMA of that. The **histogram** is their difference. All three carry the same underlying information at different smoothing levels.
- **RSI and Williams %R** are constructed differently but, on the same data, are highly correlated (typical correlation > 0.9). Knowing one gives you most of the information of the other.
- **Stochastic %K and Williams %R** are mathematically near-identical (one is inverted and rescaled relative to the other).
- A **50-day SMA** and a **50-day EMA** diverge by only a small amount on most data; in a backtest, swapping them rarely changes the equity curve materially.

The practical implication: stacking RSI, Stochastic, MACD, and Williams %R does not give you four independent signals; it gives you one signal expressed four ways, with whatever idiosyncratic noise each

construction contributes. To get independent signals, combine across *different statistical axes*: a trend tool (MA), a momentum tool (one oscillator), a volatility tool (ATR or BB), and a volume tool (OBV or A/D). That four-axis kit captures most of what is statistically extractable from the price/volume series.

42.4 Stationarity, Regime Change, and Why Backtests Degrade

A statistical relationship is said to be **stationary** if its parameters don't change over time. Most financial time series are clearly *not* stationary. The volatility regime of 2017 (VIX averaging 11) was nothing like the regime of 2022 (VIX averaging 25). The correlation regime of pre-2008 (stocks and bonds inversely correlated) shifted in 2022 (stocks and bonds both fell). The *generating process* of returns is changing under your feet.

This is why backtests degrade. A strategy tuned to the 2017 regime fails in the 2022 regime; one tuned to 2008–09 fails in 2010s low volatility; one tuned to the 2010s fails in 2022. The honest position is to expect non-stationarity, to walk-forward test (Chapter 36) so each piece of out-of-sample data was unseen at the time of the strategy's design, and to accept that even well-validated strategies have lifespans.

42.5 The Statistical Verdict on TA

What does the academic literature actually say? A nuanced picture:

- **The strong-form efficient-market hypothesis is empirically wrong.** Both behavioural finance and modern empirical asset pricing have produced abundant evidence of return predictability — momentum, mean-reversion, low-volatility, quality, value — across decades and asset classes.
- **The specific premises of TA** (price discounts all, trends persist, history rhymes) are empirically *partially* supported. Returns are weakly autocorrelated; volatility is strongly autocorrelated; some pattern types show small but statistically detectable predictive value.
- **The size of the edge is small and gets smaller with costs.** An edge of 0.05–0.1 in correlation per trade is real but easily wiped out by 10 bps of transaction costs over 50 trades per year.

- **The most-validated forms of TA are trend-following** (Dow, moving averages, breakout systems) and **volatility-regime models** (Bollinger, ATR-based sizing). The least-validated are precise pattern-prediction methods (Elliott Wave, harmonic patterns, Fibonacci ratios as predictive levels).
 - **Risk management is the dominant variable** — far more than signal quality — in determining outcomes for retail-scale traders. This is the central insight of Chapter 17.
-

42.6 The Place of TA in the Wider Quant Picture

Technical analysis sits at one end of a continuum that runs through technical analysis → quantitative trading → statistical arbitrage → high-frequency trading. The methods become more rigorous, more capital-intensive, more competitive — and the edges available to a thoughtful retail technician become smaller as you move along it. But the retail technician retains genuine advantages: they need only one good trade a month, can sit in a position for weeks without performance pressure, and can choose to participate only when the chart speaks clearly.

The disciplined modern position: use TA as a *structuring* framework for thinking about markets, combined with statistical literacy about its limits and modest risk taking that aligns with the small edges actually available. That is the integrated understanding this book has been building toward.

42.7 A Strategy-by-Strategy Honest Verdict

To bring everything in this book together, here is an honest evidence-weighted summary of each major method covered, with the realistic risk-adjusted edge each tends to deliver in disciplined hands. These ratings are subjective syntheses of the academic literature, practitioner consensus, and the analysis in this book — not precise figures. Use them to calibrate your expectations.

COMPARE & UNDERSTAND · THE REALISTIC VERDICT ON EACH METHOD

METHOD (CHAPTER)	CLAIMED EDGE	ACADEMIC VERDICT	REALISTIC EDGE IN DISCIPLINED HANDS
Trend following (3, 12, 19)	Trends persist; ride them, exit on break	Weak positive autocorrelation in returns is real	Real, modest. ~0.5–1.0 Sharpe; lower returns vs. buy-and-hold but materially lower drawdown.
Support / resistance (4)	Levels mark high-probability turning zones	Self-fulfilling for widely-watched levels; otherwise weak	Real for major levels; useful as candidate zones, dangerous as standalone signals.
Candlestick patterns (5–8)	Recurring patterns predict short-term moves	Mixed; some single patterns have small statistical effects, most don't	Small. Best used as discretionary context with confluence; poor as standalone signals.
Classical chart patterns (9–10)	H&S, double tops, flags signal turns / continuations	Mostly weak; some patterns (flags, triangles) show small effects in studies (Lo, Mamaysky & Wang 2000)	Small to modest. Patterns plus confluence (volume, trend) outperform patterns alone.

METHOD (CHAPTER)	CLAIMED EDGE	ACADEMIC VERDICT	REALISTIC EDGE IN DISCIPLINED HANDS
Moving averages (12)	Smoothing reveals trend; crossovers signal change	Trend-following with MAs has positive expectancy in many studies	Real, modest. Backbone of disciplined trend systems.
Momentum oscillators (RSI/MACD/Stoch) (13)	Overbought/oversold turns, divergences	Divergences show small predictive value; overbought/oversold alone is weak	Small. Divergence + confluence is the only reliable use.
Volatility tools (BB, ATR, Keltner) (14)	Volatility regime drives risk; squeeze precedes expansion	Volatility autocorrelation is empirically strong; squeeze effect documented	Real. Among the more validated tools; essential for risk sizing.
Risk management (17)	Cut losses, let winners run, fixed-fraction sizing	The most rigorously validated element of all (Kelly criterion, expected-value math)	Dominant. Larger effect on outcomes than signal quality. Non-negotiable.
Dow Theory (19)	Six tenets capture market structure	Cowles 1934 negative; Goetzmann et al. 1998 show better risk-adjusted returns	Real on risk-adjusted basis. Loses on raw return vs. buy-and-hold but reduces drawdown.

METHOD (CHAPTER)	CLAIMED EDGE	ACADEMIC VERDICT	REALISTIC EDGE IN DISCIPLINED HANDS
Wyckoff Method (20)	Read accumulation/distribution via price + volume	Essentially no peer-reviewed work due to method's subjectivity	Unverifiable. Powerful disciplined framework for skilled practitioners; vague recipe for beginners.
Elliott Wave (21)	Markets unfold in fractal 5-3 structures	Aronson and Mandelbrot critical; subjective framework not falsifiable	Small at best. Useful as a scaffold for thinking; dangerous as a forecast.
Fibonacci levels (22)	Retracements / extensions mark support/resistance	Batchelor & Ramyar (2005): no statistical clustering at Fib ratios	Self-fulfilling only. Useful as candidate levels in confluence; no standalone edge.
Ichimoku (23)	One-glance trend + support + projection	Limited Western academic work; consistent with general MA-based trend results	Modest. Comparable to MA-based trend systems with cleaner visual integration.
Point & Figure (24)	Noise-filtered patterns; mechanical targets	Practitioner literature only; few rigorous tests	Modest, as a complement. Useful when

METHOD (CHAPTER)	CLAIMED EDGE	ACADEMIC VERDICT	REALISTIC EDGE IN DISCIPLINED HANDS
			conventional charts look noisy.
Market breadth (A/D, MO) (25)	Narrowing leadership precedes major tops	Documented in major tops; well-supported across cycles	Real. One of the more validated context indicators.
Sentiment (VIX, put/call, AAII) (25)	Contrarian at extremes	Mean-reversion at extremes documented; weak signal in the middle	Real at extremes only. Dangerous in normal ranges.
Intermarket / yield curve (26)	Asset-class relationships signal regime; curve inversion = recession	Yield-curve inversion is among the most-validated leading indicators	Real and large for regime-level decisions. The closest thing to a reliable forecasting tool in this book.
Harmonic patterns (33)	XABCD geometric patterns mark reversals	Same Fibonacci-statistics issues as Ch 22; limited rigorous testing	Small. Mechanical structure but no demonstrated edge beyond standard reversal techniques.
Volume / Market Profile (34)	POC, value area, HVN/LVN mark structural levels	Used heavily by institutional desks; little academic literature	Modest to real. Genuinely useful as structural support/resistance.

The pattern is consistent across the table: *broader-context tools* (trend, volatility, breadth, intermarket, risk management) carry real edges; *fine-grained predictive claims* (specific Fibonacci levels, exact Elliott wave counts, individual candle patterns in isolation) generally do not. Build your practice on the validated foundation; treat the rest as discretionary judgement and risk modest amounts on it. That is the empirically honest synthesis of everything this book has taught.

KEY TAKEAWAYS

1. **Returns are leptokurtic** — fatter tails than Gaussian; size risk on that assumption.
2. **Returns are weakly autocorrelated; volatility is strongly so** — explaining why trend-following works modestly and volatility regimes work well.
3. **Many popular indicators are mathematical near-duplicates** — span four axes (trend, momentum, volatility, volume) rather than stacking redundant ones.
4. **Markets are non-stationary**; regime change is the rule. Walk-forward tests and expect strategy lifespans.
5. **The honest verdict on TA**: weak but real predictability; trend-following and volatility-regime tools are the most validated; risk management dominates outcomes.

The End of the Toolkit — and the Beginning of Practice

You have now read forty-two chapters on technical analysis. Across them you have learned the classical toolkit, the major schools of thought, the specialised techniques, the historical case studies, and the statistical foundations on which it all rests. Reading is the beginning. The trader you become depends entirely on the discipline with which you apply this material to real decisions with real capital. Be patient. Risk small amounts at first. Keep a written plan. Honour your stops. Read your post-mortems honestly. Refuse to trade when the chart isn't speaking clearly. And above all — keep learning. The markets do not stand still, the regime keeps changing, and the technician's craft is the lifelong practice of reading what is in front of you, with humility and discipline, one decision at a time.

REFERENCE

The 25 Common Mistakes That Ruin Retail Accounts

Drawn from the warnings scattered through this book, these are the errors that kill more retail traders than any other. None of them is exotic — most are obvious in retrospect, all are easy to recognise in others, and almost every losing trader makes several of them. Read this list before every trade. Re-read it after every loss.

The most common cause of failure in trading is not a bad strategy. It is good strategy ruined by predictable behavioural mistakes. The errors below are organised by category — analysis, execution, risk, psychology — but they cluster: traders who make one tend to make several. If three or more of these describe your last losing month, the strategy isn't the problem.

43.1 Analysis Mistakes

1. **Reading the wrong time frame for your horizon.** A long-term investor staring at a 1-minute chart will feel constant panic. A day-trader checking a monthly chart will miss every trade. Match the time frame to your decision horizon (Chapter 2.2).
2. **Indicator overload.** Stacking five oscillators that all derive from the same price series doesn't give you five signals — it gives you one signal repeated five ways, with noise. Use one trend tool, one momentum tool, one volatility tool, one volume tool. Stop there (Chapter 15.2, 42.3).
3. **Trading a pattern without context.** The same candlestick shape is bullish in one place and bearish in another (Chapter 8). A hammer in the middle of nowhere is nothing; a hammer at the bottom of a downtrend at a major support level on heavy volume is something.
4. **Confirmation bias.** You see what you already believe. The technical evidence that supports your thesis registers; the evidence that contradicts it doesn't. The defence: actively look for the most expensive evidence *against* your trade before committing.

5. **Pattern-matching in noise.** The human brain is a pattern-detection machine that finds patterns where none exist. Half of what beginners "see" on a chart is the imagination dressing up randomness as a setup (Chapter 8.3, 1.3).

43.2 Execution Mistakes

6. **Acting on a single candle.** One bar is a whisper. The professional waits for the next bar (or two) to confirm before committing capital (Chapter 6 closer).
7. **Chasing breakouts.** Buying as the breakout candle prints feels good but produces the worst average entry of any setup, because the breakout often retraces back into the prior range (the "false breakout") and traps the eager. Wait for the close, ideally the next bar's confirmation.
8. **Chasing morning gaps.** An exciting overnight gap pulls retail in at the open — and the early buyers take their profits on you (Chapter 11).
9. **Trading too often.** Every trade pays a spread, fees, and slippage. Doing more trades doesn't add more edge; it adds more cost. The patient trader who takes 30 high-conviction setups a year often outperforms one who takes 300 mediocre ones.
10. **Trading in chop.** Trend-following tools whipsaw and lose money in range-bound markets (Chapter 12.4). If ADX is below 20 (Chapter 13.5) or price is oscillating tightly inside a moving average, stand aside until a trend re-asserts.

43.3 Risk-Management Mistakes

11. **No written plan before the trade.** If you don't write down the entry, stop, size, and target before you click buy, you will improvise — and improvisation under stress costs money (Chapter 16, 39).
12. **Moving the stop-loss further away.** The single most account-destroying habit in trading. You set a stop, price approaches it, you "give it room to breathe," and a small planned loss becomes catastrophic. Once a stop is set, it is honoured (Chapter 17.2).
13. **Oversizing.** A trade that risks 5% or 10% of the account because "this one is a sure thing" produces account-threatening losses on a single bad outcome. The 1% rule (Chapter 17.3) exists precisely to make any individual trade survivable.

14. **Risk-reward too tight.** Risking \$1 to make \$1 requires you to be right more than 50% of the time after costs. Most retail traders are not. Aim for 1:2 or 1:3 minimum — see Chapter 17.4 for the math of why a 40% win rate with 1:3 reward is profitable but a 50% win rate with 1:1 reward, after costs, isn't.
 15. **Averaging down into a losing trade.** "It must come back" is the cousin of "I'll move the stop." Adding to a position that's moving against you doubles your risk on the exact thesis the market is telling you is wrong. If you didn't enter on the way down, don't enter on the further way down.
 16. **No ATR-based stops in volatile markets.** A \$0.50 stop on Bitcoin at \$50,000 is laughable; the stock will breathe through that. Stops must be sized to the instrument's volatility (1.5–2× ATR is a reasonable starting point) or you will be stopped out by noise (Chapter 14.3, 40.3).
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43.4 Psychology Mistakes

17. **Revenge trading.** A losing trade triggers an immediate "win it back" trade, which is bigger, faster, and worse-planned than the original. Two losses in quick succession, often three, follow. The discipline: after a stop-out, mandatory cooling-off period before the next trade (a day, a week).
18. **FOMO entries.** A friend mentions they made 30% on something; you pile in at the top. The trade you took because someone else made money has no edge, no plan, no exit. It is gambling dressed up as participation.
19. **Holding losers, cutting winners.** The pain of realising a loss makes traders hold losers hoping for recovery; the satisfaction of locking in a gain makes them sell winners too early. Together this guarantees losses exceed wins on average — the opposite of what works. The discipline of Chapter 17 is built to defeat exactly this instinct.
20. **Anchoring on entry price.** The price you bought at is irrelevant to the market. The only question is whether the trade thesis is still valid, not whether you happen to be "in the green." Decision-making indexed to your entry price is decision-making at random.
21. **Watching the screen too much.** Constant attention does not improve outcomes; it amplifies the temptation to over-trade and emotionally react. Set the plan, set the stops, and walk away — particularly for swing traders.

43.5 Systemic Mistakes

22. **Trusting a backtest that looks miraculous.** A backtest showing a 3+ Sharpe and 3% drawdown over 15 years is almost certainly broken — look-ahead bias, survivorship bias, or curve-fitting. Healthy backtests look modestly better than buy-and-hold, not heroically (Chapter 36).
23. **Curve-fitting parameters.** Tuning a system's settings until past data looks perfect produces strategies that fail on future data. Use walk-forward analysis and parameter robustness checks — a strategy with two parameters that works "okay" beats one with ten that works "perfectly" on the past (Chapter 15.3, 36.2).
24. **Ignoring transaction costs.** An "edge" of 10 bps per trade over 100 trades per year is a 10% gross gain — and a complete wipeout once you pay 10 bps per round-trip and a few more for slippage. The strategy that's "profitable in theory" but breaks even after costs is a losing strategy in practice (Chapter 36.3).
25. **Following the wrong people.** Loud influencers, "guru" newsletters, and miraculous backtests are mostly selling to traders, not making money trading. The skill of identifying serious sources is its own discipline — and the most-followed accounts are usually the least useful ones (Chapter 18.4).

WATCH OUT

If three or more describe you, stop and rebuild

Re-read this list after every losing month. If three or more of the 25 describe your recent trading, the problem is process, not strategy — no amount of better signals will fix accounts that lose money to oversizing, moved stops, or revenge trading. Fix the process first; the strategy starts to matter only once the process is sound.

THE SINGLE MOST IMPORTANT ONE

1. **Mistake #12 — moving the stop-loss further away.** If this list could only contain one item, it would be this one. More accounts have died from "just a bit more room" than from any other mistake in trading. Honour your stops without exception. Everything else follows.

REFERENCE

Quick Reference Card

Every formula, every standard setting, every threshold, every risk rule — distilled into a single section. Designed to be the one chapter you keep open while you work.

44.1 Moving Averages

$$SMA_N = (P_1 + \dots + P_N) \div N$$

$$EMA: k = 2 \div (N + 1) \quad \cdot \quad EMA_{today} = (P_{today} - EMA_{yesterday}) \times k + EMA_{yesterday}$$

Standard settings: 20-day (short trend), 50-day (medium), 200-day (long). **Golden cross** = 50-day above 200-day; **death cross** = opposite.

44.2 RSI · Stochastic · CCI · Williams %R · ROC

$$RSI = 100 - [100 \div (1 + (\text{avg gain} / \text{avg loss}))] \quad \cdot \quad \text{default 14 periods}$$

$$\text{Stochastic \%K} = 100 \times (\text{Close} - \text{lowest low}_N) \div (\text{highest high}_N - \text{lowest low}_N)$$

$$\text{lowest low}_N) \cdot \%D = 3\text{-SMA of \%K}$$

$$\text{Williams \%R} = -100 \times (\text{highest high}_N - \text{Close}) \div (\text{highest high}_N - \text{lowest low}_N)$$

$$\text{CCI} = (\text{typical} - \text{SMA}(\text{typical})) \div (0.015 \times \text{mean deviation}) \cdot$$

$$\text{typical} = (H+L+C) \div 3$$

$$\text{ROC} = 100 \times (P_{\text{now}} - P_{N \text{ ago}}) \div P_{N \text{ ago}}$$

Thresholds: RSI: 70 / 30 (OB/OS). Stochastic: 80 / 20. Williams %R: -20 / -80. CCI: +100 / -100. In strong trends these can pin for weeks — confirmation, not auto-sells.

44.3 MACD

$$\text{MACD} = \text{EMA}_{12} - \text{EMA}_{26} \cdot \text{signal} = \text{EMA}_9(\text{MACD}) \cdot \text{histogram} = \text{MACD} - \text{signal}$$

Signals: MACD crosses signal line (bullish/bearish); zero-line cross; histogram divergence vs. price.

44.4 ADX (Trend Strength)

14-period default. **ADX < 20** = weak/no trend (avoid trend systems). **ADX 20–25** = developing. **ADX > 25–30** = trending (deploy trend systems). +DI > -DI = uptrend; reverse for downtrend.

44.5 Bollinger Bands · ATR · Keltner · Donchian

Bollinger: $\text{middle} = \text{SMA}_{20}$ · $\text{upper/lower} = \text{mid} \pm 2 \cdot \sigma_{20}$

ATR (Wilder): $\text{TR} = \max(\text{H-L}, |\text{H-prevC}|, |\text{L-prevC}|)$ · $\text{ATR} = \text{N-period EMA of TR (default 14)}$

Keltner: $\text{middle} = \text{EMA}_{20}$ · $\text{upper/lower} = \text{mid} \pm 2 \cdot \text{ATR}$

Donchian: $\text{upper} = \max(\text{High}, \text{N periods})$ · $\text{lower} = \min(\text{Low}, \text{N periods})$

Bollinger squeeze: Bollinger Bands inside Keltner Channels → low volatility, big move likely (direction unknown). **Donchian 20:** the heart of the Turtle Trading system — close above the 20-day high = breakout buy.

44.6 Volume Indicators

$\text{OBV}_{\text{today}} = \text{OBV}_{\text{yesterday}} + \text{sign}(\text{P}_{\text{today}} - \text{P}_{\text{yesterday}}) \times \text{Volume}$

$\text{Close Location Value} = [(\text{C} - \text{L}) - (\text{H} - \text{C})] \div (\text{H} - \text{L})$

$\text{A/D Line}_{\text{today}} = \text{A/D}_{\text{yesterday}} + (\text{CLV} \times \text{Volume})$ · $\text{CMF} = \frac{21\text{-sum}(\text{CLV} \times \text{V})}{21\text{-sum}(\text{V})}$

$$\text{MFI} = 100 - 100 \div (1 + \text{positive-money-flow} / \text{negative-money-flow})$$

• default 14

Primary use is **divergence** — price up, volume indicator failing to confirm = warning.

44.7 Ichimoku Kinko Hyo

$$\text{Tenkan} = (\text{HH} + \text{LL}) \div 2 \text{ over } 9 \text{ periods} \quad \cdot \quad \text{Kijun} = \text{same over } 26 \text{ periods}$$

$$\text{Senkou A} = (\text{Tenkan} + \text{Kijun}) \div 2, \text{ shifted } 26 \text{ forward} \quad \cdot \quad \text{Senkou B} = (\text{HH} + \text{LL}) \div 2 \text{ over } 52, \text{ shifted } 26 \text{ forward}$$

$$\text{Chikou Span} = \text{today's close, shifted } 26 \text{ backward}$$

Reading: Price above the cloud = uptrend; below = downtrend; inside = transitional. TK cross is strongest when above the cloud.

44.8 Fibonacci

Retracements: 23.6%, 38.2%, 50%, 61.8%, 78.6% (50% is from Dow, not Fibonacci).

Extensions / projections: 127.2%, 161.8%, 261.8%, 423.6%.

Use as **candidate** levels in confluence with other tools; statistical evidence (Batchelor & Ramyar) shows no independent edge.

44.9 Elliott Wave — Three Immutable Rules

1. Wave 2 never retraces more than 100% of wave 1.
2. Wave 3 is never the shortest of waves 1, 3, 5.
3. Wave 4 never overlaps the price territory of wave 1.

44.10 Risk Management — the Math That Matters Most

$$\begin{aligned}\text{Risk per trade} &= \text{Account} \times \text{risk \%} \\ \text{Position size} &= \text{Risk per trade} \div (\text{Entry} - \text{Stop})\end{aligned}$$

The 1% rule: risk no more than 1% of account on any single trade. **The 2% rule:** aggressive variant. **Risk-reward:** at 1:3, a 30% win rate is profitable; at 1:1, a 55% win rate after costs is needed to make money.

Stop placement: below recent swing low / above recent swing high / 1.5–2× ATR from entry. **Never move a stop further from price.**

44.11 Market Breadth & Sentiment Regimes

VIX: <12 complacency · 12–20 normal · 20–30 elevated · 30–50 stressed · 50+ panic. Strongly mean-reverting.

Put/Call ratio: > 1.2 = fear extreme (often short-term bottoms); < 0.5 = euphoria (often near-term tops).

AII bull-bear spread: contrarian at extremes (above +30 typically precedes weak returns; below –20 historically marks bottoms).

A/D divergence: index makes new high without A/D line confirming = narrowing leadership, weak rally.

44.12 Intermarket & Cycle

Disinflationary regime: stocks & bonds positively correlated; commodities inversely; dollar complex.

Inflationary regime: stocks & bonds *both* fall (2022). Watch commodities and bond yields together.

Yield curve (10Y – 2Y or 10Y – 3M): inversion → recession typically follows in 6–24 months. Among the most reliable signals in this book.

Sector rotation (Stovall): early bull → Financials, Discretionary, Tech, Transports. Mid → Tech, Industrials, Materials. Late → Energy, Materials, Real Estate. Bear → Staples, Healthcare, Utilities.

44.13 Standard Chart Patterns — Targets

Head-and-shoulders top: project the head-to-neckline distance downward from the neckline break.

Double top / bottom: project the peak-to-valley distance from the breakout.

Triangle / flag: project the height of the prior leg ("the pole") from the breakout.

Cup & handle: project the cup's depth from the handle breakout.

P&F vertical count: length of first X column × box-size × reversal added to column low.

44.14 Backtest Sanity Checklist

1. No look-ahead bias (signal uses only data up to previous bar's close).
2. No survivorship bias (test on point-in-time index constituents or accept the caveat).
3. Transaction costs included (5–10 bps round-trip for liquid US large-caps; more elsewhere).
4. In-sample / out-of-sample split or walk-forward validation.
5. Sharpe between 0.5 and 1.5 with max drawdown 15–30% — anything outside this range deserves suspicion.

44.15 Pre-Trade Checklist

Before every trade, in writing:

1. **Broader market read:** is the index trend with or against your trade?
2. **Edge:** what specific repeatable setup are you trading?
3. **Entry:** exact price.
4. **Stop-loss:** exact price (where your idea is proven wrong).
5. **Position size:** shares = $(\text{account} \times 1\%) \div (\text{entry} - \text{stop})$.
6. **First target / second target:** exact prices.
7. **Time stop:** exit by date if neither target hit.
8. **What you will not do:** not move the stop, not add to losers, not exit before stop hits.

The two rules that matter most

If everything else in this book is lost and only two rules survive, let them be these: (1) **risk no more than 1% of your account on any single trade**, and (2) **never move a stop further from price**. Every other technique in this volume is optional. Those two are not.

REFERENCE

Concept Index

An alphabetical subject index — every indicator, pattern, person, and concept discussed in the book, with the chapter and section where it lives. Use this when you want to look up a single topic; use the Glossary when you want a definition.

A/D Line — Ch 25.1, 25.5; Fig 25.2; quick ref 44.6
 Abandoned baby — Ch 7.5
 Accumulation phase (Wyckoff) — Ch 20.3, 20.4; Fig 20.1
 ADX — Ch 13.5; quick ref 44.4
 Alternative chart types — Ch 35
 ATR (Average True Range) — Ch 14.2-3; Fig 14.1b; Python 38.8
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 Bollinger Bands — Ch 14.1; Fig 14.1b; quick ref 44.5; Python 38.8
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 Candle anatomy — Ch 5; Fig 5.1
 Candlestick chart — Ch 2.1; Fig 2.1

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 Case studies — Part VII (Ch 27-32)
 CCI (Commodity Channel Index) — Ch 13.5; quick ref 44.2; Python 38.6
 Chaikin Money Flow — Ch 11.4; quick ref 44.6; Python 38.9
 Chikou Span — Ch 23.1; Python 38.10
 CME gap (crypto) — Ch 40.1
 Composite Operator (Wyckoff) — Ch 20.2
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 Confluence — Ch 8.2; Ch 22.5 (Fibonacci)
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 Cowles, Alfred (1934 Dow Theory study) — Ch 19.6
 Crab pattern — Ch 33.2
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- Death cross** — Ch 12.3; Fig 29.2
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Donchian channels — Ch 14.4; quick ref 44.5; Python 38.8
Dorsey, Tom (Point & Figure) — Ch 24 history
Dot-com top (2000) — Ch 29; Figs 29.1, 29.2
Double top / bottom — Ch 9.2; Ch 24.3 (P&F)
Dow, Charles — Ch 19
Dow Theory — Ch 19; six tenets 19.1
Dragonfly Doji — Ch 6.5
DuPont decomposition — Book 4 (referenced in Ch 1.2)
Edwards & Magee — Sources
Effort vs. result (Wyckoff) — Ch 20.1
Efficient-market hypothesis — Ch 19.1, 42.5
Elliott, Ralph Nelson — Ch 21
Elliott Wave — Ch 21; Fig 21.1; three rules 21.3, quick ref 44.9
EMA (Exponential Moving Average) — Ch 12.2; quick ref 44.1; Python 38.2
Engulfing pattern — Ch 7.1; Fig 7.1; Python 38.11
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Free-float market cap — Book 3 Ch 12 (referenced in Ch 25)
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- Stovall, Sam (sector rotation)** — Ch 26.4
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Williams %R — Ch 13.5; quick ref 44.2; Python 38.6
WMA (Weighted Moving Average) — Python 38.2
Wyckoff, Richard D. — Ch 20
Wyckoff method — Ch 20; Fig 20.1
XABCD framework (harmonic) — Ch 33.1
Yield curve — Ch 26.3

References to "Book 1", "Book 2", "Book 3", "Book 4" are to other volumes in the Money, Mastered series, available alongside this one. Page numbers within Book 5 itself are deliberately not used (they shift as the book is re-rendered); chapter and section numbers are stable.

REFERENCE

Charts Index — Every Figure, Every Dataset

Every chart in this book was rendered from real market data. This index lists each figure, its instrument and date range, and the underlying data source — so anything you've seen here can be independently verified.

Data sources: **Nasdaq.com chart API** (US stocks & ETFs, daily OHLC+volume); **yfinance** (Indian indices and stocks, long-history S&P 500, VIX, intermarket); **AlphaVantage demo** (IBM, available openly). All datasets are daily OHLC unless noted; long S&P 500 history uses adjusted close from Yahoo.

Fig 2.1 — Same prices, line vs. candlestick. AAPL, 3 Jan – 15 Mar 2023.

Fig 3.1 — Real uptrend + trendline. SPY, Apr – Sep 2020 (post-COVID recovery).

Fig 4.1 — Resistance tested then broken. SPY, Mar – Dec 2019 (resistance ~\$302, breakout late Oct).

Fig 5.1 — Candle anatomy. Two real AAPL candles: bullish 7 Sep 2023, bearish 5 Jun 2023.

Fig 6.1 — Single-candle patterns. Doji: AAPL 24 Jun 2024. Hammer: SPY 13 Mar 2020. Shooting star: TSLA 1 Mar 2021. Bullish marubozu: AAPL 11 Jun 2024.

Fig 7.1 — Engulfing. Bullish: AAPL 13 Oct 2022 (CPI-day). Bearish: AAPL 26 Aug 2022.

Fig 8.1 — Same shape, two contexts. Hammer: SPY 13 Mar 2020. Hanging man: AAPL 21 Jul 2022.

Fig 9.1 — Real topping pattern. TSLA, Dec 2020 – Mar 2021 (support ~\$237 broken 23 Feb).

Fig 10.1 — Real bull flag. META, Oct – Dec 2022.

Fig 11.1 — Real gap on heavy volume. META, -26% earnings gap on 3 Feb 2022.

Fig 12.1 — Real golden cross. SPY, Jul 2019 – Jun 2021 (50/200 SMA cross on 9 Jul 2020).

Fig 13.1 — Real RSI bearish divergence. TSLA, May – Aug 2020.

Fig 13.2 — MACD on real data. SPY, full year 2020.

Fig 13.3 — Stochastic Oscillator on real data. AAPL, Jan – Sep 2023.

Fig 14.1b — Bollinger Bands on real data. AAPL, Mar – Sep 2023.

Fig 20.1 — Real Wyckoff accumulation. SPY, Feb – Jun 2020 (COVID bottom; PS — SC — AR — ST — Spring — SOS — LPS).

Fig 21.1 — Real 5-wave Elliott impulse. SPY, Mar 2020 – Sep 2021.

Fig 22.1 — Fibonacci retracement on a real swing. SPY, 2020 crash (high \$339 on 19 Feb — low \$218 on 23 Mar).

Fig 23.1 — Real Ichimoku Cloud. SPY, Jun 2019 – Apr 2021.

Fig 25.1 — The VIX, real 10-year history. CBOE VIX index, 2016 – 2026.

Fig 25.2 — Real breadth divergence. SPY vs. RSP/SPY ratio, Apr 2021 – Jun 2022 (RSP/SPY trough 1 Dec 2021 preceded SPY peak 3 Jan 2022).

Fig 26.1 — Intermarket grid. Stocks (SPY), bonds (TLT), gold (GLD), dollar (DXY), Sep 2021 – Jun 2023.

Fig 27.1 — 1929 crash (log scale). S&P 500, 1928 – 1933.

Fig 28.1 — Black Monday 1987. S&P 500, 1986 – mid-1988.

Fig 29.1 — Dot-com top. S&P 500, 1996 – 2003.

Fig 30.1 — 2008 Global Financial Crisis. S&P 500, 2007 – 2010.

Fig 31.1 — COVID crash and recovery. S&P 500, Sep 2019 – Jun 2021.

Fig 32.1 — 2022 inflation bear. S&P 500, 2021 – 2023.

Fig 34.1 — Real Volume Profile. AAPL, full year 2023 (POC at \$178; Value Area \$150 – \$197).

Fig 35.1 — Heikin-Ashi vs regular candles. AAPL, H2 2023.

Fig 35.2 — Renko bricks on real data. AAPL, Jun 2022 – Jun 2024 (\$0.50 brick size).

Fig VII.1 — Dow Jones Industrial Average long arc (log scale). DJIA, 1985 – 2026 with all five modern crashes marked.

Fig 8.1 (Book 1) — Real compounding: \$1 in the S&P 500, 1927 → 2026 (log scale, \$1 → ~\$426).

Fig 20.1 (Book 3) — Candle anatomy in ₹. Reliance Industries (NSE): bullish 31 May 2021, bearish 24 Jan 2022.

Fig 20.2 (Book 3) — Real candlestick chart. Nifty 50, Q1 2024.

All these can be reproduced with the code in Chapter 38 (the Python Companion). The dataset filenames, where stored locally, follow the pattern `{ticker}_{start}_{end}.csv`. To re-fetch real data, use `yf.Ticker("SYMBOL").history(period="...", interval="1d")` as shown there.

REFERENCE

Glossary

The working vocabulary of technical analysis, in plain language.

ATR (Average True Range) — a volatility indicator: the average size of a period's price range (counting gaps). Used to size stop-losses.

Bollinger Bands — a channel of a 20-period SMA $\pm$ 2 standard deviations; widens with volatility, pinches in a “squeeze.”

Breakout — when price moves decisively through a support or resistance level; more trustworthy on heavy volume.

Candlestick — a chart symbol showing one period's open, high, low and close; body = open-to-close, wicks = the extremes.

Continuation pattern — a consolidation (triangle, flag, pennant) after which the prior trend usually resumes.

Curve-fitting — over-tuning a strategy's settings to past data; produces great backtests and poor real results.

Divergence — when an indicator disagrees with price (e.g. price higher high, RSI lower high); an early warning of fading momentum.

Doji — a candle with almost no body (open $\approx$ close); signals indecision.

EMA (Exponential Moving Average) — a moving average weighting recent prices more heavily; multiplier $k = 2/(N+1)$.

Engulfing — a two-candle reversal where a large candle's body swallows the previous one.

Gap — an empty space where price leaps from one close to the next open with no trades between; usually news-driven.

Golden / death cross — when the 50-day SMA crosses above (golden) or below (death) the 200-day SMA.

Hammer / hanging man — same shape (small body, long lower wick): bullish after a fall, bearish after a rise.

Head and shoulders — a reversal pattern of three peaks (middle highest); confirmed on a break of the neckline.

MACD — momentum indicator: $EMA_{12} - EMA_{26}$, with a 9-EMA signal line and a histogram of their difference.

Marubozu — a long candle with no wicks; one side controlled the whole period.

Moving average — a smoothed line of the last N prices, revealing the trend; inherently lags.

Overbought / oversold — RSI above 70 / below 30; indicates stretched momentum, *not* an automatic sell/buy.

Position sizing — deciding how many shares to buy so that a loss equals a fixed small % of the account.

Resistance — a price “ceiling” where selling repeatedly halts a rise.

Risk-reward ratio — the amount risked versus the amount targeted (e.g. 1:3); favourable ratios let you profit while often wrong.

RSI (Relative Strength Index) — momentum oscillator (0–100): $100 - 100/(1+RS)$, $RS = \text{avg gain} / \text{avg loss}$.

SMA (Simple Moving Average) — the plain average of the last N closing prices.

Stop-loss — a predetermined exit price that caps a trade's loss; should never be moved further away.

Support — a price “floor” where buying repeatedly halts a decline.

Trend — the prevailing direction: uptrend (higher highs & lows), downtrend (lower highs & lows), or sideways.

Trendline — a straight line connecting rising lows (uptrend) or falling highs (downtrend).

Volume — the number of shares traded in a period; measures conviction and should confirm a move.

Whipsaw — a false signal in a choppy market that reverses immediately, causing repeated small losses.

Dow Theory — Charles Dow's founding framework: six tenets covering three trends, three phases, index confirmation and volume.

Wyckoff Method — Richard Wyckoff's tape-reading approach centred on three laws (supply/demand; cause/effect; effort vs. result) and the Composite Operator.

Composite Operator — Wyckoff's mental model of an idealised informed actor moving the market.

Accumulation / Distribution / Markup / Markdown — the four phases of a Wyckoff market cycle.

Spring (Wyckoff) — a false breakdown below an accumulation range's low, immediately reversed.

UTAD — Upthrust After Distribution; the bearish mirror of a spring at a market top.

Elliott Wave — Ralph Elliott's fractal theory: 5-wave impulse + 3-wave correction at every timescale.

Fibonacci ratio — proportions derived from the Fibonacci sequence (23.6, 38.2, 61.8, 78.6%); 50% is from Dow.

Golden ratio (ϕ) — 1.6180339...; the limit of consecutive Fibonacci ratios.

Retracement / Extension — pullback within / projection beyond 100% of a prior swing.

Ichimoku Kinkō Hyō — Hosoda's "one-glance equilibrium chart," five lines and a forward-projected Kumo cloud.

Tenkan-sen / Kijun-sen — Ichimoku's 9-period Conversion Line and 26-period Base Line.

Senkou Span A / B / Chikou Span — Ichimoku's leading spans (form the Kumo) and lagging span.

Kumo — the cloud between Senkou Spans A and B; thick = strong support/resistance.

Point & Figure — time-less X/O chart with a box-size and reversal-amount noise filter.

Advance-Decline line — cumulative (advancing – declining) issues; the workhorse breadth gauge.

VIX — the CBOE Volatility Index; expected 30-day S&P 500 volatility; the "fear gauge."

Put/call ratio — option-volume ratio; read contrarian at extremes.

Yield curve inversion — short Treasury yields above long ones; one of the most reliable recession leading indicators.

Sector rotation — sectors that lead at different stages of the business cycle (Stovall model).

Stochastic Oscillator — George Lane's momentum indicator (%K, %D) on the close-vs-range scale.

Williams %R — Larry Williams' inverted Stochastic-style oscillator.

CCI — Commodity Channel Index, by Donald Lambert; price deviation from its statistical mean.

ADX — Wilder's Average Directional Index; measures trend *strength* (not direction) on a 0–100 scale.

OBV — Granville's On-Balance Volume; cumulative volume by price direction.

Keltner / Donchian Channel — channel systems using ATR / N-period high-low bands (the latter the heart of Turtle Trading).

Cup and Handle — O'Neil's rounded-base + short-pullback continuation pattern.

Rounding top / bottom — slow curved reversal pattern formed over weeks or months.

Broadening formation — expanding-swing pattern, almost always bearish in mature trends.

Island reversal — range bounded by gaps on either side; a powerful but rare reversal signal.

Open Interest — total outstanding futures contracts; rising OI with rising price = healthy uptrend.

Contango / Backwardation — futures-curve regimes (distant > near / near > distant) that produce roll-yield drag or boost.

COT report — CFTC's weekly Commitment of Traders report; positioning by commercials, large speculators, small traders.

Basis — the spot vs. futures price difference.

On-chain analysis — crypto-specific indicators read from the blockchain (active addresses, exchange flows, NUPL, MVRV).

NUPL — Net Unrealised Profit/Loss; on-chain crypto sentiment proxy.

MVRV — Market Value / Realised Value; crypto valuation gauge.

Leptokurtic — a return distribution with fatter tails than the normal (Gaussian).

Autocorrelation — the correlation of a time series with its own past; weak in returns, strong in volatility.

Stationarity — when the statistical properties of a time series do not change over time; rarely true of financial markets.

Walk-forward analysis — rolling in-sample/out-of-sample backtest discipline.

Sharpe ratio / Calmar ratio — risk-adjusted return metrics; (return – risk-free) / volatility, and return / max drawdown.

POC / Value Area — Point of Control (price of most volume) and the 70%-of-volume range in volume profile.

HVN / LVN — High and Low Volume Nodes in a volume profile; act as support/resistance and as price vacuums.

Footprint chart — order-flow visualisation showing buy-at-ask vs. sell-at-bid volume at each price.

Heikin-Ashi — Japanese smoothed candlesticks built from weighted averages; synthetic OHLC.

Renko — time-less brick chart that plots only when price moves a fixed amount.

Harmonic pattern — Gartley/Bat/Butterfly/Crab/Shark — XABCD geometric patterns with specific Fibonacci-ratio rules.

PRZ (Potential Reversal Zone) — the cluster of Fibonacci levels where a harmonic pattern's D-point completes.

REFERENCE

Sources & Further Reading

Where to verify the formulas, the conventions, and the sobering evidence — and where to go deeper.

▪ Foundational texts

Murphy, John J. — *Technical Analysis of the Financial Markets*. The standard comprehensive reference; covers trend, patterns and indicators in depth.

Nison, Steve — *Japanese Candlestick Charting Techniques*. The book that introduced candlesticks to Western traders; definitive on the patterns of Part II.

Edwards & Magee — *Technical Analysis of Stock Trends*. The classic origin of chart-pattern analysis (Part III).

Wilder, J. Welles — *New Concepts in Technical Trading Systems*. The original source for the RSI, ATR and ADX (Chapters 13–14).

Hamilton, William Peter — *The Stock Market Barometer* (1922). Hamilton systematised Charles Dow's editorials into a coherent theory (Chapter 19).

Rhea, Robert — *The Dow Theory* (1932). The clearest classical exposition of Dow's framework (Chapter 19).

Wyckoff, Richard D. — *Studies in Tape Reading* (1910); *Stock Market Technique*. Wyckoff's original works (Chapter 20).

Pruden, Hank — *The Three Skills of Top Trading*. A modern, accessible synthesis of Wyckoff's approach (Chapter 20).

Elliott, Ralph Nelson — *The Wave Principle* (1938); *Nature's Laws: The Secret of the Universe* (1946). The foundational works of Elliott Wave (Chapter 21).

Frost & Prechter — *Elliott Wave Principle: Key to Market Behavior* (1978). The modern standard text on Elliott Wave (Chapter 21).

Sasaki, Hidenobu — *Ichimoku Kinkō Studies*. One of the few authoritative Japanese-to-English Ichimoku texts (Chapter 23).

du Plessis, Jeremy — *The Definitive Guide to Point and Figure* (2nd ed.). The standard modern reference on P&F (Chapter 24).

Dorsey, Tom — *Point and Figure Charting*. Practical applications of P&F to modern markets (Chapter 24).

Murphy, John J. — *Intermarket Analysis: Profiting from Global Market Relationships* (2004). The standard text on intermarket analysis (Chapter 26).

Stovall, Sam — *Standard & Poor's Guide to Sector Investing*. The codified sector-rotation model (Chapter 26).

Carter, John — *Mastering the Trade*. Popularised the Bollinger-inside-Keltner “squeeze” setup (Chapter 14.4).

Faith, Curtis — *Way of the Turtle*. The story and rules of Richard Dennis's Turtle Trading system based on Donchian channels (Chapter 14.4).

O'Neil, William — *How to Make Money in Stocks*. The originator of the cup-and-handle pattern and CAN SLIM growth-investing system (Chapter 10).

Bollinger, John — *Bollinger on Bollinger Bands*. The creator's own account (Chapter 14).

▪ On the honest odds (Chapter 18)

Barber & Odean — “Trading Is Hazardous to Your Wealth” and related studies, showing active individual traders underperform.

Barber, Lee, Liu & Odean — studies of Taiwanese day traders finding the large majority lose money over time.

Regulatory disclosures — under rules such as the EU's ESMA, brokers must publish the percentage of retail accounts that lose money on leveraged products (commonly 70–85%); check any broker's own figure.

Malkiel, Burton — *A Random Walk Down Wall Street*. The classic case for low-cost index investing over active trading.

▪ Verifying the math

Every formula in Part IV — SMA, EMA ($k = 2/(N+1)$), RSI, MACD, Bollinger Bands, ATR — is standard and can be cross-checked against the original sources above or any reputable financial-education reference. The worked numbers in this book were computed by hand; redo them yourself as the self-checks ask, and confirm they match. Understanding beats trusting.

A note on data: to practise, pull free historical price data from your brokerage or public sources and recompute these indicators on a spreadsheet. Seeing an indicator built from raw prices — exactly as Chapter 12 did by hand — is the fastest way to truly understand (and stop over-trusting) it.

WHERE THIS SITS IN THE SERIES

This is **Book 5** of *Money, Mastered — The Roadmap*. It builds on the foundations of **Book 1** (**Money, From Zero**) and **Book 2** (**Where to Put Your Money**), complements the business-analysis craft of **Book 4** (**Fundamental Analysis**), and — as Chapter 18 stresses — should always be read alongside, never instead of, the patient long-term investing those books teach. Next in the roadmap: funds, SIPs and portfolios; then derivatives, tax, psychology and safety; then building and protecting wealth.
