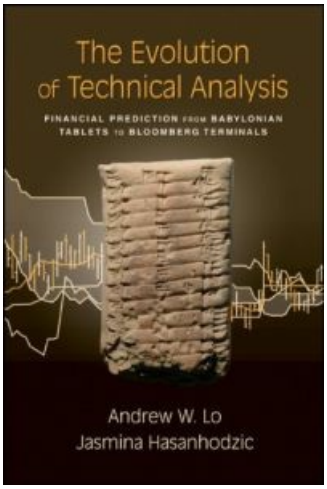

Book The Evolution of Technical Analysis

Financial Prediction from Babylonian Tablets to Bloomberg Terminals

Andrew W. Lo and Jasmina Hasanhodzic
Bloomberg Press, 2010

Recommendation

Finance professor Andrew W. Lo and research specialist Jasmina Hasanhodzic present a history of finance and of the development of business and stock markets. Their informative research connects the commerce of ancient times to modern practices, theories and analytical methods. *BooksInShort* recommends this sweeping and engaging history to professionals curious about how business evolved and to students majoring in economics, finance, history or related disciplines.

Take-Aways

- Technical analysis uses patterns in past market data to predict future prices.
- The practice dates back to the ancient civilizations of Babylon, Greece and Rome.
- Rapid population growth, the expansion of trade, the abacus and paper money contributed to the development of China's merchant class.
- The stock ticker, telegraph and telephone transformed business on Wall Street in late 19th-century America.
- Charles Dow and his successors introduced scientific methods such as "data gathering, hypothesis testing and mathematical rigor" to technical analysis.
- Dow's theory attempted to explain how human psychology affects market prices.
- "Relative strength" measures a stock's performance compared with others in its industry.
- A market cycle lasts approximately 10 years, according to the "market cycle theory."
- Computers help, but people are still better at some aspects of technical analysis.
- Proponents of the efficient markets hypothesis reject technical analysis, but recent studies in behavioral finance support it.

Summary

How Technical Analysis Works

Technical analysis seeks patterns like cycles or waves in past market data to forecast prices. This kind of study originated long before computers permitted the development of today's math-intensive, analytical theories. Technical analysis and quantitative analysis both attempt to predict the future based on the past, but quantitative analysis depends on a rigorously mathematical approach, while technical analysis applies human judgment and interpretation to data. "One is statistical, the other is intuitive." The investment industry more commonly uses quantitative analysis, while technical analysis prevails in commodities and currency trading.

Ancient Arithmetic

Ancient civilizations left many examples of their technical analyses, including "Babylonian price records, Greek market sentiment assessments and Roman seasonality patterns." These early societies followed market prices and sought to gauge how supply and demand shifts would affect prices and profits. They also applied insights gleaned from astrology and weather observations.

> "It should come as no surprise that in ancient times technical forecasting methods were inextricably linked with and...arose from trading and speculation."

Early Babylonian commercial innovations included using a system of weights and measures, as well as formalizing deals with contracts written on clay tablets. The

Babylonians invented limited partnerships, in which one partner raised capital and another traveled for business. Babylonians accumulated great stores of wealth. Traders often acted as brokers, buying and selling merchandise they did not produce.

> "Nowhere was the focus on getting rich so pronounced as in ancient Babylon, an early hotbed of commercial innovation."

In ancient Mesopotamia, the word "street" implied the market. The Babylonian language had words to connote merchant stalls, prices and marketplaces. Assyrian documents record price fluctuations and suggest that increases in demand led to increases in prices. For almost four centuries, the Babylonians kept journals of weather readings and the prices of various commodities. These diaries quoted prices as the amount that one "shekel of silver" (the basic unit of money) could buy. They documented the value of Babylon's six staples: "barley, dates, mustard, cardamom, sesame and wool." Modern technical analysis also monitors a small number of well-chosen stocks over a long period of time. Babylonians charted their markets and sought to forecast future prices based on existing prices. If a price forecast was unfavorable, they took action to control the future supply and demand. For example, they might shut down the market briefly or bring scarce commodities into play.

> "The union of banking and trade...naturally led to speculation, which became so pronounced that it...prompted Aristotle to write about chrematistichè, or the art of getting rich."

The market-based economy arose in ancient Greece. Farmers focused on particular crops and produced them for export. As the economy grew, demand for such specific services from farmers, craftsmen and merchants increased. People no longer produced all their own food but instead bought what they wanted from specialized growers.

Coinage, Banks, Fairs and Markets

Coins appeared around 650 BC. The first banks were religious institutions, which accepted deposits and lent money out for interest. As banks became private institutions, instead, the banking profession emerged. Ancient Rome's commercial environment featured "market-oriented agricultural production," an increased demand for luxuries, the regular issue of Roman coinage, and national and international free trade. Romans built permanent market halls and opened specific marketplaces for cattle, vegetables, wine and general provisions.

> "A passion for making money was considered a deep character flaw that evinced poor control over one's emotions and an amoral willingness to exploit others for one's own profit."

Even in those early times, people held negative opinions about traders and businesspeople. Cultures from China to Greece saw merchants and traders as greedy, dishonest and unreliable; society considered the desire to make money a character flaw.

Technical analysis went global starting in the fifth century. Price charts became widespread in Europe. Chinese manuals advised merchants to learn how to predict changes in the price and availability of goods based on cycles. With the rise of exchanges, the merchant class matured. Public contempt for traders subsided; people began to tolerate and even respect them.

> "The societal embrace of trading did not materialize in medieval and renaissance Asia to the same extent, despite its technological superiority.

In medieval Europe, the clergy decreed that townspeople must hold their markets on weekdays in the streets or squares instead of in churchyards after Sunday services. Markets served local inhabitants, while fairs catered to traveling traders. Fairs dealt in wholesale goods rather than in retail products, lasted several days and took place either once or twice a year. These gatherings were central to European commerce for centuries, but advances in transportation and communications during the Industrial Revolution led to their decline and eventual replacement by year-round produce markets.

Evolving Western Business Practices

During the Renaissance, Europeans discovered the New World and the route to the Far East. This exploration opened European markets to overseas clients and created commercial and political rivalries among nations. In medieval Italy, merchants wrote bills of exchange as proxies for cash. Banks encouraged saving and investment, increased the supply of capital available to merchants, handled deposits, lent money and allowed depositors to withdraw cash with prior notice.

> "For example, the Chinese invented the printing press and used it to print money at least three centuries before Europeans."

Business methods became more systematic as commercial practices grew more complex. The adoption of Arabic numerals in the 12th century simplified calculation. New business manuals told merchants about the locations of markets and fairs, including their array of traded commodities, local customs and transport options. They also described weights, measures, currencies, exchange rates, business techniques and accounting methods.

> "The merchant class [instituted] lay education in the Middle Ages, putting an end to solely monastic education and the use of Latin in business and private life."

In the Middle Ages, the Catholic Church taught that making money was wrong. The doctrine of the "just price" stated that it was dishonest to sell an item for more than it was worth. The usury doctrine maintained that charging interest on loans was a mortal sin. Traders circumvented church rules by buying bills of exchange for less than their face value or intercepting goods in transit and reselling them at higher prices.

> "The adoption of Arabic numbers in the 12th century was a big step forward because they tremendously simplified calculation."

Over time, the church changed its attitudes toward making money. It recognized that the laws of supply and demand governed prices and that charging interest was acceptable within limits. As a result, the definition of usury changed from "interest charged for loans" to "excessive" interest on loans. The Protestant Reformation in the 16th century reduced the authority of the church and established a moral system based on thrift, hard work and honor, particularly keeping promises. Social attitudes toward trading further softened, and investing became socially acceptable.

Analysis in Historic Asia

"Medieval and renaissance Asia" did not embrace trading to the same extent as Europe did. Asian governments were more oppressive than European regimes, so merchants had to overcome restrictive regulations and policies. The origins of Chinese markets date from the "Commentaries" of the ancient *Book of Changes*, also known as the *I Ching*. Between the eighth and the 13th centuries, China's merchant class emerged. Rapid population growth, trade and technical innovations – such as the abacus and paper money – spurred China's economy.

> "Banks...encouraged individuals to save and invest [and] increased the supply of capital available to merchants...fueling economic growth."

Technical analysis arose in Japan as the country's rice exchanges emerged, shaped by national political unification in the late 16th and early 17th centuries.

Charles Dow

By the mid-19th century, "financial speculation" gained acceptance as one of the four accepted principles of wealth production, along with "work, capital and trade." In late 19th-century America, the stock ticker, telegraph and telephone transformed business on Wall Street. Charles Dow, the father of modern technical analysis, began publishing the Dow Jones Industrial Average, which was the "average price of the 11 most active stocks on the New York Stock Exchange." Dow and his successors introduced scientific methods such as "data gathering, hypothesis testing and mathematical rigor" to technical analysis. Yet these developments did not change public skepticism and mistrust in regard to technical analysis.

> "Chinese merchants operated on the belief that the market was not a mysterious force beyond control but one that could be understood, mastered and manipulated."

Dow's theories sought to explain how human psychology affected market prices. He described his concept of the "trend" as patterns in "successive highs and lows." According to Dow, the market is in a "bull period as long as the average of one high point exceeds that of previous high points. It is a bear period when the low point becomes lower than the previous low points." Other methods for reading and interpreting the market include:

- **"Relative strength"** – This is a comparison of how one stock performs in relation to shares of other companies in the same industry.
- **"Market cycles"** – A market cycle lasts approximately 10 years: five to six years of boom followed by a bust or depression of roughly the same duration.
- **"Wave principle"** – The stock market follows a cyclical pattern. Each cycle has eight waves: five waves in one direction, followed by three waves in the opposite direction.

> "Breakthroughs in communications made time shrink, transforming the way business was conducted on Wall Street and solidifying an ethos of impartial, numerical representation of financial reality."

Critics disparaged technical analysis because it is based on pattern recognition, not statistical analysis. Before computers, analysts used data patterns to detect supply and demand imbalances. Each pattern told a story based on market psychology and crowd action and reaction. But after the stock market crash in 1929, statistics provided investors with greater objectivity in financial dealings. Investors could use trading volume – the number of shares involved in stock sales or purchases – as a measure of supply and demand for shares.

New Developments

The financial world is vastly more complex today than ever before, but technical analysis remains meaningful because it is "so robust and so deeply relevant to how markets operate." Technical analysts have adapted their methods to deal with these developments:

- **"Small investors"** – The bull market in the 1950s and 1960s created prosperity that attracted individual investors and day traders.
- **"Institutional trading"** – Small investors in bull markets led to a growing number of mutual funds specializing in the US stock markets and in international investments.
- **"Negotiated commissions"** – The SEC mandated a transition from fixed commissions to graduated commissions in 1971.
- **"Market integration"** – The US dropped the gold standard, also in 1971, requiring investors always to consider the strength of the dollar. Foreign currency derivatives allowed investors to hedge movements in the dollar's value.
- **"Decimalization"** – The exchanges now quote stock prices in decimals instead of in fractions of a point. That construct reduces the spread between the bid and ask prices of shares: the bid/ask spreads, advance/decline lines and high/low statistics. A stock can "go up one cent and make a 12-month high."
- **"Electronic markets"** – Electronic exchanges now match buyers and sellers without a market maker or specialist. Electronic markets enable "streamlined procedures, fast execution, reduced commissions and after-hours trading."
- **"Computers"** – Computerized "automatic ranking and filtering" of securities enables immediate communication of financial data. Technical analysis still requires great expertise, because the market is too complicated to represent with only equations and statistics. People are still better than computers at classification and image recognition.

Technical Analysis and the Efficient Markets Hypothesis

The efficient markets hypothesis (EMH) states that no one can predict market price changes in a "properly functioning market." It is based on the idea that – given an ideal competitive market with many self-interested participants – current stock-market activity reflects all relevant factors that determine value. It omits no information that indicates useful patterns or trends in market data. Proponents of the EMH do not believe it is possible to find "exploitable patterns in historical market prices," and thus dimiss the foundation of technical analysis. Yet technical analysis is more in tune with behavioral finance, which calls for the use of "social, cognitive and emotional factors to explain and predict market activity." More recent studies have provided "new theoretical underpinnings...and empirical validation" for technical analysis.

About the Authors

Andrew W. Lo is a professor of finance at the MIT Sloan School of Management and the chairman of the AlphaSimplex Group, where electrical engineer and computer scientist **Jasmina Hasanhodzic** is a researcher.