Optimizing a day trading strategy based on support and resistance levels: ATR and LWTI contributions

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Received: 12/07/2025 **Accepted:** 04/12/2025 **Published:** 19/12/2025

Abstract :

This article examines the effectiveness of a day trading strategy based on support and resistance levels, by assessing the contribution of technical indicators such as the Average True Range (ATR) and the Larry Williams Large Trade Index (LWTI). The study is based on a quantitative and comparative approach, applied to four major financial assets: Bitcoin, EUR/USD, gold (CFD) and the S&P 500 index (CFD), using hourly data from January 2024 to March 2025.

Through a series of backtests, several configurations of the strategy are tested: the basic strategy, the integration of the ATR alone, the integration of the LWTI alone, and finally the combination of the two indicators. Performance is assessed using measures such as return, Sharpe ratio, maximum drawdown and profit factor. The results show that the addition of technical indicators significantly improves risk management and profitability, particularly when ATR and LWTI are combined. This research makes a useful empirical contribution to traders and technical analysts seeking robust strategies for day trading in volatile markets.

Keywords: Day trading, Technical analysis, Support and resistance, Average True Range (ATR), Optimization of trading strategies.

JEL classification codes: G14 ; C63 ; C58 ; G11.

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Introduction:

Problem and interest of the study

The accelerated development of financial technologies has democratized access to financial markets, giving rise to a new generation of individual traders, often active on a very short-term basis. Among the approaches favored by these traders, day trading strategies based on technical analysis occupy a central place, particularly those based on identifying support and resistance levels. While these strategies enjoy a certain popularity due to their simplicity and graphical legibility, their actual effectiveness remains widely debated in the literature. Moreover, few empirical studies have examined how these strategies can be optimized by integrating additional technical indicators.

Background to the development of day trading strategies

Day trading, characterized by the opening and closing of positions during the same trading session, requires rapid decisions and rigorous risk management. Technical analysis tools are widely used to anticipate short-term price movements. Numerous studies have highlighted the growing importance of this approach in trading practice, particularly over intraday horizons. In this context, support and resistance levels are frequently used to define market entry and exit points. However, the increasing volatility of digital assets and derivatives is driving traders to reinforce these basic strategies by more sophisticated tools such as the ATR (Average True Range), a volatility indicator, and the LWTI (Larry Williams Large Trade Index), a volume-based momentum indicator.

Research objectives

The main objective of this study is to measure the effectiveness of a day trading strategy based on support and resistance levels, and to assess the extent to which the addition of the ATR and LWTI indicators improves profitability and risk management. More specifically, we will :

- Compare the performance of the basic strategy with its optimized variants (with ATR, with LWTI, with both combined).
- Identify the impact of these indicators on performance metrics such as yield, drawdown, success rate and profit factor.
- Analyze performance differences across asset classes (cryptocurrency, currency, index, commodity).

Research hypotheses

In light of the above objectives and existing work, we formulate the following hypotheses:

- H1: The support and resistance strategy, applied alone, generates positive but limited performance on the markets studied.
- H2: Adding the ATR improves the strategy's risk management, reducing drawdown and increasing the Sharpe ratio.
- H3: The addition of LWTI improves the quality of entry signals, increasing the success rate and profit factor.
- H4: The combination of ATR and LWTI results in a strategy that performs better overall, compared with using one or the other separately.

Research question

In view of these developments, a central question arises : To what extent can a day trading strategy based on support and resistance levels, optimized by technical indicators such as the ATR and LWTI, improve profitability and risk management on different financial assets ?

Study contributions

This article aims to provide an empirical answer to this question through a comparative study applied to four assets representative of different classes: a cryptocurrency (Bitcoin), a currency pair (EUR/USD), a stock market index (S&P 500) and a precious metal (Gold). The methodological approach is based on the implementation of backtests on hourly historical data covering the period from January 2024 to March 2025. Performance is evaluated according to standard metrics (return, drawdown, Sharpe ratio, profit factor), comparing the basic strategy with its optimized variants. This study contributes to the literature by providing quantitative evidence on the combined interest of two technical indicators in an operational day trading framework.

I. Literature review:

1. Principles of day trading and the role of technical analysis :

Day trading is the practice of taking positions on financial markets for a very short time, usually less than a day. This approach relies heavily on technical analysis, i.e. the study of past price and volume movements in order to anticipate future trends. Several authors, including Taylor & Allen (1992), have observed that over 90% of professional traders in London use technical analysis

in their daily decisions. Smidt (1965), in his first empirical observations, noted a significant prevalence of this approach among futures traders.

Marshall, Nguyen and Visaltanachoti (2008) have also pointed out that technical analysis is used twice as much for short-term forecasting as for long-term strategies, due to its adaptability to rapid market dynamics. This popularity is explained by the very nature of day trading, which requires instant price reading tools, often independent of economic fundamentals.

2. Strategies based on support and resistance levels :

Among the most widely used technical analysis tools, support and resistance levels occupy a central place. These levels represent price zones where market movements historically tend to slow down or even reverse. Traders use them to determine entry or exit points in a bounce or breakout strategy. Although these notions are empirically anchored in market practice, their theoretical foundation remains fragile.

Murphy (1999) and Pring (2002) have described these levels as "psychological zones" influenced by investor behavior. However, their effectiveness as a trading signal remains debated, particularly in the absence of confirmation by other technical indicators.

3. Integrating technical indicators for strategy optimization :

To improve the robustness of strategies based on supports and resistances, many traders combine them with technical indicators. The Average True Range (ATR), developed by Wilder (1978), is a volatility indicator that enables dynamic adjustment of exit levels (stop loss and take profit), taking into account the magnitude of price fluctuations. Several studies have shown that ATR improves risk management in automatic trading systems (Silva & Neves, 2021).

The Larry Williams Large Trade Index (LWTI), on the other hand, is a volume-based momentum indicator, intended to reflect the activity of major market participants. By identifying areas where high volumes accompany price movements, the LWTI aims to refine the entry signals generated by supports and resistances. Although little discussed in academic literature, LWTI is increasingly used in platforms such as TradingView, where it is seen as a complementary indicator to price reading.

4. Limitations of existing approaches :

Despite the popularity of technical strategies in the trading community, academic research is still struggling to establish their effectiveness on a consensual basis. The effectiveness of technical models varies widely according

to asset, time and market conditions (Park & Irwin, 2007). Furthermore, the majority of studies focus on mature markets (equities, major currencies) and rarely explore emerging assets such as crypto-currencies.

In addition, studies on combinations of technical indicators (e.g. support/resistance + ATR + LWTI) remain very rare. There is therefore an empirical void concerning the effectiveness of multi-indicator strategies applied in day trading on a diversified panel of assets. It is with this in mind that the present study aims to partially fill this gap.

II. Methodology:

1. Description of the basic strategy: support and resistance

The trading strategy evaluated in this study is based initially on support and resistance levels, identified visually from price analysis. A support level corresponds to an area where the price has historically tended to bounce upwards, while a resistance level marks a potential downside reversal zone. The strategy consists in opening a long position when the price rebounds on a support, and a short position when the price fails below a resistance, setting take profit and stop loss targets in advance.

Entry and exit points are defined using a semi-automated system based on the breakout or rejection (rebound) of these levels, without recourse to fundamental analysis. The strategy is applied systematically to all assets, according to identical rules.

2. Presentation of technical optimization indicators

To enhance the robustness of this strategy, two indicators have been integrated into optimized versions:

- ATR (Average True Range): measures volatility over a given period (parameter: 14 periods). It enables stop-loss and take-profit levels to be dynamically adjusted according to recent volatility. A more volatile market calls for wider thresholds.
- LWTI (Larry Williams Large Trade Index): identifies price movements supported by high volumes, considered significant. It is used here to validate or filter entry signals on technical levels.

Three optimized versions of the strategy are tested:

- Support/Resistance + ATR
- Support/Resistance + LWTI

- Support/Resistance + ATR + LWTI (combined version)

3. Data and scope of the study

The analysis focuses on four distinct financial assets:

- Bitcoin (BTC/USD) - a highly volatile digital asset
- EUR/USD - major pair on the foreign exchange market (Forex)
- S&P 500 CFD - stock market index representative of the US market
- Gold CFD (XAU/USD) - safe-haven commodity

The data used comes from the TradingView platform, in hourly timeframe (1H) over a period from January 2024 to March 2025. This granularity makes it possible to adapt the strategy to an intra-day logic, while ensuring a sufficient volume of observations.

4. Evaluation method: backtesting and performance indicators

The various strategies are evaluated by backtesting, i.e. by applying them retroactively to historical data. For each strategy execution, orders are simulated under realistic market conditions, with no backtesting bias.

Performance is measured using five key indicators:

- Overall return: measures the gross profitability of the portfolio.
- Success rate: proportion of winning trades.
- Profit factor: ratio between cumulative gains and losses.
- Maximum drawdown: maximum observed capital loss.
- Sharpe ratio: risk-adjusted profitability.

Each version of the strategy is compared on these criteria for each asset.

1. Justification for the use of backtesting as a validation Tool

Backtesting serves as the primary validation framework in this study. Unlike classical statistical tests that require assumptions of stationarity and independence, conditions rarely met in financial time series, backtesting directly evaluates the behavior of a strategy under realistic historical market conditions.

It captures the interaction between signal generation, volatility regimes, and sequence-dependent drawdowns, which are essential in trading strategy evaluation but cannot be captured by simple t-tests or ANOVA.

For this reason, backtesting is the preferred tool in quantitative finance, algorithmic trading, and institutional systematic strategy development. Given the

operational nature of this research and its focus on practical performance, backtesting provides a more relevant measure of robustness than standard statistical methods.

III. Empirical results

1. Presentation of results: the case of Bitcoin (BTC/USD)

Strategy	Success rate (%)	Overall return (%)	Max. drawdown (%)	Profit factor	Sharpe ratio
Support/Resistance (S/R)	57	12.4	-18.3	1.12	0.56
S/R + ATR	60	16.8	-12.1	1.38	0.74
S/R + LWTI	62	19.5	-13.2	1.47	0.82
S/R + ATR + LWTI	65	24.9	-9.8	1.73	1.03

Interpretation of results - Bitcoin

The basic strategy produces a positive return, but with a high drawdown (-18.3%), which limits its quality. The addition of the ATR improves risk management: drawdown decreases significantly, and the Sharpe ratio rises from 0.56 to 0.74, demonstrating a better risk-adjusted return. LWTI, used alone, increases the success rate to 62% and the profit factor to 1.47, demonstrating its effectiveness as a signal filter. The combined strategy (ATR + LWTI) achieves the best overall performance, with a return of 24.9%, 65% success rate, a drawdown of less than 10%, and a Sharpe ratio greater than 1, indicating a strategy that is both profitable and robust.

2. Presentation of results: the case of Gold (XAU/USD)

Strategy	Success rate (%)	Overall return (%)	Max. drawdown (%)	Profit factor	Sharpe ratio
Support/Resistance (S/R)	54	8.7	-14.6	1.15	0.49
S/R + ATR	57	11.2	-9.9	1.32	0.63
S/R + LWTI	59	13.1	-10.2	1.44	0.72
S/R + ATR + LWTI	63	17.6	-7.4	1.61	0.91

Interpretation of results - Gold (XAU/USD)

The basic strategy (S/R) applied to gold is moderately profitable, but exposed to significant risk, as evidenced by a drawdown of 14.6%. With ATR, exits are better calibrated, leading to a significant reduction in drawdown to

9.9%, and an improvement in overall return to 11.2%. LWTI improves signal quality, with a gain in success rate (59%) and profit factor (1.44), showing that triggered trades are more relevant overall. The combined strategy produces even better results: Return of 17.6%, higher than all other variants. Lowest drawdown (7.4%). Sharpe ratio of 0.91, indicating good return stability.

To sum up, in the gold market, the addition of the ATR and LWTI strengthens the core strategy by reducing the volatility of results and increasing their reliability.

3. Presentation of results: the case of the S&P 500 (CFD)

Strategy	Success rate (%)	Total return (%)	Max. drawdown (%)	Profit factor	Sharpe ratio
Support/Resistance (S/R)	48	5.1	-12.8	0.94	0.38
S/R + ATR	51	7.6	-9.3	1.21	0.56
S/R + LWTI	54	9.8	-8.7	1.36	0.63
S/R + ATR + LWTI	58	13.4	-6.5	1.53	0.78

Interpretation of results - S&P 500 (CFD)

The basic strategy was the least effective of all the configurations observed: success rate < 50%, low return (5.1%), and a profit factor of less than 1. This means that losses outweighed gains overall. The addition of the ATR provides a visible improvement to the strategy: better risk management (drawdown reduced from 12.8% to 9.3%) and higher returns. The integration of LWTI produces a significant gain on all performance dimensions: success rate at 54%, yield at 9.8%, profit factor at 1.36, reflecting better trade selection. The combined version (ATR + LWTI) enables : Increase the success rate to 58%, Reduce drawdown to 6.5%, And achieve a Sharpe ratio of 0.78, which is high for an intraday index strategy.

These results confirm that, in a rather stable, framed market like the S&P 500, technical indicators play a crucial role in filtering out valid opportunities, and limiting losses on false signals.

4. Presentation of results: the case of EUR/USD

Strategy	Success rate (%)	Overall return (%)	Max. drawdown (%)	Profit factor	Sharpe ratio
Support/Resistance (S/R)	50	6.2	-11.7	1.05	0.44
S/R + ATR	52	8.9	-8.6	1.21	0.58

S/R + LWTI	53	10.1	-9.1	1.29	0.61
S/R + ATR + LWTI	56	13.7	-6.2	1.48	0.77

Interpretation of results - EUR/USD

The basic EUR/USD strategy is marginally profitable, with a success rate of 50%, which is the strict break-even point. The profit factor of just over 1 (1.05) reflects a weakly effective unfiltered strategy. With the addition of the ATR, we observe a moderate improvement on all metrics: yield at 8.9%, drawdown at 8.6%, Sharpe ratio at 0.58. This shows a better calibration of exits in a relatively non-volatile market. LWTI, applied alone, provides a slight gain in signal accuracy, resulting in an improved success rate (53%) and a return of just over 10%.

- As with other assets, the ATR + LWTI combination remains the best performer: Overall return 13.7
- Drawdown reduced to 6.2
- Profit factor of 1.48, close to that observed for gold and the S&P 500
- Sharpe ratio of 0.77, indicating good control of the risk/return trade-off.

These results suggest that EUR/USD responds best to a combination of technical filters, and that optimizations are particularly useful in a highly liquid but often trendless market such as the major currencies.

5. Cross-sectional summary of results

Strategy	BTC/USD	XAU/USD	S&P 500	EUR/USD	General comments
S/R only	Average (+)	Medium	Low	Low (+)	Low robustness, variable results
S/R + ATR	Good	Good	Fair	Average	Systematic drawdown reduction
S/R + LWTI	Very good	Good	Good	Good	Better input signal quality
S/R + ATR + LWTI	Excellent	Very good	Very good	Very good	Best strategy across all dimensions

The basic strategy (support/resistance) shows a modest and unreliable performance: It is highly dependent on volatility and liquidity. It is sometimes

profitable (Bitcoin), sometimes marginal (EUR/USD), or insufficient (S&P 500).

The addition of ATR significantly improves risk management: Systematic reduction in drawdown. Moderate yield increase, but above all greater stability.

The addition of LWTI acts as a qualitative filter for signals: Improved success rate on all assets. Increased profit factor and reduced timing errors.

The combined strategy (ATR + LWTI) clearly outperforms all others: It achieves the best performance on all four assets. The risk/return ratio (Sharpe) is the highest, always above 0.75.

IV. Limitations of the Study

Although the results of this research provide a robust comparative evaluation of day-trading strategies based on support and resistance levels, several limitations must be acknowledged.

Temporal scope

The dataset covers January 2024 to March 2025. This period is characterized by specific volatility structures and does not fully capture long-term market cycles such as crisis periods, macroeconomic shocks, or regime shifts. Consequently, the results should not be generalized without caution beyond this timeframe.

Market-behavior constraints

The strategy assumes systematic execution independent of discretionary behavior or emotional reactions, while real traders are influenced by behavioral biases, especially under stress or during high-impact news releases. These behavioral elements fall outside the scope of this research.

Transaction costs and slippage

This study does not incorporate spreads, commissions, or slippage. While this choice is consistent with institutional contexts—such as hedge funds or large banks—where execution costs are negligible due to liquidity access and preferential fee structures, it represents a limitation for retail traders. For individual traders, transaction costs may significantly reduce or even eliminate profitability.

Absence of order-book dynamics

The strategy does not integrate market microstructure variables (depth, liquidity imbalances, order-flow), which could enhance the quality of entry and exit signals.

These limitations highlight the need for complementary research and emphasize that the present results reflect an idealized systematic framework designed primarily for institutional trading environments.

V. Conclusion

This article has examined the performance of a day trading strategy based on support and resistance levels, applied to four representative financial assets: Bitcoin, gold, the S&P 500 and EUR/USD. Starting with a simple but widespread technical strategy, the study evaluated the effect of two complementary indicators - the ATR for dynamic risk management, and the LWTI for entry point improvement.

The backtesting results showed that :

- The basic strategy is partially effective, but suffers from a lack of precision in volatile or trendless markets.
- The integration of ATR clearly improves loss management by adapting exit thresholds to market volatility.
- The LWTI indicator helps filter out unreliable signals, validating technical levels through volume analysis.
- The combined strategy (support/resistance + ATR + LWTI) proved to be the best performer, with higher risk-adjusted profitability and a significant reduction in drawdown.

These results reinforce the idea that day trading strategies must incorporate risk management and signal confirmation tools if they are to be viable over the long term. From a methodological point of view, this study demonstrates the value of a comparative multi-asset approach, and underlines the fact that the effectiveness of a technical strategy is highly dependent on the market context.

Research prospects

There are several possible avenues for further research:

- Extend the analysis to real-time data to test the robustness of the strategy in live market conditions.
- Integrate transaction costs, spreads and latency to refine the evaluation of net performance.

- Use machine learning techniques to dynamically optimize indicator parameters.
- Test this approach on other asset classes (individual equities, ETFs, agricultural commodities, etc.) or on crisis periods.

In short, this work proposes a reproducible operational approach for traders and researchers interested in optimizing technical strategies within a rigorous framework.

Practical implications for institutional trading and intelligent trading systems

Beyond academic relevance, the findings have direct implications for institutional trading desks and intelligent trading systems. The ATR-based dynamic volatility adjustment is consistent with institutional risk-parity frameworks and proprietary volatility-targeting models. Similarly, the LWTI indicator provides a proxy for order-flow confirmation, a concept widely used in execution algorithms that monitor volume concentration to validate price movements.

The combined ATR + LWTI strategy mirrors the architecture of intelligent trading systems that integrate layered signals, volatility, momentum, and structural price levels. As such, the proposed framework can serve as a foundation for advanced algorithmic models, including reinforcement-learning agents and hybrid systematic-discretionary strategies used in hedge funds and large banks.

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