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## THEORETICAL METHODOLOGICAL JUSTIFICATION IN TECHNICAL ANALYSIS OF FINANCIAL MARKETS

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**Abstract:** We live in strange times - times of change, crises, pandemics, conflicts and even wars. Technology is developing at an incredible speed, and our ability to predict or react is narrowed by rapidly changing trends, market changes and more. Throughout millennia of written and unwritten history, humanity has learned to change, evolve and survive. Economists and marketers have long recognised the cyclical nature of events and their repeatability, thus creating theories and tools. In our attempt to predict future events, we often refer to past experience and historical lessons. In the field of finance, technical analysis is a methodology for analysing financial markets, the purpose of which is to predict likely price commute based on regularities - deploy on similar price changes in the past under similar circumstances. For this purpose, historical market data such as prices and volume are used (Kirkpatrick, Dahlquist, 2006). At its core, technical analysis has many tools: time charts, support and resistance charts, Fibonacci analysis, Japanese candlestick chart and many other theoretical methods and methodologies with greater or lesser practical success. But while there are many instruments, the indicators that help correctly start the future investment or withdrawal are a few looking for changes in time and matching trends by comparing the lengths of their intervals: there are indicators reporting the involvement of the instrument in the trend - Indicator ADL, McClellan Oscillator, the Index of McClellan Sherman (McClellan Summation Index) and indicators follow the change in prices - Indicator %C (Percent Contraction Index), Indicator ADX (Average directional index), Index of the Commodity Channel (Commodity Channel Index), Indicator MACD (Moving Average Convergence / Divergence), Relative strength index (RSI), Relative vigor index (RVI), Stochastic oscillator and indicators based on market volume - Accumulation/distribution index, Cash flow and Balance sheet volume. The purpose of the research is to draw attention to a theoretical hypothesis for the beginning of the trend wave itself, the beginning of the considered period - supporting future investment or withdrawal from a given industry, the development of a trending product or service. The chosen methodology and corresponding tool - formula are entirely author's and would help to visualise the time intervals for investment or withdrawal from the market.

**Keywords:** market, monitoring, resources, economy, history

### 1. INTRODUCTION

In the most information period in human history, tracking past periods is easier than ever. With the rise of artificial intelligence, many studies are investigating automated trading (or algorithmic trading [AT]) systems to identify the best trading strategies (Hendershott, Jones, & Menkveld, 2011). Managers need to think ahead and continuously grow a long-term strategy for the development of the company so that they can adapt in time to changes in the conditions in the internal and external environment of the company. Forecasting the stock market is a difficult problem to solve and its complexity is closely related to many factors that could affect price changes (Picasso Andrea, 2019).

The purpose of a strategic analysis is to identify, analyse and evaluate the relevant factors that can affect the final strategy of the company (Gregova E. 2020).

### 2. RESEARCH METHODOLOGY

The chosen methodology and corresponding tool - formula are entirely authorial, in its essence it represents the beginning of the coordinate axis which is set with an appropriate meter, as it is to be sought in past events of this kind. The coordinate selected for the beginning of the observation is denoted by "K0". As it should be comparable to our desired coordinate (present time) K1.

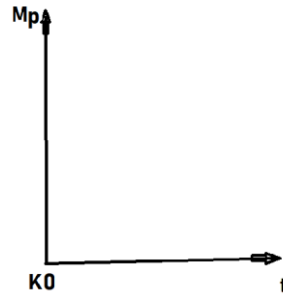
The figure shows the main points by coordinate K0:

K0 = The zero point, the beginning of the event whose repetition we observe

t = time, the choice of time period is free

Mp = The change in the price of the raw material in the given coordinate axis.

*Figure 1: Coordinate axis of K0*



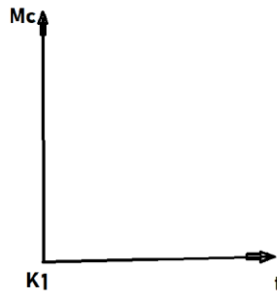
The figure shows the main points by coordinate K1:

K1 = observation coordinate compared to K0

t = time, the choice of time period is free

Mc = The change in the price of the raw material in the given coordinate axis.

*Figure 2: Coordinate axis of K1*



The formula begins with a desired change in raw material, commodity or other, the time intervals (t) must be taken into account, comparing them between the two axes of observation - K0 and K1. Another part of the uranium is included, namely the change that has occurred (C), an indicator for predicting the change (P) is used, the historical data for the change in the price of a given resource.

A solution of the formula would lead to the revelation of Tx- the future change. In its entirety, the formula would look like this.

$$Tx = (t_{k0} + C_{k0}) - P - (t_{k1} + t_{k1})$$

### 3. RESULTS OF RESEARCH

In trying to apply the concept of price change in real conditions we face certain difficulties. Financial data is also highly volatile and includes unpredictable noise, making its patterns unclear. (Gyeeun Jeong, 2019)

The homogenisation of data, assessment of inflationary changes, and change in demand for certain raw materials due to the shift in production practices and the discovery of new market niches. For universality, the result will be expressed in percentages. Political factors also include government stability and import and export and regulations. (Sedlackova N, 2006)

We give an example: while in one case one may consider the demand for coal during hostilities, and predict the change in price in subsequent ones. The pricing and payment method of the given raw materials in the past remain unclear also due to the lack of systematisation of the data.

For convenience in the application of the theoretical formula, we would use prices of raw lead, in the range of the hostilities in Bosnia and Herzegovina (April 6, 1992 - December 14, 1995) and the war between Russia and Ukraine (started in 2014, and escalated to full-scale - with massive Russian advance into Ukraine in the early hours of February 24, 2022).

At the beginning of the hostilities in Bosnia and Herzegovina in 1992, as seen in table 1 (*Alumeco Group (2023)*), the price of lead on world markets was \$541.37 per 1 metric ton, at the end of the period under review the price was \$630.95 per metric ton, or an increase of 89.58 \$.

**Table 1**

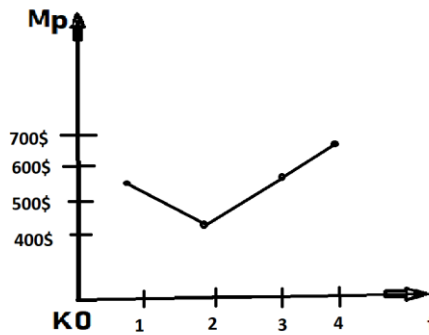
1995	\$ 630.95
1994	\$ 547.77
1993	\$ 406.36
1992	\$ 541.37

February 2022 The price of lead metal on world markets is \$2,150.60 per 1 metric ton, after a year from the start of full-scale actions, the price in the month of February 2023. Is \$2,093.06. (*World-bank (2023)*)

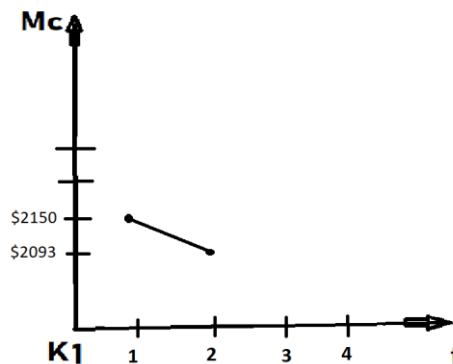
Two of the indicators that are characteristic for the period can be seen, namely a decrease in the price of the raw material next year. In one case, the difference between 1992 and 1993 was a 24.9% decrease in price. In more modern terms, the difference between the beginning of February 2022 and February 2023. is 2.67%. Followed by a rise in indicator 1 for the third year from \$406.36 to \$547.77 or 34.79%.

The applicability of the conceptual formula is:

**Figure 3: Coordinate axis K0, with entered values.**



**Figure 4: Coordinate axis K1, with entered values.**



Enter the formula data in the first formula.

$$Tx=(t_{k0}+C_{k0})-P-(t_{k1}+t_{k1})$$

$$T_x = (2+24.9) - 34.7 - (2+2.6)$$

$$T_x = -7.8$$

Therefore, the expected change for the third year would be a 7.8% increase in the price of steel.

#### 4. DISCUSSIONS

Using channels and trend lines to predict future returns, as tempting as it is, can be misleading. (JEREMY J. SIEGEL 2019). As with any market trending tool, the above should be carefully considered and empirically proven with more examples.

#### 5. CONCLUSIONS

There are many unknowns in the results of the given example, the small amount of data and the short periods visible in the K0 coordinate axis give us a possible premise for a future increase in price. Today, when artificial intelligence can work with a lot of data and operate faster and more accurately.

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