



Research and Countermeasures on the Causes of Pulse Changes in Stock Prices

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Abstract. There are many patterns of changes in stock prices, and the stock price pulse pattern is one of them. Once this pattern occurs, the related stock prices will undergo a pulse change in a very short period of time, bringing considerable short-term returns to investors. Through observation and analysis of the vast majority of stocks in the market, it is found that this kind of stock price pulse trend has considerable universality and is worth investors' careful study and understanding of this investment style, in order to obtain corresponding investment returns.

Keywords: Stock price pulse, pulse signal, Pulse function, Pulse inspection

1 Introduction

In the past decade, from the perspective of the Shanghai Composite Index, China's stock market has been hovering for a long time, with 3000 points as the central axis and fluctuating around 500 points. In contrast, the Dow Jones Index in the United States has remained in an upward trend over the past decade, although there have been fluctuations, the overall trend remains unchanged.

The saying goes that without comparison, there is no harm. Most stock investors in China have raised questions about why the Chinese stock market has shown such a stagnant state in the context of the country's leading global economic development? To clarify this issue, we need to make rational judgments and meticulous analysis of China's stock market.

2 Reasonable changes in stock prices

Since the emergence of the stock market, Benjamin Graham[1] analyzed investment and financing from the perspective of value investing in his famous "Securities Analysis": as an entrepreneur's financier, he discovered good business opportunities or invented good products, and in order to achieve wealth appreciation or product use value as soon as possible, he could use normal financing in the stock market to achieve his wealth goals or commodity goals; At the same time, as investors, we can

support these financiers to obtain corresponding funds from an investment perspective, and then share the wealth appreciation brought by the financiers, achieving a perfect combination of investors and financiers, and jointly promoting social progress or technological development.

In this process of change, from the perspective of financiers, they have obtained a corresponding amount of funds from the stock market, which enables them to use this fund to achieve their dream of mass production of products and provide consumers with usable goods. If this product meets the psychological expectations of today's people, it is likely to become a target product that consumers are eager to buy, thus achieving the goal of financiers providing products to consumers. At the same time, by providing satisfactory products to consumers, financiers can obtain rich returns.

As a carrier for connecting investment and financing parties, the stock prices of listed companies are constantly changing due to market transactions and investors' expectations. Therefore, the corresponding stock prices will also change at any time, and rising and falling is a normal phenomenon.

3 Changes in stock prices

The above is based on a common aspiration for a perfect stock market. However, the stock market always has its own self-interest, and not all stock market participants are rational investors. There are always some participants who create strange trends, such as the pulse changes in stock prices.

According to traditional pulse economy theory, it assumes that resources in the economy are infinite and all economic agents are rational. Obviously, this traditional pulse theory is not suitable for the price variability characteristics of the stock market, so it is not adopted here.

In the case of unlimited stock supply, the amount of funds in the market has a limit within a limited time. However, the market is always full of enthusiasm, and there are always investors who are enthusiastic about actively participating in the market. Therefore, the market is always full of opportunities. Reflected in changes in stock prices, there is a clear manifestation of short-term price fluctuations, which are particularly characterized by short-term behavior and are therefore referred to as price pulses.

This kind of pulse is a centralized release of market sentiment, where some active participants mobilize a large amount of funds in a very short period of time, focusing on a certain underlying asset and buying in large quantities in a short period of time, causing huge fluctuations in the price of that underlying asset.

Here are some recent cases of stock price fluctuations: 1. Shanghai fenghuang; 2. meiri hudong; 3. Rifeng gufen; 4. Shandong boqian; 5. yuegui gufen, etc.

Table 1 lists several examples of prominent stock price changes. From the K-line charts of these stocks, it can be clearly seen that the fluctuations in their stock prices are entirely caused by the market sentiment of some investors. In a very short time window, due to certain reasons, funds accumulate in the short term, resulting in a continuous large number of buying orders and driving a large number of trend fol-

lowing orders, thus causing abnormal changes in the underlying stock prices. This type of stock price change is a typical pulse trend.

Table 1. Examples of Stock Price Fluctuations

Stock target	Pulse price variation range	pulse time	Accumulation of funds (million)
Shanghai fenghuang	11.40-22.90	2024.12.11-2024.12.20	7990
meiri hudong	18.18-70.50	2025.1.23-2025.2.19	80530
Rifeng gufen	9.45-17.20	2024.12.10-2024.12.19	6690
Shandong boqian	5.21-11.95	2024.12.2-2024.12.13	3840
yuegui gufen	5.94-21.75	2024.11.6-2024.11.26	13620

4 Stock price pulse abnormal pattern

Pulse phenomenon can occur in various scenarios, especially in the financial field, such as commodity prices, deposit and loan interest rates, stock prices, etc. It can be said that wherever price changes can bring short-term returns, pulse phenomena of price fluctuations will occur. This article only discusses the pulse phenomenon of stock price trends.

In the stock market, the pulse of price changes is mainly caused by events. An accidental event may affect the future expectations of a certain stock, forming a market consensus. Therefore, under the guidance of certain funds, the corresponding stock's underlying price will undergo abnormal changes, forming a price pulse. These pulse phenomena can be summarized as passive pulses, interactive pulses, and interactive pulses.

Passive pulse, the change in stock prices is not premeditated, and the pulse change in stock prices is caused by the occurrence of sudden events, which have suddenness. Such events can form a consensus expectation in the market in the short term, resulting in pulse like changes in related stock prices, such as meiri hudong in Table 1.

Interactive pulse is a premeditated price change, in which some investors carefully plan, prepare for a long time, and intentionally create certain events to form the future expectations of the underlying stock, resulting in a lack of market information awareness. They then activate the price pulse of the underlying stock at a specific time and use their financial advantages to drive the price fluctuation of the underlying stock, forming a market trend following trend, such as Yuegui gufen in Table 1.

Interactive pulse is a combination of passive and interactive modes, where the fluctuation of stock prices is caused by both accidental factors and deliberate actions of some investors, resulting in market resonance and leading to the phenomenon of stock price pulses, such as rifeng gufen in Table 1.

5 Analysis of the principle of stock price pulse

The factors involved in stock price pulses mainly include pulse time and price pulse space. Pulse time mainly includes two aspects: pulse time window and pulse start

time. Price pulse space mainly includes absolute price changes and relative price changes.

The pulse time window is generally triggered by events. As the initiation of stock prices requires financial support, it is generally difficult to gain recognition from investors without providing them with an imaginable event. Therefore, events are a necessary condition for triggering pulses. If the event is predictable and widely recognized by investors, then this time is highly likely to trigger a pulse like rise in the corresponding stock price, as shown in Table 1. This is because the Deepseek big model has been highly recognized by relevant companies in the United States, thus triggering a pulse like rise in stock prices.

The pulse start time also has a high degree of coincidence. Generally speaking, starting a pulse of a stock requires waiting for the corresponding timing. Market leaders will not rashly start a pulse like market trend of a stock. Considering the sustainability of subsequent selling actions, if this motivation does not conform to the operating rules of stock prices, starting a pulse like rise of a stock will only lead to a large amount of chips accumulating in the hands of the main force, which is a headache.

According to the principle of pulse theory, a mature event driven pulse [2] needs to solve two problems: one is to be able to quickly calculate the state of the stock price at any moment, and the operation of the stock price conforms to the general theoretical trend of technical analysis; The second is the interaction model for existing operating prices that conform to pulse changes.

The first question is not difficult to understand, because the traditional value investment education model that the vast majority of investors receive is basically based on the theory of technical analysis. Therefore, the most cost-effective model for the main force to launch a stock is to conform to the thinking mode of value investors in principle, and spend the minimum investment cost to obtain the maximum investment return.

The second issue is a bit complicated. The interaction mode of stock price pulse requires interaction between the main force and retail investors. When the main force starts the price of a certain stock, it must always pay attention to the emotional changes of the retail investors. If the main force performs alone and the retail investors do not follow, the main force will not forcefully continue to rise. This is a failure form of pulse interaction mode. Stocks in the stock market often have a stagnant pattern, with a loud limit up the day before and a significant adjustment the next day, which is the specific manifestation of this phenomenon. So the interaction mode is the most difficult mode to measure, and researchers find it difficult to come up with a mature model to quantify and handle this situation.

Gamma [3] once proposed the function of pulse mode, attempting to quickly calculate the starting timing of the pulse process, but it is obviously impossible to achieve because this starting mode has a high degree of randomness, too many occasional factors, and different market response modes. Therefore, this mode is more subjective, while the function is a fair description of objective phenomena, and there is a fundamental difference in understanding between them.

Subsequently, Tonnelier [4] proposed a nonlinear event driven pulse mode, which to some extent describes this subjective stock price change. However, there are fun-

damental theoretical differences, so it cannot systematically solve the shortcomings brought by the theoretical model.

6 Stock Price Pulse Adaptive Model

After the stock price pulse observed by investors, they usually have an adaptive process. When investors observe that a certain stock is likely to pulse, they will quickly make their own judgments, including key factors they agree with, such as the follow-up of funds and the impact of events, to judge whether it is worth participating in and whether it can resonate with the main force. These will directly affect the driving force of the pulse like rise, and investors need to make corresponding judgments in a very short period of time.

Here, assuming the stock price pulse adaptive model is:

$$\begin{aligned}\tau_m \frac{dV}{dt} &= -(V - V_{rest}) - g_a (V - V_k) \\ \tau_a \frac{dg_a}{dt} &= -g_a\end{aligned}\tag{1}$$

Among them, V represents the pulse price of the stock, τ_m represents the duration of the pulse, V_{rest} represents the starting price, τ_a represents the adaptive time constant, g_a represents the probability of adaptive following price fluctuations, and V_k represents the adaptive reversal price.

When the stock market encounters a typical event, it will respond accordingly, such as the deepseek event in Table 1, which successfully triggers a pulse in the stock price of the corresponding company (daily interaction). At this time, the market sends out a specific signal of the pulse, the start-up price V_{rest} changes rapidly, while the amount of funds also increases synchronously. These can be specifically judged from the changes in the equivalent values of τ_m , V_{rest} , τ_a , g_a , V_k in the above equation. Over time, there may be two differentiated outcomes. Firstly, it can stimulate market investors' recognition and lead to a successful pulse of upward movement; The second one cannot stimulate market investors' recognition, the pulse is short-lived, and the stock price quickly returns to tranquility after the corresponding pulse. From an operational perspective, the probability of the second outcome occurring is much higher than that of the first.

Whenever the market sends out a pulse signal, the adaptive start-up price V_{rest} will exhibit random follow-up, and the stock price will adjust accordingly with the pulse time τ_m . The stock price will change accordingly with the pulse time during the adap-

tive time. Take a look at the sustainability of the event that triggers the pulse at this point and the social response to the triggering factor. If this event can continue to develop and society responds positively to it, then the pulse time will be correspondingly prolonged. Conversely, if the triggering factor cannot be recognized by society, then the pulse time will rapidly decay and the upward pulse of stock prices will fail.

To solve the above differential equation of the pulse adaptive model, when $t = 0$, if a pulse signal is input, the expression between the stock price and the adaptive time change can be expressed as:

$$V(t) = \int_0^t \exp\left[a_t \exp\left(-\frac{s}{\tau_a}\right)\right] [a_2 \exp(a_3 s) + a_4 \exp(a_5 s)] ds \quad (2)$$

The parameters in the equation are represented as:

$$a_1 = -\frac{g_a(0)\tau_a}{\tau_m}, \quad a_2 = \frac{g_a(0)V_k}{\tau_m}, \quad a_3 = \frac{1}{\tau_m} - \frac{1}{\tau_a}, \quad a_4 = \frac{V_{rest}}{\tau_m}, \quad a_5 = \frac{1}{\tau_m}$$

a_1 represents the degree of adaptability of stock price volatility over time, a_2 represents the ratio of stock price adaptive reversal price volatility, a_3 represents the degree of pulse time, a_4 represents the time variable factor of starting price, and a_5 represents the sustainability of pulse time.

Equation (2) comprehensively describes the comprehensive factors that need to be considered in the pulse of stock prices, including market sentiment, event influence, launch time, heat duration, the degree to which investors may accept it, and the speed at which market sentiment dissipates. These seemingly subtle subjective variables can be quantified by equation (2).

The formula(2) is a general expression of the Gamma function, where the parameters a_1, a_2, a_3, a_4, a_5 all exhibit self convergence, and this convergence can occur at any time period of stock price changes. It can be said that its occurrence is only related to the event itself. As the event itself develops, the stock price changes accordingly. Once the environmental factors that exist in the event disappear, the stock price immediately responds, and the original trend of the stock price will change accordingly.

The Deepseek case that occurred in early 2025, corresponding to the price trend of the stock (Huajin ziben 000532), effectively verified that the disappearance of the event is the only basis for the trend of stock price changes, rather than a time factor. And the incident of another company (meiri hudong 300766) continued the trend as it could be supported by evidence.

Using recursive formulas $a\Gamma(-a, z) = z^{-a}e^{-z} - \Gamma(-a+1, z)$ (where z is the time function related to the pulse), the Gamma function is expanded in series form, and its asymptotic expansion is

$$\Gamma(a, z) = z^{a-1} e^{-z} \sum_{n=0}^{\infty} \frac{\Gamma(a)}{\Gamma(a-n) z^n} \tag{3}$$

Launch

$$\Gamma(a) = \int_0^{\infty} e^{-t} t^{a-1} dt \tag{4}$$

From equations (3) and (4), it can be seen that the two series of the Gamma function have convergence when a are non negative integers, which coincides with the fact that stock prices are non negative. Therefore, the Gamma function based on pulse theory can be used to simulate the pulse trend of stock prices in the stock market.

In the absence of pulse issuance, the issuance of the next pulse $+\infty$ means that the market will wait for the next possible market hot spot (event). Usually, the issuance of such pulse events requires the joint efforts and consensus of the whole society. If the market issues several pulse signals simultaneously, it may choose one or all of them [5], depending on the amount of funds in the market.

There is also a situation where when the market does not emit a pulse signal for a long time, market investors may take advantage of an opportunity to artificially create a pulse signal and see the feedback from the market.

7 Verification of Stock Price Pulse Results

Comparing the impact of different events (pulse factors) on pulse prices and the corresponding degree of pulse adaptation time on pulse factors, there are significant differences in adaptive events under event driven pulse patterns.

Table 2. Reasons for stock price fluctuations and the extent of their continuation

Stock target	Pulse event	Pulse signal strength	pulse time (Step size: days)	Pulse price amplitude (%)
Shanghai fenghuang meiri hudong	The concept of big consumption	weak	8	100.88
	Deepseek is globally recognized	strong	14	287.79
Rifeng gufen	Concept of Consumer Electronics	weak	8	82.01
Shandong boqian	Concept of Composite Materials	weak	10	129.37
yuegui gufen	Solid state battery raw materials	strong	15	266.16

Pulse events (factors) are the fundamental cause of triggering pulses, which is equivalent to the market sending out a pulse signal. There are significant differences

in the reactions of market investors to different signals. The data in Table 2 shows that when the pulse signal is strong, the corresponding pulse step length can be maintained more effectively. When the pulse signal is weak, the corresponding pulse step length should be shorter, and market hot pots disappear faster. Among them, meiri hudong (Deepseek incident) and Yuegui gufen (sulfide solid-state battery raw materials) are stock price pulses caused by strong events, so the pulse height and sustainability are stronger than the other three companies. However, Shanghai fenghuang, Rifeng gufen, and Shandong boqian, although the market has sent out a pulse signal, the market recognition is obviously not enough. Once the wind and grass move, the stock price will collapse and participants will experience stampede.

Table 3. Analysis of Factors Influencing Stock Price Fluctuations

Stock target	a_1	a_2	a_3	a_4	a_5
Shanghai fenghuang	0.53	0.76	-0.0584	0.53	0.067
meiri hudong	2.69	3.49	-0.0048	0.93	0.067
Rifeng gufen	0.43	0.52	-0.0584	0.53	0.067
Shandong boqian	0.86	0.45	-0.0334	0.67	0.067
yuegui gufen	2.66	1.05	0	0.39	0.067

In Table 3, the numerical values of a_1 , a_2 , a_3 , a_4 , a_5 indicate that a_1 , a_2 , a_4 have significant guidance. The larger the value, the smaller the convergence, and the stronger the inertia of the stock price. Comparing the pulse market trends of these five companies, it can be seen that the inertia of meiri hudong is the largest, followed by yuegui gufen, and the inertia of the other three companies is relatively weak.

The above tests are consistent with the stock price pulses of listed companies in the stock market, proving that the pulse theory model is in line with the actual situation of pulse like stock price changes in the stock market. And based on the relative strength of the five values in Table 3, the intensity of the stock price pulse is determined.

When a_1 , a_2 is large and a_3 is small, the corresponding intensity of the stock price pulse will be stronger, conversely, the intensity of the pulse will be weaker, and the duration of the adaptive time will be shorter.

8 Conclusion

The impact of the stock price pulse model on stock prices is widely present, that is, the pulse stock price trend is a universal stock price trend. Investors can open the K-line chart of a stock at will and see various pulse patterns. Although these pulse patterns [5] are different, it does not affect the description of these pulse patterns by the pulse model.

Investment itself is a complex process, and the operation, trends, and directions of stock market prices are constantly changing, influenced not only by external markets

but also by internal markets. These influences are complex and varied, leading to the emergence of strange K-line charts. But stock prices always contain some basic patterns. For example, the pulse trend of stock prices is one of many trends. When investors carefully analyze the pulse model and grasp the basic laws of stock price pulse changes, they can at least provide investors with more coping methods and the possibility of outperforming the market. Therefore, the description of the pulse stock price model has value. From the actual performance of the five stock prices listed in this article, the law of pulse price changes has been verified.

Since pulse patterns exist so widely, investors should have a clear understanding of the trend and future predictions of this stock price, so as to actively grasp the market's movements and make corresponding investment plans, thereby outperforming the market and achieving returns higher than the market average.

In this way, the method proposed in this article to simulate stock price pulses based on the pulse model has practical significance, and further analysis can be conducted to discuss the pulse morphology in detail.

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