Analysis of the Ripple Effect of the US Federal Reserve System's Quantitative Easing Policy on Stock Price Fluctuations

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미국연방준비제도의 양적완화 정책이 주가 변동에 미치는 영향 분석

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Abstract The macroeconomic concept represents the movement of a country's economy, and it affects the overall economic activities of business, government, and households. In the macroeconomy, by looking at changes in national income, inflation, unemployment, currency, interest rates, and raw materials, it is possible to understand the effects of economic actors' actions and interactions on the prices of products and services. The US Federal Reserve System (FED) is leading the world economy by offering various stimulus measures to overcome the corona economic recession. Although the stock price continued to decline on March 20, 2020 due to the current economic recession caused by the corona, the US S&P 500 index began rebounding after March 23 and to 3,694.62 as of December 15 due to quantitative easing, a powerful stimulus for the FED. Therefore, the FED's economic stimulus measures based on macroeconomic indicators are more influencing, rather than judging the stock price forecast from the corporate financial statements. Therefore, this study was conducted to reduce losses in stock investment and establish sound investment by analyzing the FED's economic stimulus measures and its effect on stock prices.

Key Words : FED, Prediction, Stock analysis, AI. Big data, Text mining, Macroeconomic

요 약 거시경제는 한 나라의 경제 전반의 움직임을 나타내는 개념으로 경제주체인 기업, 정부, 가계경제 활동 전반에 영향을 미친다. 거시경제는 국민소득, 물가, 실업, 통화, 금리, 원자재 등의 변화를 살펴보면 경제 주체들의 행위와 상호작업이 제품과 서비스의 가격에 영향을 파악할 수 있다. 미국연방준비제도(FED)는 코로나 경제침체를 극복하기 위한 다양한 경기부양책을 내 놓으며, 세계경제를 이끌고 있다. 현재 코로나로 인한 주가가 2020년3월20일에 지속적으로 하락하였지만, FED의 강력한 경지부양책인 양적완화로 미국의 S&P500지수는 3월 23일이후 반등을 시작해 12월 15일 3,694.62까지 회복에 성공했다. 따라서 주가의 예측을 기업의 재무제표로 판단하는 것이 아니라 거시경제지표에 따른 FED의 경기부양책이 더 영향을 미치고 있는 실정이다. 따라서 본 연구는 FED의 경기부양책과 주가에 미치는 영향을 분석하여 주식투자에 손실을 줄이고 건전한 투자 정착을 위해 본 연구를 진행하였다.

주제어 : 연방준비제도, 예측 시스템, 인공지능, 주가분석, 빅데이터, 텍스트마이닝 거시지표

1. Global economic growth after Covid

According to Ahn Dong-hyun, professor of economics at Seoul National University, recently published in the Dong-A Ilbo, each country has recently announced the economic growth rate for the first quarter of 2020. The result is a global economic downturn caused by the coronavirus that started in China. The US and Europe suffered economic downturns at -3.8% and -4.8%, while China, the first affected, experienced a 6.8% economic retreat. Korea, where corona infections occur relatively less frequently on a daily basis compared to other countries, also achieved a negative 1.4% growth [1].

The problem is from 2Q. The Corona 19 pandemic, which began in earnest from February, reached its peak in April, and there were more than 80,000 new corona infection confirmed cases on average worldwide. In addition, although countries are showing movements to lift social distancing measures and border blockades, the situation will be more difficult in the second quarter. Thus, unemployment in the United States increased, businesses cut costs, and the vicious cycle of the economy began. The growth rate for the second quarter of the United States was predicted from minus 15% to 40%. The U.S. unemployment rate was 3.6% until the end of February, but increased to 4.4% in March, rose to 14.7% in April, and gradually decreased to 6.7% as of the end of November. In addition, the consumer price index also fell from 259 in February 2020 to 255 at the end of April, and is rising to 260 at the end of November.

On the other hand, global stock prices reached their trough on March 23 and succeeded in rising. Fig. 1 shows that the U.S. S&P 500 index peaked at 3,386 on February 19, 2020, then began to decline and fell to 2,237 on March 23. However, it began to rebound and recovered to 3,694 as of December 15th. After falling about 34% from the peak, it recovered about 65% again in 9 months. Due to this rapid recovery, the gap between the real economy and stock prices has also increased more than ever.

In fact, the Buffett index obtained by dividing the market capitalization of 5,000 companies in the US's Wilshire 5,000 index by GDP is 183.9% at present (12/16/2020) [2]. Table 1 shows the value according to the Buffett index. If the Buffett index exceeds 135%, it is considered overheating and can be said to be just before a bubble. The current figure is 17% higher than the record high of 157% in December 2019. In addition, this figure is above 148% in 2000 when the IT bubble was formed and 107% just before the financial crisis in 2009.

Fig. 1. S&P 500 Overview from Jan 2020 to Dec 2020 (source from investing.com)

Table 1. Market Valuation (Buffett Indicator)

Ratio = Total Market Cap / GDP	Valuation
Ratio <=73%	Significantly Undervalued
73% < Ratio <=94%	Mostly Undervalued
94% < Ratio <=114%	Fair Valued
114% < Ratio <=135%	Mostly Overvalued
Ratio >135%	Significantly Overvalued
Where are we today(2020-12-16)? 183.9%	Significantly Overvalued

2. FED's Quantitative Easing Policy

Why did the real economy crash, but the big

difference in stock prices rising? There may be several factors for this, but the quantitative easing of FED is pointed as the biggest cause. After the Lehman Brothers crisis in 2008, the three quantitative easing of the FED, which took place immediately after the global financial crisis, provided about $3.5 trillion worth of currency to the market. Most of the currency released on the market went to financial institutions, including US banks. Unlike in the 2008 financial crisis, greedy financial institutions were treated as bad guys when the financial crisis came due to the thieves of Wall Street. There was no problem with easing the economy and boosting the economy. When financial bailouts were applied to the banking sector in 2008, executives were criticized by society for earning large bonuses from the bailouts they received. As of 2020, about $2.8 trillion of the amount of quantitative easing has been returned to FED as excess payment reserves. Therefore, the remaining $1 trillion is the actual amount used by financial institutions. Exactly how that trillion dollars was spent is not known, but most of this amount is estimated to have come to financial institutions, including stocks. During the 2008 financial crisis, banks were supported, but now in 2020, most of them were paid out as bailout assistance and unemployment benefits for the entire US.

This is one of the main reasons that made the difference between the real economy and stock prices. This is the reason why the stock price rose 7 times based on NASDAQ standards, while the abnormal phenomenon represented by low inflation and low growth has been maintained since the financial crisis.

The FED released 3,610 trillion won for 4 months after the coronavirus, of which 1,725 trillion won was recovered as FED. Therefore, 1,885 trillion won was actually supplied to financial institutions and the private sector. Unlike in the past, since the FED put bailouts and

unemployment benefits in the real market in parallel with qualitative easing, it is not clear exactly how much money went into financial institutions, but most of the 1,885 trillion won is believed to have been used by banks. This scale is comparable to the three quantitative easing that took place for six years from 2008 to 2014, when Bernanke was chairman of the FED at the time. It is highly likely that a significant portion of this was invested in the stock market, including financial markets, and it is estimated that the stock price rose rapidly. As quantitative easing has progressed, the likelihood that the real economy will be sluggish is highly likely.

The FED, which was well received as a relief pitcher in the US economy, is now being pointed out as the main culprit behind the asset market bubble. There are concerns that the stock and bond markets may be collapsed at the same time when the policy stance changes as the 361 trillion won by FED is supporting the stock and bond markets [3].

3. The fair share price of the company

Since the stock price of a company reflects the future value of the company, the financial statements that can determine the growth potential of a company have a great influence on the stock price. Therefore, in order to increase the return on investment, many stock investors calculate an appropriate stock price through analysis of the company's financial statements, and if it is rated low, it is the basis for the judgment of buying and selling if it is calculated high. However, the current situation is that the FED is supporting the stock price through quantitative easing, so it can be confirmed that the stock price fluctuates more sensitively according to the FED Quantitative Ease policy rather than corporate financial statements.

The FED uses an index called Personal

Consumption Expenditure, which is announced every three months along with the Gross Domestic Product, as well as the Monthly Consumer Price Index, which is referred to when implementing the stimulus policy. Until now, if the inflation indicator is likely to exceed 2%, inflation has been managed by raising interest rates to limit inflation. However, in the future, the inflation rate from several years ago to this year was added and averaged, and if the average value did not exceed 2%, he declared that it would not raise the interest rate [4]. The Fed decided to maintain the'zero interest rate' on September 16, 2020 (local time). This has had the effect of stabilizing investor sentiment because stock investment is influenced by sentiment. In a statement issued after the Federal Open Markets Committee (FOMC) meeting on the same day, the Fed announced that the interest rate would be frozen at the current 0.00~0.25%.

The Fed decided on a zero interest rate to respond to the corona 19 virus outbreak from China in March and confirmed the same position at the 4th FOMC meeting.

At the FOMC meeting in March 2020, when concerns about the economic downturn due to the coronavirus pandemic were raised strongly, the Fed cut the base rate by 1% from the existing 1.00 to 1.25% to the lowest interest rate of 0.00 to 0.25%.

All 17 members of the FOMC, who do not have the right to vote, expected to maintain the current interest rate by 2021. Also, 16 people commented on maintaining zero interest rates until 2022. In 2020, the US economic growth rate is expected to be -3.7% and the unemployment rate to be 7.6%. Considering that the estimates for June, which were just before, were -6.5% and 9.3%, respectively, we believe that expectations for an improvement in the economic situation are reflected even in the midst of the corona 19 pandemic [5]. Fig. 2 thru Fig. 6 came from Fred economic data (https://fred.stlouisfed.org/). Figures'

Time period are from Jan 2020 to Dec 2020.

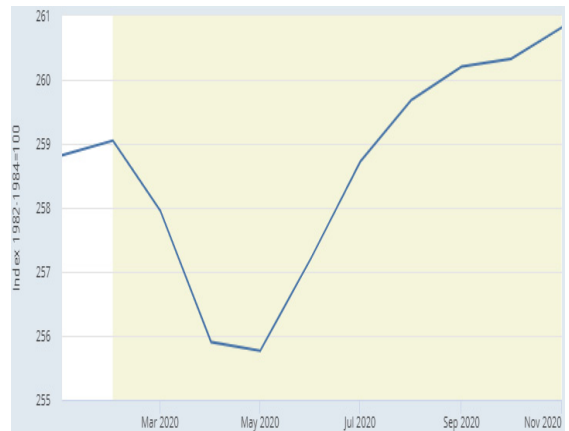Fig. 2. Monthly Supply of Houses in the United States

Fig. 3. Consumer Price Index for All Urban Consumers in U.S. City Average
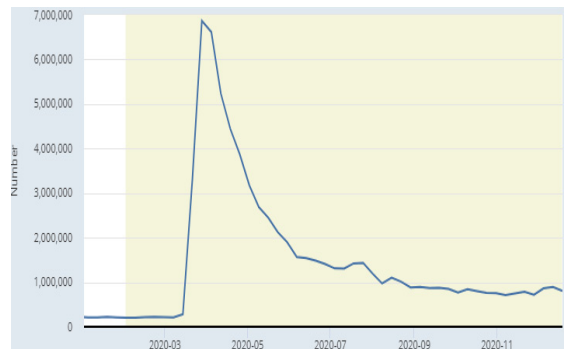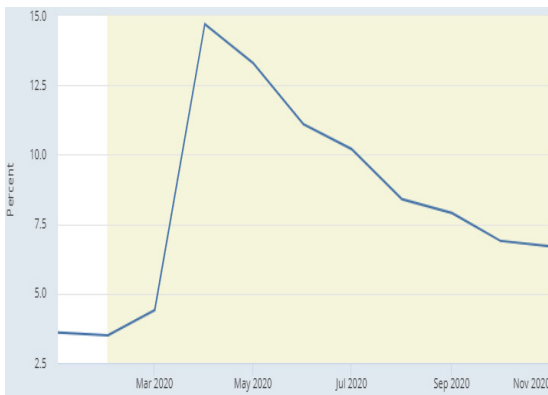

Fig. 4. Initial Jobless Claims
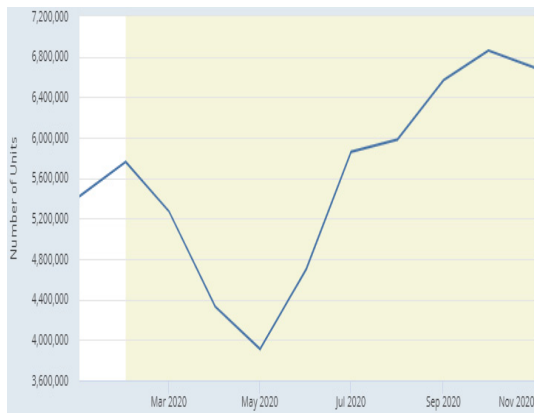
Fig. 5. Unemployment Rate

Fig. 6. Existing Home Sales

3.1 Factors influencing the interest rate of FED

One of the key indicators that the FED uses when considering rate cuts and hikes is the consumer price index and the number of unemployment benefits claims, along with the existing home sales and new home sales indices. Fig. 2 shows the new home sales index from January to November 2020 [6]. It can be seen that it peaked after March and then plummeted. Also, Fig. Figure 3 shows the US consumer price index, peaking in March, bottoming in May, and gradually rising [7]. The number of claims for unemployment benefits in 4 has also risen sharply since March and has been corrected and gradually declined [8]. Fig. 5 is the US

unemployment rate, which rose to 14.7% in March, but fell to 6.7% in November and is expected to decline further in December [9]. Fig. 6 is the number of existing house sales in the US, which fell to 3.9 million units in March, but is increasing to 6.9 million units [10]. Therefore, the FED will refer to these figures to determine whether the economy will be good or bad in the future to determine the quantitative easing policy and the rate cut policy. Therefore, the US stock price is affected by the FED policy decision in the US, and Korea is also affected by the US stock price, which also affects the domestic stock market.

4. Conclusion

For stock price prediction, many algorithms for predicting buy and sell mechanically, excluding human emotions, are being developed through deep learning and machine-machining of artificial intelligence, and are actually used in algorithmic trading [10-15]. However, through the FED's policy decision, it was found that stock forecasting is more favorable for stock forecasting to look at macro indices rather than simply to predict trends. Therefore, in order to predict individual stock prices, it is necessary to first analyze how the FED's policy decisions are made, and the conclusion that the FED's policy decisions are related to the flow of macro indicators has been reached. In order to succeed in stock investment, if you first analyze macro-indicators, which are factors that influence FED policy decisions, analyze proactive economic changes, check the growth potential of individual stocks, and invest, there is a possibility that it will be a successful investment. Will be high. In the future, we plan to study a stock prediction method that predicts macro-indices using artificial intelligence deep learning algorithm [17-18], predicts individual stock

prices, compares them with actual values, analyzes them, and calculates weights.

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