

Research on the influencing factors of quantitative easing policy

Zheheng Lin¹ and Jiaxin Wang^{2,*}

¹Eberly College of Science, Pennsylvania State University, Harrisburg, Pennsylvania, 15090, United States

²SWUFE-UD Institute of Data Science, Southwestern University of Finance and Economics, Chengdu, Sichuan, 033399, China

Abstract. To cushion the blow from the financial crisis, the Federal Reserve stimulated the economy for the first time in 2008 through quantitative easing. In 2020, the outbreak of the covid-19 has caught the US economy in turmoil again. United States implement QE policy again after six years. While the US economy continues to warm up, the negative impact of QE policy on it has gradually emerged. Therefore, this paper will study three related factors about the impact of quantitative easing through the "Theory + Case analysis" research methods on the unemployment rate, deflation rate, and currency circulation M0. It is found that the implementation and withdrawal of QE are closely related to the change of the unemployment rate, the degree of the deflation rate and the M0 of currency circulation. The significance of this paper is that looking at quantitative easing from multiple perspectives can better understand the essence of policy operation and help the community to prevent the negative effects of quantitative easing.

1 Introduction

Since the outbreak of the subprime crisis in 2008, a large number of financial institutions have declared bankruptcy. Unable to promote economic activity by lowering interest rates, the Fed (Federal Reserve System) began to increase banks' liquid currency assets by purchasing Treasuries, Mortgage-Backed Securities, and so on. In 2020, the United States once again implemented quantitative easing policy (QE) to stimulate financial markets affected by the covid-19, so the relevant research on QE policy has been widely proposed again.

At present, most studies have focused on the spillover effects of QE to discuss the impact mechanism of the policy on designated countries' financial markets and relevant response experience. Balcilar found that the spillover effect index fluctuates with the introduction of QE and affects relevant financial markets such as stocks and bonds [1]. Todorov studied the impact of quantitative easing on European bond markets, and found that QE increased bond prices and liquidity but reduced yield rates [2]. Liu and Liu analysed the impact of the US currency spillover effect on the economies that have close trade relations with the US during the QE period, and proposed relevant policy recommendations [3]. In the process of research, some deficiencies in the cause of QE were revealed.

This paper will analyse the four times of QE in the United States and analyse the three main factors that affect the implementation of QE policy which are unemployment, deflation, and currency circulation (Table 1). Based on the analysis of its influence on the country, it is concluded that the unemployment rate, deflation degree and currency circulation are the important factors affecting the quantitative easing.

2 Factors affecting quantitative easing

Quantitative easing policy in the United States is an unconventional monetary policy aimed at boosting the economy. It injects huge amounts of money into the market by purchasing government and institutional bonds, lowering market interest rates, stimulating private investment growth, and promoting employment.

Table 1. QE policy in American history.

	Period	Cause
QE1	2008/03—2010/03	Subprime Crisis& Financial Crisis
QE2	2010/11—2011/06	Financial Recovery& Unemployment
QE3	2012/09—2014/10	Steady economy
QE4	2020/03—2022/03	Economic decline

The United States has experienced four different rounds of quantitative easing in its history. Quantitative easing can be divided into two categories. Both QE1 and QE4 are designed to response to the financial and social emergencies in US. QE2 and QE3 are non-monetary policies aimed at solving the unstable financial market after the subprime crisis.

Through the investigation of the social background before the proposition of QE policy, we find that QE had higher unemployment rate, lower currency circulation, and lower inflation rate. Therefore, this paper will focus on these three factors and analyse the inevitable result of quantitative easing policy (Figure 1).

* Corresponding author: wjiaxin@udel.edu

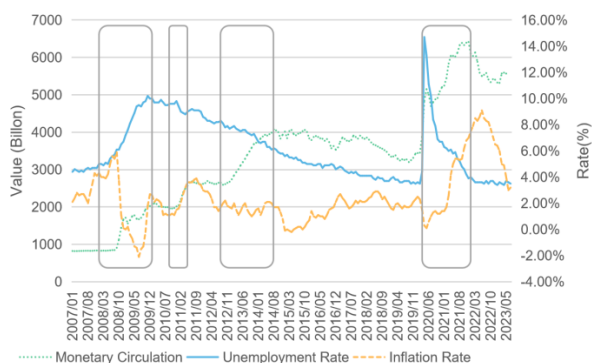


Fig. 1. Unemployment rate, inflation rate, money supply(M0) in the United States, 2007- 2023 (Picture credit: Original).

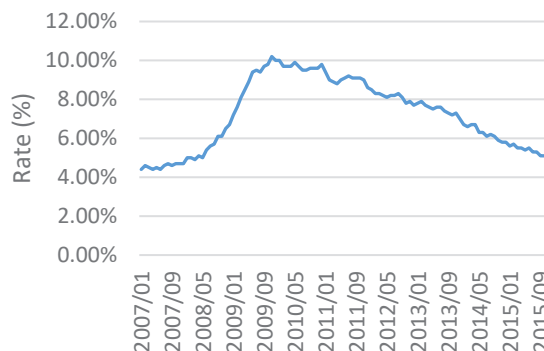


Fig. 2. Unemployment rate in the United States, 2007- 2015 (Picture credit: Original).

3 Research on unemployment rate, deflation and currency circulation

3.1 Unemployment rate affect quantitative easing policy

Phillips proposed a trade-off between the rate of change in monetary wages and unemployment [4]. Post Edmund Phelps questioned the stable relationship between unemployment and inflation in the Phillips curve and argued that changes in monetary policy could only affect unemployment in the short run [5]. Given that both inflation and unemployment rates are common factors affecting economic growth, there must be a certain relationship between inflation and economic growth rate. It is generally recognized that there is some opposite relationship between unemployment rate and economic growth rate. And there is a strong negative correlation between the unemployment rate and the economic growth rate through Pang's research [6]. Therefore, this paper confirm that reducing the national unemployment rate will increase the overall level of economic growth. The rising unemployment rate with inflation could be eased.

At the same time, studies have shown that unconventional monetary policies like QE can only stimulate the economy in the short run, but in the long run, they will inevitably cause damage to financial markets [7]. Therefore, this paper can conclude that increasing the amount of fluid capital through quantitative easing policy is an inevitable way to solve the problem of unemployment. Taking 2007-2015 as an example. Unemployment rate has continued to rise since the outbreak of the financial crisis in 2007, and QE1 has left a legacy of related unemployment as it aims to alleviate financial problems. By 2010, the unemployment rate had reached 9.6% (much higher than the reasonable unemployment levels). For this reason, United States began implementing QE2 to reduce the unemployment rate. And since January 11, 2010, the unemployment rate has been decreasing to less than 8% (Figure 2).

Consider 2019- 2021. Since outbreak of the Covid-19 in 2019, a large number of production has been forced to stop, which not only seriously hampered economic development, but also hindered the demand for enterprises. This has led to a rapid rise in unemployment rate. Therefore, the United States is once again using QE to revitalize the economy, and unemployment rate is falling as the epidemic eases (Figure 3).

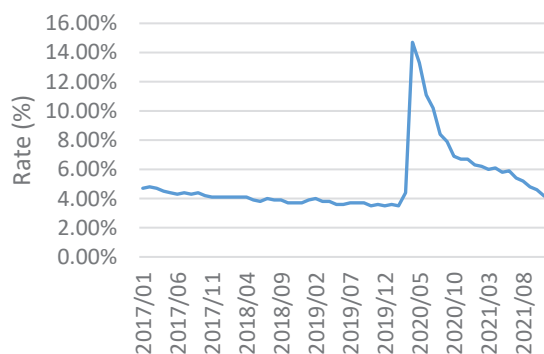


Fig. 3. Unemployment rate in the United States, 2017- 2021 (Picture credit: Original).

3.2 Deflation affect quantitative easing policy

Due to the outbreak of the subprime crisis in the United States in 2007, many financial companies were acquired or declared bankruptcy. As the situation out of control, the subprime crisis triggered the global financial crisis. Advanced countries are experiencing negative GDP growth and deflation [8]. As the birthplace of the financial crisis, United States suffered a severe recession of its economic. To solve this problem, the US government pursue the first quantitative easing policy. The goal of this policy is to increase the amount of money in circulation by purchasing government bonds and corporate debt, giving sellers more money to spend and thus boosting economic growth [9]. Since November in 2008, the Federal Reserve Bank financed \$600 billion dollars to purchase those troubled assets from financial institutions (including Mortgage-Backed Securities, US Treasuries, and Agency Securities) [10]. With this policy taking effect, the Federal Reserve Bank financed

additional \$1.75 billion dollars to purchase other troubled assets at March in 2009 [10].

This policy provided a large amount of circulate money for the market and helped stabilize the US financial industry which was about to collapse. However, the economic situation in the United States was still not optimistic at that time, the government could only maintain the quantitative easing policy [11]. And in the following years, the government also started the second and the third quantitative easing policy [11]. Quantitative easing will lead to an increase in the amount of money in circulation, but because the supply of goods remains the same, prices will be higher and higher [8]. This will generate inflation. The usual method to control inflation in United States is raising interest rates, the excessive interest rate will lead to a decline of consumption in people's willingness, and no consumption will lead to deflation. This will create a vicious circle, which US government is constantly moving between stimulating the economic through quantitative easing and raising interest rate to control inflation. Moreover, the United States also carried out quantitative easing by printing money, this causes an increasing amount of dollars in the market, and the debt of the United States government doubled in just a few years [12]. This has led to a decline in the credibility of the dollar, and had an impact on the dominance of the dollar as the world currency. The time of the exit from quantitative easing is crucial.

For example, the United States did not generate much inflation between the first and the third rounds of quantitative easing. During the first and the second round of quantitative easing, the US government promptly exited the market. For the third time, US government set a floor for tapering QE policy when the unemployment rate was below 6.5% and the inflation rate was above 2.5% [13]. For these reasons, the first three rounds of QE policy did not have a big impact on inflation. However, during the COVID-19 pandemic, the United States set an unlimited QE policy, which led the inflation rate in the United States increase from 2% to 6.8% [14]. To ease the inflation at this time, US has raised the interest rates by the most in nearly 40 years. The US has increased interest rates seven times by a total of 425 basis points, but the inflation has fallen by only 0.3% [14]. This is far from the expected effect. The cost of essential goods is still high, and the debt problem of US is getting worse.

3.3 Monetary circulation affect quantitative easing policy

In response to the financial crisis, the Federal Reserve implemented quantitative easing policy to stimulate the economy and restore people's livelihood. As we all know, the oversupply of money is an important cause of inflation [15]. According to the monetarist theory, inflation is caused by the fact that the money supply in circulation is far greater than the actual demand required for economic growth, and the change of money supply is one of the main reasons for inflation. It raises interest rates through a series of monetary policies to reduce the

liquidity of money in the market, essentially to curb inflation [16].

In 2008, the world financial crisis, the United States economy was severely hit, the Federal Reserve in order to prevent further economic decline. To this end, the Federal Reserve decided to implement quantitative easing (QE) monetary policy, by printing and issuing money to stimulate consumption, in order to achieve the purpose of economic recovery [17]. The Fed made the US economy gradually improve through the intermittent implementation of QE, but due to some aggressive monetary policies, serious inflation occurred in the US [18]. The first fundamental reason is that there is too much money circulating in the market. In the relationship between currency circulation and inflation proposed by Friedman, it is pointed out that in the case of unstable market supply and demand, the stronger the currency circulation, the higher the inflation. In order to alleviate the negative impact of inflation in the United States, the Federal Open Market Committee decided to reduce the liquidity of money in the consumer market by raising the federal funds target rate. After raising interest rates, the demand for all consumption and investment in the market will be inhibited, including the desire of individuals, enterprises and the government for all economic investment will be reduced, so the circulation amount of money in the market will decrease and return to the normal level [19]. A decrease in the public's desire to invest corresponds to a decrease in the amount of new money circulating in the market, which increases the demand for money to curb inflation. As the number of interest rate hikes continues to increase, the amount of money in circulation in the consumer market will continue to decrease, which will lead to a negative impact on investment transactions in various industries, and the economy will also decline. In order to avoid further economic decline, the United States has opened a new round of QE, enhancing the quantity and liquidity of money, in order to achieve economic recovery [20]. The increase in the amount of money in circulation stimulates the rise of inflation. Inflationary pressures are increasing globally, with more than 80% of economies having their highest inflation rates in several years since 2021 [21]. The international financial market is turbulent, the currency circulation system is out of order, the stock market, bond market and commodity market of many countries have fluctuated sharply, and the national debt of the United States is particularly serious. It's a record high. There are various indications that the unlimited quantitative easing policies implemented by major developed economies, especially those led by the United States, have distorted the price of funds, promoted abnormal fluctuations in the currency circulation market, exacerbated resource misallocation, and led to market speculation and inflated prices. Unconventional stimulus policies, while palliative in the short term, are still difficult to solve deep-seated structural problems.

Therefore, in order to alleviate the impact of the epidemic on the US financial market and save market liquidity, in March 2021, the Federal Reserve again implemented quantitative easing policy and increased the supply of money, and the Biden administration planned to

implement a \$1.9 trillion economic stimulus plan and a \$2 trillion infrastructure plan. On March 23 of the same year, the Federal Reserve officially opened the unlimited quantitative easing policy and implemented the asset purchase program, providing assistance and loans directly to individuals, institutions and companies. This led to an excess of money circulating in the market, which forced the Federal Reserve to enact new monetary policies to curb it. At the end of QE4, in order to maintain the stability of financial markets, to cool down the overheating economy. The Federal Reserve implemented the first QT policy in June 2022, which put higher requirements on the liquidity of the financial system, and the demand for the liquidity of money is also greater, which may bring about a market crash [19]. Although the objective of the QT policy is to fundamentally alleviate the problem of excess money in circulation in the market, it is necessary to strike a relative balance between withdrawing funds from the economic system and not undermining the stability of the financial market. If liquidity is withdrawn too quickly, it is likely to frighten financial markets and lead to a lot of destabilizing fluctuations in financial markets. Another drawback of QT is that the policy has not been fully implemented. QE was mandated in the wake of the global economic crisis, with the aim of easing a severe recession and heating up the economy. However, after the second round of QE policy, the Federal Reserve chose to carry out the third round of QE, and it was not until 2018 that the Federal Reserve had to implement QT due to serious market inflation and excessive currency circulation leading to market volatility, but less than a year later, the Federal Reserve terminated QT. Therefore, there are no clear examples of QT's effect on the actual circulation of money.

4 Conclusion

Through the analysis of unemployment rate, deflation and money supply, this paper finds that QE policy is to stimulate the economy and alleviate the high unemployment rate. However, as a result of quantitative easing, a large amount of new money flows into the market, triggering a vicious cycle 'quantitative easing - inflation - interest rate hikes - economic contraction - quantitative easing again'. Because of the dollar's status as the world currency, this cycle not only affects American society, but also challenges the stability of the world economy. Analysing this cycle can help the public better response to the economic problems brought about by US policy.

Finally, this paper only analyses QE and its related policies in the United States. In fact, this paper consider other related factors such as US presidential elections, social conflicts, epidemics, etc. These aspects can be studied further in the future, and the impact of this cycle can be refined.

Authors contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

1. M. Balcilar, Z.A. Ozdemir, H. Ozdemir, M.E. Wohar, *QREF*, **78**, 42-52, (2020).
2. K. Todorov, *JFE*, **135**, 340-358, (2020).
3. I. Shkodina, O. Melnychenko, M. Babenko, *FINANC CREDIT ACT*, **2**, 513-521, (2020).
4. Jinqun Liu, Yue Liu, *FTR*, **34**, 55-67, (2023).
5. A.W. Phillips, *Econ*, (1958).
6. M. C. Pang, *RFEI*, **1999**, 23-26, (1999).
7. E. S. Phelps, *Economica*, **34**, 254-281, (1967).
8. H. Alekseievskaya, A. Mumladze, *TSEJ*, **1**, 39-45, (2020).
9. B. Naape, *MPRA*, (2019).
10. J. J. Liu, *MC*, 36-37 (2012).
11. Z. Yildirim, M. Ivrendi, *Financial Innov.*, **86**, 1-38, (2021).
12. D. Schilirò, *Rev. Int. Organ.*, **5**, 101-105, (2010).
13. Y. Cao, *Quantitative easing monetary policy research*, Zhejiang University, (2017).
14. Z. H. Zhang, *HBEM*, **14**, 250-256, (2023).
15. X. H. Meng, *MBTI*, **44**, 43-45, (2023).
16. W. T. Zhang, R. H. Xu, W. T. Xiong, *FMR*, 1-11, (2022).
17. D. Piotrowski, A. Piotrowska, *CJFA*, **1**, 123-136, (2012).
18. T. Lee, *SOC*, **3**, 18, (2015).
19. D. Xu, Q. Y. Zhang, *Economist*, 87-95, (2015).
20. Y. M. Sun, *RCCSI*, (2018).
21. Q. Ge, *SIF*, **365**, 45-56, (2017).