

Quantitative Easing and Climate Change: A Case Study

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Abstract:

In the context of increasing global climate change, this article takes an in-depth look at how central banks can use quantitative easing to help address this issue. Based on three research methods: Green Bond, SDGs Bond, Carbon Trading Market and Carbon Reduction Project, this paper analyzes the pros and cons of specific measures of quantitative easing in dealing with climate change. The study found that the above three types of quantitative easing policies can effectively guide funds to green industries, promote green economy and sustainable development, and thus mitigate the economic impact of climate change. This research not only provides a new perspective for central bank policy making, but also provides investors with new opportunities for green investment. This paper suggests that the central bank should increase its support for green projects when formulating quantitative easing policies, and encourage investors to actively participate in green investment to jointly promote the response to climate change.

Keywords: Green Bond, SDGs Bond, Carbon Trading Market and Carbon Reduction Project

1. Introduction

1.1 Research background

Under the background of increasingly severe global climate change, human beings are facing dual challenges brought by environment and economy. Climate warming, sea level rise, frequent extreme weather events and other issues not only affect people's living environment, but also pose a serious threat to the stability and development of the global economy. Therefore, addressing climate change has become the focus of common attention of the international community.

1.2 Central bank purpose

As the makers and implementer of a country's monetary policy, central banks play an important role in the fight against climate change. Its role is not only to provide liquidity support to the economy, but also how to integrate climate-related risks into the framework of economic policies to support green economic development. Central banks are using monetary policies such as quantitative easing as tools to use large amounts of money to counter the positive economic and environmental impacts of climate change [1].

1.3 Research Purpose

This paper explores how quantitative easing can play a positive role in dealing with the economic problems brought about by climate change. Quantitative easing is

an unconventional monetary policy tool that stimulates economic growth by purchasing various types of assets to increase the money supply in the economy. In the context of combating climate change, central banks can use QE funds to buy or invest in climate change-related assets to support the development of green bonds, carbon trading markets, sustainable development bonds and other areas. The development of these areas can not only reduce greenhouse gas emissions, but also promote the green transformation of the economy and achieve sustainable development.

2. Cases analysis

2.1 Green Bonds

Green bonds are bonds that specifically finance environmental protection and sustainable development projects. The money raised will be used to fund or refinance green projects. The central bank's purchase of these bonds can directly finance clean energy, energy conservation and emission reduction projects, thereby promoting sustainable development and climate change solutions.

2.1.1 Case Study

According to Climate Bond Market Intelligence (CBMI) [2], green bond issuance continues to grow, and the global green bond market will exceed \$500 billion (517.4 billion) by 2021. This is the highest value in the history of the green bond market, which has been expanding for a

decade.

On March 24, 2022, Apple released its 2021 Green Bond Impact Report on its official website [3]. In February 2016, Apple issued its first green bond, worth \$1.5 billion [4]. In June 2017, after the US government announced its intention to withdraw from the Paris Agreement, Apple issued a second green bond, this time for \$1 billion. Since launching its green bond program, Apple has raised \$4.7 billion and has invested \$3 billion in green technology innovations as of October 2021.

Apple's most recent offering was in November 2019, when it raised €2 billion (\$2.2 billion) in its first-ever European green bond offering [5], which it used to support 50 projects that will mitigate or offset 2,883,000 metric tons of carbon dioxide equivalent emissions [6].

According to the Green Bond report, as of October 2021, more than 175 of the company's manufacturing partners in 24 countries have committed to using 100 percent renewable energy in Apple products.

2.1.2 Analysis

Apple's massive purchase of green bonds is one of the effective measures of quantitative easing to deal with climate change, and the ultimate purpose of buying green bonds is actually focused on the following two points:

The application of green bonds helps to guide funds. In order to comply with the quantitative easing policy implemented by the central bank, Apple Inc., as a world-renowned enterprise, has purchased a large number of green bonds and actively used its brand effect to guide a large amount of market funds to green environmental protection projects. This behavior greatly reduces the financing cost of green projects, promotes green investment, and thus promotes the development of green industries.

At the same time, it also has a positive effect on policy coordination that cannot be ignored. The combination of green bonds and quantitative easing can achieve policy synergy. Apple's purchase of green bonds can both help the central bank achieve the regulatory goals of monetary policy and contribute to the goal of combating climate change. This combination of policies will help further drive sales and awareness of Apple products, promote economic growth, and achieve environmental protection and sustainable development.

2.1.3 Influence

Led by Apple, more and more large enterprises such as Walmart and Fannie Mae have decided to comply with the quantitative easing policy of the US central bank and actively buy green bonds to resist the dual impact of climate change on the environment and economy. According to statistics, because many companies in the United States

buy a large number of green bonds, their prices have risen sharply so far. According to the data analysis, the reasons are summarized as follows:

(1) With the rise of environmental, social and governance (ESG) investing, more and more investors are looking to put their money into investment products. Apple's green bond meets that demand, so it could attract a lot of investors, which could lead to higher bond prices.

(2) Apple is a world-renowned brand, and its financial products are generally trusted and favored by investors. Apple's green bonds may be highly attractive because of their branding, driving up the price.

(3) Apple has a high credit rating, which means that the bonds it issues are considered low-risk. Investors may be willing to pay more for this low-risk green investment product.

(4) Green bonds may have less supply in the market than traditional bonds. The price of Apple's green bonds could rise if demand outstrips supply.

(5) Apple's investment in green projects may have good long-term growth prospects and potential economic returns. Investors may be optimistic about the future of these projects and be willing to pay higher prices for the associated green bonds.

2.2 Sustainable Development Goals (SDGs) Bonds:

The SDGs are the 17 global sustainable development goals identified in the 2030 Agenda for Sustainable Development adopted by the United Nations in 2015 [7] and are also one of the effective means of quantitative easing. Issuers can raise money by issuing bonds to reduce greenhouse gas emissions and other projects that help ameliorate climate change. Funds from SDG bonds are typically used to support green and sustainable development projects that help reduce greenhouse gas emissions and drive the transition to a low-carbon economy. Under the guidance of the central bank's quantitative easing, the issuance of SDG bonds has led investors to pay more attention to climate change issues and invest funds in low-carbon energy, green travel, forest protection and other areas that help mitigate climate change.

2.2.1 Examples

On November 23, 2023, in response to the United Nations 2030 Agenda for Sustainable Development, "Industrial Rich Union" fully incorporated SDGs into the company's development strategy, and officially released the first "Industrial Rich Union SDGs Strategy White Paper". Three key points are put forward in the SDG's "3C Response strategy": creating enterprise growth momentum (Competitiveness), promoting industrial transformation and

upgrading (Collaboration), and promoting social prosperity and win-win Community. People focus our limited resources on the SDGS most relevant to the company's operational activities and value chain and contribute to global sustainable development while achieving our own growth.

The company has made a carbon neutral commitment to reduce operational carbon emissions by 80% by 2030 compared to the 2020 base year, to achieve operational carbon neutrality by 2035, and to achieve full carbon neutrality by 2050.

2.2.2 Analysis

As a means of quantitative easing, the implementation of the SDGs strategy has reduced the cost of financing. With the full integration of SDGs into the company's development strategy, Industrial Fulian issued and purchased SDGS-related bonds, and the market demand for SDG-related bonds increased, thereby reducing the financing costs of issuers. This has encouraged more businesses and institutions to invest in green and sustainable projects.

The actions of the Industrial Rich Union have greatly enhanced the confidence of the SDGs market. Following the instructions of the central bank's quantitative easing, the issuance of bonds related to the purchase of sustainable development sends a message to the market that the central bank firmly supports sustainable development and the fight against climate change. This will help boost market confidence in green and sustainable investments and attract more investors to participate in the SDG bond market.

2.2.3 Influence

Through the release of the SDGs strategy white paper, the SDGs will be fully integrated into the company's development strategy and put forward a distinctive "3C response strategy" and a series of action goals. Through these measures, the industrial rich Union has played an active role in promoting global sustainable development.

By investing in environmentally friendly projects, such as renewable energy and low-carbon technologies, people can reduce carbon emissions, improve climate quality and promote sustainable development.

Targeting the economic impact, the issuance of SDGs can attract more investors, especially those focused on ESG (environmental, social and corporate governance) factors, which will help companies raise capital and drive economic growth.

In addition to the above, it also improves risk management and adaptation capacity, and the issuance of SDG bonds can help businesses and governments better manage the risks posed by climate change by investing in climate ad-

aptation projects and improving their capacity to respond to extreme weather events and natural disasters to reduce the impact of climate change on local economies and societies.

Finally, the implementation and emphasis of the SDGs has fulfilled international commitments, and raising funds through SDG bonds helps countries to better fulfill their commitments in international climate agreements such as the Paris Agreement and promote the process of global climate governance.

2.3 Carbon Trading Market and Carbon Reduction Project

The central bank invests in the stocks of enterprises with low-carbon technologies such as sustainable energy and clean technology to help reduce greenhouse gas emissions, promote economic growth and employment, and promote carbon reduction through market mechanisms. The European carbon trading market, in particular the European Emissions Trading System (EU-ETS) [8], is one of the largest and most influential carbon trading markets in the world.

2.3.1 Examples

The European Emissions Trading System (EU-ETS) was established in 2005 to reduce greenhouse gas emissions through market mechanisms and facilitate the transition to a low-carbon economy [9]. EU-ETS currently covers the 27 member States of the European Union plus Iceland, Norway and Liechtenstein. More than 11,000 emissions facilities are traded in these countries, affecting up to 45% of the EU's carbon market. The market had a pilot phase from 2005 to 2007[10], and multiple compliance periods thereafter. Through continuous adjustment and improvement of the quota system, optimize the allocation of resources to ensure the realization of carbon emission reduction targets.

The implementation of EU-ETS has achieved remarkable results. According to relevant data, the EU-ETS transaction volume reached \$119.8 billion in 2010 [11], accounting for 84% of the global carbon trading turnover. This shows that the EU-ETS has become the core of the global carbon trading market [12].

2.3.2 Analysis

The operation of the European carbon emission trading System has promoted capital flow and low-carbon investment. Combined with the quantitative easing policy implemented by the central bank, EU-ETS has provided a perfect carbon trading market for enterprises. Enterprises can increase market liquidity by purchasing long-term bonds, reduce corporate financing costs, and encourage more funds to invest in low-carbon technology research

and development. Thereby indirectly ameliorating the economic problems caused by climate change.

European carbon emission reduction projects have effectively improved the valuation of low-carbon technology companies. With the implementation of quantitative easing policies, market liquidity has increased, and investors' confidence in low-carbon technology companies has increased, which helps to improve the par value of stocks of low-carbon technology companies. Higher valuations could attract more investors into the space, further driving the adoption of low-carbon technologies to address climate change.

2.3.3 Influence

Europe has achieved significant technological innovation in the areas of renewable energy, energy efficiency, and carbon capture and storage (CCS). These technologies provide strong support for carbon reduction projects. For example, the use of renewable energy sources such as wind energy not only reduces the consumption of fossil energy, but also reduces greenhouse gas emissions. European governments, international organizations and enterprises have provided a large amount of funds for technology research and development for carbon reduction projects, which has promoted the smooth implementation of carbon reduction projects.

Europe's carbon trading market and carbon reduction projects have played an important role in driving the global transition to a low-carbon economy. Through market mechanisms and other means, Europe has succeeded in reducing carbon emissions and making a positive contribution to the global response to climate change.

3. Malpractice analysis

To solve the economic problems caused by global climate change, people should be without delay, quantitative easing is undoubtedly a big tool for the central bank to solve the climate problem, but every coin has two sides, quantitative easing is also a double-edged sword, bringing a lot of economic profits at the same time, there are too high risks. In contrast, government bonds, as the backbone of a country's economy, have a low-risk rate, although the return is low.

First of all, the risk of government bonds is very low mainly because the government's stable tax revenue and sound fiscal policy ensure the timely repayment of interest and principal. They also typically have high credit ratings, indicating that they are safe as an investment. Moreover, government bonds are liquid and easy to buy and sell in the secondary market, and some enjoy special legal protections that increase the likelihood of full repayment in the event of a debt default. This makes them an attractive

option for investors seeking stable income and value preservation.

Second, there are still plenty of risks that cannot be ignored in the three measures related to quantitative easing.

3.1 Risks in green bonds

Green projects invested in by green bonds may have project risks, including cash flow risks and project construction risks. If there is a shortage of cash flow due to problems in the operation of grade color projects, or the project cannot be completed on time due to project construction difficulties, or the environmental or economic benefits generated by grade color projects are significantly different from the expected benefits, these factors may lead to losses for green bond investors. Some green projects due to complex technology, large investment amount, long time, project risks will be more prominent

3.2 Risks in SDGs Bond

Investing in SDG bonds involves uncertainties such as policy changes, technical risks and market demand, affecting project selection and implementation. Regulatory changes and adverse events may affect environmental and social impacts, affecting bond performance. The SDG bond market is still developing, with potential low liquidity and pricing challenges. Despite rigorous due diligence, asymmetric information also poses risks, so investors must carefully consider the characteristics of the bond and the credit profile of the issuer.

3.3 Risks in carbon trading markets and carbon reduction projects

Investing in low-carbon technology companies carries risks such as volatility in carbon trading markets, policy changes and project execution challenges. Carbon price fluctuations affect business costs and profitability. Risks to emission reduction projects include technical feasibility and political stability, affecting expected benefits. These risks directly affect the profit model and business prospects of low-carbon technology companies. Investors should assess the company's ability to manage these risks before investing.

Finally, in order to better apply quantitative easing to deal with the economic problems caused by climate change, central banks have a responsibility to guide the economy towards sustainable, low-carbon and climate-resilient development through monetary policy and financial regulation. In the process of investment, the central bank can improve the scientific and accuracy of investment decisions by strengthening risk management and supervision, so as to minimize potential losses.

Therefore, while investing in high-risk areas such as green energy and environmental projects may increase the risk

of financial losses for central banks, this does not mean that central banks should avoid such investments. These risks should be addressed by strengthening risk management and supervision, and making investment decisions more scientific and accurate.

4. Conclusion

As a monetary policy tool, quantitative easing has shown its unique role in stimulating economic growth, but it has both potential and challenges in addressing the global problem of climate change.

Through quantitative easing, the central bank can guide funds to low-carbon and environmentally friendly fields and provide financial support for green projects, thus promoting the development of the economy in a more sustainable direction. However, central banks also face a number of challenges in using quantitative easing to address climate change.

First of all, the effective allocation and use of funds should be ensured to avoid the waste of funds. Secondly, the effect of quantitative easing policy has risks that cannot be ignored, and the central bank needs to pay close attention to the market and make adjustments and optimization in a timely manner. In addition, central banks will need to work with other policymakers to reach consensus and jointly address the climate change conundrum.

Therefore, central banks need to continue to develop and innovate in the use of quantitative easing to address climate change. By constantly improving policy requirements and strengthening international cooperation, we will make greater contributions to addressing climate change. At the same time, solving climate change requires not only the joint efforts of the whole society, but also the joint actions of the government, enterprises, and even the public. Only in this way can people effectively respond to the global challenge of climate change and achieve sustainable development of human society.

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