Research on the Inflation Crisis under COVID-19 and Ukraine Conflict

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Abstract. In recent years, the emergence of the epidemic has had varying degrees of impact on the economic conditions of various countries. Various online surveys and studies have also shown that the harm of COVID-19 to people has led to a decline in residents' consumption level. In addition, the Russia-Ukraine conflict in February 2022 could also have an impact on different economies. This paper shows how inflation fluctuates under COVID-19 and Ukraine conflict. For clear analytics, the economic market is divided to three main and biggest markets to analyze the influence of these two factors. It is believed that the pandemic has a significant affection on the economic situation. Any important large-scale event will affect the change of the economic situation. Similarly, the war between Russia and Ukraine will also have a great impact on the surrounding countries and even the European market situation. The whole paper focuses on the analysis of the three economic markets. By collecting information on the website and comparing the consumer price index of the three economic markets during the period of the novel coronavirus epidemic and the period of the Russia-Ukraine conflict, it explores the impact of the two events on different economic markets.

Keywords: Inflation; energy crisis; COVID-19 pandemic; Ukraine conflict, CPI.

1. Introduction

Inflation is a complicated topic in financial market. The inflation rate had significant fluctuation during these years in many countries. Through this research of analyzing the data of the global economic situation, it can be found that all the economic indicators performed negatively since 2020. At the same time, the COVID-19 broke out in January 2020. Therefore, the hypothesis is that COVID-19 has a significant influence on the inflation. Some researchers have already shown that U.S. households' inflation beliefs, including inflation expectations, uncertainty and disagreement, were affected during the first six months of the COVID-19 pandemic [1]. Most of the papers related to inflation during the pandemic have considered a variety of factors, some of which make comparisons across the world, some of which consider the economic impact, and other effects in parallel with inflation such as inflation expectations. It is clear that prior research focuses on specific areas intensively and may lack a big picture. Much less is known about the general causes and effects of inflation in the United States. There also has been very little discussion about the inflation situation in different stages of the epidemic because both inflation and COVID-19 experienced a process of outbreak, recovery, and normalization

Another assumption is that the situation of Ukraine can also be a key element affecting the price of energy such as oil and gas, as a result, having an influence of the inflation especially in European market. The exogenous shocks and pandemic directly affect the price index increasing in a short period. These effects caused many changes, such as changing in consumption patterns, the relationship of supply and demand and obstructions of logistics. This paper aims to divide the whole market into three biggest separated markets which are US market, EU market and China market to analyze that to what extent these three markets are affected by both COVID-19 pandemic and Ukraine conflict. The methodology is collecting the CPI of the energy and food (core CPI) and comparing along the time period.

2. The U.S. Market

Since March 2020, consumer price indexes for food at home posted some of the largest monthly increases of recent years. While prices for meats, poultry, fish, and eggs increased the most among major grocery store food groups, all other food at home CPIs increased broadly from March to June 2020 [2]. Table 1 and Table 2 can show the CPI for food and energy for the U.S. market. The CPI program attempted to collect as much data as possible, many indexes are based on smaller amounts of collected prices than usual, and a small number of indexes that are normally published were not published this month. The data of CPI had a decrease by lacking of data collection [3].

Table 1. CPI for selected food at home categories

	12-month change in percentage	3-month change in percentage
Food at Home	1.1	4.3
Meats, poultry, fish, and eggs	2.3	10.3
Beef and veal	3.8	20.4

Table 2. Percent changes in CPI (Energy) for All Urban Consumers (CPI-U): U.S. city average

In 2020	Jan.	Feb.	Mar.	Apr.	May.	Jun.
Energy	5.1	2.5	0.9	0.8	0.1	0.4
Energy commodities	11.7	5.3	2.0	-0.1	-0.5	-0.2
Gasoline (all types0	12.3	5.6	2.0	0.1	-0.5	-0.4
Fuel oil	10.2	4.3	3.9	-5.3	-0.3	3.6
Energy services	-0.2	0.0	-0.2	1.6	0.8	1.1
Electricity	-2.3	0.3	-0.2	0.9	1.2	0.5
Utility gas service	0.0	-1.0	-0.2	4.2	-0.7	3.5

Additionally, the energy index rose for the seventh straight month in December, increasing 4.0 percent. The biggest contributor to the increase was the gasoline index, which rose 8.4 percent in December after falling in the previous two months. (Gasoline prices rose 3.4 percent in December, before seasonal adjustments.) The electricity index rose 0.4 percent for the month, while the natural gas index fell 0.8 percent. Despite the monthly increase, the energy index is down 7.0 percent over the past 12 months. The energy commodity index fell sharply during the period, with fuel oil down 20.0 percent and gasoline down 15.2 percent. Over the past 12 months, the energy services index increased, with the natural gas index up 4.1 per cent and the electricity index rose 2.2 percent.

Due to the COVID-19 pandemic, the collection of personal access data for the CPI programme has been suspended since 16 March 2020. Where possible, data that would normally be collected in a personal visit is collected online or by telephone. In addition, data collection in December was affected by the temporary closure or restriction of operations by certain types of institutions. These factors have led to an increase in the number of prices considered temporarily unavailable.

Figure 1 shows the CPI in the US market from December 2019 to December 2020. It can be seen that there was a sharp decrease in February 2020 from 109.3 to 108.3 in April 2020 when the Covid-19 first broke out at the same time. And the lowest CPI lasted for a whole month until May 2020. After that, there was a picked-up increase of CPI after May and surpassed pre-pandemic levels after July 2020. It also indicates that the pandemic truly brought a huge impact on the consumers because the fear of the pandemic kept people at home. Fewer consumers have led to negative developments in the economy, while inflation is likely to fluctuate erratically because of disappointment in the economy.

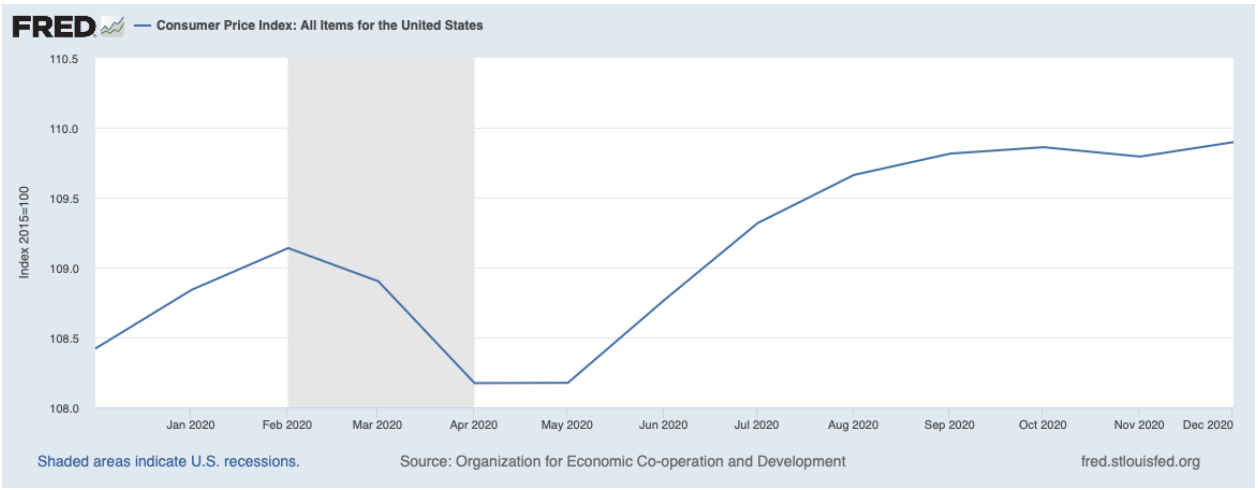


Figure 1. CPI of the U.S. from Dec. 2019 to Dec.2020 [4]

Figure 2 shows the CPI in the US market from January 2022 to April 2022 when the Ukraine conflict happened. It can be found that the CPI had a slight increase in February on which the conflict of Ukraine and Russia happened. Since Russia is a major producer of oil and gas, geopolitical conflicts have pushed prices up significantly in recent weeks [5]. The country is also the world's largest wheat exporter and a major food supplier to Europe [6]. As a result, if Russia had a conflict with Ukraine, there will be certainly an impact on the price of energy in the entire world market. Ukraine is also a significant producer of uranium, titanium, iron ore, steel and ammonia, and a major source of arable land [6]. An invasion of Ukraine is likely to increase global food prices, which will stabilize after rising sharply last year [7]. From Figure 2, it can be found that the increase was significantly sight compared with other period of time in US market. The higher gasoline prices at the pump and higher energy costs have left American consumers unhappy amid rising prices and sluggish economic growth.

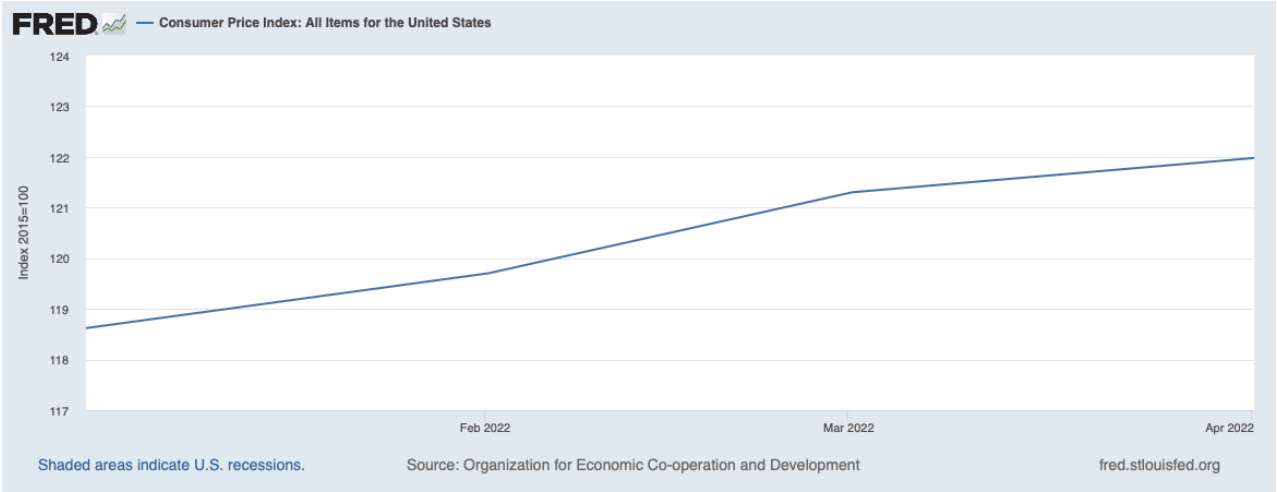


Figure 2. CPI of the U.S. from Jan. 2022 to Apr. 2022 [4]

3. EU Market

The CPI in European area after the COVID-19 Pandemic situation are shown in Figure 3. There is a sharp decrease when it was February 2020 compared with CPI in January 2020. It can be found that the pandemic brought a strong impact on CPI in European market. But the CPI got increase back to the same level in a short period of time. The CPI even achieved 105.7 in June 2020, which is at the peak of the whole year. The rapid recovery of the consumption index in the European market means that the policies of the European governments have, to a large extent, had a significant positive impact

on the European market and the economic situation. It has to be said that their policy is a success. In the same way, it also gives some inspiration to countries in other regions, such as the US market and the Chinese market, that it is necessary to adopt an open policy against the epidemic after vaccination, which will help some countries that have been significantly affected by the epidemic to return their economic situation and inflation rate to stability and normality.

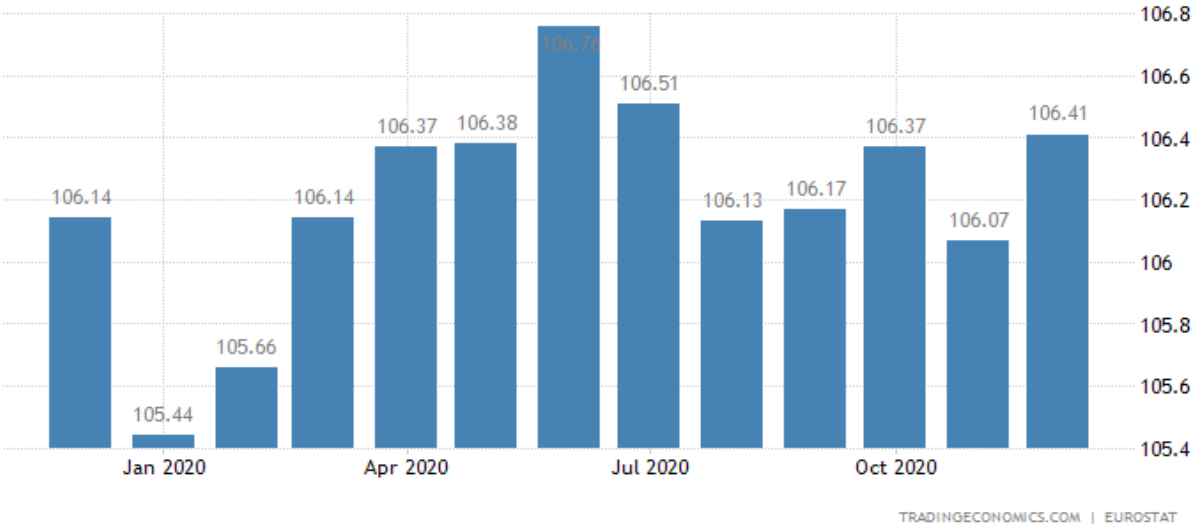


Figure 3. CPI of EU from Dec. 2019 to Dec. 2020 [8]

Figure 4 indicates the CPI in EU market from December 2021 to March 2022. It can be seen that the CPI in February 2022 was higher than the CPI in the last few months which achieved 113.65, higher than 112.67 in December 2021. While the recursive analysis provides clear evidence of a significant increase in inflation persistence (especially in the case of EU27, where upward trends can be clearly identified), the full sample results suggest that the effects of the two shocks considered are long-lasting, but only temporary [9]. Policies responding to these two shocks should also be temporary in nature, and indeed this appears to be the approach that governments are following, with measures taken to respond to the COVID-19 pandemic already phased out in most cases, and a clearly defined and limited time frame for responding to the energy crisis caused by the current conflict. Just like the European government's policies on the epidemic, if they adopt the right policies and measures when the European market is affected by the war between Russia and Ukraine, the impact on the European market will only be temporary.

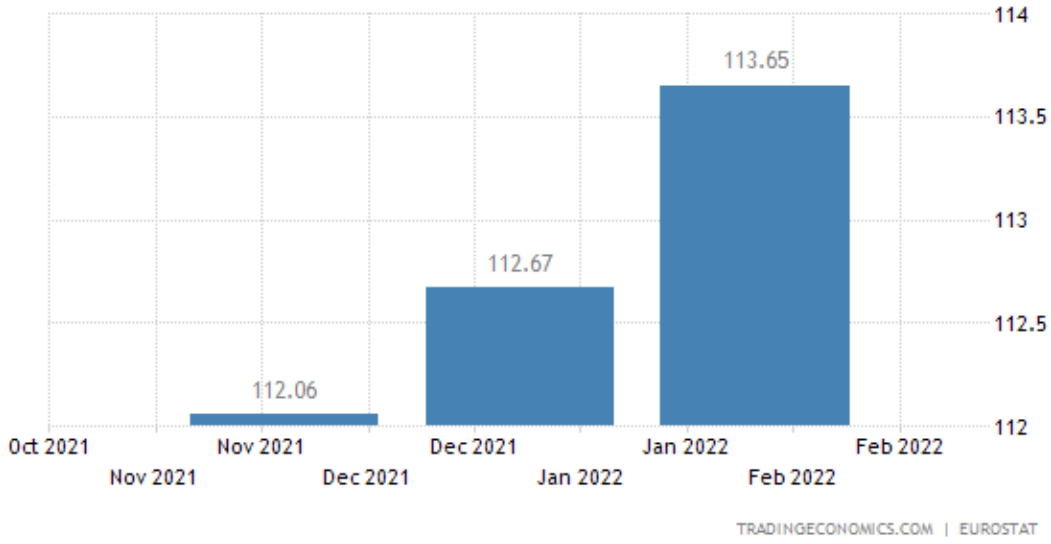


Figure 4. CPI of EU from Dec. 2021 to Mar. 2022 [8]

4. China Market

The Chinese market is also a large and important economic market. As the second largest economy in the world, the impact of the Chinese market on the epidemic and the Russia-Ukraine conflict is also worth studying. Figure 5 shows the CPI in China from December 2019 to December 2020.

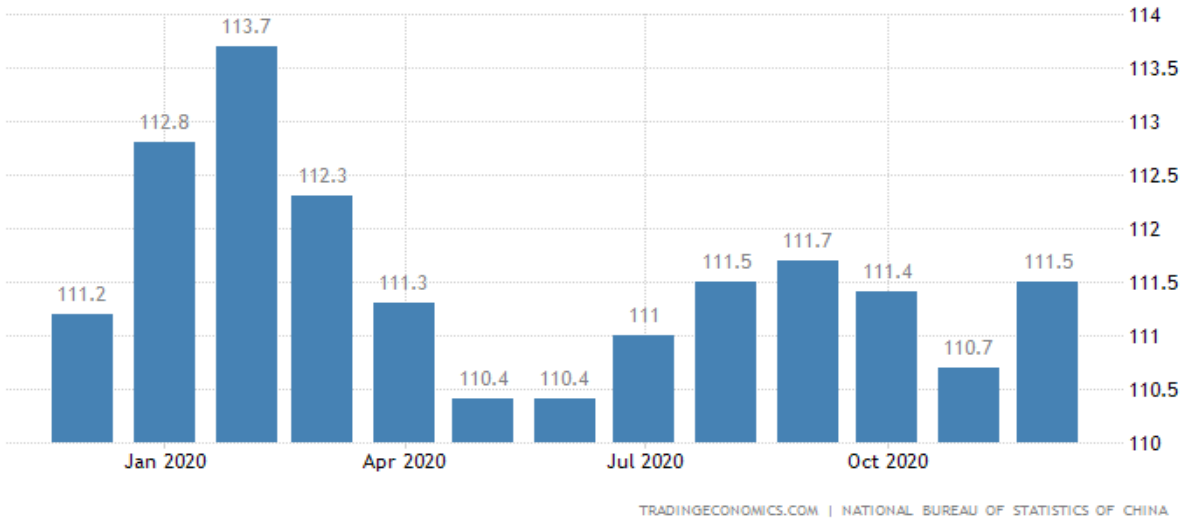


Figure 5. CPI of China from Dec. 2019 to Dec. 2020 [8]

It can be found that the consumer price index reached its peak at February which is 113.7, after that there was a marked and rapid decline in CPI, which reached its lowest point in May and June of the same year at 110.4, dropped from 3.3. After reaching the lowest value, CPI rose slightly, indicating that China's epidemic prevention and control policy had a certain resistance to the epidemic, which made the economic situation of the Chinese market not depressed for a long time, but it still did not recover to the same level compared with before the outbreak of the COVID-19. As can be seen from the picture, in November of the same year, CPI dropped significantly again, which was due to the small spread and outbreak of the epidemic in China in November 2020, which made the economic situation of the Chinese market hit turbulence again.

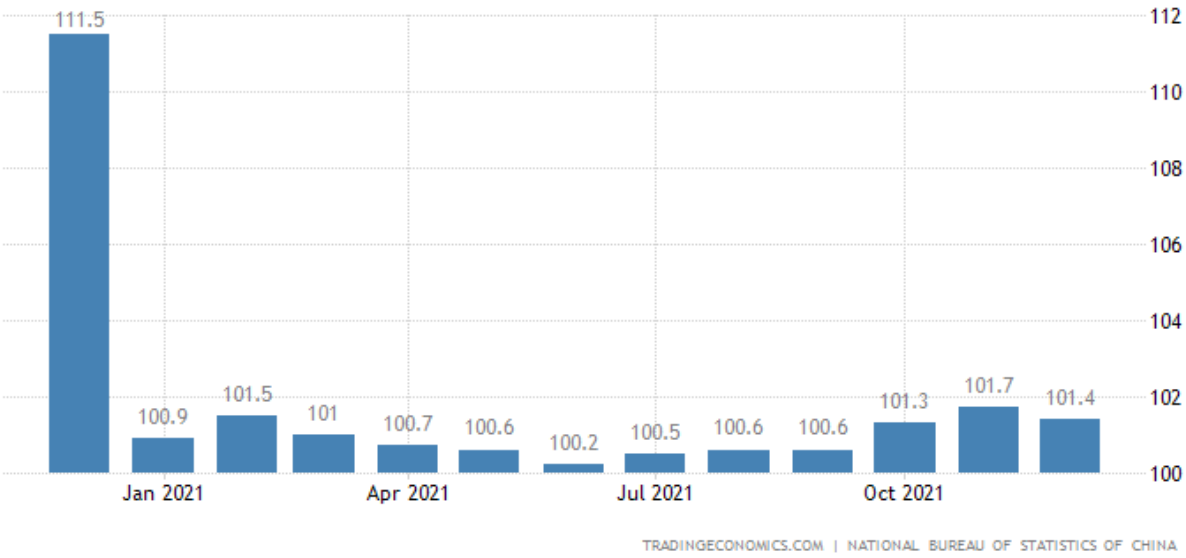


Figure 6. CPI of China from Dec. 2020 to Dec. 2021 [8]

Figure 6 is the CPI from December 2020 to December 2021 in China market. As can be seen from the picture, the consumer consumption index of China was very low in the whole year of 2021, which

had a huge downward trend at the beginning of 2021 and maintained a small fluctuation every year throughout 2021, indicating that the economic situation of China was very negative in this year. It can be concluded from the data that China was significantly affected by the epidemic in this year. In 2021, due to the high population density in China, COVID-19, a large-scale spreading disease, is difficult to be well controlled. The repeated outbreaks of COVID-19 force the Chinese government to adopt the most effective prevention and control method at present, namely the quarantine policy. This is the most effective way to control infectious diseases in a country with a high population density. However, with the popularization and implementation of this policy in various regions of China, it also restricts people's going out and consumption level, which is why there is a big gap in the consumption level of Chinese market in 2021 compared with other years.

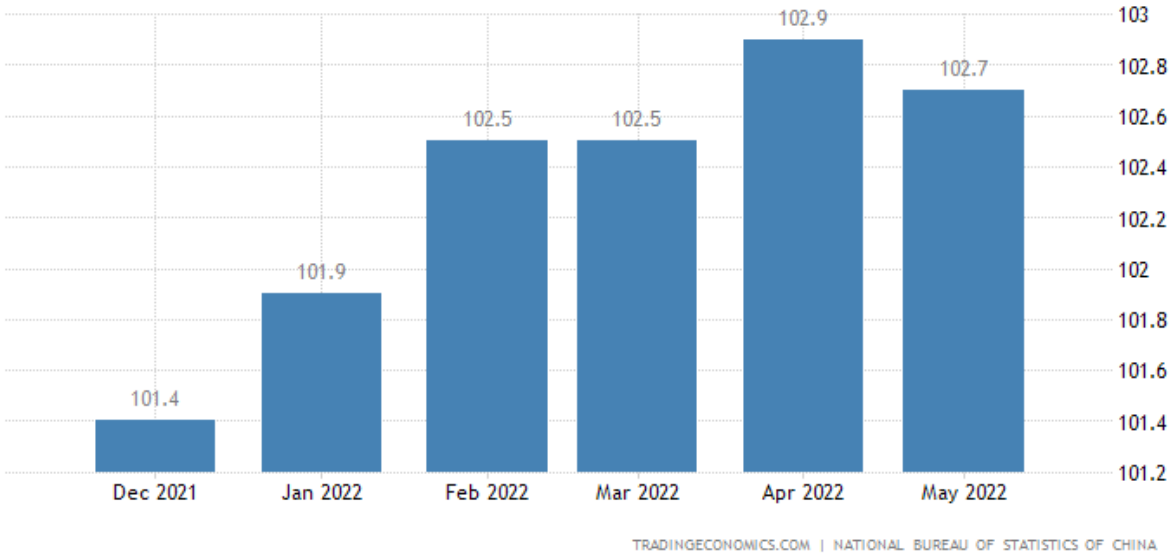


Figure 7. CPI of China from Dec. 2021 to May. 2022 [8]

Figure 7 is the CPI in certain time period from December 2021 to May 2022. The data collected in the figure was from December 2021 to May 2022 when Ukraine was suffering the conflict with Russia. It can be found that there was a slight increase of CPI in China market in February and it had a same level of price index in March. Coal's growing appeal in China was partly due to fuel switching caused by the rise in gas prices after Russia's invasion of Ukraine, but it also happened before that. After a power shortage in China in the fall of 2021, the country's energy regulator ordered domestic mines to ramp up production - approving more coal capacity as long as safety requirements were met - and stabilized prices by intervening in coal market pricing. The appeal of domestic coal to China has been further highlighted by the turmoil in energy markets triggered by Russia's invasion of Ukraine [10]. While energy-related challenges are great, rising levels of inflation, particularly food inflation, are making food unaffordable for most people on low and middle incomes. So the biggest impact of the war in Asia is likely to be on food security, as both Russia and Ukraine are the biggest players in global agriculture. The results show that the conflict between Russia and Ukraine has a certain impact on Asian countries, especially China, which has a certain demand for coal, natural gas and other energy sources. In addition, food also has an impact on specific consumer groups, which leads to the reason why China's CPI and inflation rate are also affected by the Russia-Ukraine war.

Figure 8 is the CPI from January 2020 to January 2023. As it shown, after the beginning of 2022, compared with 2021, China's CPI shows a rising trend, which is due to the gradual stabilization of the epidemic and China's strict control and implementation of prevention and control policies. Comparing the impact of the epidemic with that of the Russia-Ukraine war, the impact of the epidemic on China, a populous country rich in energy resources, is obviously greater than the impact of the Russia-Ukraine war on China's economic market. Recently, China has also implemented the same epidemic opening policy as Europe and the United States. The weakening and normalization of the

epidemic will inevitably bring changes and shocks to China's economic market again. In addition, it can be predicted that China's economic market will not recover as quickly as Europe's. Large-scale opening also means a large area of infection and outbreak of the epidemic, which will cause residents to lock themselves in their homes in the short term, thus leading to a decline in residents' consumption level. In the long run, such continuous infection will also lead to a downturn in China's economic situation.

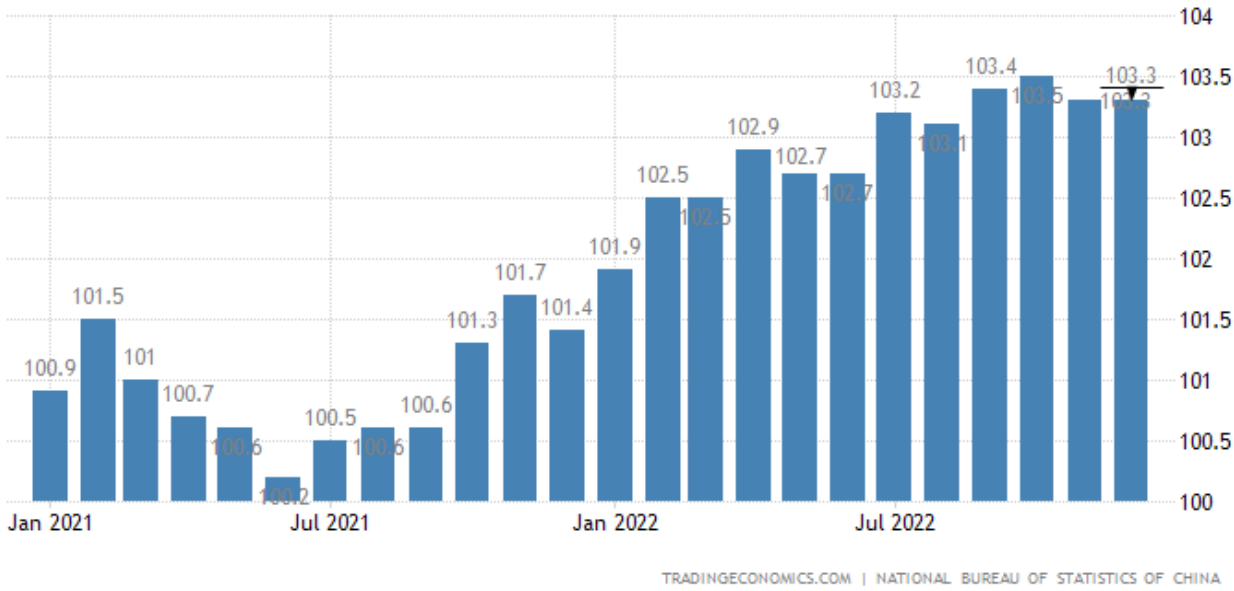


Figure 8. CPI of China from Jan. 2020 to Jan. 2023 [8]

5. Conclusion

Based on the data collected and the analysis, it can be shown that all three markets are influenced by both Covid-19 Pandemic and the Ukraine war to different extent. The American market, the European market and the Chinese market have all been impacted to varying degrees by the epidemic and the Russia-Ukraine conflict. The different measures taken by each country have also had different impacts on each market. The governments of each country have chosen harm minimization policies in accordance with their own national characteristics and conditions, which not only protect the health and safety of the people, but also minimize the impact on the economic situation. For US market, the effect was mixed, both Pandemic and Ukraine conflict affects the CPI significantly. For EU market, Ukraine war and COVID-19 both brought a strong impact on their economy. However, due to the early policy of opening up to the epidemic, although the initial stage of the epidemic had a great impact on the economy, the subsequent recovery of the economic situation was relatively stable and rapid. If European governments respond as effectively to the COVID pandemic as they have, the impact of the Ukraine conflict on economic markets will be only temporary. For China market, because of the lack of participation of the Ukraine war, the impact of the conflict should be the smallest. However, due to the high population density, for the sake of the health and safety of the Chinese people, the opening policy on the epidemic should not be premature, and the long-term closure is also the main reason for the poor economic situation in China. It can be predicted that the implementation of the opening policy on the epidemic at the present stage is bound to have an impact on the economic situation again. A large number of infections in a short period of time could again have a negative impact on the economy by making people less likely to go out.

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