

Inflation and Energy Crisis under COVID-19 Pandemic and Ukraine Conflict

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Abstract. COVID-19 started in late 2019 and Ukraine conflict started on February 24, 2022 have caused inflation and energy crises to the world. The aim of this paper is to research on the inflation and energy crisis under COVID-19 and Ukraine Conflict by analyzing three markets including the United States, Europe, and China through their reactions to the crises. This is because these three markets are three typical economic entities of the world which have features and representative. Detailed information has been acquired by the authors that the degree these three markets are influenced. Behaviors and measures taken to deal the situation would be analyzed through the relative economic data. Through comparison and analysis, the result is all these three bodies are affected at varying levels on import and export, job opportunity, industrial structure, agriculture and so on. From the study, the authors came to realize that China goes through the crisis relatively smoothly while the United States and Europe are more severely affected. Expectations of the macro situation will be introduced in the end.

Keywords: Ukraine conflict; COVID-19; inflation; energy crisis.

1. Introduction

On February 24, 2022, Russia launched the largest military operation against Ukraine since World War II, the Russia-Ukraine conflict, under the main circumstances that NATO's eastward expansion squeezed Russia's strategic space and living space. Because from the standpoint of Western countries, there is no reason for this conflict. Therefore, Russia has been subject to unprecedented comprehensive sanctions by Western countries, including: prohibiting several major Russian banks from using Swift's international settlement system has imposed personal sanctions on some Russian politicians, frozen their funds in Western banks, and prohibited financing for certain Russian companies [1]. Under such circumstances, Russia had no choice but to impose anti-sanctions on Western countries, including: cutting off natural gas pipelines to Europe, and reducing the production of grain and steel exported to the world [2]. Therefore, under such circumstances, with the further intensification of the conflict between Russia and Ukraine, the situation of energy crisis and inflation has become more and more serious and bad on a global scale. The reason why this is an inescapable topic is because of the energy crisis and inflation is closely related to each of us. The energy crisis makes us more expensive to use energy. It will be difficult for people to survive the severe winter. Refueling the car will also make people more and more burdened. According to statistics, only in the United States, the price of oil the increase was as high as 52%; while inflation caused people's living costs to soar, basic living materials became expensive, people's living standards began to decline, and society became unstable [3]. But so far, no scholars have conducted detailed research on this area. Therefore, this article aims to study the impact of the Ukraine conflict on the energy crisis and inflation in the United States, Europe, and China on a global scale, and to propose how people should respond to the energy crisis and inflation. Besides, in the context of the novel coronavirus sweeping the world, the inflation and energy crisis in Europe have become more severe and complicated.

Since the beginning of the Russia-Ukraine War on February 24, 2022, with the further intensification of the conflict between Russia and Ukraine, the further deepening of European

countries' condemnation and sanctions against Russia, and the gradual decoupling of Russia and Western European countries, inflation and the energy crisis are on the rise. The problem is getting more and more serious. This part aims to study and discuss the impact of the Russo-Ukrainian War on inflation and energy crises in Europe and some suggestions and proposals to reduce losses.

As the season enters winter, the temperature drops further, and people's demand for energy and food becomes more and more prosperous. However, the conflict between Russia and Ukraine does not mean that it will end at all, so the energy crisis and inflation problems have become increasingly common in Europe, especially in Western Europe. It is becoming more and more important and unavoidable. Under normal circumstances, the inflation rate is 3%-6%, but after the Russo-Ukrainian war, the overall inflation rate of the euro zone rose to 7.5%, "Frankfurt Allgemeine Zeitung" 12 Japan said that according to the latest statistics from the European Union, the inflation rate in March as a whole in Europe was as high as 7.5%, which is the highest inflation rate since the birth of the euro, and it is also the first time that the consequences of the conflict between Russia and Ukraine are reflected in the inflation data. In some countries, even Double-digit inflation rates: 15.6% in Lithuania and 11.9% in the Netherlands. According to reports, Germany's inflation rate reached 7.6% in March, of which fuel prices rose by 50%, cooking oil rose by 20%, and even basic Food and bread also rose by 7% [4]. At the same time, under the circumstances of inflation and energy crisis, the currency values of European countries have dropped seriously, which is very unfavorable for European countries to purchase foreign products. The politics of European countries have had a profound impact, causing serious social turmoil. Next, this article will discuss in detail the causes of European inflation and energy crises and some effective countermeasures.

2. The U.S. Market

The COVID-19 pandemic, which began in late 2019, and the war in Ukraine on February 24, 2022, have changed the economic order of countries around the world. For example, the two events have caused inflation and energy crises in the United States. First of all, the COVID-19 pandemic has dealt a huge blow to the US economy. Since the start of COVID-19 at the end of 2019, the U.S. inflation rate, unemployment rate and government debt have all skyrocketed. The inflation rate in the United States increased by 4.8% from 2.3% at the end of 2019 to 7.1% in November 2022. The highest inflation rate in the United States reached 9.1% in June 2022, which is the highest inflation rate in nearly 40 years (see Figure 1). The huge increase in U.S. inflation is reflected in the prices of food, gasoline, consumer goods and other goods.

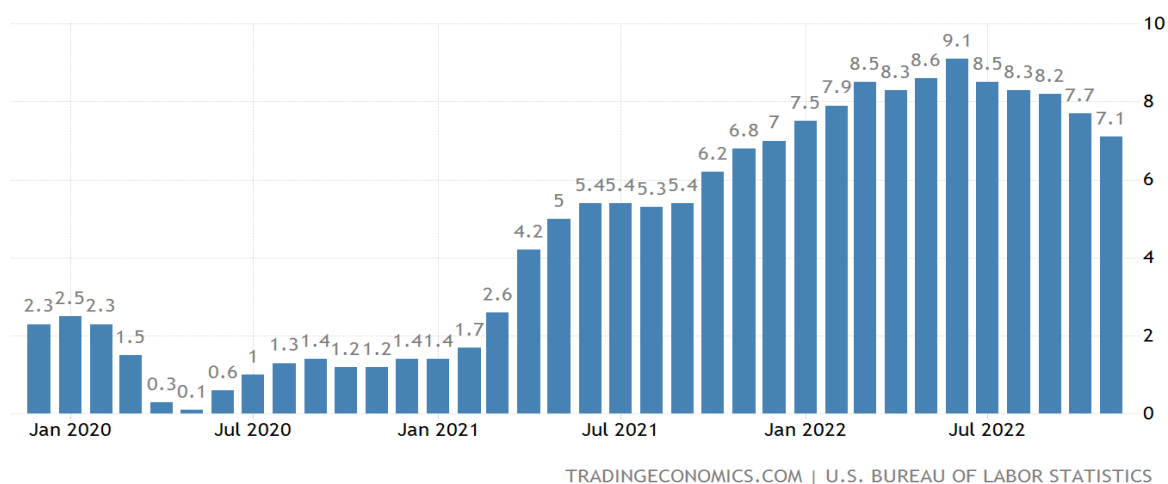


Fig 1. The U.S. inflation rate [5].

So what causes this? What's driving this trend? We all know that inflation is when the money supply is greater than the actual demand for money, that is, the purchasing power is greater than the

supply output, resulting in the devaluation of money. The most direct manifestation of inflation is the excess of money and the short supply of goods. On the one hand, the COVID-19 pandemic has led to severe supply shortages due to continued disruptions in global supply chains, factory bankruptcies or closures, logistical difficulties, labor shortages, and rising energy prices and production costs [6]. On the other hand, the "Rebooting the American Economy" released on April 16 has led to a gradual recovery of the economy in various parts of the United States, leading to the growth of consumer demand exceeding expectations. So it is the sharp rise in consumer demand and the lack of supply that is causing prices to rise.

In addition, the massive stimulus measures introduced by the US government in the wake of the COVID-19 outbreak have also contributed to the high inflation. So we can also analyze the causes of inflation from monetary and fiscal policy. On the monetary policy front, it took the Fed about two years between the outbreak and the beginning of this year to expand its overall balance sheet from \$4 trillion to \$9 trillion, with the Fed injecting a total of about \$5 trillion, an unprecedented pace. By comparison, it took the Fed more than twice as long and three rounds of quantitative easing to expand its balance sheet from \$1 trillion to \$4 trillion during the 2008 subprime crisis, an increase of \$3 trillion. In terms of fiscal policy, the total fiscal stimulus since COVID-19 is about \$6 trillion, about three times the total since the COVID-19 pandemic in the United States after the subprime crisis. At the beginning of 2019, the debt of the United States government was about 22000000 million USD, which increased by about 1000000 million USD at the beginning of the epidemic. This year, the debt of the United States government has been increasing dramatically, increasing to 31,413322 USD million in November 2022. Government debt was 137.2% of GDP in December 2021 (see Figure 2).

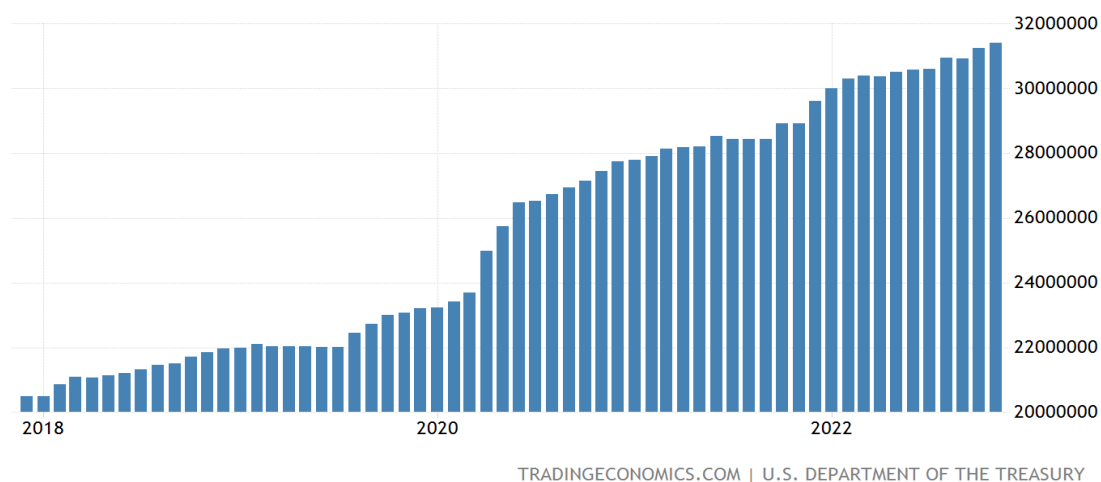


Fig 2. The U.S. government debt [5].

Since February 2022, the U.S. unemployment rate has risen, reaching a record high of more than 14 percent in April. The outbreak triggered a wave of job losses in the US, bringing to an abrupt end the longest period of job growth in US history. Nonfarm payrolls in March were negative for the first time since 2010, Labor Department data showed, while the rate of layoffs and firings was the highest since records began in 2000. Hiring fell to a record low in April, and the unemployment rate is 14.7 percent, the highest since the Great Depression, and accounting for statistical errors, the true unemployment rate is 20 percent. Initial jobless claims surged to 3.28 million on March 15 from 280,000 the week before, peaking at nearly 6.9 million in late March. Keith Hall, a former director of the Congressional Budget Office, put it bluntly: "Not even the Great Depression saw such a big drop." In the week ended May 30, initial jobless claims topped 1 million for the 11th straight week, bringing the total to 42.6 million -- more than the entire population of 22 less populous states and wiping out all the jobs created in the past decade in a single month [7]. But the U.S. unemployment rate has since declined, recently returning to its pre-pandemic level, which stood at 3.5 percent in September 2022 (see Figure 3).

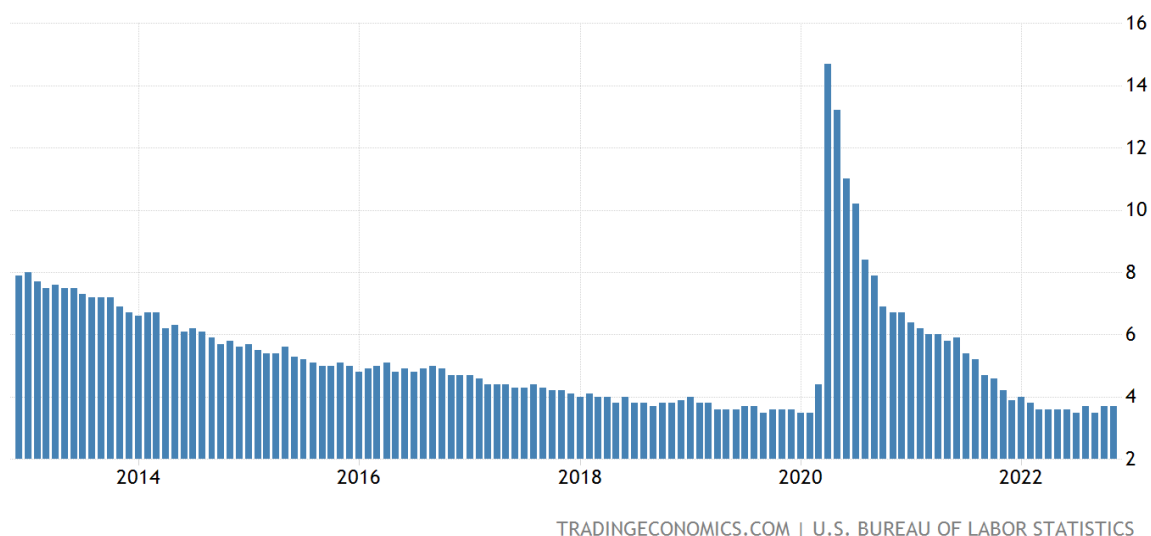
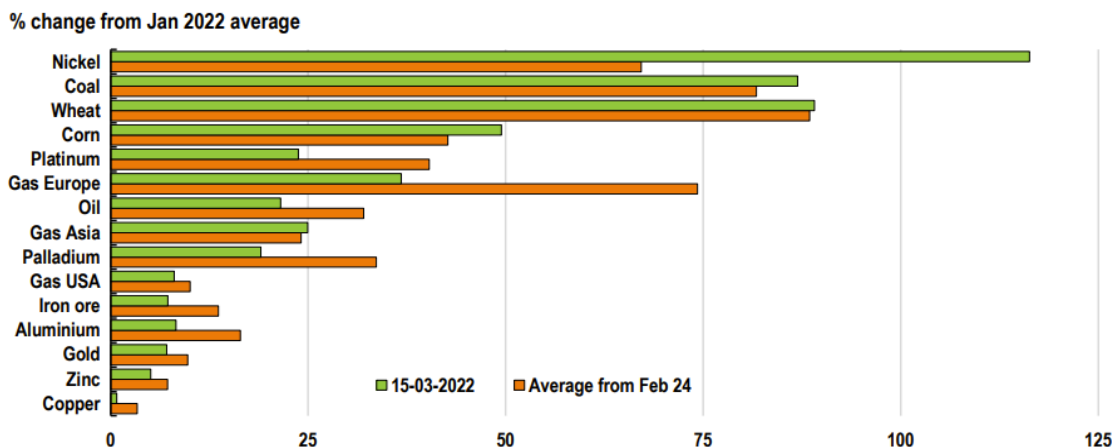


Fig 3. The U.S. unemployment rate [5].

Since the onset of the global COVID-19 pandemic in 2020, global demand has exceeded supply and rising food and energy prices have led to inflation. On February 24, 2022, Russian President Vladimir Putin decided to launch a special military operation in the Donbass region, and the Russia-Ukraine conflict officially broke out, which immediately attracted widespread global attention and has become one of the most serious military conflicts in the world. The outbreak of the conflict between Russia and Ukraine made the global economy worse, seriously affected the recovery of the global economy, the uncertainty of economic policies increased significantly, and the world economy again faced the risk of stagflation.

So why is the conflict in Ukraine so bad? Russia and Ukraine are the world's major energy and food suppliers. The escalation of the conflict between the two sides has led to increased tension in the international energy and food markets, rising prices of international crude oil, natural gas, agricultural products and gold, and significantly increased global inflation. On the energy front, the conflict between Russia and Ukraine has led to a spike in global energy prices, which has also led to sharp price increases in the United States. On the one hand, Russia is the world's second largest oil producer with abundant oil reserves, accounting for about 6.2% of the world's reserves, ranking the sixth in the world, and is one of the world's important crude oil exporters. Russia also has the world's largest natural gas reserves, accounting for about a fifth of the world's reserves and 12 percent of global gas exports. The outbreak of conflict between Russia and Ukraine will lead to a global energy supply crisis. On the other hand, Russia is a major supplier of crude oil and natural gas to European countries; at the same time, the energy industry is also the main pillar industry of Russia's economic development. Therefore, a series of retaliatory sanctions between the US, Europe and Russia have a great impact on both sides, resulting in the mismatch between global energy supply and demand, increasing the risk of global energy supply chain and further pushing up energy prices [8].

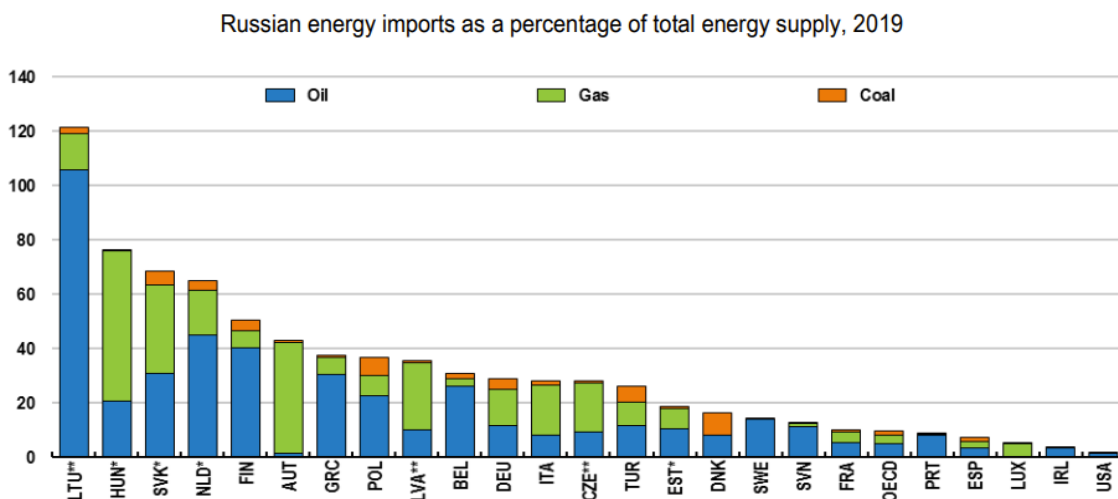
In addition to energy and agricultural products, Russia also has rich reserves of metal minerals such as palladium, nickel, platinum and gold. According to the OECD report. The outbreak of the conflict between Russia and Ukraine will directly affect the global supply of metal minerals and push up the price of metal minerals. After the outbreak of the conflict between Russia and Ukraine, the average price of various metals increased in different degrees, among which the price of nickel increased the most, about 110%. Platinum was next, with an average price increase of more than 40 percent. This is followed by the change of palladium about 30%. Then, the price of aluminum increased about 17%, Iron ore also experienced a significant increase for 15%. Other metal mineral prices (e.g. gold, zinc) also showed an upward trend (see Figure 4).



Source: Refinitiv.

Fig 4. The prices of the principal export commodities of Russia and Ukraine [9].

But the Russian conflict does not affect the United States as badly as it does other countries. While both the European Union and the US have imposed sanctions on Russia, the energy losses are quite different. The United States is energy-rich and less dependent on imports from other countries. In particular, due to the distance between the two countries, energy imports from Russia do not amount to much. In terms of oil, the U.S. imported 672,000 barrels of oil per day from Russia in 2021, just 8 percent of its total oil imports. As a result, the United States will not be much influenced by Russia. The European Union, by contrast, is energy-poor and highly dependent on imports. Moreover, the proximity of Russia makes it difficult for the EU to wean itself off its energy dependence on Russia. There is a limit to how much the EU can reduce Russian energy imports [10]. Looking at the APEC chart, we can also see that before the Russia-Ukraine conflict in 2019, the United States was almost the least dependent on Russian energy exports among most EU countries (see Figure 5).



Note: * Country imports include transit trade figures ** Figures include amounts that went to stocks.
Source: IEA World Energy Balances database; and OECD calculations.

Fig 5. Many EU countries import energy from Russia in 2019 [9].

However, just because the Russia-Ukraine conflict has little impact on the United States does not mean it has no impact. In fact, after the Russia-Ukraine conflict, oil and gas prices continued to rise in the United States, and the inflation rate experienced the large increase described above. The main reason is the dual impact of the COVID-19 pandemic and the Russia-Ukraine conflict. Even if the United States achieves energy independence, due to its high degree of integration with the global energy market, the United States has exported a large amount of energy to Europe since the outbreak

of the Russia-Ukraine conflict, greatly reducing its domestic oil product inventory and ultimately leading to inflation and higher energy prices in the United States and other countries. The only difference between the United States and other countries is that they don't have to worry about energy shortages and we don't have to be constrained by other countries. In addition, although the current high degree of integration with the global energy market has had adverse consequences for the United States, in the long run, it has also given the United States global influence and a voice in the energy market.

3. EU Market

In 2022, due to the skyrocketing price of natural gas in Europe, it will become the region with the highest price in the world. The reason is that due to the intense energy transition in Europe, the production of natural gas in Europe has declined seriously. Due to the friction between Russia and Ukraine, the supply of natural gas in Russia has fallen short of expectations, so the price of natural gas in Europe has risen rapidly, especially in the fourth quarter. The ratio increased nearly tenfold to \$32.39/MMBtu [11].

In the context of the Russo-Ukraine War, it is very difficult for Europe to advance its energy transition strategy. In 2020, the EU's overall dependence on oil and natural gas is 29.01% and 23.7%, respectively. Japan, the United Kingdom, and the United States are 31.5%, 35.0%, 34.6% and 24.3%, 36.9%, 41.2% dependent on oil and natural gas, respectively [12]. In comparison, European countries have relatively low dependence on these two fossil energy sources, and have reached a high level in the use of clean energy, and their use of nuclear energy is also better than that of the United States, the United Kingdom, and Japan. Even so, to reduce Europe's dependence on fossil energy, especially in a short period of time to reduce its dependence on Russia's imported energy, the entire energy sector must be adjusted. Whether it is time, financial resources or coordination among countries, Europe is facing huge difficulty. If it is necessary to quickly transform the entire energy system, it is not only necessary to rapidly increase the use of clean energy, but also to build and develop new energy transmission networks. The time left for European countries is very tight. In addition, the construction of new energy systems and the laying of oil pipelines also require the concerted efforts of European countries.

Since May 2022, the year-on-year growth rate of CPI in the 27 EU countries has continued to grow due to external supply shocks. Among them, "fat" accounted for 0.47%, "bread and grain" accounted for 2.77%, and food accounted for 15.1% of the CPI. In addition, the impact of the Russia-Ukraine conflict can also be reflected in inflation in European countries. Among them, the closer the country is to Russia, the higher the inflation rate. Among them, among the countries in the euro area, the inflation rates of Estonia, Lithuania, Latvia, Slovakia and Greece are 20.1%, 18.5%, 11.8% and 10.5% respectively. In addition, inflation rates in Bulgaria and Romania exceeded 11% [13]. While Europe is struggling to shake off the impact of the new crown epidemic, the sharply rising inflation rate in the context of the Russo-Ukraine war will undoubtedly make the region's economy worse.

After the outbreak of the Russia-Ukraine conflict, the import and export trade volume of the entire EU to Russia has fallen off a cliff, which is not only closely related to the war itself, but also related to the sanctions imposed by Europe and the United States on Russia. After the outbreak of the Russia-Ukraine conflict, Russia's merchandise trade surplus with Europe increased rapidly, which directly led to the direct deterioration of the overall European economy. Of the 38.97 billion euros and 47.66 billion euros in net exports, exports to Russia decreased by 10.35 billion and 16.42 billion euros respectively (see Table 1) [14]. From the perspective of European production enterprises, it is difficult to transfer the upstream pressure of raw materials to downstream consumers, so this has caused great pressure on the profits of European enterprises. On the other hand, in terms of income, the income of people in Europe has not shown a significant downward trend. In May 2022, the unemployment rate in Europe was 6.6%, compared with 6.9% in January. Secondly, from the perspective of wage income, labor costs in European countries are clearly showing a continuation of rising posture. In the first

quarter of 2022, the hourly labor cost index in European countries rose by 3.7% year-on-year, and Germany rose by 4.5%. This means that inflation has brought great pressure to the operation of upstream enterprises and labor units.

Table 1. European trade with Germany and Russia, January-March 2022 [14].

	27 European Union states		Germany	
	Export/billion	Import/billion	Export/billion	Import/billion
January	71.33	194.85	21.39	39.89
February	74.02	209.50	21.62	37.02
March	38.59	234.03	10.20	44.31

The impact of the Russia-Ukraine conflict on the European economy is profound. Besides, in the context of the novel coronavirus sweeping the world, the inflation and energy crisis in Europe have become more severe and complicated. Much of the turmoil in the European economy has come from the energy sector. Europe is a leader, with the conflict between Russia and Ukraine resulting in energy prices and rising energy and raw material prices causing inflation to continue to rise in the world's major economies. Europe's economic woes have been exacerbated by the Russia-India conflict at a time of high inflation and strong global macroeconomics. Monetary and fiscal policy room for maneuver will be more limited. Part of the fallout from the Russia-Ukraine conflict has been caused by European sanctions against Russia. Sanctioning Russia is a "double loser" for both Europe and Russia. But Europe also wants balance or balance. Europe's strategy is to do the most damage to Russia, to the extent that it is strength, but at a lower cost. For example, European sanctions on Russian oil pipelines are a buffer zone that must be left with some leeway, and sanctions on Russian banks are incomplete. Finally, in the case of high inflation, people can resist inflation by buying some precious metals, houses and buying antiques.

4. China Market

Compared to Europe and US, China suffers lower influence by COVID-19 and Ukraine Conflict. Take the US for example, Chinese people attach more attention to food and clothing, but people in the US take more attention to travelling and living condition. According to statistic data, the proportion of food in the total CPI in China is 18.4% while the US is 7.8%. The proportion of clothing in the total CPI in China is 6.2% while the US is 2.8%. The proportion of house rent in total CPI is 16.2% while the US is 32%.The proportion of transportation in total CPI is 10.1% while the US is 15.1%. Although COVID-19 makes no benefit to Finance, China is the first country to emerge and resume economic growth-as early as the second quarter of 2020.Chinese government issues special bonds to deal with economic fluctuations. In this way, Chinese financial industry and securities are not like US with big up and downs. Despite falling, but steady improvement. COVID-19 has been well controlled in China, but spread in a high speed in foreign countries. In a way, this is good to companies and people of all walks of life. Pochmann, president of the Institute of Applied Economic Research says: "Countries like China and Brazil have a recipe for growth that is not the recipe for growth sustained in papers, it is a growth sustained in production, in commerce, in employment" [15]. In comparison to open management, Chinese government conducts a strict control of management, which promotes online education and online office. This leads to the development of some industry. During the period of COVID-19, the Internet industry develops better and better, which supplies chances for the unemployed. By these measures, the China's CPI increased by 2.1% while core CPI increased by 0.9% last year. As of May this year, the inflation rate of China is 1.5%, which is apparently lower than EU and US. In general, the correlation between PPI and CPI is strong. If the price of means of production becomes higher, the consumer price also becomes higher. But in recent years, different situation has emerged in China. In May 2020, the PPI in China decreased by 3.7%.

In October 2021, the PPI of China increased by 13.6%. During this period, the Chinese CPI is relatively stable. That's because there is price divergence between pig and food cycle.

Despite the smooth situation, China suffers bad influence in many aspects, such as destroy of industrial structure [16]. Although it shows an increase with online sales volume, a large amount of real economies are destroyed or facing a risk of bankrupt. On the one hand, COVID-19 has been a disaster of the world, many countries established different restrictions with entry and transport because of this, making a range of impacts with international connections. External demand sharply decreased and the difficulty of reaching new orders becomes higher. Global energy prices become higher and higher because of Ukraine conflict. Russia is one of the second crude oil exporting countries. In 2021, the value of exports of natural gas, coal, oil and liquefied natural gas account for 27.0%, 15.5%, 12.0%, and 8.1% of the total in the world [17]. Recently, North Sea Brent crude futures rose to 140 per bucket, which has an impact on global economy.

5. Conclusion

The detailed analysis in this paper shows that all these three entities suffer a lot. During COVID-19 and Ukraine Conflict in the area of energy transition, leading to inflation and energy crisis. Ukraine conflict causes the serious decline of the production of natural gas. The whole energy system is destroyed and the degree of the influence depend on the degree that the market relies on the energy. In contrast to US and EU, China spent a relatively smooth time during the disaster. This conclusion can be drawn by referring to the latest data and using a different measure of pay inequality. As the adjustment period of the COVID-19 is over and the Ukraine Conflict is coming to an end, we can estimate that the future situation will be relatively smooth. However, detailed data in the future is the basic. Future research on COVID-19 and Ukraine conflict might focus on how to deal with the post-pandemic era since this paper deeply analyses the status quo and the reasons. Further experiments can be done to monitor the future development of the finance situation of these three entities. Since Chinese government removed the inner control of the COVID-19 and have a trend towards opening entry and exit gradually, how this will affect Chinese even the world's finance is another interest subject as well.

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