

Gas Prices and Oil Prices under the Russia-Ukraine War Regression Analysis of Inflation

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Abstract. In the context of the Russia-Ukraine war, this paper analyzes the impact of the changes of oil prices and natural gas prices on the core inflation rate, inflation rate, CPI and other factors in different types of countries. This paper argues that the changes in oil and gas prices caused by the Russia-Ukraine war have a significant impact on the inflation of developed countries, while the impact on the core inflation rate and CPI is not significant.

Keywords: Russia-Ukraine War; Inflation Rate; The Price of Oil; Natural Gas Price.

1. Introduction

On February 24, 2022, Russia announced a "special military operation" in eastern Ukraine, which was followed by a large-scale armed conflict between Russia and Ukraine, triggering a new round of Ukraine crisis. Up to now, the conflict between Russia and Ukraine has lasted for 13 months. This conflict has lasted longer than anyone can imagine, and has brought a series of effects and consequences. Russia-ukraine War had a certain impact on the world pattern system which had been peaceful for a long time, and caused a series of problems.

First of all, petrochemical energy. Russia is known to have huge oil fields, and every year Europe imports a lot of Russian oil for industrial production and automobile transportation. But after the outbreak of Russia and Ukraine, European countries imposed economic sanctions on Russia, which caused Russian oil prices to plunge. The Russian government later retaliated, saying it would rather not export oil than accept price sanctions from European countries, which briefly caused oil prices in European countries to spike. Most chemical plants relying on oil as energy can only save energy and reduce production, which also affected the economic development of Europe. The shortage of petroleum and chemical energy supply has led to a sharp rise in oil prices in Europe.

Second, food security. The outbreak of the war between Russia and Ukraine has seriously affected food security and production. If governments do not seek a solution, it may cause turmoil in the whole world food system and further curb the development of the world economy. Russia as an agricultural country, on the agricultural production is very high, among them 18% 14% of the world's wheat and barley are produced from Russia and Ukraine territory, occupies a relatively large proportion in the global food market. The war is bad news for many countries that depend on food imports, which may face high prices and may have to find other trading partners. Russia-ukraine War had a great impact on our country likewise. China has always been a strategic cooperative partner with Russia, and has close cooperation in the fields of agriculture, industry and service industry. Every year, a large amount of food needs to be imported from Russia. However, as the conflict between Russia and Ukraine continues to intensify, this may affect our food security. To sum up, the Russia-Ukraine war may lead to a food crisis, which will also lead to serious inflation through the grain market level.

Finally, there is the impact on the European countries themselves. Every day, the war needs to spend a huge amount of financial and material resources to maintain equipment maintenance, personnel salaries, medical expenses, weapons manufacturing, etc., which will put a huge burden on the economies of both countries. Although Ukraine's economic and military strength is far behind that of Russia, Ukraine is backed by military and economic aid from the United States and NATO countries. Although from the current world pattern, the United States and NATO countries have been resistant to the continuous delivery of supplies to Ukraine, and sanctions against Russia in various aspects have caused impacts on their own economies, from the above aspects of food security issues,

oil and energy issues, the Russia-Ukraine war seems to have become a bottomless pit. Both sides are spending huge amounts of money and material on the border every day, and neither side is willing to compromise. In addition, the massive loss of population caused by the war will also lead to problems in the productivity of various countries, and the decrease of output will lead to insufficient supply and eventually lead to the inflation situation on a global scale.

I collected the core inflation rate, inflation rate, CPI, whether developed country, whether OECD, whether OECD, distance from Ukraine and Russia, GDP, gas prices, oil prices, coal production, food inflation, import prices, export prices, consumer goods for 110 countries in the world during the outbreak of the war between Russia and Russia Detailed data on price coordination index and producer prices, and how the Russia-Ukraine War affected inflation and other economic indicators, I found: The effect of changes in gas and oil prices on the inflation rate is significant, but the effect of gas and oil prices on core inflation, CPI, food inflation, import prices, export prices, the Consumer price reconciliation index, and producer prices is not significant.

Gregory D. Hess (1995) et al. believe that war is inevitable under a certain probability, the randomness of war depends on the ability of leaders, and whether war can be avoided also depends on the political motives of national leaders. Although wartime damage reduces our production and consumption capacity, The political consequences of the war may have produced higher per capita consumption growth. However, Iris Kesternich et al. (2014), in their study on the economic and health effects of the Second World War on the later years of life, constructed three kinds of war exposure measurement criteria, namely deprivation of property, persecution, local fighting and exile experience, indicating that the middle class was more seriously affected by the large-scale war. If the economy produces class war, social conflict and technological progress, the loss of growth will be complicated in the long run. In the past, the generals have been accused of fighting false inflation. Thus, when prices rose in the United States in 1946-48, attention was focused on bargaining for successive rounds of increases in collective wages, but most economists today now agree that postwar price rises were mainly due to demand pull, this pull is due to the accumulation and deferral of current assets during wartime (Nicholas Kaldor, 1959; Paul A. Samuelson and Robert M. Solow, 1960).

After the war, money is printed in large quantities, prices rise, costs rise and supply exceeds demand. If appropriate policies are not adopted to improve it, it will easily lead to inflation. And inflation doesn't just affect war-affected countries, it affects the global economy as well. Liu Zhigang (1989) believed that inflation, as a worldwide problem, had different causes in different countries, or even in the same country at different stages of economic development. China's current inflation is the result of the mutual action of financial guarantee, investment expansion and the indiscriminate allocation of capital. Zhang Tianding (2013) pointed out that the change of international commodity prices significantly affected China's inflation dynamics in a statistical sense. Zhu Zixiang et al. (2023) built a medium-scale open economy model and analyzed that the cyclical sensitivity of domestic inflation to foreign output would weaken with the decline of trade openness, but the cyclical sensitivity of domestic inflation to domestic output would not change significantly with the decline of trade openness.

As far as the Russia-Ukraine war is concerned, the Russia-Ukraine war will have an impact on food security. There is a lot of literature on food security. For example, Lu Qianwen (2022) pointed out that food security is a security line to ensure national security and the primary task of rural revitalization in China. The military war caused by the conflict between Russia and Ukraine will not only affect the agricultural production of the two countries, but also cause a huge impact on the global trade system. Therefore, it is very necessary to discuss how to guarantee the national food security and what measures should be taken to prevent risks. Yao Shujie and Wang Jiefei (2022) also said that the Russian crisis is increasingly evolving into a major world political game, which will bring great uncertainty and threat to world food security. Although at present, the short period of perfecting the grain system will not cause great impact, it will intensify the food security supply crisis in the long term.

In the field of world economy and finance, Wang Zhan (2022) and other scholars say that the Russia-Ukraine conflict has an intensified impact on the periodic operation crisis of the world economy, and is a change in the international system and order affecting the whole body. The complexity of impact on the economic field will cause unprecedented international impact. He Qing (2022) said that a series of influences such as inflation evolved from the Russia-Ukraine war, especially the interest rate hike in the United States, would have a huge impact on our financial market, and it is very important for China to seize the "window period", improve international strength and cope with financial challenges. Wang Yu (2022) also proposed that in order to make steady progress under the current situation of drastic interest rate hikes by many countries, China needs to take continuous measures to stabilize the market and curb inflation.

A war between Russia and Ukraine would create a crisis of energy conflict. Chen Chunhua (2022) believes that Russia has a huge area of oil fields, and every year Europe imports a large amount of oil from Russia for industrial production and automobile transportation. However, due to the Russia-Ukraine war, Europe has imposed economic sanctions on Russia one after another, which will lead to the rise of the four energy contradictions between Russia and Europe, and also cause certain turbulence in the world energy system. Pu Zhengning (2015) mentioned that the gas dispute between Russia and Ukraine will have an impact on the international trade system and the global economy, and no country can be immune from global integration. Yi Xiaozhun (2022) also analyzed in the literature that the conflict between Russia and Ukraine would have a huge impact on the international economic and trade pattern, especially in the aspect of energy security, and would urge all countries to build an energy security system. The existing literature mainly studies the impact of the war on Russia and Ukraine from the aspects of food security, world economy and finance, energy conflicts and international trade, but less from the perspective of inflation. This paper not only analyzes from the perspective of food, economy and finance, energy and international trade, but also analyzes the influence of inflation brought by the war between Russia and Ukraine. At present, the relevant literature at home and abroad is insufficient, so this paper will contribute to the literature in this field. In general, this paper will combine the latest economic, political, cultural and other data to specifically study the inflation problem derived from the war between Russia and Ukraine.

2. Data

According to the website of economic indicators and the United States energy information administration has collected more than one hundred countries from November 2021 to July 2022 data, the data covered a wide range of topics, Including the economy, food and energy. This section briefly describes the sources of the data and the variables.

My data covers the economies of more than 100 countries from November 2021 to July 2022, Specific variables include inflation rate, core inflation rate, CPI, OECD status, OECD status, developed status, distance from Russia and Ukraine, GDP, production and prices of various energy sources, food inflation, import prices, export prices, consumer price harmonization index and producer prices. The inflation rate in developed countries is the most significant.

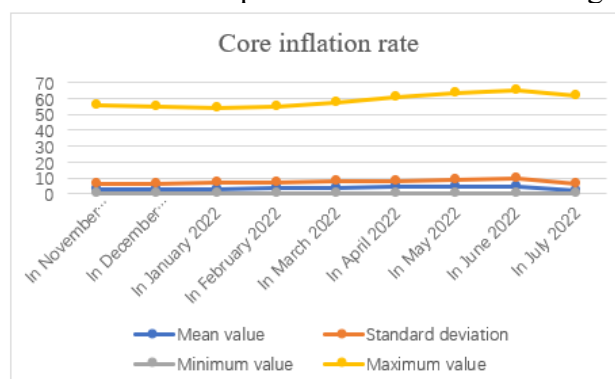


Figure 1. The change trend of core inflation rate from November 2021 to July 2022

Figure 1 describes the change trend of core inflation rate from November 2021 to July 2022. The mean value and standard deviation increase first and then decrease, the minimum value is 0, and the maximum value decreases first and then increases.

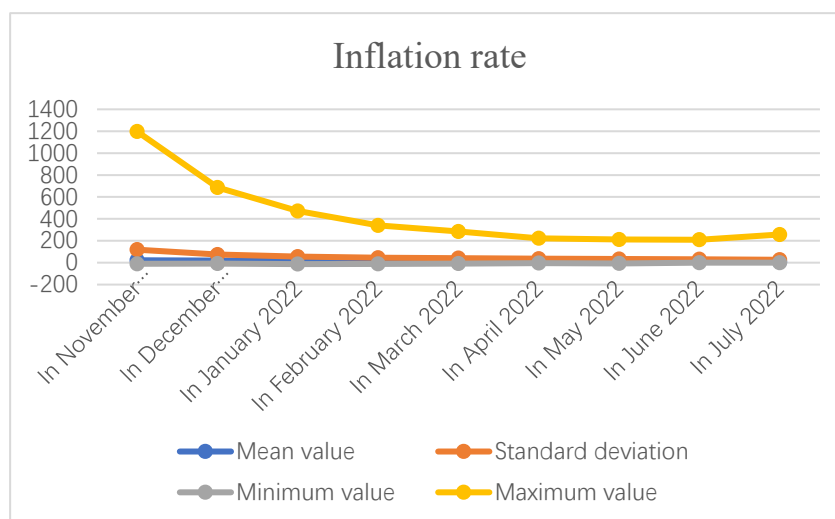


Figure 2. The changing trend of the inflation rate from November 2021 to July 2022

Figure 2 describes the changing trend of the inflation rate from November 2021 to July 2022, with the mean, standard deviation and maximum decreasing month by month and the minimum increasing month by month.

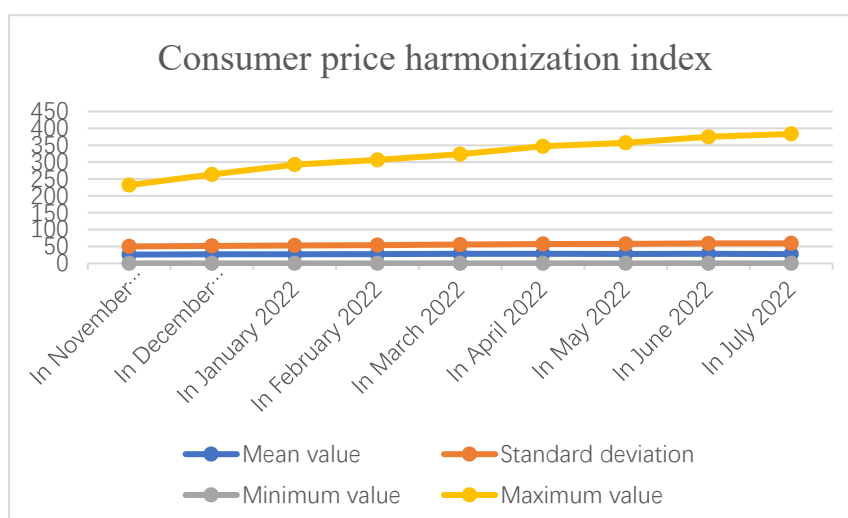


Figure 3. The change trend of the CPI from November 2021 to July 2022

Figure 3 describes the change trend of the CPI from November 2021 to July 2022. The mean value, standard deviation and maximum value increase month by month, while the minimum value is 0.

3. Regression Results

3.1 Core Inflation

$$\text{Core inflation} = a_0 + a_1 * \text{price}(\text{natural gas}) * \text{time} + a_2 * \text{price}(\text{natural gas}) + a_3 * \text{time}$$

$$\text{Core inflation} = a_0 + a_1 * \text{price}(\text{oil}) * \text{time} + a_2 * \text{price}(\text{oil}) + a_3 * \text{time}$$

Table 1. Core inflation rate

Core inflation rate								
	Distance free effect	Distance influence	Developed country	Developing country	OECD	none- OCED	European OECD	none- European OECD
Panle A:Natural gas price								
did gas price*time	-0.828	-0.695	-0.336	0.833	-0.551	-0.762	-0.320	-0.782
	(0.670)	(0.705)	(0.408)	(0.950)	(1.246)	(0.827)	(0.536)	(0.860)
Loggas_price	2.482	2.337	1.927	2.494	1.792	2.590	2.307	2.343
	(1.815)	(1.911)	(1.107)	(2.575)	(3.376)	(2.240)	(1.451)	(2.330)
time	1.378	1.161	0.636	1.363	1.204	1.142	0.639	1.282
	(1.197)	(1.260)	(0.730)	(1.698)	(2.226)	(1.477)	(0.957)	(1.536)
log distance to Russia		-1.037***	0.495***	-3.200***	-1.537***	1.416*	0.909**	-1.051***
		(0.271)	(0.101)	(0.621)	(0.307)	(0.615)	(0.327)	(0.310)
log distance to Ukraine		-0.074	0.673***	1.020	-1.262*	0.548	0.422	-0.258
		(0.388)	(0.174)	(0.571)	(0.494)	(0.509)	(0.506)	(0.458)
constant	-0.251	9.441*	9.254***	19.300**	24.553***	-18.067**	4.138	11.256*
	(2.902)	(4.315)	(2.411)	(6.372)	(6.956)	(6.161)	(4.117)	(5.546)
observation	990	893	252	641	288	605	171	722
Panle B:Oil price								
did oil price*time	0.830	0.915	0.915	0.915	0.656	1.036	1.211	0.847
	(1.021)	(1.075)	(0.617)	(1.449)	(1.900)	(1.260)	(0.807)	(1.311)
logoil_price	7.663**	7.184*	4.742**	8.121*	5.792	7.830*	5.467*	7.582*
	(2.920)	(3.074)	(1.765)	(4.144)	(5.435)	(3.602)	(2.308)	(3.749)
time	-4.098	-4.445	-4.222	-4.531	-2.934	-5.146	-5.539	-4.192
	(4.668)	(4.915)	(2.822)	(6.624)	(8.689)	(5.759)	(3.690)	(5.994)
log distance to Russia		-1.037***	-0.495***	-3.200***	-1.537***	1.416*	-0.909**	-1.051***
		(2.700)	(0.100)	(0.620)	(0.306)	(0.613)	(0.322)	(0.310)
log distance to Ukraine		-0.744	-0.673***	1.021	-1.262*	0.548	0.422	-0.258
		(0.338)	(0.173)	(0.570)	(0.493)	(0.507)	(0.499)	(0.457)
constant	-31.281*	-19.640	-9.354	-13.802	0.986	-49.705**	-17.199	-19.619
	(13.174)	(14.200)	(8.128)	(19.316)	(24.912)	(17.004)	(10.941)	(17.408)
observation	990	893	252	641	288	605	171	722

In Table 1 panle A, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further controlled the distance between the country and Russia and Ukraine respectively, and the interaction term coefficient increased from -0.828 to -0.695. Only the result in the seventh row was significant at 1%. I further divided these countries into developed countries and developing countries, and the results were shown in the third and fourth columns. For developed countries, although the results in the first six rows were not significant, regression analysis found that when the distance between developed countries and Russia increased by 1%, the core inflation rate would increase by 0.495%, which was significant at 1%. When the distance between the developed country and Ukraine increases by 1%, the core inflation rate increases by 0.673, which is significant at 1%. For developing countries, only the distance between the developing country and Ukraine is significant at 1%. After that, I further divided these countries into OECD, non-OECD, OECD in Europe and OECD in Europe, and the results were shown in the fifth to eighth columns respectively. In OECD, although the results in the first six rows were not significant, the regression analysis found that when the distance between OECD and Russia increased by 1%, the core inflation rate would decrease by 1.573%. This result is significant at 1%; When the OECD's distance from Ukraine increases by 1%, core inflation falls by 1.262%, a result that is significant at 10%.

In panle B, in the first column of this table, the influence of oil price is significant without the influence of distance. Through regression analysis, I find that when the oil price rises by 1%, the core inflation rate will rise by 7.663%, which is significant at 5%. In the second column, I further control the distance from the country to Russia and Ukraine, and the interaction coefficient becomes larger, increasing from 0.830 to 0.915. Through regression analysis, I find that when the oil price rises by 1%, the core inflation rate will rise by 7.184%, which is significant at 10%. When the distance between the distance-affected country and Russia increases by 1%, the core inflation rate decreases by 1.037%, which is significant at 1%. Then I further divided these countries into developed countries and developing countries, and the results were shown in the third and fourth columns. For developed

countries, although the interaction terms were not significant, regression analysis showed that when the oil price rose by 1%, the core inflation rate would increase by 4.742%, which was significant under 5%. When the distance between the developed country and Russia increases by 1%, the core inflation rate decreases by 0.495%, which is significant at 1%. When the distance between the developed country and Ukraine increases by 1%, the core inflation rate decreases by 0.673%, which is significant at 1%. For developing countries, although the distance between the interaction term and Ukraine is not significant, regression analysis shows that when the oil price rises by 1%, the core inflation rate will increase by 8.121%, which is significant at 10%. When the distance between the developing country and Russia increases by 1%, the core inflation rate decreases by 3.2%, which is significant at 1%. After that, I also divided countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8 respectively. For non-European OECD, although the results in rows 1, 5 and 9 are not significant, the results in row 3 are significant under 10%, and the results in row 7 are significant under 1%.

3.2 Inflation Rate

$$\text{Inflation rate} = a_0 + a_1 * \text{price}(\text{natural gas}) * \text{time} + a_2 * \text{price}(\text{natural gas}) + a_3 * \text{time}$$

$$\text{Inflation rate} = a_0 + a_1 * \text{price}(\text{oil}) * \text{time} + a_2 * \text{price}(\text{oil}) + a_3 * \text{time}$$

Table 2. Inflation rate

Inflation rate								
	Distance free effect	Distance influence	Developed country	Developing country	OECD	none- OCED	European OECD	none- European OECD
panleA:Natural gas price								
did gas price*time	0.047 (5.117)	0.196 (5.558)	-0.604 (0.419)	0.478 (7.634)	-0.646 (1.542)	0.507 (7.997)	-0.458 (0.510)	0.346 (6.825)
Loggas price	11.145 (13.867)	11.451 (15.062)	2.630* (1.136)	14.914 (20.690)	2.164 (4.179)	16.012 (21.673)	2.413 (1.383)	13.552 (14.497)
time	-2.179 (9.140)	-2.596 (9.929)	1.221 (0.749)	-4.028 (13.636)	1.606 (2.755)	-4.441 (14.284)	1.139 (0.911)	-3.459 (12.191)
log distance to Russia		3.823 (2.134)	-0.432*** (0.104)	9.920* (5.010)	-1.757*** (0.379)	20.595*** (5.986)	0.394 (0.311)	4.377 (4.463)
log distance to Ukraine		1.107 (2.667)	-1.714*** (0.179)	-4.088 (4.596)	-2.549*** (0.612)	-5.086 (4.928)	-1.528** (0.482)	-2.857 (0.634)
constant	-1.334 (22.171)	-43.017 (34.010)	17.974*** (2.474)	-53.979 (51.256)	38.273*** (8.610)	-140.958* (59.755)	10.264** (3.922)	-15.199 (44.024)
observation	990	893	252	641	288	605	171	722
panleB:Oil price								
did oil price*time	5.959 (7.815)	6.200 (8.489)	1.120 (0.628)	8.180 (11.660)	0.757 (2.353)	8.823 (12.214)	1.175 (0.768)	7.368 (10.424)
logoil price	13.384 (22.383)	12.893 (24.317)	6.734*** (1.795)	15.526 (33.419)	6.183 (6.730)	16.859 (35.012)	5.743** (2.195)	14.577 (29.870)
time	-28.936 (35.734)	-30.127 (38.817)	-5.102 (2.870)	-39.888 (53.315)	-3.156 (10.760)	-43.148 (55.849)	-5.135 (3.510)	-35.933 (47.666)
log distance to Russia		3.825 (2.134)	-0.432*** (0.102)	9.931* (5.010)	-1.757*** (0.379)	20.613*** (5.986)	0.394 (0.306)	4.380 (4.464)
log distance to Ukraine		1.106 (2.667)	-1.714*** (0.175)	-4.094 (4.596)	-2.549*** (0.611)	-5.093 (4.928)	-1.528** (0.475)	-2.859 (3.634)
constant	-45.139 (100.996)	-84.132 (112.336)	-8.627 (8.266)	-101.805 (155.922)	13.481 (30.848)	-193.215 (165.541)	-12.188 (10.406)	-60.754 (138.706)
observation	990	893	252	641	288	605	171	722

In Table 2 panle A, in the first column of this table, all variables are not significant without the influence of distance. In the second column, I further control the distance from this country to Russia and Ukraine respectively, and the interaction term coefficient increases, but it is still not significant. After that, I further divided these countries into developed countries and developing countries, and the results are shown in the third and fourth columns. Only the interaction terms of developed countries are not significant. I guess the possible reason is that the time involved in this paper is from November 2021 to July 2022, a total of 9 months, which is short and the time effect is not significant, but the price of natural gas has an impact on developed countries. Through my regression analysis, I

find that when gas prices rise by 1%, inflation rises by 2.63%, which is significant at 10%; When the distance between the developed country and Russia increases by 1%, the inflation rate will decrease by 0.432%, which is significant at 1%. When the distance between the developed country and Ukraine increases by 1%, the inflation rate decreases by 1.714%, which is significant at 1%. I also divide these countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8. In the OECD, although not significant in the first six rows, the regression analysis shows that when the distance between the OECD and Russia increases by 1%, the inflation rate decreases by 1.757%. This result is significant at 1%; When the OECD's distance from Ukraine increases by 1 per cent, inflation falls by 2.549 per cent, a result that is significant at 1 per cent.

In Table 2 panle B, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further controlled the distance between the country and Russia and Ukraine respectively, and the coefficient of interaction term increased but was still not significant. Then I divided these countries into developed countries and developing countries, and the results are shown in the third and fourth columns. Only the interaction terms of developed countries are not significant. I guess the possible reason is that the time involved in this paper is from November 2021 to July 2022, a total of 9 months, which is short and the time effect is not significant. Through my regression analysis, I find that when the price of oil rises by 1%, the inflation rate rises by 6.734%, which is significant at 1%; When the distance between the developed country and Russia increases by 1%, the inflation rate will decrease by 0.432%, which is significant at 1%. When the distance between the developed country and Ukraine increases by 1%, the inflation rate decreases by 1.714%. This result is significant at 1%, and the developed country is more affected by the price of oil than the price of gas. I have also divided the countries into OECD, non-OECD, European OECD and non-European OECD. The results are presented in columns 5 to 8. For the OECD, while the results in the first six rows are not significant, the results in rows 7 to 10 are significant at 1%.

3.3 CPI

Table 3. CPI

CPI								
	Distance free effect	Distance influence	Developed country	Developing country	OECD	none-OCED	European OECD	none-European OECD
panleA:Natural gas price								
did_gas_price*time	-127.249	-138.682	-6.006	-189.571	-3.659	-201.301	-0.623	-170.671
	(292.036)	(317.286)	(44.956)	(434.089)	(41.775)	(457.968)	(962.242)	(388.226)
Loggas_price	-353.467	-387.213	19.784	-543.322	8.312	-570.645	1.148	-477.199
	(791.365)	(859.789)	(121.824)	(1179.302)	(113.204)	(1241.012)	(168.665)	(1052.023)
time	210.550	229.695	9.350	314.212	8.510	332.275	3.373	282.137
	(521.764)	(566.878)	(80.321)	(775.562)	(74.638)	(818.226)	(111.204)	(693.621)
log_distance_to_Russia		225.257	-53.428***	844.249**	-61.415***	1104.114***	-211.657***	277.259*
		(121.743)	(11.143)	(283.630)	(10.277)	(340.643)	(37.946)	(140.053)
log_distance_to_Ukraine		-261.519	-99.463***	-855.615	-89.482***	-952.973	-24.945	-604.388***
		(152.273)	(19.200)	(260.973)	(16.572)	(281.847)	(58.837)	(206.786)
constant	1338.542	1688.853	1379.114***	1796.788***	1403.071***	427.626***	2165.575***	4489.370
	(1265.31)	(1941.30)	(265.376)	(2910.437)	(233.253)	(3412.817)	(478.464)	(2503.764)
observation	990	893	252	641	288	605	171	722
panleB:Oil price								
did_oil_price*time	-147.532	-162.453	4.916	-266.649	3.008	-239.188	1.632	-200.472
	(446.186)	(484.772)	(68.671)	(663.279)	(63.814)	(699.774)	(95.083)	(593.182)
logoil_price	525.520	568.366	54.916	765.305	35.839	815.334	11.094	697.490
	(1276.02)	(1386.37)	(196.388)	(1896.880)	(182.500)	(2001.251)	(271.922)	(1696.414)
time	591.320	652.304	-25.146	912.150	-13.003	960.855	-5.659	804.760
	(2040.06)	(2216.48)	(313.977)	(3032.659)	(291.773)	(3199.524)	(434.739)	(2712.216)
log_distance_to_Russia		225.267	-53.428***	844.249**	-61.415***	1104.114***	-211.657***	277.259*
		(121.276)	(11.142)	(283.695)	(10.277)	(340.724)	(37.946)	(140.080)
log_distance_to_Ukraine		-261.519	-99.463***	-855.615***	-89.482***	-952.973***	-24.945	-604.388***
		(152.296)	(19.199)	(261.032)	(16.571)	(281.913)	(58.837)	(206.826)
constant	-1614.164	-1512.214	1160.332	-2548.162	1252.926	-4188.353	2116.762	557.906
	(5757.61)	(6403.99)	(904.270)	(8842.618)	(836.502)	(9447.402)	(1289.036)	(7876.012)
observation	990	893	252	641	288	605	171	722

The CPI is a price index that shows the cost of buying a basket of goods at different times. It is used to describe the level of prices in the economy. It can also reflect the level of inflation to some extent. So, in this part, I look at how changes in oil or gas prices affect CPI.

$$CPI = a_0 + a_1 * price(natural\ gas) * time + a_2 * price(natural\ gas) + a_3 * time$$

$$CPI = a_0 + a_1 * price(oil) * time + a_2 * price(oil) + a_3 * time$$

In Table 3 panle A, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further controlled the distance between the country and Russia and Ukraine respectively, and the coefficient of interaction term became smaller, but it was still not significant. I further divided these countries into developed countries and developing countries, and the results were shown in the third and fourth columns. For developed countries, although the results in the first six columns were not significant, regression analysis found that when the distance between developed countries and Russia increased by 1%, CPI would decrease by 53.428%, which was significant at 1%. When the distance between the developed country and Ukraine increases by 1%, the CPI decreases by 99.463%, which is significant at 1%. For developing countries, only the distance between this developing country and Russia is significant at 5%. After that, I also divided these countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8. For OECD, although the first six rows are not significant, the distance from Russia and Ukraine is significant.

In panle B, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further control the distance from the country to Russia and Ukraine respectively, and the interaction term is smaller, but still not significant. Then I further divided these countries into developed countries and developing countries, and the results were shown in the third and fourth columns. For developed countries, the first six rows were not significant, but regression analysis showed that when the distance between the developed country and Russia increased by 1%, CPI would decrease by 53.428%, which was significant at 1%. When the distance between the developed country and Ukraine increases by 1%, the CPI decreases by 99.463%, which is significant at 1%. For developing countries, the first six rows are still not significant, but regression analysis shows that when the distance between the developing country and Russia increases by 1%, CPI will decrease by 844.249%, which is significant at 5%. When the distance between the developing country and Ukraine increases by 1%, the CPI decreases by 855.615%, which is significant at 1%. Later, I also divided these countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8 respectively. For OECD and non-OECD, although the first six rows are not significant, the distance from Russia and Ukraine is significant at 1%.

4. Mechanism Analysis

Since import and export prices and other factors will affect inflation, this paper only analyzes the mechanism of import prices, export prices and producer prices.

4.1 Import Price

The war between Russia and Ukraine contributed significantly to global inflation. Russia is an important exporter of natural gas and oil, and Russia and Ukraine are also important grain exporters. Therefore, the Russia-Ukraine war caused the instability of the world security situation and economic situation, rapidly raised the international energy and food prices, and formed cost-push inflation.

$$Import\ price = a_0 + a_1 * price(natural\ gas) * time + a_2 * price(natural\ gas) + a_3 * time$$

$$Import\ price = a_0 + a_1 * price(oil) * time + a_2 * price(oil) + a_3 * time$$

In Table 4 panle A, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further controlled the distance from the country to Russia and Ukraine, and the interaction coefficient became smaller, but the result was still not

significant. Then I further divided these countries into developed countries and developing countries, and the results are shown in the third and fourth columns. For developed countries, only the distance from Russia has a significant effect on 1%. For developing countries, the effect of distance from Russia alone is significant at 10%. After that, I also divided these countries into OECD, non-OECD, OECD in Europe and OECD in Europe. The results are shown in the fifth to eighth columns respectively. For non-OECD, the first six rows are not significant. When the distance between the organization and Ukraine increases by 1%, the import price decreases by 0.273%, which is significant at 1%.

Table 4. Import price

Import price								
	Distance free effect	Distance influence	Developed country	Developing country	OECD	none- OCED	European OECD	none-European OECD
panleA:Natural gas price								
did_gas_price*time	-0.068 (0.078)	-138.682 (317.286)	-0.012 (0.032)	-0.124 (0.157)	-0.105 (0.115)	0.010 (0.063)	-0.024 (0.040)	-0.104 (0.125)
Loggas_price	-0.043 (0.212)	-387.213 (859.789)	0.098 (0.087)	-0.157 (0.422)	-0.098 (0.314)	0.155 (0.170)	0.097 (0.108)	-0.115 (0.340)
time	0.143 (0.136)	229.695 (566.878)	0.032 (0.056)	0.260 (0.272)	0.216 (0.202)	0.003 (0.110)	0.051 (0.069)	0.218 (0.219)
log_distance_to_Russia		225.257 (121.743)	-0.028*** (0.007)	0.168* (0.068)	0.012 (0.024)	0.213*** (0.033)	-0.027 (0.026)	0.036 (0.026)
log_distance_to_Ukraine		-261.519 (152.273)	-0.011 (0.014)	0.023 (0.086)	0.120* (0.046)	-0.273*** (0.047)	0.048 (0.042)	0.021 (0.079)
constant	5.021*** (0.338)	1688.853 (1941.309)	4.981*** (0.194)	3.727*** (0.929)	4.047*** (0.661)	5.293*** (0.502)	4.544*** (0.307)	4.750*** (0.865)
observation	990	893	252	641	288	605	171	722
panleB:Oil price								
did_oil_price*time	-0.135 (0.122)	-162.453 (484.772)	0.017 (0.050)	-0.304 (0.247)	-0.228 (0.179)	0.058 (0.101)	-0.012 (0.063)	-0.222 (0.195)
logoil_price	0.044 (0.421)	568.366 (1386.377)	0.152 (0.164)	-0.181 (0.914)	0.080 (0.589)	0.030 (0.391)	0.157 (0.221)	-0.001 (0.662)
time	0.628 (0.563)	652.304 (2216.488)	-0.656 (0.230)	1.416 (1.144)	1.047 (0.825)	-0.231 (0.469)	0.063 (0.290)	1.029 (0.898)
log_distance_to_Russia		225.257 (121.762)	-0.028*** (0.007)	0.168* (0.068)	0.012 (0.024)	0.212*** (0.033)	-0.027 (0.026)	0.036 (0.026)
log_distance_to_Ukraine		-261.519 (152.296)	-0.011 (0.014)	0.022 (0.086)	0.120* (0.046)	-0.271*** (0.047)	0.048 (0.042)	0.019 (0.079)
constant	4.768* (1.905)	-1512.214 (6403.993)	4.447*** (0.754)	4.341 (4.218)	3.552 (2.717)	5.378** (1.831)	3.993*** (1.023)	4.605 (3.100)
observation	990	893	252	641	288	605	171	722

In panle B, none of the variables in the first column of this table is significant without the influence of distance. In the second column, I further controlled the distance from the country to Russia and Ukraine, and the interaction coefficient became smaller, but the result was still not significant. Then I further divided these countries into developed countries and developing countries, and the results are shown in the third and fourth columns. For developed countries, only the distance from Russia has a significant effect on 1%. For developing countries, the effect of distance from Russia alone is significant at 10%. I then divide the countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8, respectively. For European OECD and non-European OECD, the results are not significant.

I guess the reason for the insignificance may be that under the background of economic globalization, countries around the world can actively seek alternative import sources from Russia and Ukraine to cope with the adverse impact of the Russia-Ukraine war on countries.

4.2 Export Price

Russia-ukraine war led to economic depression, unemployment surge, export prices rise; Foreign trade demand is low, supply exceeds demand, and prices fall. Therefore, this paper wants to see how the war affects export prices, and how it affects inflation.

$$\text{Export price} = a_0 + a_1 * \text{price}(\text{natural gas}) * \text{time} + a_2 * \text{price}(\text{natural gas}) + a_3 * \text{time}$$

$$\text{Export price} = a_0 + a_1 * \text{price}(\text{oil}) * \text{time} + a_2 * \text{price}(\text{oil}) + a_3 * \text{time}$$

Table 5. Export price

Export price								
	Distance free effect	Distance influence	Developed country	Developing country	OECD	non-OECD	European OECD	non-European OECD
panleA:Natural gas price								
did gas price*time	-0.009	-0.011	-0.003	0.002	-0.011	0.042	-0.025	0.014
	(0.043)	(0.043)	(0.029)	(0.082)	(0.038)	(0.074)	(0.037)	(0.063)
Loggas price	0.039	0.038	0.052	0.035	0.066	0.052	0.062	0.028
	(0.115)	(0.118)	(0.079)	(0.220)	(0.103)	(0.198)	(0.099)	(0.170)
time	0.033	0.038	0.027	0.017	0.038	-0.046	0.061	-0.001
	(0.074)	(0.759)	(0.051)	(0.1421)	(0.067)	(0.129)	(0.064)	(0.110)
log distance to Russia		0.020	-0.010	0.123***	0.010	0.184***	0.018	0.037**
		(0.107)	(0.006)	(0.035)	(0.008)	(0.038)	(0.024)	(0.013)
log distance to Ukraine		0.032	-0.002	-0.068	0.084***	-0.455***	-0.067	-0.139***
		(0.183)	(0.013)	(0.045)	(0.015)	(0.056)	(0.039)	(0.040)
constant	4.894***	4.473***	4.887*	4.517***	4.078**	7.280***	5.110***	5.886***
	(0.184)	(0.253)	(0.177)	(0.487)	(0.218)	(0.604)	(0.287)	(0.439)
observation	990	893	252	641	288	605	171	722
panleB:Oil price								
did oil price*time	-0.001	-0.008	0.005	0.006	0.008	0.042	-0.018	0.006
	(0.066)	(0.068)	(0.045)	(0.129)	(0.059)	(0.117)	(0.058)	(0.097)
logoil price	0.034	0.024	0.014	-0.013	0.099	-0.228	0.117	-0.113
	(0.231)	(0.235)	(0.150)	(0.480)	(0.196)	(0.458)	(0.205)	(0.333)
time	0.022	0.057	0.004	-0.003	-0.018	-0.140	0.096	0.006
	(0.307)	(0.313)	(0.209)	(0.596)	(0.272)	(0.543)	(0.267)	(0.448)
log distance to Russia		0.020	-0.010	0.123***	0.010	0.183***	0.017	0.037**
		(0.011)	(0.006)	(0.035)	(0.008)	(0.038)	(0.024)	(0.013)
log distance to Ukraine		0.032	-0.002	-0.068	0.084***	-0.454***	-0.066	-0.140***
		(0.018)	(0.013)	(0.045)	(0.015)	(0.056)	(0.039)	(0.040)
constant	4.803***	4.424***	4.910***	4.632**	3.733***	8.394***	4.682***	6.446***
	(1.046)	(1.079)	(0.691)	(2.221)	(0.903)	(2.168)	(0.953)	(1.563)
observation	990	893	252	641	288	605	171	722

In Table 5 panle A, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further controlled the distance between the country and Russia and Ukraine, the interaction coefficient became smaller, and the results were not significant. Then I further divided these countries into developed countries and developing countries, and the results were shown in the third and fourth columns. The results of developed countries were not significant, while the influence of the distance between developing countries and Russia was significant only at 1%. I also divide countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8 respectively. For non-OECD, although the results in the first six rows are not significant, the influence of the distance between the non-OECD and Russia and the distance between Ukraine is significant at 1%.

In panle B, all variables in the first column of this table are not significant without the influence of distance. In the second column, I further controlled the distance from the country to Russia and Ukraine, and the coefficient of interaction term became smaller, and the results were not significant. Later, I further divided these countries into developed countries and developing countries. The results are shown in the third and fourth columns. For developed countries, the results are not significant, while for developing countries, only the distance from Russia has a significant impact on 1%. I also divide countries into OECD, non-OECD, European OECD and non-European OECD. The results are shown in columns 5 to 8 respectively. For non-European OECD, although the results in the first six

rows are not significant, the influence of the distance between the non-European OECD and Russia and Ukraine is significant at 5% and 1% respectively.

I guess the reason may be that in the context of globalization, countries around the world can actively seek alternative markets of Russia and Ukraine to defuse the adverse effects of the Russia-Ukraine war on their own countries.

5. Conclusion

I found that changes in gas and oil prices had significant effects on the inflation rate, but that the effects of gas and oil prices on core inflation, CPI, food inflation, import prices, export prices, the consumer price reconciliation index and producer prices were not significant. So maybe in today's world the influence of traditional energy is still very strong.

The Russia-Ukraine war has taught us more that we need to create a higher intensity and more profound energy transformation in our homeland. Energy transformation is of great importance both in terms of economy and national security. At present, China has begun to see results, and new energy vehicles are the most vivid example of the current stage. The policy of our country has strongly encouraged the development of new-energy vehicles. But at the same time, there are two important problems to be overcome in the energy transformation: one is stability, and the other is economy. The current development stage does not fully meet the two energy sources.

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