

The influence of gravitational interaction on the regional and global balance of forces in the world

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Abstract

The universe is a complex system that functions under certain laws, which allows it to keep its balance and prevent its collapse. Gravity is one of these laws, it is the gravitational forces that created the universe that we know – the location of celestial bodies, their movement, and interaction. It should be said that such laws are fair and at a lower level, the level of society. Relationships between people or countries are also subject to gravity laws. Yes, countries with a large mass (powerful economy, trade, armed forces, diplomacy) will be attracted by their mass less successful countries and make them with their satellites. It is this interaction that will determine the distribution of forces in the world. We can watch some countries lose their mass lose their impact on the regional and global levels, and in contrast, others are increasing it. Using the existing law of gravity, the work has shown how the force of gravity between Ukraine and the US, the EU, Turkey, and the Russian Federation has changed over the last ten years. On the basis of the calculations, it is given that the loss of mass of one country and its growth by others leads to the inevitable redistribution of the balance of forces and spheres of influence. In turn, the loss of mass, in the past, powerful country, leads to temporary chaos – economic crisis or war. At the same time, this situation is temporary and continues until the more massive countries align the lost balance, that is, new satellites (countries with less mass that have been lost in the past country) are drawn into their orbit). In addition, if the loss of mass of the country doesn't stop and neighboring countries will have several times more power, it can lead to its defragmentation and significant territorial losses.

Key words: gravity, balance, power, country, gravity, economic power.

Introduction

According to the theory of systems, the Universe is a large system that contains an infinite number of lower-order systems [1]. Such systems include, for example, the following: galaxies; solar system; social systems (economic systems, countries, political and military-political unions, international organizations, public associations, family, etc.); Biological systems (organisms' population, biological objects) and many others. Accordingly, all existing systems simultaneously interact. For example, processes that occur in a solar system have an impact on the biological and social systems on Earth. Such interaction and influence of one system on another can be explained by the emergence of

certain forces, in our case curiosity is the gravitational force.

Material and methods

An interdisciplinary approach was used to conduct this study, and the well-known law of physics – the law of gravity – was used to study social processes. This approach was used by scientists of economists such as J. Tinbergen, T. Chaney, J. Anderson, Eric Van Wincoop, D. Acemoglu, M. Vasco, J. Eton. Their research helped to understand the trends of trade relations between countries and has been confirmed in practice.

The purpose of the article is through the use of the law of gravity to understand the tendencies in the distribution of gravity forces in the world, to explain the causes of the aggressive policy of the Russian Federation toward European countries, and to predict the possible distribution of the balance of forces in the world.

Results and discussion

According to the law of universal gravity, first formulated by the English scientist Isaac Newton in 1687 in the treatise “Mathematical Beginnings of Natural Philosophy” [2], the force of gravity between two bodies (material points) is directly proportional to the product of their masses, and inversely proportional to the square of the distance between them:

$$F = G \frac{m_1 m_2}{r^2} \quad (1)$$

where F – is the gravity that acts between the first and second bodies;

G – gravitational steel, accepted as one;

m_1, m_2 – masses of the first and second body;

R – is the distance between bodies.

Scientists have begun to apply the law of gravity in the research of economic relations between countries since the mid-XX century. Yes, J. Timbergen [3] suggested using gravitational law to study patterns in international trade:

$$F = G \frac{GDP_A^\alpha \times GDP_B^\beta}{R_{AB}^\delta} \quad (2)$$

where α, β – is the role of economic size ($\alpha, \beta \approx 1$);

δ – the role of distance;

GDP – the mass of the country A and B is expressed in GDP.

Gravitational models in the economy have become widespread as they have received empirical evidence. Common in all models is that the basis in the calculations is the distance between countries and their economic dimensions. The works [4-8] proved that there is a dependence of the development of trade relations between countries on economic power and the geographical distance between them. The use of gravitational models in the economy allows you to see not only trends in the development of trade between countries, but a much wider spectrum of interactions. With the growth of turnover between countries, their cooperation in the political, cultural and military spheres is also growing. Each of the interactions enhances the general gravity

between the countries and encourages them. Also, the loss of its weight in the country, that is, the loss of economic power, or vice versa, it can lead to dramatic changes not only in the country, but also to influence the region or even the whole world. It is these changes that we will try to show, in this work, on the example of several chosen countries.

If we equate individual countries to space bodies and use gravitational theory to study the force of interaction between them, we will be able to explain certain regional and global processes and predict further trends in the distribution of world forces in the future. It is proposed to use values such as the economic power of the country (mass) and the geographical distance between the countries under study.

No one will deny the fact that countries such as the United States and China have the largest mass. As of 2020, they had GDP of 20.95 trillion. Dol. US or 25 % of the world, and China's GDP amounted to 14.72 trillion. Dol. US or 17.4 % of the world [7]. It is the economic weight of these two countries that gives them the opportunity to attract other countries, while spreading their economic and political influence in the world.

In recent decades, China has been gaining increasing mass, and its gravity has become increasingly powerful and allows it to attract more and more countries to their orbit, turning them into satellites. This situation is concerned about the United States because every new satellite adds to China the total mass and over time it will be able to compete for world leadership.

A striking example of the loss of its mass is the Russian Federation. As of 2020, it was 1.48 trillion. Dol. US or 1.7 % of the world. Such a situation has led to the fact that Russia is unable to keep in its orbit of the former USSR and the Warsaw Treaty, which began to be attracted to the US, EU, China and Turkey, depending on the geographical position. Moreover, with such a vast territory and small economic mass of the Russian Federation, it will not be able to maintain its integrity, which causes it to be aggressive, which it projects to neighboring countries, Ukraine and Georgia became such countries. In addition, the Russian Federation, realizing that it is hopelessly lagging in the economic, technological and cultural spheres from the advanced countries of the world, and accordingly loses its world authority, tries to threaten Europe and Western culture by destruction. This situation is natural in the case of helplessness and not the possibility of stopping the decline of the state.

Russia had solved a full-scale war against Ukraine for reincarnation of the Russian Empire, and Ukraine in this war was only an intermediate goal, which, according to the Russian elites, had to fall into their hands like a ripe apple. Today, it is already clear to everyone that after Ukraine is in the queue Moldova, Georgia, Baltic countries, and if it can, then the countries of the Warsaw Treaty may be possible. The "Phantom Pain of the Empire" does not put up to the ruling top and the people who have lived in the lament of "Velicic Russia" for centuries, which has no amputated limb in real life.

It should be said that Russian ideologues in the nationalist "Ugar" and in the distorted propaganda of reality have completely forgotten the lessons of the past, which say that all the imperial wars for the restoration of their influence ended with the disintegration of the empires themselves.

In order not to go to the ancient times, only the causes and consequences of the two world wars will be mentioned. The First World War – was launched by the Austro-Hungarian Empire with the support of Germany. In the war, they were interested in both Austria-Hungary, which had its invading plans in the Balkans, and the German Empire, which waged colonial wars to expand its influence. Therefore, it can be confidently stated that the motive of the initiators of the war was the territorial, economic and political expansion of the influence of the two empires.

The First World War for Europe has become an unprecedented catastrophe with huge human losses and destruction, and its results led to the defeat and disintegration of two initiators- the Austro-Hungarian and German empires.

The war for the expansion for the Austro-Hungarian Empire became a war of its collapse. After the war, new nation -states emerged on the Terns of the former Empire: the Polish Republic; German republic; Western Ukrainian People’s Republic; Hungarian Democratic Republic; Kingdom of Serbs, Croats and Slavs.

Kaiser Germany or the Second Reich, also defeated and was forced to sign the shameful conditions of surrender, as a result of which it lost part of the territories, received a foreign military contingent in its territories (which was to hold), carrying out demilitarization (the feather of the vast majority of weapons. Full disrepair of the fleet), withdrawal of troops from Africa, France, Belgium, Luxembourg, Alsace, Lorraine, Left Bank and Right Bank of the Rhine and payment of reparations to the winners.

The authors of the Second World War again became Germany or the Third Reich, that is, the third German empire headed by Fuhrer Adolf Hitler. The reason for the war was again the old images for losing and humiliation in the First World War and the desire to expand the boundaries of the German Empire. Adolf Hitler and all German propaganda constantly repeated that the German people (Aryan race) had a “living space” and it needs its expansion. By the way, it is reminiscent of propaganda of the Russian Federation, which was constantly repeating that “us would be strangled by NATO”. The result of the Second World War, which took place in order to expand the German Empire, was a complete defeat. Germany was divided into two parts that were influenced by the US and the USSR. The German nation has received humiliation and shame that it feels to this day, and Germany itself was able to unite only before the collapse of the USSR.

The above historical facts indicate that the efforts to recreate an empire, which has partially broken up simply not real and lead to its full destruction. Of course, the current Russian political elites, which have not studied history, but Soviet propaganda, are not aware of this and will lead to war in Ukraine to the collapse of the Russian Federation.

The open aggression of Russia against Ukraine is a clear proof that there is only one tool in the Russian Federation in the Russian Federation for the former satellites in the orbit of its influence, and it is a power tool. Instruments such as economics, culture, language and even bribery of political elites in the countries of the former Soviet Union lose their power and military aggression remains the only effective tool.

Using the gravitational law in the economy, it is possible to trace how Russia has struggled for influence on Ukraine, but the West countries prevailing its economic power did not allow it to do so. It should also be understood that economic power is an example of success and imitation for less successful countries that are post -Soviet countries, which in turn encourages cultural and mental changes in society. The example of Ukraine is indicative and it will be advisable to show trends on the change of gravity between it and the EU and the US, the Russian Federation, Turkey and China.

Indicators such as the GDP of the selected countries and the distances between their capitals were used to carry out the calculations. Since the amount of gravity was calculated by the EU and the US GDP, in the case of determining the distance between Kiev and Washington, the distance to the nearest European capital was taken from half of this path, i.e. to Lisbon, and information on the GDP of the studied countries was taken from the Electronic resource of the World Bank.

The results obtained conclude that the force of gravity between Ukraine and the Russian Federation is weakening, and between the EU, the US and Turkey is growing. It is this situation on the one hand that led to Russia’s aggression against Ukraine, and on the other, it does not leave the Russian Federation to keep Ukraine in its influence. Moreover, the weakness of the Russian Federation in economic terms and its territorial proximity with China, which has a huge mass, can lead to the territorial losses of Russia itself in the future.

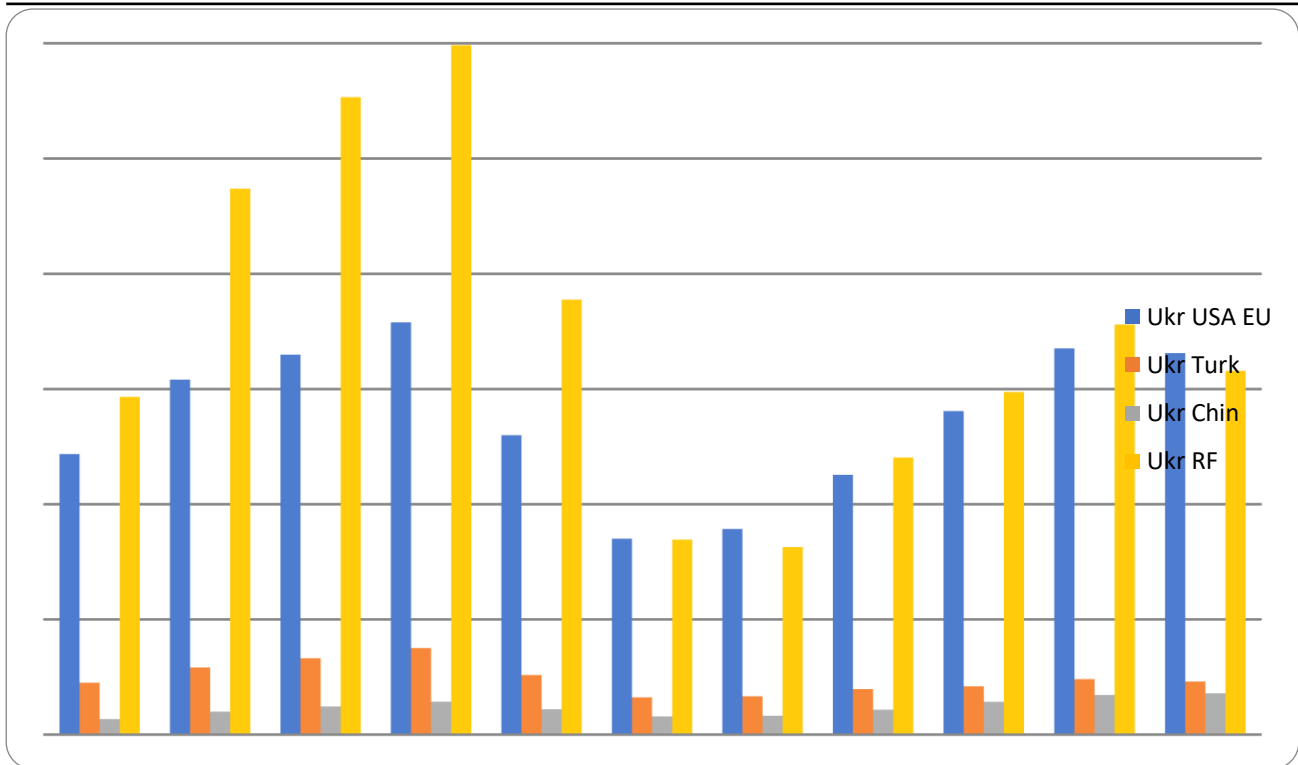


Figure 1 – The force of gravity between Ukraine and the United States of America and the European Union, Turkey, China, the Russian Federation

With the onset of the war, the likelihood of the collapse of the Russian Federation has become extremely high, the question only in time, and the war, as we already know, accelerates time. The economic sanctions of the Western countries (democratic countries) will lead to the fact that the Russian Federation will simply be “cut” from the global economy and will return in the 90s of the 20th century. The majority of post-Soviet countries mention these times as a “terrible dream” – galloping inflation, shortage of goods, employees did not receive salaries, gangs, and at the end for the Russian Federation full bankruptcy (default). Now we add to this war, which absorbs huge resources, both material and human and frozen assets of the Russian oligarchy, which has accumulated for decades. This situation will inevitably lead to dissatisfaction with elites and people, and when the dissatisfaction will reach a critical point in the internal explosion.

Separately, we want to focus on China, the mention of which causes tremor in the political elites of Russia, why there are specific explanations. The Russian elites began the war with Ukraine, and in fact with the West, they understood that there were no specific military threats from European countries. Moreover, they were convinced that the West see Russia’s military power, as well as a large extent corrupt and dependent on Russian raw materials, would make the necessary concessions. Only selfless resistance to the Ukrainian people allowed to break the plans of the rapid and successful war.

The situation with China is dramatically different. There is a large dry border between China and Russia. More and more Central Asian countries, which were in the sphere of influence of Russia, are strengthening their economic and political relations with China. Even the subjects of the Russian Federation, such as the Far Eastern Federal District, are increasingly approaching China. Currently, the mass of China, and therefore its gravitational force is at times higher than Russian, and military advantage, without taking into account nuclear weapons, is not relatively higher. Given the above facts, it is safe to say that Russia understands a huge threat to China, and therefore tries to please him. China, in turn, uses this and waiting for the moment when, as a result of the war, Russia will

weaken in the military and economic spheres, its vertical of the central government is unlawful, which in turn will allow to resolve its territorial claims against Russia with minimal losses.

Conclusions

The use of gravitational theory to explain processes in international relations and the formation of forecasts for the future balance of the world forces is extremely interesting and promising practice. It should also be noted that you need to use a greater palette of existing factors – demographic indicators, levels of diplomatic relations, turnover, military power, cultural ties, language spread, etc. More factors will allow you to analyze better and receive more realistic forecasts. This approach can be used as a retrospective analysis for understanding cause and effect relationships, as well as a good basis for building forecasts for the distribution of the Center for the World Masses. The use of gravitational theory also allows you to understand where in the world the voltage points that can lead to armed conflicts are created and how it will affect the direct participants, the region or the world as a whole.

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