Analysis of the Possibilities of Calculating Energy Needs Using Methods of Economic Theory

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Abstract: The production and consumption of energy have a significant impact on the economic performance, since initially the energy sources have been used for energy purposes. In this regard, the relevance of this work is due to consideration of the impact of energy indicators on the economic ones. The purpose of the research work is to analyze the processes of commodity dynamics from the point of view of physical environment, considering electromagnetic interactions. The analysis, generalization, as well as method of relative monetary permeability became the methodological basis of the study. According to the result of the study of these comparisons, a new concept and term has been introduced – relative monetary permeability, which is an indicator of the level of economies in different countries of the world. A new concept is also defined – "absolute monetary permeability", which is an invariant of the economy of any country. With the help of method of relative monetary permeability for economic energies, the physical value of money is revealed, it is determined the bipolarity of a banknote and complete identity by the nature of actions with permanent magnets. A new concept is defined – "currency monetary susceptibility", revealing the physical essence of international movement of capital. The mediation between energy and economic performance was also assessed.

Keywords: induction tension, relative monetary permeability, absolute monetary permeability, residual monetary induction, bipolarity of money, currency susceptibility.
JEL Codes: A1, N7, P18.

1. INTRODUCTION

The current economy has limitations in solving a number of tasks that can be solved given the fact that important areas of policy can simply go beyond the boundaries of competence. The economy is engaged in an extraordinary use of resources and the search for devices that do not waste resources to no avail. The authors Iorgulescu and Polimeni (2007) demonstrate in their work the biophysical foundations of economics, by analyzing it as an analytical thermodynamic theory using the concept of entropy. Let's assume that the concept of economic environment and its system have not yet acquired a scientific basis. There are no clear economic indicators and concepts that determine the levels of economic development of different countries. Biophysical objects of the economy can be built on the basis of physical flows and reserves associated with them. For example, in the work by Kennedy (2022), the author used the concepts of wage payment, profit, turnover and value by adding to the model in order to formulate the problem of wealth sharing, considering the biophysical constraints. The influence of physics on the financial economy and the economy in general is an indisputable fact. The authors Jovanovic et al. (2019) explored in their work the preamble direction of the advancing nature of knowledge between the disciplines such as physics and economics. Understanding this impact can be very beneficial for the financial economists and economists in general. In addition, Zeithamer (2015) provides a study in his work on the systematic use of methods applied in theoretical physics and economics. In the work by Bejan (2012), the author proposes to consider from a physical point of view how energy is generated and flows on our planet due to the interest of the world economy.

The purpose of development of the modern financial theory can be presented as an attempt to create theoretical models that characterize the position of financial markets, considering the cause-and-effect mechanisms, statistical laws, and even the predictive power. By studying the nature of movement of the real financial markets through the collection and analysis of transient series of financial data, as a result it is possible to miss many models that object to the observed behavior (Wolek et al., 2021). The physicist perceives the economy as a set of interconnected units. This system is far from the primitive one, so physicists are looking for empirical laws that can characterize, as well as theories that will help to understand these difficult interactions. The physical aspects of any economy are reflected in the material values of capital. The complex of funds and financial instruments represented by contracts of varying complexity is mainly the basis for the use of resources (Havrysh et al., 2019). It is also worth considering that the main goal of statistical physics is to explain the macroscopic behavior of a system and its evolution in terms of physical laws that govern the mobility of microscopic constituents (atoms, protons, electrons, ions,

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particles, spins, etc.), which include and are mainly made up of it. The development of infrastructure technologies in the world is becoming scalable due to existing resources, which are in some way dependent on the monetary market valuation, but there is also consequences of interaction of such valuation and the second law of thermodynamics (Azieva et al., 2021; Berikbaeva et al., 2020; Mustafin and Kantarbayeva, 2021).

In this regard, the purpose of the study is to analyze the processes of commodity dynamics from the point of view of physical environment with electromagnetic interactions. In the course of the study, monetary fields and commodity-money interactions in the economic environments of different countries were studied and compared using the technique of expression through physical formulas and laws. In addition, the new concept and term was defined – "relative monetary permeability of the countries' economies". Furthermore, a number of new concepts and terms are given, as well as formulas for calculating monetary permeability and new methods for calculating and measuring inflation, identifying the reasons of changes in inflation and its dynamics by years. It is important to determine the physical essence of money, which will allow comparing the levels of economies in these countries.

2. MATERIALS AND METHODS

In this work, the formulas of induction field were applied using the expression $B = F/(\Delta q \cdot v)$ through the force, charge and speed, where the field was understood as the money supply or demand. In commodity-money relations, special attention is paid to the analysis of meaning and practical action of induction B of money fields. It has been revealed that it is induction that determines the real tensions and actions of forces on the market force field. According to the formula $B_1 = F_1/(\Delta q \cdot v)$, induction is the induction intensity of supply money field, and according to the formula $B_2 = F_2/(\Delta q \cdot v)$, induction is the induction intensity of the demand field. The induction tension of supply and demand fields is the tension created by monetary resources and their flows from supply and demand fields. Other physical formulas were also used, where the values were expressed through economic indicators. First of all, a demonstrative analysis was carried out with a detailed example.

Further from magnetic induction, attention was transferred to magnetic permeability to characterize it as "money" permeability. That is, identity was determined based on the following characteristics of permanent magnets and money:

1. Magnets have their own magnetic energy. Money has its own economic energy.

2. Magnets have two poles – north (negative) and south (positive). Money also has two poles, that is the quality for the purchase of commodity (negative pole) and the quality for the sale of commodity (positive pole).

3. If to divide the magnet in half, two halves will be available with two poles each, but half the magnetic energy and force. If to exchange 100 dollars for two banknotes of 50 dollars, then each of these banknote will have two poles, but at the same time, the economic energy and monetary momentum and susceptibility will be reduced by 2 times.

4. Both magnets and banknotes retain residual induction for a long time.

5. Natural magnets are pieces of magnetic iron ore called magnetites.

During the permeability analysis, the following techniques were also applied:

1. The method of relative monetary permeability on the economic energies of supply fields of the reporting and base periods.

2. The method of relative monetary permeability on the economic energies of demand fields of the reporting and base periods.

As an indicator of induction, the monetary unit was adopted as a measure of value, where it has the ability to participate in all processes of commodity-money interactions on the market. Namely, as an indicator of induction, the monetary unit of any country is the coefficient of monetary measurements of all goods, works and services produced in this country or coming from other countries.

As an indicator of energy capacity, the monetary unit is the coefficient of proportionality between the cost of utility and utility itself, as well as between the economic energy and the real energy that a product possesses. It is these coefficients that serve to measure and express the cost of all goods, works and services.

In the course of studying the identity of the patterns of money ("economics") and magnetic ("electrodynamics") fields, having analyzed the physical essence of money, it was made the conclusion about the characteristics' identity of the energies concentrated in money and permanent magnets. At the end of the study, it was analyzed the works of authors similar in subject matter. When searching for literary sources, it has been noticed that by now there is a very small number of innovative methods and technologies in research journals that affect the aspects of relationship between economics and physics.

3. RESULTS

3.1. Monetary Permeability and Susceptibility. The Physical Essence of Money

At the time of purchase and sale, the final (total) induction B_1 that determines the cost of goods φ_1 offered by the manufacturer (costs + profit) should be equal to the monetary induction B_2 from the buyers, determining the cost of goods φ_2 that prevails on the market. In this regard, a new concept and term has been introduced – "monetary permeability of goods" on the market of a certain country. This permeability μ_P is determined by the ratio of the total induction B_1 on the part of producer to the induction B_2 from the part of buyers or the ratio of the cost of the finished product φ_1 offered by the manufacturer to the cost of product φ_2 prevailing on the market:

$$\mu P = B_1 / B_2 = \varphi_1 / \varphi_2. \quad (1)$$

For the established market of any product, in the economic environment of each country, it is obvious that the cost of

goods φ_1 of producer should be equal to the value φ_2 of the market, that is:

$$\varphi_1 = \varphi_2. \quad (2)$$

In this case, the monetary permeability was called "commodity absolute monetary permeability" μ_a.:

$$\mu_a = B_1/B_2 = \varphi_1/\varphi_2 = 1. \quad (3)$$

It is obvious that this permeability for the existing market of any product in the economic environment of each country should be equal to one.

It follows that the absolute monetary permeability of a commodity μ_a is invariant for the established market of any commodity in the economic environment of each country:

$$\mu_a = B_1/B_2 = \varphi_1/\varphi_2 = (R+r)/\varphi_2 = R/\varphi_2 + r/\varphi_2 = 1, \quad (4)$$

since $\varphi_1 = \varphi_2$, then $r/\varphi_1 = r/\varphi_2$ is the ratio of profit to the cost of selling goods.

The definition of "absolute monetary permeability of the country's economy" μ_a is given – this permeability is the ratio of economic energy of the entire market supply field of the country φ_1 to the economic energy of the demand field φ_2 of this country, which should be equal to one for any period. This permeability is invariant for the economy of any country. If, using the exchange rates, the total economic energy of goods in the supply fields of all countries of the world is calculated in dollars and divided by the consumed economic energy of purchased goods in the demand fields of all countries, which expresses the real energy consumed, then in the best scenario, this ratio should be equal to one. This ratio has been called the "absolute monetary permeability of the world economy" and its invariant.

If one of the producers of the same product managed to reduce the production costs as a result of additional investments, and he reduced the cost of his product, in comparison with the prevailing market price, then with $B_1 < B_2$:

$$\mu_r = B_1/B_2 = \varphi_1/\varphi_2 < 1. \quad (5)$$

In this case, the permeability is called the "relative monetary permeability" μ_r of this commodity on the market. For some time, all other producers are usually forced to reduce their prices, a new lower market price will be formed and $\mu_r = \mu_a = 1$, that is, the relative permeability will again become absolute.

It is known from economics that inflation is a decrease in the purchasing power of money, which manifests most often in a widespread increase in prices. The most common reason is that there is a lot of money, but there are few goods, and consumer demand exceeds the product supply. Deflation is a decrease in the general level of prices for goods and services, that is, the process is the opposite of inflation. In "economics", there are several methods of measuring inflation. In this work, it is proposed to measure inflation with a new method – "the method of absolute monetary permeability of the country's economy." Here, the above formula is used:

$$\mu_a = \varphi_1/\varphi_2 = 1, \quad (6)$$

where φ_1 is the economic energy of the supply field of the country's economy. This field is determined by the value of entire volume of the final production of goods and services produced in the country during the reporting period, excluding the value of volume of the exports of goods, including the value of the volume of imports; φ_2 is the economic energy of the demand field of the country's economy. This field includes the entire amount of cash payments that all citizens of the country receive during the reporting period, including: wages, scholarships, social benefits, pensions, dividends, etc. If $\mu_a < 1$, then inflation occurs, and if $\mu_a > 1$, then deflation occurs.

From the economy, it is known the definitions of the monetary unit:

• measure of the cost of goods (works and services) determined in accordance with the legislation;

• unit in which the price of goods (works and services) is expressed;

• measure of the account;

• unit of the monetary measurement;

• element that serves to measure and express the prices of all goods (works and services);

• name of the country's money (dollar, mark, manat, etc.).

Because:

$$B_1 = \varphi_1/Q = (F_1 \cdot 1pcs)/(\Delta q \cdot 1pcs) = F_1/\Delta q, \quad (7)$$

where F_1 is the cost of the utility charge; Δq is the utility charge; φ_1 is the economic energy of the product; Q is a product.

It is applicable to the monetary unit:

$$B = 1/C = F/\Delta q, \quad (8)$$

where: $F/\Delta q$ = monetary unit/unit utility charge; 1/C is the economic energy capacity.

Based on this and applying the definition of energy capacity, it has been found that the monetary unit is the conventional or accepted value of a unit charge of utility or a quantitative indicator of the economic energy that this charge possesses. Thus, the monetary unit of any country is a measure of the cost of a unit utility charge. As a rule, a certain weight of gold or silver is taken as a unit of utility charge, and it is used in the country as a price scale.

When a ferromagnetic product is placed in external magnetic field, it becomes magnetized. Permanent magnet is a product that has a residual induction after removing the external field. The process of producing permanent magnets is called the magnetization of a ferromagnet. It is known from electromagnetism that in the process of magnetization, the atoms of this material become owners of a system of the opposite magnetic charges ("plus" and "minus"). Such atoms are called magnetic dipoles, that is, these atoms have positive and negative poles. This analogy is conditional, since no magnetic charges have been detected. The magnetization M is defined as the sum of magnetic dipoles:

$$M = n \cdot p_m, \quad (9)$$

where p_m is the magnetic moment of dipole; n is the concentration of atoms in the substance.

The ratio between the field induction in the substance that fills the magnetic field is the sum of inductions of the magnetizing currents and the field of magnetized substance:

$$B = \text{Current} + \text{Substance}. \quad (10)$$

After some transformations, the following value is obtained: $\mu = 1 + \chi_m$, which is called the relative magnetic permeability of substance, χ_m is called the magnetic susceptibility. It is considered that magnetization is the residual induction after removal of the external field.

Let's consider the process of producing banknotes, perceiving them as a commodity. According to the above formula for the relative monetary permeability of the monetary fields of supply and demand:

$$\mu_r = B_2 / B_R = \varphi_2 / \varphi_R = 1 + \Delta r/\Delta R = 1 + \Delta L/\Delta R \quad (11)$$

or:

$$\mu r = 1 + p = 1 + \chi, \text{ где } p = \Delta r/\Delta R, \text{ а } \chi = \Delta L/\Delta R, \quad (12)$$

where $\varphi_1 = \varphi_2$ is the denomination (value) of the banknote (1, 5, 10, ... 100 dollars), established by law and conditionally determining the field of demand during their manufacture, from the state; ΔR is the cost of producing one banknote, which determines the effect of the monetary supply field; p and χ are respectively the monetary moment and monetary susceptibility of the banknote, determined by the face value.

The denomination of banknotes determines the number of monetary units in its composition, just as in "electromagnetism", the magnetization of substance is determined by the number of magnetic dipoles. The monetary unit, in its action, is identical to the magnetic dipole. Since the costs of producing banknotes are minimal compared to the face value, the residual monetary induction is practically equal to the monetary moment and susceptibility, and it also determines the economic energy expressed by the face value of banknote. For example: if a gold digger has found gold, then he will receive a large profit at minimal cost. Thus, the denomination of banknotes has the maximum monetary moment and monetary susceptibility. The point is that for any product that is sold on the market for any value, based on the ratio $\Delta r/\Delta R$, it is possible to find out the cost of expenses and profit for it. According to the cost of purchased product, the ratio $\Delta L/\Delta R$ determines the cost of real energy of the product and profitability of the market for this product. For example: the cost of goods is 80$, and the profit is 20$, then monetary permeability will be: $\mu r = 1+\Delta r/\Delta R = 1+ 20\$/80\$ = 1.25$. This means that 25% of the goods' value is profit. Or, for example: the employee received a salary – part of this money will be paid for the physical energy spent (costs), and the other part is his profit. Thus, monetary susceptibility is defined as the purchasing power of money, and the money moment is defined as the profitability of this ability. The concepts of monetary susceptibility and monetary moment are interconnected, since these concepts determine the producer's monetary costs for the costs of goods in order to make a profit, and they encourage the buyer to buy this product and transfer its profit to the producer. Based on this, the denomination of banknote expresses its purchasing power. Thus, the result of the process of magnetization in "electromagnetism" is identical to the result of the money manufacture, and the magnetization in "electromagnetism" is the purchasing power of money, expressed in face value. The special paper, on which money is printed, represents the substance as in "electromagnetism" that will be magnetized, and the process of magnetization is the process of printing denominations on this paper. In "electrodynamics", the magnetic moment is a physical quantity that characterizes magnetic properties of a substance, that is, the ability to create and perceive magnetic field (Borisov et al., 1998). In "commodity dynamics", the monetary moment is defined as a physical quantity that characterizes monetary properties of banknotes – to create and sell goods, and the monetary susceptibility of banknotes – as a property to buy goods. Based on this, the monetary moment of the face value is defined as a positive pole of banknote, and the monetary susceptibility of the face value is defined as a negative pole. The denomination of banknotes determines the amount of economic energy, the monetary moment, and at the same time, the monetary susceptibility.

Analyzing all of the above-mentioned, it can be concluded that before being put into operation, new printed money is endowed with economic energy in a "pure" form, the amount of which is determined by the banknote denomination. Further, in the process of commodity-money interactions, the "clean" economic energy of the face value changes, it is distributed between the cost of real energy and the cost of profit (Suleimenov et al., 2022a; Poier et al., 2022). And then, the monetary profit becomes a "clean" generated economic energy.

As it is known, an electric current generator is a device that reconstructs mechanical energy into electrical energy. That is, the generator is a source of electric charges and alternating current that satisfies the consumer's demand. Magnets are used in the current generators as carriers of magnetic energy, creating a magnetic field, and when the mechanical energy of rotor's rotation changes it, an electrical alternating current induces (Kudabayev et al., 2022). The money resources of producer, as carriers of economic energy, create a monetary field in the source of commodity current, and when the various energies change it (by means of their reunification), then it is induced the creation of utility charges and commodity current of these charges with one of the types of energies – either biological, or material, or spiritual. This commodity current is also variable. The utility charge of good is a positive charge, and the cost of this charge is a negative charge, since this cost expresses the producer's cost for creating a positive charge. It is necessary to note that all known energies (electrical, thermal, etc.) are also produced in the source of "commodity" current (Chernets et al., 2008; Suleimenov et al., 2022b).

It is known from history that gold and silver coins were a medium of exchange in a number of countries of the world. Paper currency denomination are backed by gold and silver. It should be noted that economic energy is not only the monetary equivalent of a permanent magnet as a commodity (the cost of magnet on the market), but it is also the energy that creates both magnetic energy and all other generated types of energy. In turn, all other types of energy participate in the process of creating economic energy. Monetary profit is such a newly created economic energy in its "pure form". It is known from "electrodynamics" that if a certain conductor

with current creates a magnetic field in vacuum, its magnetic induction vector at a given point is equal to B_0, then in a homogeneous isotropic medium that fills the entire space with a magnetic field, a field will be created at the same point with induction $B = \mu \cdot B_0$; $\mu = B/B_0$ (where μ is the relative magnetic permeability). In any medium, it is possible that $\mu>1$ or $\mu<1$, and this shows how many times more or less the magnetic induction is at the considered point of isotropic medium that fills the entire field at given points that create a magnetic field, than in vacuum.

In the "economy", the term "exchange rate" is known, when the monetary unit of one country is formulated by the monetary unit of another country. The exchange rate can be formed either as a result of the coherence of market forces – this is the real rate, or as a fixed, legally established nominal rate. In addition, the term "reserve currency" is known, which is used in calculations in international trade. The concept of "relative monetary permeability of the countries' economies" will be explained by the example of one of the main reserve currencies in the world economy – the US dollar. In international trade, during settlements between parties, the monetary units of countries are converted, for example, into US dollars at the appropriate exchange rate, the price of goods in dollars is calculated and calculations are carried out. If some market conductor with a current of some commodity creates a money field with monetary induction B_0 in the USA, and the same market conductor with a current of the same commodity in a certain country creates a monetary field with induction B, then: $B = \mu \cdot B0$; $\mu = B/B_0$. Since $B = \varphi/Q$, and $B_0 = \varphi_0/Q$, then $\mu = \varphi/\varphi_0$, where B is the monetary induction in the economy of a certain country, and B_0 is the monetary induction in the US economy, φ is the cost of goods in a certain country or the currency of this country, φ_0 is the cost of identical product in the US or the US currency (dollar). Thus, μ is the relative monetary permeability of the countries' economies, which determines the level of economy of a particular country in relation (in this example) to the level of the US economy, expressed by the real exchange rate of the monetary unit of this country in relation to the US dollar. The real exchange rate shows the relative cost of comparable goods in different monetary units. Obviously, the relative monetary permeability of the economies of compared countries is the ratio of monetary units of these countries.

Based on the above-mentioned formulas, it is concluded that utility charges in comparable goods (butter, milk, bread, etc.) produced in different countries are practically the same, but their cost is different in accordance with the monetary unit (economic energy) of the economic environment of the country where these goods are produced. The relative monetary permeability of the countries' economies is determined by the level of investment and financial climate of the economic environment in a particular country or in various sectors of economy of this country (Koshkinbaeva et al., 2019). As in the case with magnetic permeability, monetary permeability can be: $\mu>1$ or $\mu<1$ and this indicates how much the exchange rate of the currency of a certain country is more or less than currency of another country (for example, the US dollar). From the "economy", it is known that "commodity" is a thing that is the object of purchase and sale. Thus, the currency of each country can be a commodity for another country. The economic energy that any country's currency possesses, has a value as a commodity in the monetary units of any other country, and this value is determined by the relative monetary permeability of the countries' economies, which at the same time is the exchange rate (Niyazbekova et al., 2022). For example: if a tourist leaves Azerbaijan for the USA, then he buys dollars in a bank and pays 1.7 manats (monetary unit of Azerbaijan) for each dollar purchased. Then, according to the formula $\mu = \varphi/\varphi_0$, the exchange rate will be: μ = 1.7 manat/1 dollar. In this case, $\mu>1$ by 0.7 manat/dollar. However, it turns out that $1 in the denominator of exchange rate formula is a commodity that is bought and sold. Obviously, this product has the utility that is equivalent to its cost – 1.7 manats, but not in America, and in a completely different economic environment – Azerbaijan. In the US, this "$1" product costs $1, then according to the same permeability formula, this permeability will naturally be the absolute monetary permeability of the US economy. Based on the foregoing, it is possible to suppose that the physical essence of the concept "exchange rate" has been revealed. Relative monetary permeability determines how many times the monetary induction in one country differs from that in another country. This, in turn, determines the efficiency of monetary costs for the production of any product in different countries.

3.2. Currency Monetary Susceptibility of the Country's Economy

In the "economy", there is the concept of "international movement of capital". The foreign investment is one of the forms of such movement, in which the capital is placed and operates abroad. The investor company benefits from foreign direct investment, in addition to other things. A significant substantial consequence of the mobilization of foreign direct investment for the country-recipient of investments can be the acquisition and the previous extension of more advanced consumption and management technologies in the economy of the host country. For example: for about two decades, foreign companies opened plants and factories in China, mainly using cheap labor. This made it possible to significantly save on costs and increase the profits of these companies. However recently, the situation has changed. China's competitive advantage as a low-cost manufacturing center has begun to decline, which has led to the long-term wage increases in the country. Let's consider the physical essence of foreign investments on the example of investments in the US dollars. Let's imagine that a foreign investor wants to invest money in dollars for the production of a certain product in Azerbaijan. To do this, he exchanges his dollars for Azerbaijan's manats at the established rate: μ = 1.7 manat/ 1 dollar = 1 manat/ 1 dollar + 0.7 manat/ 1 dollar = 1 (manat/ dollar) + 0.7 (manat/ dollar) = $1+ \chi_c$. Using the above formula for the relative monetary permeability $\mu = 1+ \chi_c$, let's introduce a new term and concept – "monetary susceptibility of the country's economy", determined by the difference in exchange rates and determining investment attractiveness for investors from other countries. In the above example, the currency monetary susceptibility will be: χ_c = 0.7 (manat/dollar). Thus, the relative monetary permeability also determines the currency susceptibility. Let's also assume that an American exporting company needs 100.000 dollars to

produce a certain product in the United States, and 100.000 manats in Azerbaijan at the exchange rate amount to 58.824 dollars. The difference in investments will be 42.176 dollars. After the production of this product, the company will sell it in dollars to different countries of the world.

In theoretical terms, the indicator of currency susceptibility determines and forms the basis for calculating the return on investments in the monetary units of a country with a developed economy, in the organization of production in a country with a less developed economy (Rausch and Suchanek, 2021). Thus, there is a flow of economic energy from a country with more economic energy to a country with less economic energy. This process in the future determines the trend towards equalization of economic energies of these countries. This process is identical to the concept of "heat transmission" known in physics – the physical process of transferring thermal energy from a hotter body to a less hot one, until the thermodynamic equilibrium is reached (Sydorets et al., 2017; Aimbetova et al., 2020). In addition, this process is identical to the operation of condenser, when electrical energy flows from it to consumer. All of the above confirms the physical meaning of the well-known concept in economics – the international movement of capital.

4. DISCUSSION

Economic prospects play a significant role in the political process. The economic perspective also emphasizes that policy modifications in one area lead to the regulation in others and can have different kinds of results for the entire economy, which may even resist the initial modifications. This fixed view of overall balance is less commonly used by other sociologists and public health researchers, although it may have a link to physical activity. Some possible modifications in politics or social trends may already promotes to their personal construction and therefore be less (or more) significant than they really are. In the work by Sturm (2005), the authors contrast the perspectives of the economic and health aspects in political processes, where it is also reported that the perspectives of economy and public health can modify each other, although the use of any synergy encourages for an understanding of different perspective. In addition, for example, in the work by Afolalu et al. (2021), the authors report that engineering processes should be carried out considering the economic indicators in order to avoid adverse side effects.

The term econophysics usually refers to the promotion of methods and tools traditionally covered and formed in the field of statistical and theoretical physics, to the study of problems usually analyzed in the field of economics, and in particular the questions of finance. The specificity of each of the two disciplines of physics and economics, which set the boundaries of econophysics, implies the impact of one discipline (or subdiscipline) on another and vice versa. It is exactly the way of econophysicists to deal with substantial amount of data characterizing economic, social and financial systems, which recommends a vivid example of empirical analysis conducted without considering the micro-grounded theories. This type of analysis is more popular today than twenty years ago among scholars of economics and finance fields, as evidenced by the number of articles devoted to a significant set of data taken from the major academic journals in economics and finance. In general, economics is no longer considered a field of application in which the methods, models, and tools from mathematics and physics can be applied. Econophysicists can apply consequences and identified issues from financial economics to research the innovative trials in physics. In the work by Jovanovic et al. (2019), the authors define what is needed to do for the econophysicists to make a significant contribution to financial economics – to develop a common structure for better comparison and integration, to develop generative models that explain the emergence of power laws, and develop statistical tests to identify such statistical patterns. In the work of Poitras (2019), the author considers the events of econophysics with the history of economy, in which the contributions of statistical mechanics are traced, and the influence of phenomenology in econophysics is identified and discussed in the results. In general, with the help of econophysics, it is possible to study various kinds of dynamic forecasting, as it is presented in the work Li et al. (2022). Soriano-Hernández (2022) described in their work the energy poverty issues using econophysics as a theoretical and methodological framework.

Economic activity consists of the movements of all the masses of living society: people, objects of sale, message, communication, and everything that flows inside the living human bodies and functioning engines that dispose of this movement. This is the area of physics to which the economics belongs. A country's annual domestic economic initiative (gross domestic product) is commensurate with the amount of fuel produced annually in the country. In the work by Samuelson (2004), it is reported that there are examples in economics and physics, which show that economists get little more from maximization principles than from conservation principles. In the work by Stanley et al. (2001), the authors show some similarities between the work done by economists and physicists trying to make their contribution to the economy. Newton's law of cooling is used in the study of certain processes in order to recreate the long-term dynamics of inflation, that is, to successfully use the concept of physics in the field of economics. It is also proved that the dynamics of monetary aggregates can be characterized using the same model. In the work by Todorović et al. (2019), Newton's law of cooling is adjusted to establish whether this model can be applied to describe the long-term dynamics of inflation and monetary aggregates. The suitability principle of quantum statistics, classical statistics and economics, connecting the volume of particles with the number of money, chemical potential with nominal interest, negative pressure with debts and the law of economic preference made it possible to achieve coherence between the general theory of thermoeconomics and the latest experimental data in the work of Maslov (2005). In the article by Rutledge (2015), it is provided a basis for thinking about economic development, trade and capital flows, analyzed as reorganization of current and ancient solar energy derived from various types of natural resource, human capital, physical capital and technologies characterized by the laws of thermodynamics. Statistical physics is one of the most advanced areas of science, in which the predictions well demonstrate a large number of physical situations. As a rule, it is associated with macroscopic systems of many particles and attaches particular im-

portance to the probabilistic nature of their behavior. On the other hand, the market economy or the economic structure of human society interacting with it consists of many interacting units or agents. For example, in the work by Kusmartsev (2011), it is demonstrated that statistical mechanics is favorable in characterizing the financial crisis and the economy. In the work by Young (1991), it is reported that the law of entropy imposes an absolute scarcity of resources that cannot be overcome by technological changes, exploration or substitution. In the work by Vos (1999), the authors explore economic activity as a non-equilibrium process applied to economic systems. In the work by Stanley et al. (2007), it is provided a review that brings together practitioners of economic theory and statistical physics in order to try to better understand the mysteries involved in economic fluctuations. In the work by Skoglund et al. (2010), it is considered in details the general problem of saving the conversion systems of renewable electricity by means of studying the relationship between physics, engineering and economics. In the work by Giffin (2009), the author demonstrates how a physical concept such as entropy can be applied to economic problem.

Thus, when it comes to energy in a society, it is calculated an established utility, a set of characteristics of energy forms that can also be described in physical terms. Energy comes from natural systems and it is given to natural systems after changes in society (Shinwari et al., 2022). These processes are economic and biological as well as technical in nature and they are often regulated by society. Rational mechanics gives the first introduction to the theory of equilibrium and motion of bodies. Similarly, Marshall's theory, The Fisher Effect and others show the first approximation to a complete theory of economic phenomena. It is also worth considering that this is only an approximation; it is similar to what has just been developed in the laws of a heavy body that has been supposed to fall in a vacuum. Pure economics has no optimal way to manifest a particular economic phenomenon than rational mechanics for the performance of a particular mechanical phenomenon. Actually, at this moment, it is time for mathematics to express itself. The question of pure economics bears a striking resemblance to the question of rational mechanics. To date, in terms of empirical fact, people have not yet been able to decide on the last problem without the help of mathematics. Therefore, it is quite legitimate to turn to mathematics for help in solving an economic problem. Policies act on resource flows by amplifying or smoothing price and profitability gradients, providing incentives or signals for entrepreneurs to act on behavioral volatility (Niyazbekova et al., 2021). The second law of thermodynamics is one among the physical sciences. It stood the test of time, including the numerous and inventive, attempts to counter its effectiveness. However, in the life sciences, the so-called "law of entropy" has a more difficult history. The fact that energy plays a major role in living systems and in evolution has long been recognized as valuable.

The main driver of changes in the situation on the global energy markets are fundamental factors - supply and demand. Demand and supply will continue to play a key role in the dynamics of prices and volumes The demand and supply side will continue to play a key role in future price and volume developments on energy markets, and therefore it should be borne in mind that analyses of economic growth and energy consumption also consider the supply side. Therefore, one should be aware that an analysis of economic growth and energy consumption also touches on supply-side factors that adjust the observed levels and patterns of consumption. The most important factor determining the structure and dynamics of consumption of both energy in general and specific energy carriers, and thus the structure of the world fuel and energy balance, is also the relative levels of energy prices (Goncharuk et al., 2018; Kozhageldi et al., 2022). Existing opportunities for inter-fuel substitution as well as contractual.

Existing opportunities for inter-fuel substitution as well as contractual practices determine the existence of a positive correlation between the prices of energy carriers.

Thus, it is possible to single out the main aspects of analyzed sources, as well as the work done: there is an initial impact of investments in energy on the indicators of economic development of a particular object. In addition to this work, the study by Zhang (2022) is such an example, in which the relationship between the green economy and economic indicators with renewable energy sources is considered. Therefore, in the work by Dube (2021), the author reports an increase in the trend of reforming economy through the integration of theories from ecology and physics.

5. CONCLUSIONS

In economic life, the many rich institutional forms provide a considerable variety in the performance of basic functions that should be given to any viable complex economy. Thus, economics in its pursuit of becoming a "social physics" has turned into a contemplative science, isolated from ethical science, political economy and human-ecological relationships.

The internal and external development of science and technology can be formed in the aspect of economics, business and the fact why more efficient enterprises survive among competitors. Applying a constructive law in expression with the help of economic indicators means approaching the natural essence of quantities.

In this regard, the new concepts and terms were introduced in this work – “monetary permeability of product” in the market of a certain country using the formulas of induction field, where certain quantities were expressed in terms of the economy (for example, the induction field is the monetary field), as well as “absolute monetary permeability of the world economy”. Economic energy can be ranked among the known types of physical energies. And at the same time, it is universal due to the fact that it has the ability to evaluate all other types of energies, as well as take the main forceful part in generation of these energies, and most importantly, in the reunification of these energies in order to generate energies of the utility charge in the product. This energy is compact – it can be stored in large quantities anywhere and without causing problems with transfer or transmission. Thus, the identity of commodity-money and electromagnetic interactions was proved. That is, these interactions were defined as a physical process in the market. And for the convenience of presenting research on all physical processes, a general con-

cept and term is defined – "economic energy". However, specifically for the process of interactions in the market, this energy will be called "monetary", and for the electromagnetic interactions – it is called magnetic energy. In addition, an analysis of works has been done that raises similar issues in the field of relationship between economics and physics, where the main aspect is considered the fact that economy, in its pursuit of becoming "social physics", turned into contemplative science isolated from ethical science, political economy, and human ecological relationships.

It is also worth considering that environmental protection and strong economic growth are global requirements that concern the research community and lawmakers. Analyzing the economy and comparing the commodity-money interactions with physical processes in all areas of physics, it is necessary for further research to determine not only the main directions of change in classical physics, but also the fundamental laws of energy conservation.

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