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## FORMATION OF THE LAND MARKET IN UKRAINE: METHODOLOGICAL ASPECT

**Hryhorii Shary, Doctor of Economic Sciences.**

**Oleh Maksymenko, Candidate of Economic Sciences**

**Viktor Dubischev, Doctor of Economic Sciences**

**Nataliia Chornovol, National University “Yuri Kondratyuk Poltava Polytechnic”**

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**Formulation of the problem.** On July 1, 2021, the agricultural land market was officially opened in Ukraine. This significant step in the implementation of land reform requires the improvement of land relations at the theoretical and applied levels.

Land relations are basic for the system of economic relations, are the main immanent component and the most important factor in the agricultural sector of the modern market economy.

Despite the dramatic socio-economic changes that have taken place in country in the 90's of the twentieth century. and At the beginning of the XXI century. soil potential. At the same time, it did not become a trigger for a forced transition to an environmentally balanced one land use and, as a result, increasingly distanced itself from the model of the foundations of the economy of sustainable land use. At present, a significant number of problems in the system of land relations of Ukraine remain unresolved.

For a radical transformation and elevation of land relations at a qualitatively new level, it is impossible to limit oneself to traditional approaches and outdated standards, or norms, without an institutional factor. It is necessary to deepen the existing system of philosophical and economic attitudes to land resources in society. Develop and recommend new more flexible concepts of land relations development. It is expedient to improve the existing methodological approaches, to develop progressive mechanisms for regulating the management system of land use and reproduction.

The problem of improving methodological approaches to economic evaluation of land, separation and distribution of land rent, effective management of lease rights, minimization of natural and economic risks, elaboration of the principles of transition to sustainable land use is acute.

**Analysis of recent research and publications.** Fundamental, theoretical and methodological, and applied aspects research of problems of institutional development of economic and land relations in the agricultural sector of the economy are laid down in the works of: W. Hanilton, D. North, T. Veblen, J. Commons, W. Mitchell, T. Eggertson, J. Johnson, G. Barnes, K. Panunzio, J. Fableman, G. Kleiner, F. Jacob, W. Neil.

**Selection of previously unsolved components of the overall problem.** Needs a solution to the scientific problem of creating a theoretical, methodological and methodological basis for institutional support for land development in the agricultural sector of Ukraine as a system of methods, principles and mechanisms, the use of which will form a system of land relations, where its priorities will be efficient, rational and sustainable land use. resource potential of the country.

The direct and indirect dependence of the quality of the land market on its (land) evaluation mechanism requires in-depth research, in particular, the natural impact of cyclical prices on agricultural land.

At the methodological level, it is necessary to substantiate the effectiveness of the mechanism of evaluation of agricultural land, which, unlike the existing one, takes into account the use of institutional components of legal objectivity and legal subjectivity of land relations;

**Presentation of the main material.** Regarding the formation of the market of agricultural land in Ukraine, a number of regulations and bylaws have been adopted, first of all, the Land Code of Ukraine, the Laws of Ukraine "On Land Valuation", "On Land Management" and others. Thus, according to the Law of Ukraine "On Land Valuation", Article 5., depending on the purpose and methods, land valuation is divided into the following types: soil evaluation; economic evaluation of lands; monetary valuation of land. And monetary valuation of land can be normative and expert.

In general, soil grading data are an integral part of the state land cadastre and are the basis for economic assessment of agricultural land and are taken into account in determining the ecological suitability of soils for growing crops, as well as losses of agricultural and forestry production.

It is natural that the economic valuation of land is the basis for the normative monetary valuation of land, analysis efficiency of land use compared to other natural resources and determining the economic viability of land agricultural purpose for cultivation crops. Monetary valuation of land, depending on the purpose and procedure may be normative and expert.

Normative monetary valuation of land is used to determine the amount of land tax, state duty on mines, inheritance and donation of land in accordance with the law, rent for land of state and communal property, loss of agricultural and forestry production, the value of land over 50 hectares for the placement of outdoor sports and sports facilities, as well as in the development of indicators and mechanisms of economic incentives for the rational use and protection of land.

With the deepening of the essence of land as an economic factor as opposed to natural, it is natural to raise the issue of ensuring the reproduction of its natural properties, taking into account the state of potential natural and economic fertility.

The solution of the problem of the corresponding objective, by natural content, estimation of the earth is connected with use of methodology of institutionalism. Thus, theoretical, methodological and applied problems related to the economic development of land relations in the agricultural sector and their institutional support remain insufficiently researched and unresolved, especially in terms of adapting the requirements of modern neo-institutional economy to the agricultural economy of Ukraine.

A natural stage of substantiation of objective land valuation, taking into account the state of potential natural and economic fertility, is the substantiation of methodological approaches to improving the normative monetary valuation of land, which includes a study of the dynamics of price fluctuations. construction of price cyclical models in forecasting land prices.

The problem of land market formation in Ukraine is a multifaceted phenomenon that cannot be reduced to one whole, but in our opinion, the main one is the institutional component. It is not development, but sometimes the lack of proper quality of institutional factors that makes it impossible to introduce a land market in the country. From this point of view, it is advisable to analyze the institutional factors, factors influencing the formation of land prices. Important studies of countries where there is a long experience of land pricing. Ukraine is more responsible experience of countries with large sown areas, both in the United States and Canada. This methodological approach is based on taking into account the regularity of the impact of cyclical prices of agricultural products on the forecast of land prices.

To this end, outlined two models of harmonics that can be used in the analysis and forecasting of processes with the formation of land prices, in which the object was the historical experience of land development in the United States, which can be typical for any country, including the possibility of functioning of the land market in Ukraine.

In the process of analyzing the factors influencing the price of land, in particular in the United States, the alignment (approximation) of the time series of the price was carried out of agricultural land in the United States by exponential function, for the period 1910-2014, which describes quite well the actual series. Translating the obtained coefficients, a complex percentage was calculated, which characterizes the overall dynamics of annual price changes. The regression coefficient for this line of approximation is 0.0448, with a complex percentage of 0.046.

The above means that the price of 1 acre of agricultural land for the analyzed period in the United States changed with an annual increase of 4.6%. The high degree of reliability of the approximation is indicated by the coefficient of determination, which amounted to 0.899. The chosen form of approximation, which takes into account the time factor, explains 89.9% of the variation in price change, and, according to calculations, only 10.1% of price variation depends on other factors that were not included in the exponential function. The approximation emphasizes the dynamics of price change, the general trend of the time series.

It is also important to analyze the influence of other factors, especially cyclic component. For this purpose, a spectral analysis of this time series was performed, which provides for the distribution of the price wave so that it best describes the random processes by the significance of the selection of the variance at different frequencies. In spectral analysis, the main approach is to divide the time series of the process into a Fourier series. That is, the transformation of one series into another due to harmonic components. In the decomposition of Fourier series, the choice of the shape of the spectral window, according to which the series will be smoothed, is important. In this case, the Tukey window was used. The choice of this form spectral window is associated both with a preliminary assessment of the resulting Fourier series, and based on monographic studies by scientists. The authors showed from their own example the discrepancy of the obtained variances of different estimated spectral windows. According to Tukey, the smoothing variance is 7.5%. This takes into account the data of harmonics, and the distribution of spectral density illustrates the presence of different time periods of waves that occur in the actual price range.

Two spectra are most clearly manifested, which simultaneously characterize both the ascending and descending phases. The spectrum indicates how the variance of the stochastic process is distributed in a continuous frequency range. The price of an acre of agricultural land in the United States in the study period contains cyclical fluctuations with two major and two minor periods, respectively 16 and 32 years and – 18.3 and 42.7 years.

According to the results of spectral analysis, the time series of the price of one acres of agricultural land in the United States for 1910-2014 were divided into two Fourier series by different number of harmonics, which affect the magnitude of fluctuations of the cyclical component in the price in ascending order.

The Fourier series for 9 harmonics shows not only a prolonged decline in agricultural land prices in the United States in the 1990s, but also shows two declines (bottoms), the last of which occurred at the beginning of the XXI century. tendency to further growth. In the United States in the twentieth century. there were two significant recessions. According to the United States Department of Agriculture, the price of land in the United States has changed critically twice since the 1920s. and in the mid-80's of the same century. The collapse in land prices was due to a positive balance, slowing inflation, which ultimately affected the decline in demand for land [5]. After the end of the last recession (the passage of the second bottom), in the United States since 1987 the price of land has a steady upward trend, the dynamics of growth is higher than before the second period of the rise.

The study takes into account the fact that increasing the number of harmonics to determine the impact of the cyclical component on the price of land does not yet allow to emphasize the high degree of adequacy of objective assessment. At 9 harmonics, the influence of the cyclical component in the price of agricultural land in the United States changes dramatically compared to actual processes, in contrast to a number built in 5 harmonic cycles. In general, the dynamics of the price of 5 harmonics, quite well revealed the changes that took place in the US land market in the 80's of the twentieth century, which in fact has been since 1987, and given the cyclical component since 1994, this process does not preclude the impact on the land market of other natural fluctuations.

Analyzing the period of fluctuations in agricultural land prices in the United States for 1965–2014, which are inherent in both Fourier series, traces the smallest decline in the cyclical component, which occurs in the late 60's and early 70's of the twentieth century. For 9 harmonics, the cyclic component reached its minimum in 1973, and for 5 harmonics – in 1969.

Declines or fluctuations in price cyclicals on two Fourier series that occurred after the beginning of the next rise in land prices since 1987, should be considered from the standpoint of lack of influence on price formation for some time.

Here it is legitimate to take into account the fact that the price of land for a long time was formed without the negative manifestation of cyclical fluctuations. If we consider the cyclic component for 9 harmonics, this transition took place in 2006, and for 5 harmonics since 2002. Different number of harmonics once again

confirmed the shift (uncritical) between cycles, which affected the forecast land prices. It should be noted that the cyclical component began to press on prices as an upward trend since 2002 (because it has a positive value). This is indicated by the Fourier series, built on the basis of 5 harmonics, ie the US economy was in recession. The greatest value of cyclical impact on both models appeared in 2012.

Price forecast for 1 acre of agricultural land, taking into account the cyclical component in the period of rise, for a number of 9 harmonics is 785.8 dollars / acre and for 5 harmonics – 762.5 dollars / acre. Respectively, the share of the cyclic component was 31.1% and 30.3%. Compared to the previous surge in cyclicity, which occurred in the early 80's of the twentieth century, this trend has intensified significantly, and in recent years the cyclical component in the price of land plays a more significant role than before. The cyclic component is an integral part modern land prices in the United States and as a system-forming factor should to be taken into account when forecasting and studying the dynamics of pricing in the market of agricultural land in Ukraine.

According to the model of cyclical land prices for 9 harmonics, three cycles were identified: one – declining, and two – increasing. The period of recession falls on 1972 and 1992, where the cycle lasted 20 years. Accordingly, there are two cycles of growth, the first of which occurs in 1983 and 2012 with a period of 29 years, and the second cycle, manifested in 1992 and 2001 with a duration of 9 years. The last cycle did not add a cyclical component to the price, is part of the overall growth cycle as a subperiod. Given the entry into a long-term cycle of rise, as well as virtually no impact of cyclicity in price, it is rational to analyze the two cycles, in the fall from duration of 20 years and growth of 29 years.

Two models of price cyclicity, decomposed into a Fourier series, coincide in cycle and duration. The duration of the cyclicity is long-term and is 29 years, and is quite close to the longest period of the spectrum established by the distribution of spectral density, which was 32 years.

Research by prof. D.V. Shiyani, who, conducting an analysis of cyclicity in agriculture in Ukraine for 1961–2010, found that two crops are most in line with changes in general cyclicity of the agricultural sector. These are cereals and sugar beets. The medium-term cyclicity in terms of production corresponds to 14.7 and 11 years, and in the short-term cyclicity – 5.2 and 6.2 years [6, p. 128].

Despite the research conducted in different countries, the main thing is the magnitude of the manifestation of cyclicity, which informs us about the possibility of individual processes to influence cyclical changes in land prices. Such comparisons should be made with caution, as a specific indicator is considered – the volume of production.

Consider in this case the periods of cyclic oscillations, but for indicator of grain and sugar beet yield. To do this, we present the results of research by prof. O.V. According to Oliynyk, according to those in Ukraine, the cyclical fluctuations in grain yields in the short term are about four years, and in the medium term – 16.1 years. According to the yield of sugar beet, the duration of cycles is 6.1 and 15.4 years, respectively [7, p. 63–68]. Clear manifestation of the duration of different cycles in terms of production relevant products, and the yield is not observed.

But they describe cyclical processes and vary closely from the 9-year cycle, which is typical of the sub-period of rising land prices in the United States. If we look at the cyclical fluctuations in such an indicator as the price of wheat, the latter is quite close to our subperiod according to the results of research by prof. D.V. Shiyani, who studied the cyclical nature of wheat prices in the United States, found that this cycle duration is 9.5 years [8, p. 149].

The presence of short- and medium-term cyclical fluctuations in the respective crops and at the same time in the context of the considered indicators are closer to the subperiod (9 years) than to the general cycle of rise, 29 years. We can observe that in the USA the price of land is not free from the manifestations of cyclicity in the short run, but in general it flows from the long run. The latter characterizes the processes in the United States, which have a stable, long-term dynamics of land prices, which is largely related to general macroeconomic conditions, as observed during the period of greatest price growth in the early 80's of the twentieth century. and after the exit from the recession since 2001.

To date, the cyclic component has formed a half-cycle, which is clearly visible from the obtained data of two models of cyclicity. The difference in the cycle of numbers in the two Fourier series is mainly due to some change in shape, with a clearer wave oscillation is observed for 5 harmonics. They differ in depth (amplitude) of deviations and insignificant shifts – in the temporal dynamics.

The obtained results of spectral analysis indicate that the dynamics of prices shows cyclical fluctuations at the end of growing ridges, rather than falling ones. Therefore, cyclicity is essentially manifested in the rise



of the trend with its subsequent reversal, and not vice versa, in the phase of the process after the recession (bottom). The above feature, which relates to the properties of cyclical prices, does not diminish the relevance of the impact on pricing. These two models of harmonics can be used in the analysis and forecasting of processes with the formation of land prices, in which the object was the historical experience of land development in the United States, which can be typical for any country, including the ability to operate land market in Ukraine.

The applied content of the research methodology is manifested in the fact that using models of cyclicity in forecasting the price of agricultural land in the US for 2015–2030, the results were obtained, which emphasize that in fact the cyclical wave is in decline, and forecast data indicate for the initial cyclical decline in prices, and then the resumption of cyclical growth, and the "bottom" of cyclical fluctuations in the model of 9 harmonics will be passed in 2018. The projected value of agricultural land prices will be 2289.5 and 1728.5 dollars / acre. The offset of the cyclic decline period for the 9-harmonic model is three years longer than for the 5-harmonic model.

14 As for the lifting cycle, for the model with 9 harmonics it will last until 2025, and for 5 harmonics will last until 2028. And in this case there is a shift in the time of formation of the cycle, where the phase of rise for three years is longer according to the model of 5 harmonics than the results of the model with 9 – you are harmonics. In general, the forecast of three volumes of the lifting cycle for models with 9 harmonics g with 5 harmonics, respectively, is 7 and 13 years. That is, in fact, the next cycle of recovery will be medium-term, and will begin after the previous, not significant in time correction of cyclical prices of agricultural land, such a correction of prices is the cycle of decline.

The mechanism of land price formation in the United States is reflected in the order of its use and motivation of farmers, their attitude to land as property. Producers-tenants (tenants) carried out cultivation on the area of agricultural land in 1910, which amounted to 225.5 million acres, and in 2007 it amounted to 81.8 million acres, or 36.3% compared to 1910. In 1910–2007, the area of land for tenant producers decreased by 63.7% against the background of the area of agricultural land in the United States during the study period increased from 878.8 million acres in 1910 to 922.1 million acres in 2007, ie in relative terms the increase was 4.9%. And the share of producers (farmers) who carried out their economic activities using the lease mechanism decreased significantly when in 1935 the share was 52.2%, then in 2007 there was an even sharper decline in the share of net producers-tenants, namely – from 42.1 to 6.4%, respectively. And private ownership of land for farmers remains a means of increasing the profitability of management through the withdrawal of land rent in their favor. The share of farmers owning agricultural land in the United States is constantly increasing, amounting to, respectively, in 1935 – 47.1%; 1950 – 57.4%; 1987 – 59.3%; 1997 – 60% and in 2007 – 69%.

The study takes into account the fact that the vast majority of landowners should not be perceived as the most cost-effective land users, given the dynamic growth of land prices observed in the United States for a long time. Significant increases in agricultural land prices took place during the 1970s and continued in the 1990s, at the beginning of the 21st century, and continue to this day.

**Conclusions.** Summing up the impact of cyclical prices of agricultural products on agricultural land, important in this case are not only price fluctuations in the cyclical component, but forecast scenarios for future events and the probability of price cycles.

The forecast for the growth cycle will be shorter, as evidenced by data from two models of cyclicity in the Fourier series than the previous rise, which lasted 29 years. So, with some confidence (the author's note – it is necessary to make annual adjustments, as these models require mandatory verification across the forecast horizon) we need to talk about shifting the frequency of fluctuations in the formation of agricultural land prices in the US, including macroeconomic factors.

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**Hryhorii Shary**, Doctor of Economic Sciences. Oleh Maksymenko, Candidate of Economic Sciences. **Viktor Dubischev**, Doctor of Economic Sciences. **Nataliia Chornovol**, National University "Yuri Kondratyuk Poltava polytechnic". **Formation of the land market in Ukraine: methodological aspect.**

The problem is to develop a mechanism for efficient use of land resources in Ukraine on the basis of private land ownership. Solving the problem at the methodological level of institutionalism involves deepening the existing system of philosophical and economic attitudes to land resources in society. It is necessary to improve the existing methodological approaches, to develop progressive mechanisms for regulating the management system of land use and reproduction. The problem of improving methodological approaches to the separation and distribution of land rent, effective management of lease rights, minimization of natural and economic risks, elaboration of the principles of transition to sustainable land use is acute. On this basis, it is legitimate to recommend flexible concepts for the development of land relations.

**Key words:** land market, land relations, private land ownership, land price, monetary valuation, methodology of institutionalism.

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**Шарій Григорій Іванович**, доктор економічних наук. **Максименко Олег Сергійович**, кандидат економічних наук. **Дубішев Віктор Петрович**, доктор економічних наук. **Чорновол Наталія**, Національний університет «Полтавський політехніка імені Юрія Кондратюка».

**Проблема полягає** у розробці механізму ефективного використання земельних ресурсів в Україні на основі приватної власності на землю. Враховується той факт, що кардинальні соціально-економічні зміни, що відбулися в країні як в 90-х рр. ХХ ст., так і на початку ХХІ ст., не вплинули у повній мірі на забезпечення ефективного господарського обігу землі на базі приватної власності, збереження та примноження продуктивного потенціалу ґрунтів. Також це не стало початком до дієвого переходу на екологізбалансоване землекористування і як підсумок, все більш дистанціювало від моделі основ економіки сталого землекористування. Авторами доводиться, що для докорінної трансформації та піднесення на якісно новому рівні земельних відносин без інституційного чинника неможливо. Саме нерозвиненість, а подекуди відсутність належної якості інституційних чинників, унеможливають впровадження ефективного ринку земель в країні. З цієї точки зору у статті проаналізовано інституційні чинники, фактори впливу на формування ціни на землю, а саме дослідження країн, де досить тривалий час існує досвід ціноутворення на землю. Враховано, що Україні у більшій мірі відповідає досвід країн з великими посівними площами, як у США і в Канаді. Даний методичний підхід базується на врахуванні закономірності впливу циклічності цін сільгосппродукції на прогнозування цін на землю. У статті враховується проблема вдосконалення методичних підходів до виокремлення та розподілу земельної ренти, ефективного управління правом оренди, мінімізації природничих і господарських ризиків, опрацювання засад переходу на стале землекористування. На цій основі зосереджена увага на гнучких концепціях розвитку земельних відносин. У цілому робиться наголос на раціональності поглиблення існуючої системи філософського та господарського відношення до земельних ресурсів у суспільстві. Доводиться, що закономірним етапом обґрунтування об'єктивної оцінки землі, що враховує стан потенційної природної та економічної родючості, є обґрунтування методичних підходів до вдосконалення нормативної грошової оцінки земель, яке включає дослідження динаміки цінних коливань. Побудову цінних циклічних моделей при прогнозуванні ціни на землю. Підводячи підсумок впливу циклічності цін сільськогосподарської продукції на сільськогосподарські угіддя, важливими в даному випадку є не тільки цінні коливання за циклічної складової, а прогнозні сценарії майбутніх подій та ймовірності розвитку цінних циклів. Доведено, що погноз циклу зростання буде більш об'єктивним, за рядами Фур'є.

**Ключові слова:** ринок землі, земельні відносини, приватна власність на землю, ціна землі, грошова оцінка, методологія інституціоналізму.