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Expert Monetary Appraisal of the Integral Property Complex as Element of Mortgage Security

Introduction and aim of the research

Despite the mortgage boom, that started in 2000 and lasted till 2008, it doesn't play a significant role in Ukraine so far. On the eve of the global economic crisis the total amount of outstanding mortgage credits in Ukraine was about 30 billion US dollars, or 15% of the GDP and this indicator made Ukraine lag behind the developed countries of Western Europe and North America by 3–5 times. There was hardly any mortgage refunding, while mortgage had been mainly provided at the expense of short-term deposit resources, which made it risky for the mortgagees' liquidity.

Under economic crisis conditions the situation has deteriorated, which is especially noticeable if we talk about agrarian mortgage. Agricultural sector of Ukraine is one of the most promising for the development of mortgage crediting, but at the same time, it had a high degree of risk due to the specific agricultural production. Nowadays, the agrarian mortgage in Ukraine requires creating certain prerequisites necessary for its development. Investigations have shown that the development of the mortgage as a means of investment to agrarian enterprises requires improvement of borrowers' creditworthiness of mortgage loans, particularly by improving the quality of expert monetary appraisal of real property as the object of mortgage. Correct expert monetary appraisal of mortgaged property is one of the key elements of its security.

Many foreign and domestic scientists are engaged in issues related to the improvement of real estate appraisal methodology, including agricultural land [Friedman 1997; Follak 1999; Mikerina 2000; Drapikovskiy, Ivanova 2003; Melnychuk 2007;]. The factors that impact on capitalization rates used in the process of agricultural land appraisal are identified by V. Melnychuk as well

as their quantitative impact on such rate are determined. The principles of real estate appraisal are defined by J. Friedman. Under the scientific research these principles were combined in four groups: "1. Principles based on the users' notion. 2. Principles concerning land, buildings and structures. 3. Principles related to the market environment. 4. The principles of the best and most effective use". Also nature of the basic approaches of real estate appraisal is revealed by him as well as the main techniques of income property appraisal are formed by using mathematical tools. Minimum requirements for the recognition of real estate collateral are defined by K. Follak, and the main ways to improve the Ukrainian legal provision related to collateral appraisal are identified. Essence of major issues concerning appraisal of real estate as mortgage objects in Ukraine are revealed by A. Drapikovskiy, as well as ways to improve the agricultural land appraisal methodology are suggested. However, in spite of the mentioned above, nowadays in Ukraine many questions related to real estate appraisal are unresolved.

The aim of the research is to develop a new method of expert monetary appraisal of agrarian enterprises as integral property complexes, which are used as objects of mortgage. Such method will increase the accuracy and objectivity of such appraisal and, consequently, minimize the risks associated with the Ukrainian economics agrarian sector mortgage crediting.

The expert monetary appraisal of an integral property complex as mortgaged property by income capitalization approach is shown by the example of the agricultural enterprise. The agrarian enterprise has been chosen for a reason. Among the variety of integral property complexes the agrarian enterprise is probably one of the most difficult objects for the expert monetary appraisal, due to its diversity, use of a variety of production means, which differ by construction, purpose and functions as well as a wide range of natural and economic production factors.

The proposed method of expert monetary appraisal of an enterprise as an integral property complex has been used while appraising 36 agrarian enterprises with the total area over 65 thousand hectares.

Results of the Research

The appraisal starts with its objects determination. They are the objects that provide possibility to directly calculate income (profit and/or rent) they bring, namely: branches of the estimated enterprise, its individual units, structural divisions and types of activities, as well as natural resources (land plots, mineral deposits, etc.) owned by the enterprise. Thus the appraisal objects are: crop production, livestock, industrial production (within structural divisions of: factories, certain workshops, mills, etc.), trade, other activity and natural resources.

Detalization degree of the appraisal objects is determined by the appraiser himself based on the "homogeneity" principle (i.e. each appraised object must be generally "homogeneous" by the main criteria).

Elements of the integral property complex estimation are shown in Figure 1.

The appraisal objects are divided into two groups:

1. Those with a limited service period.
2. Those with an unlimited service period.

The objects with an unlimited service period are appraised using direct capitalization method. The objects with limited service period are appraised using capitalization cash flow method.

Interest rates are defined separately both for capital and land plots. It is reasonable to use the weighted average cost of capital as its interest rate.

In case of land rent (the "equivalent" rental fee) mismatch with actual rental fee, the appraisal of the lease right that may be positive (if the actual rental fee is lower) or negative (if the fee is higher) shall be made. In case of property sublease the lease right appraisal shall also be made. In this case we should consider the difference between the primary and the secondary rent fees.

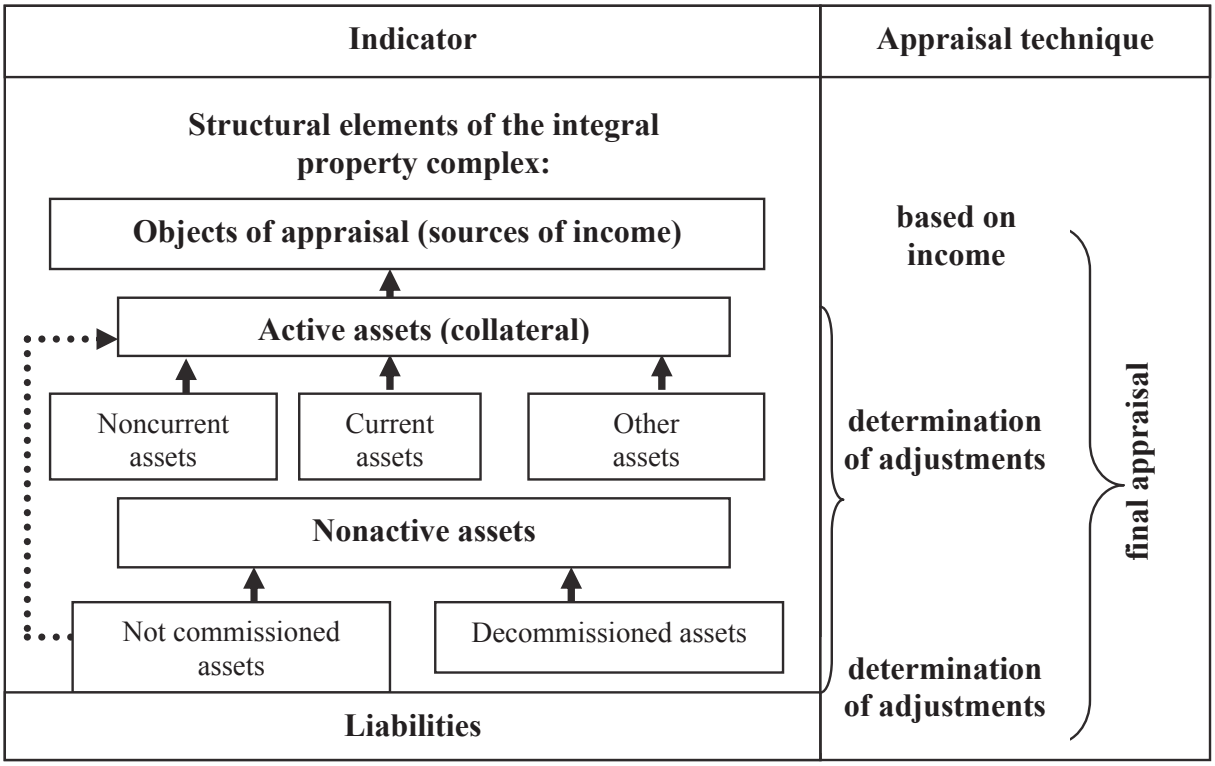

Figure 1
Elements of the integral property complex estimation

Source: Own research.

Appraisal results are summarized. The final appraisal stage is to calculate the adjustments, namely:

1. Adjustments for provision of non-current assets (the calculation does not include assets, if they are object to direct appraisal, such as fertile garden, and non-active assets, being appraised separately):
   1.1. adjustment for fixed assets backing change considering their depreciation;
   1.2. adjustment for biological assets backing change at their fair (residual) value;
   1.3. adjustment for other non-current assets backing change.
2. Adjustment for current assets backing change.
3. Adjustment for other assets.
4. Adjustment for the value of non-active assets:
   4.1. not commissioned (assets aren't put into operation yet);
   4.2. decommissioned ones.

Adjustments 1, 2, 3 and 4.1 make it possible to identify the potential growth (decline) of the enterprise, being object to appraisal. And finally, the adjustment for debt shall be calculated.

Appraisal of individual objects should be started with plant growing. Objective assessment of cash flows, received (could be received) from the plant growing, is associated with the solution of some problems. Assessment based on the actual results of previous year may not be quite correct, since such results are strongly dependent on unstable climatic conditions.

The historical approach based on actual data for recent years, allowing negating the impact of climatic instability factors is not always acceptable. First of all, one should have such a story, and therefore, start-ups based on this approach cannot be appraised. Secondly, during several years the enterprise could change significantly and the data for several years averaged in one or another way will not reflect its current state. In our opinion would be the best option that would allow determining the normative evaluation of crop production real potential, existing at the time of its implementation.

The normative profit in plant growing shall be defined as follows:

$$P_n = CGS_{cg} \cdot \frac{E_{cg} - RF}{E_{cg}} \cdot R_n, \quad (1)$$

where:

P_n – normative profit in plant growing, currency unit;

CGS_{cg} – cost of goods sold in plant growing, currency unit;

E_{cg} – expenses in plant growing, currency unit;

RF – rent fee for the cultivated land, currency unit/ha;
R_n – normative profitability ratio (profitability ratio without rent fee for cultivated land).

In order to calculate R_n one should determine the achieved level of plant growing intensification reflected by the δY index. The δY value appraisal of a particular enterprise can be done in various ways, one of which is to use the following formula:

$$\delta Y = \left(\overline{Y_c} - 0,225 \cdot Pf\right)/0,9 \cdot Iq, \quad (2)$$

where:
Y_c – average yield of cereal grain being the most likely for the estimated enterprise, cwt/ha;
Pf – soil fertility (fertility appraisal takes into account constant and long-term actions factors that significantly affect crop yields), points;
Iq – integral indicator of physical, chemical and agro-climatic characteristics of land plot (takes into account adjustments for soil material, soil texture, degree of gleyization, Na salt content in absorbing complex, soil solution reaction, heat and moisture provision), ratio.

Normative yield of the plant growing production and costs for its products production are determined considering all strategic crops, and normative land rental fee – based on normative land rent, calculated for winter crops. Experience of the economically developed countries shows a close correlation between the actual land rental fee and "wheat" land rent. At determining such land rental fee one should take into account not only the price of winter wheat, but prices for other strategic plant and animal products in terms of conventional wheat.

The following formulas help to calculate the normative values of yields, costs and payback ratios.

$$Ry_{pg} = 0,0408831\ Y_n \cdot R_p \cdot R_e \cdot R_t, \quad (3)$$

$$Ry_{wh} = 0,0318848\ Y_n \cdot R_p \cdot R_e \cdot R_t, \quad (4)$$

where:
Ry_{pg} – ratio of plant growing yield;
Ry_{wh} – ratio of winter wheat yield;
R_p – equivalence ratio of the average price for strategic products in terms of winter wheat (with exaggerated price of $R_p > 1$, with understated price $R_p < 1$);
R_e – ratio of ecological land state (in satisfactory condition $R_e = 1$);
R_t – territorial ratio (taking into account the location of land within suburban areas, etc.).

$$Rc_{pg} = \left[0,009478 \cdot \delta Y + (0,0089557 \cdot Y_n + 0,421935) \cdot R_{fg}\right] \cdot R_{d1} \cdot R_{d2}, \quad (5)$$

$$Rc_{wh} = \left[0,008802 \cdot \delta Y + (0,0027758 \cdot Y_n + 0,354104) \cdot R_{fg}\right] \cdot R_{d1} \cdot R_{d2}, \quad (6)$$

where:

Rc_{pg} – plant growing costs ratio;

Rc_{wh} – winter wheat production costs ratio;

R_{fg} – adjustment ratio for technological field group (for the III group $R_{fg} = 1$);

R_{d1} – adjustment ratio for the distance from the field to the household (average distance of the enterprise's transportations) taking into account the state of roads;

R_{d2} – adjustment ratio for the distance from the enterprise to the market taking into account the state of roads.

$$R_p = \frac{Ry_{pg} - Rc_{pg} - \left(Ry_{wh} - Rc_{wh}\right) \cdot \left[0,59754 - 0,12632 \cdot \left(Ry_{wh} - Rc_{wh}\right)\right]}{Rc_{pg}} \quad (7)$$

where: R_p – normative profitability ratio in plant growing, ratio.

The income calculated in this way will be used to assess the value of the enterprise as an integral property complex.

Due to the mismatch of the land rental fee actually paid by the enterprise with normative land rent, the enterprise gains additional type of income from plant growing, caused by the right to land lease.

The land lease right appraisal is defined as follows:

$$Ap_{lr} = \sum_{t=1}^{n} \frac{R_t - RF_t}{\left(1 + \frac{IR_l}{100}\right)^t}, \quad (8)$$

where:

n – lease term, years;

R_t – annual land rent, currency unit/ha;

RF_t – actual land rental fee in t-year, currency unit/ha;

IR_l – interest rate for land, % per annum.

If cultivated land belonged to the enterprise, then its value appraisal would take place instead of such cultivated land lease right appraisal.

In other words, compared to plant growing, the objects that bring temporary income should be appraised. Such objects appraisal is defined as the sum of the present value: cash flow from the object during its service period; residual value of the object – the excess of income over expenditure (+), excess of expenditure over income (–).

The present value of cash flow from the property, bringing temporary income is defined as follows:

$$PV_{CF} = \sum_{t=1}^{m} \frac{PR_t - C_t - R_t + D_t}{\left(1 + \frac{IR_c}{100}\right)^t}, \quad (9)$$

where:

PV_{CF} – present value of cash flow from the object during its service period, currency unit/ha;
m – service period of the object, years;
PR_t – value of products in the t-year, currency unit;
C_t – production and marketing costs in the t-year, currency unit;
D_t – annual depreciation, currency unit;
IR_c – interest rate for capital, % per annum.

The present residual value of object is calculated as follows:

$$PV_l = \frac{LI - LE}{\left(1 + \frac{IR_c}{100}\right)^m}, \quad (10)$$

where:

PV_L – the present residual value, currency unit;
LI – income associated with liquidation process, currency unit;
LE – expenditure associated with liquidation process, currency unit.

After evaluating profitable crop production sites (cultivated land, perennial plants, etc.) and the farmland lease right one shall make the appraisal of profitable livestock facilities.

It is well known that crop production has an immediate and significant impact on the efficiency of the enterprise's livestock industries since it is the main food supplier, which sufficiency and cost is a major factor in the livestock production cost.

Under this method the normative feed cost and therefore normative animal products cost is specified.

Profitability ratio in livestock is defined as follows:

$$R_p = \frac{Pn_i \cdot I_p}{Cn_i} - 1, \quad (11)$$

where:

R_p – profitability ratio of i-type livestock products production;
Pn_i – normative (equivalent) price of the i-type livestock products, currency unit/mass unit;

I_p – price index (the ratio of current price to the normative one);
Cn_i – normative cost of the i-type livestock products, currency unit/mass unit.

Normative (equivalent) price of the particular livestock products type should be determined by calculating the share of agricultural producer in the market retail price for the product.

After appraising profitable objects adjustment for these objects provision with assets over the last year shall be calculated. Thus, both those assets that are appraised as profitable objects and inactive assets are not taken into consideration.

Adjustment for assets backing change is defined as follows:

$$A_{FA} = FA_{FVE} - 0,5 \cdot FA_{IV}, \quad (12)$$

where:
A_{FA} – adjustment for fixed assets backing change, currency unit;
FA_{FVE} – fair value of the fixed assets at the end of the reporting period, currency unit;
FA_{IV} – initial value of the fixed assets at the beginning of the reporting period, currency unit.

$$A_{LTBA} = LTBA_{FVE} - LTBA_{FVB}, \quad (13)$$

where:
A_{LTBA} – adjustment for biological assets backing change, currency unit;
$LTBA_{FVE}$ – fair value of biological assets at the end of the reporting period, currency unit;
$LTBA_{FVB}$ – fair value of biological assets at the beginning of the reporting period, currency unit.

$$A_{ONCA} = ONCA_E - ONCA_B, \quad (14)$$

where:
A_{ONCA} – adjustment for other non-current assets backing change, currency unit;
$ONCA_E$ – other non-current assets at the end of the reporting period, currency unit;
$ONCA_B$ – other non-current assets at the beginning of the reporting period, currency unit.

$$A_{CA} = CA_E - CA_B, \quad (15)$$

where:
A_{CA} – adjustment for current assets backing change, currency unit;

CA_E – current assets at the end of the reporting period, currency unit;
CA_B – current assets at the beginning of reporting period, currency unit.

$$A_{OAE} = OA_E - OA_B, \quad (16)$$

where:
A_{OAE} – adjustment for the change of other assets, currency unit;
OA_E – other assets at the end of the reporting period, currency unit;
OA_B – other assets at the beginning of the reporting period, currency unit.

The final stage of the enterprise's appraisal as an integral property complex is the definition of the adjustment for its debt. This adjustment is calculated in two ways.

Under the first method such adjustment is calculated separately for long- and short-term debt.

Adjustment for long-term debt is defined as follows:

$$A_{LTD} = \frac{900}{D} \cdot (P_R + DP) - L_{LT}, \quad (17)$$

where:
A_{LTD} – adjustment for the long-term debt, currency unit;
D – number of days in the reporting period (year – 360, quarter of the year – 90);
P_R – profit for the reporting period, currency unit;
DP – depreciation charged for the reporting period, currency unit;
L_{LT} – long-term liabilities at the end of the reporting period, currency unit.

Adjustment for the short-term debt is defined as follows:

$$A_{STD} = A_{CE} - 2 \cdot L_{CE}, \quad (18)$$

where:
A_{STD} – adjustment for the short-term debt, currency unit;
A_{CE} – current assets at the end of the reporting period, currency unit;
L_{CE} – current liabilities at the end of the reporting period, currency unit;

The sum of two adjustments defines the general adjustment for debt.

Under the second way the adjustment for debt is defined as follows:

$$A_D = AT_E - 2 \cdot (L_{CE} + L_{CL}), \quad (19)$$

where:
A_D – adjustment for debt, currency unit;
AT_E – total assets at the end of the reporting period, currency unit.

From the two options of adjustments, the one that has less value shall be considered.

Conclusions

1. The mortgage relations development requires the creation of appropriate conditions and compliance with all mortgage security elements. One of the key such elements is conducting an impartial and precise mortgage object appraisal.
2. Currently in Ukraine there is a need to improve the quality of expert monetary appraisal of real estate as mortgage objects by improving the real estate appraisal methodology. Such measures will reduce the risk level at mortgage crediting and as a consequence, facilitate the mortgage crediting increase. Given the above, there is a need to develop new expert monetary appraisal methods of the mortgaged objects.
3. The proposed expert monetary appraisal method of agricultural enterprise – an integral property complex as the mortgage object, allows providing qualitative appraisal of agricultural enterprises that will be used as collateral for liabilities. Enterprise's appraisal shall be performed based on the potential income derived from the enterprise's activities. The method is developed in accordance with the requirements of the 4 Normative of the International Valuation Standards Council and tailored to specific of agricultural production, which takes place in the course of such appraisal.
4. This method testing in the agricultural enterprises appraisal process has proved its suitability for practical use and allows drawing conclusions about the relatively high accuracy and objectivity of the developed method.

Literature

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Ekspercka wycena zintegrowanego kompleksu majątkowego jako element zabezpieczenia hipoteki

Streszczenie

W artykule przedstawiono nową metodę wyceny eksperckiej przedsiębiorstw rolniczych jako zintegrowanego kompleksu majątkowego. W metodzie zdefiniowano przedmioty i algorytm wyceny. Elementy składowe zintegrowanego kompleksu majątkowego są następujące: przedmioty (źródła dochodu), aktywa obrotowe (wspomagające źródła dochodu), aktywa nieobrotowe – niesklasyfikowane (potencjał wzrostu) oraz zlikwidowane (przyszłe źródła finansowania). Przedstawiona metoda obejmuje wycenę przedsiębiorstw rolniczych, bazującą na możliwym do uzyskania dochodzie z przedmiotu, przy uwzględnieniu rynkowej wartości aktywów oraz długu.