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ОЦІНКА РІВНЯ РОЗВИТКУ УКРАЇНСЬКОГО РИНКУ ІПОТЕКИ

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Запропоновано методологія компаративної оцінки рівня ринку іпотечного кредитування. Здійснено дослідження українського ринку іпотечних кредитів за трьома напрямками: передумови розвитку іпотечного ринку, поточна ситуація на іпотечному ринку, ризики на ринку іпотечного кредитування. Розраховано інтегрований коефіцієнт рівня розвитку ринку іпотеки в Україні. Обґрунтовано, що рівень українського ринку іпотечного кредитування знаходиться в ембріонному стані в порівнянні із відповідним ринком ЄС.

Об'єктом дослідження ринок іпотечного кредитування України.

Предметом дослідження виступають методологічні засади оцінки іпотечного кредитування.

Дослідження ринку іпотечного кредитування як фінансового механізму реалізації стратегії технологічного розвитку національної економіки сприяє розумінню напрямів прикладання зусиль щодо подолання соціально-економічних проблем в країні.

Мета даної роботи полягає в здійсненні компаративної оцінки іпотечного ринку України.

Для досягнення мети були використані: системно-параметричний підхід – до наукового пізнання ринку іпотечного кредитування, що дозволило інтегрувати передумови розвитку, потенціал та ризики ринку іпотеки; компаративний аналіз щодо оцінки українського ринку іпотеки, що сприяло з'ясуванню рівня розвитку національного ринку іпотечного кредитування в порівнянні із ЄС.

Практичне значення отриманих результатів полягає у тому, що запропонований метод оцінки може бути використаний для рейтингування як банків, так і національних іпотечних ринків інших країн

Висновки. Оцінка передумов продемонструвала високу відповідальність українських позичальників іпотечних кредитів. Потенціал прикладання іпотечного капіталу в Україні перебільшує європейський майже у три рази. Найбільшим ризиком іпотечного кредитування житлового будівництва в Україні є проблема із недобудовами. Розвиток іпотечного кредитування в Україні потребує законодавчої підтримки в напрямку зміни статусу майнових прав, державної підтримки у гарантії наданих кредитів та вирішенні питань недобудов, пошуку альтернативних джерел фінансування.

Ключові слова: іпотечна процентна ставка, передумови іпотеки, безповоротна іпотека, житлова іпотека, ризики ринку іпотеки.

ОЦЕНКА УРОВНЯ РАЗВИТИЯ УКРАИНСКОГО РЫНКА ИПОТЕКИ

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Предложена методология компаративной оценки уровня рынка ипотечного кредитования. Проведено исследование украинского рынка ипотечных кредитов по трем направлениям: предпосылки развития ипотечного рынка, текущая ситуация на ипотечном рынке, риски на рынке ипотечного кредитования. Рассчитано интегрированный коэффициент уровня развития рынка ипотеки в Украине. Обосновано, что уровень украинского рынка ипотечного кредитования находится в эмбрионном состоянии по сравнению с соответствующим рынком ЕС.

Объектом исследования является рынок ипотечного кредитования Украины.

Предметом исследования выступает методология оценки рынка ипотеки.

Исследование рынка ипотечного кредитования как финансового механизма реализации стратегии технологического развития национальной экономики способствует пониманию направлений приложения усилий по преодолению социально-экономических проблем в стране.

Цель данной работы заключается в осуществлении компаративной оценки ипотечного рынка Украины.

Для достижения цели были использованы: системно-параметрический подход - к научному познанию рынка ипотечного кредитования, что позволило интегрировать предпосылки развития, потенциал и риски рынка ипотеки; компаративный анализ для оценки украинского рынка ипотеки, что способствовало выяснению уровня развития национального рынка ипотечного кредитования по сравнению с ЕС.

Практическое значение полученных результатов заключается в том, что предложенный метод оценки может быть использован для рейтингования как банков, так и национальных ипотечных рынков других стран

Выводы. Оценка предпосылок продемонстрировала высокую ответственность украинских заемщиков ипотечных кредитов. Потенциал приложения ипотечного капитала в Украине превышает европейский почти в три раза. Наибольшим риском ипотечного кредитования жилищного строительства в Украине есть проблема с недостроями. Развитие ипотечного кредитования в Украине требует законодательной поддержки в направлении изменения статуса имущественных прав, государственной поддержки в гарантии предоставленных кредитов и решении вопросов недостроев, поиска альтернативных источников финансирования.

Ключевые слова: ипотечная процентная ставка, предпосылки ипотеки, безвозвратная ипотека, жилищная ипотека, риски рынка ипотеки.

ASSESSMENT OF THE LEVEL OF DEVELOPMENT OF THE UKRAINIAN MORTGAGE MARKET

Studinska Galina
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The methodology of comparative assessment of the mortgage market is proposed. The study of the Ukrainian mortgage market was conducted in three areas: the preconditions for the development of the mortgage market, the current situation in the mortgage market, and the risks in the mortgage market. The integrated coefficient of the level of development of the mortgage market in Ukraine is calculated. It is substantiated that the level of the Ukrainian mortgage market is in an embryonic state in comparison with the corresponding EU market.

The object of study is the mortgage market of Ukraine.

The subject of the study is the methodological principles of mortgage market.

The study of the mortgage market as a financial mechanism for implementing the strategy of technological development of the national economy contributes to the understanding of the areas of efforts to overcome socio-economic problems in the country.

The purpose of this article is to carry out a comparative assessment of the mortgage market of Ukraine.

To achieve this goal were used: system-parametric approach - to the scientific knowledge of the mortgage market, which allowed to integrate the preconditions of development, potential and risks of the mortgage market; a comparative analysis of the assessment of the Ukrainian mortgage market, which helped to determine the level of development of the national mortgage market in comparison with the EU.

The practical significance of the results is that the proposed valuation method can be used to rank both banks and national mortgage markets of other countries.

Conclusions. The assessment of the preconditions demonstrated the high responsibility of Ukrainian mortgage borrowers. The potential for mortgage capital in Ukraine exceeds the European one almost three times. The biggest risk of mortgage market for housing construction in Ukraine is the problem with unfinished projects. The development of mortgage market in Ukraine needs legislative support in the direction of changing the status of property rights, state support in guaranteeing loans and resolving issues of unfinished projects, finding alternative sources of financing.

Key words: mortgage interest rate, mortgage preconditions, non-repayable mortgage, residential mortgage, mortgage market risks.

JEL Classification: G21, H81, J34, K25, L85

INTRODUCTION. The mortgage market plays a particularly important role in the socio-economic development of any country, that is explained, firstly, by its use as an tool for the integration of the financial market with the real estate market, which contributes to the capitalization of resources, and secondly, provides development of the real estate market itself, solving the country's housing problem and supporting social stability. The need to assess the level of mortgage market development In Ukraine, it is caused by the list of reasons revealed in this study through analysis of a system of indicators, integrated calculation of which allows to compare this level with the European one, as well as to show directions of improvement of the Ukrainian mortgage market, that highlights **the relevance of the study.**

The object of study is the mortgage market of Ukraine. **The subject of the study** are the methodological principles of mortgage market. The study of the mortgage market as a financial mechanism for implementing the strategy of technological development of the national economy contributes to the understanding of the areas of efforts to overcome socio-economic problems in the country. **The purpose of this article** is to carry out a comparative assessment of the mortgage market of Ukraine.

2. LITERATURE REVIEW. The global experience of the evolution of the mortgage market proves the high level of its development at the present stage. At the same time, problems in the mortgage market caused the global financial crisis of 2008, which increased the attention of scientists to this market. There is a wealth of research by

individual financial institutions and scholars in this area. Individual authors [1; 2] suggested an equilibrium valuation model that shows how the mortgage yields and the mortgage loan repayment rate depend on the original loan-to-value ratios (LTV) ratios. Other authors [3] conducted an empirical analysis of the relationship between mortgage liquidity and housing affordability in during the boom cycle of the residential real estate market. The authors concluded that there was a relationship between mortgage financing and affordability, which was driven by the deregulation of the mortgage market, which contributed to rising real estate prices and the pressure of affordability during the market's growth cycle. Some authors [4] investigate the process of buying and selling households, obtaining and managing mortgage debt, and monetizing housing as property.

Modern studies on the effectiveness of the functioning of the mortgage national market in most cases are limited to consideration of the dynamics of mortgage volumes, analysis of their structure, comparison of credit rates of different Ukrainian credit institutions, in particular in the next works: Ruda [5]. Other scientists determine or assess individual risks in the mortgage market – Revyuk [6], Latsik [7], Manzhos [8]. Some author Nazukova [9] studies the status, problems and prospects of investing in fixed capital in Ukraine. Some researchers study mortgage sectoral problems: Satire [10] analyze land-based mortgage lending in agriculture: problems and development prospects.

At the same time, the evaluation of the mortgage market efficiency should be complex, which will allow forming the general conclusions of the potential investor in making the decision to invest in this market. The complexity of the assessment should be complemented by the transparency and simplicity of the implementation methodology. It was not possible to find scientific papers to cover all the potentialities of the mortgage market and its integration role in the development of the national economy, which led to the emergence of this study.

3. METHODOLOGY AND RESEARCH METHODS. Considering the existence of a certain lag of the Ukrainian mortgage market in development from the corresponding world and European level and the essential need of the national economy of Ukraine in mortgage lending, the task of estimating this difference is arose. In general, the integration assessment of the mortgage market ***A_m*** will look as represented in the formula A.1:

$$A_m = C_s \times P_m \times R_m, \text{ where} \quad (A.1)$$

A_m – assessment of the mortgage market;

C_s – coefficient of the current situation in the mortgage market;

P_m – coefficient of mortgage prerequisites (potential);

R_m – coefficient of risk mortgage market.

Each direction of the proposed approach involves the calculation of an integrated coefficient, which is carried out by multiplying several indicators. The first direction of the methodological approach involves the study of directions of development of the mortgage market and assessment of its current state. Coefficient of the **current situation** in the mortgage market ***C_s*** takes into account the following values:

L_{ir} – the level of mortgage interest rate;

P_{lm} – coefficient of Long-term Mortgages;

P_{mn} – coefficient of Non-repayment Mortgage;

P_{GDP} – coefficient of Mortgage loans from GDP.

Assessment of the current situation in the mortgage market ***C_s*** will be made by the formula A.2:

$$C_s = L_{ir} \times P_{lm} \times P_{mn} \times P_{GDP} \quad (A.2)$$

Comparison of averages ***L_{ir}***, ***P_{lm}***, ***P_{mn}***, ***P_{GDP}*** of the national market with corresponding indicators in the European mortgage market will allow to determine the corresponding coefficients, multiplication of which will give the desired integral index.

The order of calculation of integral indicators for each direction will be described below.

4. RESULTS AND DISCUSSION.

4.1. CURRENT SITUATION IN THE MORTGAGE MARKET. The value of formula A.2 lies in its versatility of application for both assesses a bank's position in the mortgage market and the position of a national mortgage market in a global rating, which allows a potential investor to compare the market or bank's choice of free financial resources. It is clear that depending on the scale of the assessment (bank or country), the list of indicators will change, ***P_{GDP}*** will only be used to evaluate the country's mortgage market. Overall coefficient ***C_s*** provides the investor with an integrated assessment of the current situation in the country or the condition of the subject of credit in the mortgage market.

The level of mortgage interest rate ***L_{ir}*** (later other coefficients ***P_{lm}***, ***P_{mn}***, ***P_{GDP}***) is suggested to count as the ratio of the average interest rate for a mortgage loan in Ukraine to the similar figure in the EU, as shown in the formula B.1:

$$L_{ir} = \frac{L_{iru}}{L_{irn}}, \text{ where} \quad (B.1)$$

L_{iru} – the average interest rate for a mortgage loan in Ukraine;

L_{irn} – the average interest rate for a mortgage loan in EU.

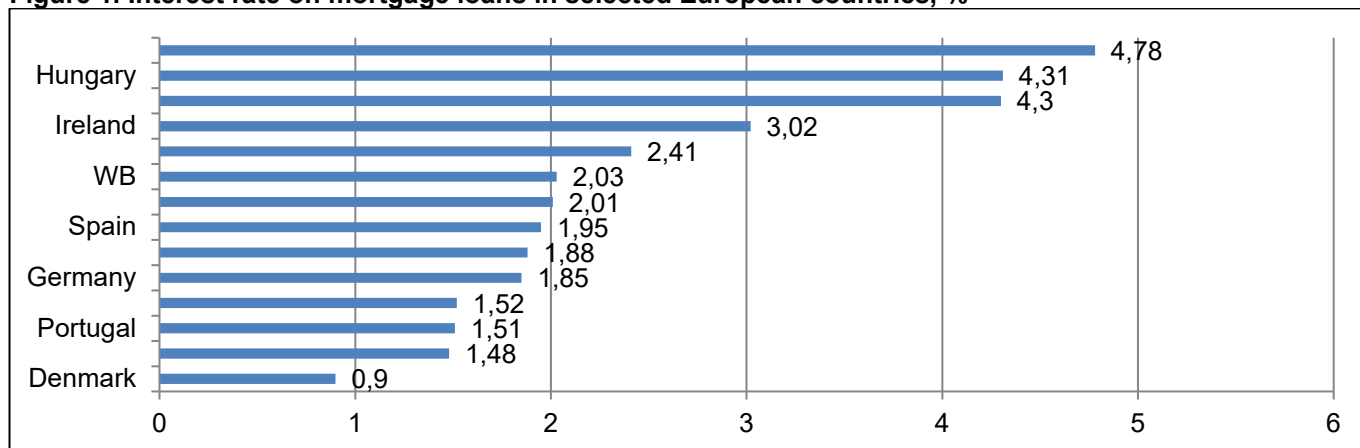
Analysis of interest rates for mortgage loans in banks of Ukraine (***L_{iru}***) revealed the following: at the beginning of the second half of 2019, the following banks provided most of the mortgage loans in Ukraine: JSC «Oschadbank» - 13% of the market, JSC «Ukreximbank» - 10%, JSCB «ARKADA» - 6%, JSCB «Pravexbank» - 4%, JSCB «Ukrsotsbank» - 3%, PJSC «Raiffeisen Bank Aval» - 3% and others. JSC «Oschadbank» traditionally occupies the largest part of the mortgage lending market by working with government lending programs. The terms of the mortgage loan for housing of OJSC «Oschadbank» were as follows: maximum term - up to 20 years, interest rate – 20.49%. At the same time, through a joint program with KAN Development, JSC «Oschadbank» offers mortgage loans in national

currency for up to 20 years with a down payment of 30% of the total cost of the apartment with an interest rate of 8.9% for the first 2 years thanks to a joint program with KAN Development from 25 months to 19.99%, the one-time loan fee is 0.99% of the loan amount. The third type of mortgage lending is offered by JSC «Oschadbank» for the acquisition of housing in the secondary market. Credit terms of such mortgage - up to 20 years at 19.99% [11; 12].

Mortgage loans JSCB «ARKADA» provides individuals - residents who have concluded an agreement with the bank to participate in the Fund for construction financing and have invested at least 20% of the total area of the selected apartment. The loan is granted for a term up to 30 years. The interest rate on the mortgage loan offered by JSCB «ARKADA» is quite attractive compared to even the average size of this indicator in Ukraine (14.73%), but the mentioned proposal applies only to housing projects of the construction company JSCB «Arkada», which limits the geography of the consumer's circle of credit [11].

With regard to mortgage interest rates in EU countries after the 2008 crisis, they have declined over several years and have fallen in 2018 from an average of 2.60% to 2.42%. Compare the average interest rate of mortgage lending in Ukraine with the corresponding indicator in some EU countries, that is shown in Figure 1:

Figure 1. Interest rate on mortgage loans in selected European countries, %



Source: composed for [13]

By simple calculations: the average mortgage interest rate in our country (5.6% in 2018) is 17.2% higher than in Romania and 6 times higher than in Denmark.

As a result of calculations, the average interest rate on a mortgage loan in EU countries (**Lim**) was **Lim = 2.42**; inverse mortgage interest rate ($2.42 : 5.5 = 0.44$) was **Lir = 0.44**, which indicates the extremely high mortgage rates in Ukraine, which negatively affect the overall assessment of the mortgage market in our country. Other coefficients are calculated according to a similar scheme. Calculate the ratio of the share of long-term mortgages **Plm**. According to a report by the European Mortgage Fund (EMF), 10-year loans are considered long-term [13]. Coefficient **Plm** in the EU in the participating countries is very different in the countries, as can be seen from the Table 1:

Table 1. Share of long-term mortgages in general volume of loans in 2018, %

Country	Up to 1%	Country	Up to 10 %	Country	More 10 %
Austria	0	Denmark	1	Belgium	17
Croatia	0	Romania	2	Hungary	21
Greece	0	United Kingdom	2	Czech Republic	25
Italy	0	Finland	2.5	Spain	27
Ireland	0	Estonia	6	Germany	36
Luxembourg	0			Netherlands	56
Portugal	0				
Poland	0				

Source: composed for [13]

For EU countries, given that in 8 EU countries there are no long-term loans at all, and in others the share varies from 1% to 56%, on average **Plm** was in 2017 – 10%, in Ukraine, taking into account our research the share of loans from 5 years – 20.1%, 10 years - less 5%. So, **Plm = 0.5**, that indicates the shortage of long-term mortgages in Ukraine compared to the average in EU countries.

Consider the following indicators **Pmn** – coefficient of non-repayment (repayment) of mortgages. According to the general report 2018 of European Mortgage Federation the mortgage lending rate in the EU countries in 2017 resumed a positive trend. Unlike 2016, the total outstanding EU credit in 2017 increased by 2.24%. Excluding exchange rate fluctuations, outstanding home loans increased by € 208 billion. Trends in mortgage repayments in the EU are under the influence of five countries: the United Kingdom, Germany, France, the Netherlands and Spain,

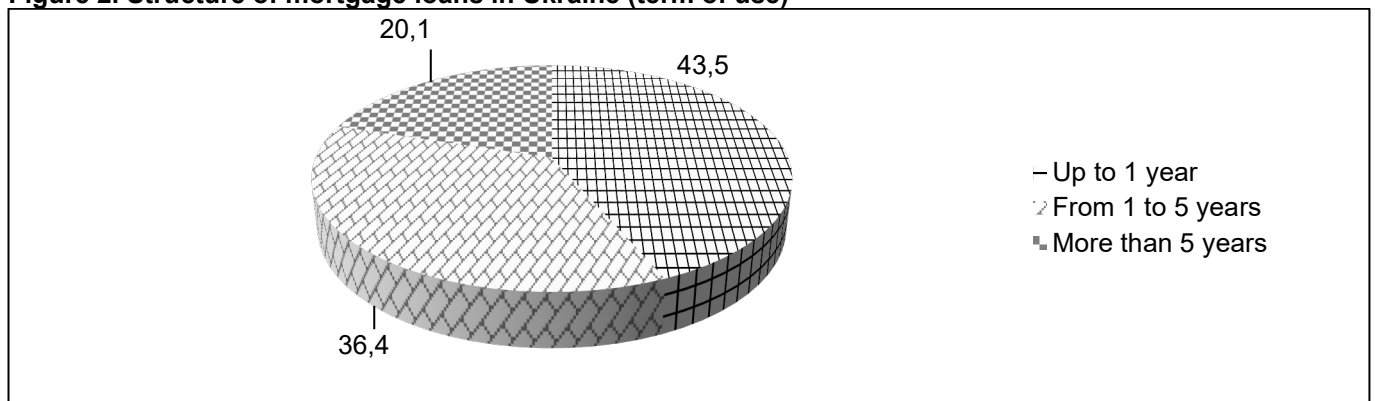
accounting for 72% of the total number of outstanding home mortgages in the EU in 2017. Fixed exchange rates UK and Sweden also saw an increase in outstanding mortgage lending. The average mortgage default rate for 19 EU countries was in 2017 67.8% [13]. The average rate of non-repayable mortgage loans in Ukraine during this period was 2%. Calculate the ratio ($67.8 : 2 = 33.9$). That is, the discipline of repayment of mortgage loans in Ukraine is almost 34 times better than in EU countries, which will positively affect the overall assessment of the national mortgage market. **$Pmn = 33.9$** .

Analyze and calculate next metric: **$PGDP$** percentage of mortgage loans to GDP. Ratio of mortgage loans to GDP of the country: 5.1% in Ukraine, 13% in the Czech Republic; in Poland – 19.6%; in France – 42.4%; in Germany – 45.3%; in Spain – 62.1%; in the UK – 83.7%, in the Netherlands – 106.2% [13]. For simplification, it is necessary to calculate the arithmetic average for the EU countries (excluding the volume of national mortgage markets in these countries) - 53.1% (it as the norm) and compare it with the similar indicator in Ukraine: ($5.1 : 53.1 = 0.1$). Coefficient **$PGDP$** in Ukraine it is extremely low, which will negatively affect the overall assessment of the mortgage market. **$PGDP = 0.1$** . Formula A.1 calculates the first integration coefficient **Cs** , to estimate the current state of the mortgage market of Ukraine: **$Cs = 0.44 \times 0.5 \times 33.9 \times 0.1 = 0.746$**

The **Cs** ratio below 1 negatively characterizes both the current state of the Ukrainian mortgage market and its overall rating of **Am** .

One of the problems of mortgage lending in Ukraine is the short term of granting loans, the structure of mortgages depending on the term of their granting is shown in Figure 2:

Figure 2. Structure of mortgage loans in Ukraine (term of use)



Source: composed for [14].

Almost 80% of the mortgages used have been received for less than 5 years. Recall that an important feature of mortgage lending is the long term of its granting, which also calls into question the existence of a mortgage for this area in the Ukrainian lending practice.

Thus, an analysis of the current state of the mortgage market in Ukraine allows us to formulate the following conclusions: proposals of Ukrainian banks to provide mortgage loans are not in most respects the conditions of mortgage lending due to short term loans and high interest rates; Housing financing is characterized by better conditions (credit up to 20 years at 15% on average), which also do not meet the pan-European interest rate - up to 2.42%. The development of mortgage lending in Ukraine requires legislative support to change the status of property rights; state support in guaranteeing loans and resolving unfinished issues; finding alternative sources of funding. Addressing these issues should strengthen the public's confidence in the country's credit and financial system, which will allow mobilization of internal financial free resources and ensure the further development of mortgage lending in Ukraine.

4.2. ANALYSIS OF THE POTENTIAL OF THE MORTGAGE MARKET OF UKRAINE. The state of the mortgage market plays a significant role in the socio-economic development of each country. The Ukrainian economy is growing at a very slow pace, lagging behind the global ones. This prevents our country from realizing its potential and for Ukrainians to improve their standard of living.

The second component of the overall assessment of the mortgage market **Am** – coefficient of prerequisites (potential) of the mortgage market **Pm** , in our design, should consider the following values:

Dfa – coefficient of depreciation of fixed assets;

Ho – coefficient of percent of overcrowded housing;

$CGDP$ – share of construction in GDP;

Hv – the Level of Vacant Housing;

$DGDP$ – coefficient of the level of deposits in GDP.

Considering these indicators, market potential rate mortgages **Pm** is carried out by the formula C.1:

$$P_m = D_{fa} \times H_o \times C_{GDP} \times H_v \times D_{GDP} \quad (C.1)$$

The calculation of each indicator **Dfa** , **Ho** , **$CGDP$** , **Hv** , **$DGDP$** is made by the ratio of the value of the indicator existing in Ukraine and the corresponding value in the EU. Coefficient **Dfa** Depreciation of Fixed Assets calculates by the formula C.2:

$$D_{fa} = \frac{D_{fau}}{D_{fan}}, \text{ where} \quad (C.2)$$

D_{fau} - Depreciation of Fixed Assets in Ukraine, %;

D_{fan} - Depreciation of Fixed Assets в EU, %.

The overall deterioration ratio of Ukrainian fixed assets in 2017 was 58.1% [14]. There is no general corresponding EU indicator, which is why the calculation uses the indicator for Poland, where the level of depreciation of fixed assets at that time was 46%. It is clear that it is not entirely correct to use another indicator of order, but that the value of the indicator in Poland reflects the average European level of depreciation of fixed assets. Since the calculation concerns the potential, ie the assessment of the need for mortgage capital, the direct ratio of indicators is calculated. So, by the formula C.2: **D_{fa} = 1.26**. This means that the Ukrainian industry needs long-term investments more than Poland by 26%, which could be an additional source of the mortgage market.

The following indicator is calculated next - the ratio of overcrowded housing **Ho**. Citizens of Ukraine have extremely low housing, 45% of Ukraine's population is overcrowded, while Europe has only 17%; 39% of Ukrainian households do not meet sanitary standards (13.65 m² per person); 60% of households live in outdated housing stock; 45% of households are dissatisfied with their housing [14]. Based on this data, the ratio of overpopulated housing **Ho = 0.38**, that demonstrating the severity of the housing shortage problem in Ukraine and the great potential for demand for it.

The next component of the calculation - **CGDP** share of construction in GDP characterizes the relative degree of development of the construction industry in the country compared to the European average. The share of construction in GDP in Ukraine at the end of 2018 was only 3.97% (**CGDPU**), while in Europe - 7.5% (**CGDPN**) [13]. This factor **CGDP = 1.89**, that means that there is a potential to apply a mortgage loan: in Ukraine the needs of the construction industry more than in Europe almost twice.

The Level of Vacant Housing in Ukraine **Hv** in 2019 was 2.77%, in Europe it was 3.3 times higher - 9.1% [13; 14]. So, the Level of Vacant Housing **Hv = 0.31**, which shows that in Europe, citizens have and use free housing to earn 3 times more income than Ukrainians, moreover, they purposefully invest in housing and even apply for a mortgage to provide additional retirement income in the future.

The last indicator in this group of mortgage lending potential is the percentage of deposits in GDP **DGDP**. Value of mortgage loans to GDP: in Ukraine - 5.1% (**DGDPU**), in the Czech Republic - 13%; in Poland - 19.6%; in France - 42.4%; in Germany - 45.3%; in Spain - 62.1%; in the UK - 83.7%; in the Netherlands - 106.2% [13]. The average size of mortgage loans to GDP in the EU countries listed is 53.2% (**DGDPN**), that is, the potential of increasing deposits in Ukraine has not been used by almost 90%. Indicator **DGDP = 10.4**. Using formula C.1, calculate the overall potential of the Ukrainian mortgage market: **Pm = 1.26 x 0.38 x 1.89 x 0.31 x 10.4 = 2.92**

The result (2.92) means that the potential of applying mortgage capital in Ukraine exceeds the European almost three times, which is a positive characteristic in the overall assessment of the mortgage market of the country.

Thus, a study of the potential of mortgage capital in Ukraine found that its volume exceeds the European almost three times, and therefore is attractive for development not only for the national credit and financial system, but also for foreign credit institutions.

4.3. RISK ASSESSMENT IN THE MORTGAGE MARKET OF UKRAINE. The rationale for this vision is beyond the scope of this study and will be covered in other articles. The calculation of the third component of the overall assessment of the mortgage market **Am** – the risk factor for the mortgage market **Rm**, in our design, should take into account the following values:

P_{cr} – Evaluation of Ukraine's position in the credit rating;

P_{db} – Rating of Ukraine's position in the rating «Doing business»;

P_{ir} – Assessment of Ukraine's position in the investment rating;

R_i – Inflation rate, %;

P_{uc} – Part of unfinished construction, %.

The list of values is made based not only on their content, but also on information accessibility to them. Given these indicators, the evaluation of the mortgage market **Rm** (Evaluation of the mortgage market risks) will be made according to the formula D.1:

$$R_m = P_{cr} \times P_{db} \times P_{ir} \times R_i \times P_{uc} \quad (D.1)$$

The calculation of each indicator **P_{cr}**, **P_{db}**, **P_{ir}**, **R_i**, **P_{uc}** is based on the ratio of the indicator in Ukraine and the corresponding average in the EU.

Coefficient **P_{cr}** - Evaluation of Ukraine's position in the credit rating calculate by the formula D.2:

$$P_{cr} = \frac{P_{cru}}{P_{crn}}, \text{ where} \quad (D.2)$$

P_{cru} – assessment of Ukraine's position in the credit rating;

P_{crn} – average rating of EU countries in the credit rating.

The list of values is made based not only on their content, but also on information accessibility to them. Given these indicators, the evaluation of the mortgage market **Rm** (Evaluation of the mortgage market risks) will be made according to the formula D.1:

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The calculation of each indicator **P_{cr}**, **P_{db}**, **P_{ir}**, **R_i**, **P_{uc}** is based on the ratio of the indicator in Ukraine and the corresponding average in the EU.

Coefficient **Pcr** - Evaluation of Ukraine's position in the credit rating calculate by the formula D.2:

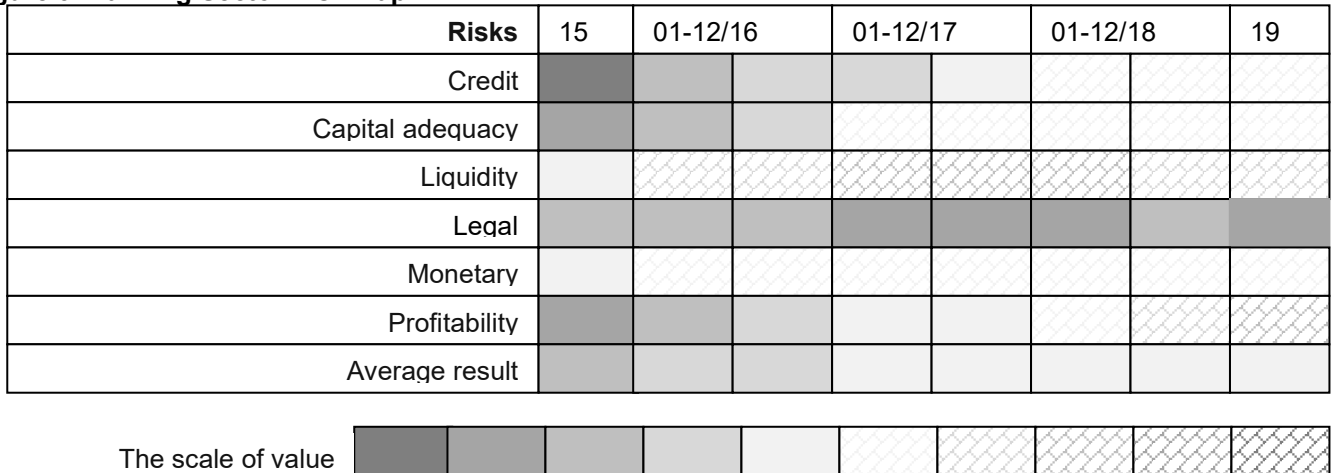
$$P_{cr} = \frac{P_{cru}}{P_{crn}}, \text{ where} \quad (D.2)$$

Pcru – assessment of Ukraine's position in the credit rating;

Pcrn – average rating of EU countries in the credit rating.

Credit ratings are used for regulatory purposes in determining capital requirements to allow for credit risks in operating and investment activities. Most financial institutions use credit ratings to evaluate the borrower, determine the loan rate, and the terms of the collateral. A serious source of systemic risk for Ukrainian banks remains the high dollarization of bank balances. The NBU estimates that the natural level of dollarization is about 20% for similar financial systems in Ukraine, while in Ukraine it exceeds 40%. A complete list of banking sector risks is presented in Figure 3:

Figure 3. Banking Sector Risk Map



Source: formed for [14].

As can be seen from Figure 3, the most dangerous risk remains legal. According to the NBU: credit risk reflects the prospects of changes in the level of non-performing loans in banks' portfolios and the need for additional reserves for such loans; capital adequacy risk assesses the ability of banks to provide sufficient capital; liquidity risk reflects the ability of banks to fully and timely meet their obligations to depositors and creditors; legal risk assesses banks' ability to protect their own interests through legal instruments; currency risk indicates how far foreign exchange market trends can affect banks' financial performance; Profitability risk refers to the ability of banks to generate net income.

On April 2019, the long-term and short-term credit ratings of Ukraine in foreign and national currencies were confirmed at the level «B+/B» with a stable outlook by three world rating agencies: Standard&Poor's, Fitch and Moody's. At the same time, according to the company «Rating and Investment Information, Inc.» (R&I) Ukraine received a credit rating CCC+. Credit rating R&I for the EU member states is presented in Table 2.

To calculate the average rating in the EU, each credit position is assigned a serial number according to the scheme shown in the Table 3:

Table 2. EU and R&I credit ratings for September 2019

Country	Rating	Cod	Country	Rating	Cod
Austria	-		Germany	AAA	26
Bulgaria	-		United Kingdom	AAA	26
Greece	-		Denmark	AAA	26
Estonia	-		Netherlands	AAA	26
Cyprus	-		Finland	AAA	26
Lithuania	-		Sweden	AAA	26
Luxembourg	-		Belgium	AA+	24
Malta	-		Czech Republic	AA-	22
Portugal	-		Ireland	A	20
Romania	-		Slovakia	A	20
France	-		Slovenia	A	20
Not evaluated by R&I			Spain	A-	19
			Latvia	A-	19
			Poland	A-	19
			Italy	BBB+	18
			Croatia	BBB-	16

Source: formed for [13]

Table 3. Codification of credit rating

AAA+	27	BBB+	18	CCC+	9
AAA	26	BBB	17	CCC	8
AAA-	25	BBB-	16	CCC-	7
AA+	24	BB+	15	CC+	6
AA	23	BB	14	CC	5
AA-	22	BB-	13	CC-	4
A+	21	B+	12	C+	3
A	20	B	11	C	2
A-	19	B-	10	C-	1

Source: suggested by the authors

Find the average for the countries where the credit score was made, $P_{crn} = 23$, $P_{cru} = 11$. From here $P_{cr} = 0.48$, which indicates that the credit risks of Ukrainian banks are almost 2 times greater than European ones.

Calculate the following indicator, which evaluates Ukraine's position in the rating «Doing business» P_{db} . The assessment of the position of the countries of the world under favorable conditions of business use is made from 1 to 190 points (by the number of countries in the rating). Higher ranking of ease of «Doing business» notes that regulatory conditions are better for the establishment and operation of local firms. The rating consists of accurate measurements of overall indicators on 10 topics, which indicates that it consists of several indicators and shows an equivalent effect on the overall rating country. The 2019 rating for all countries determines the status of May 2018. In the Table 4 gives comparative estimates of Ukraine and average scores across 28 EU countries.

Rating of Ukraine's position in the rating Doing business $P_{db} = 0.50$, as can be seen from the Table 6, indicating that there are some risks in this direction.

Particularly high risks exist when dealing with insolvency issues - in Ukraine this figure is worse than the EU average of 5 times. However, the terms of obtaining a loan and obtaining permits for construction in Ukraine, directly related to the mortgage market, are better than in Europe twice.

Table 4. Comparison of Ukraine and EU ratings in the Doing business-2019 rating

	Global score	Company registration	Obtaining a building permit	Connection to the power supply system	Property registration	Obtaining loans	Protection of minority investors	Taxes	International Trade	Ensuring the implementation of the contract	Insolvency resolution
Ukraine	71	56	30	135	63	32	72	54	78	57	145
EU average	36	64	64	51	50	67	56	44	15	50	34
P_{db}	0.50	1.15	2.14	0.38	0.8	2.1	0.78	0.81	0.19	0.87	0.23

Source: calculated by the authors for [16]

The scheme of calculating the next indicator that evaluates Ukraine's position in the investment rating P_{ir} similar to the previous one. Ukraine in 2018 rose to 3 positions and took only 131 place in the ranking of investment attractiveness of the countries of the world. The calculation of the average estimates for the EU countries is presented in Table 5:

Table 5. Calculation of average EU investment attractiveness estimates for 2018

Indicator	Overall score		Economic score		Political and legal score		Socio-cultural score	
	Rating	Score	Rating	Score	Rating	Score	Rating	Score
P_{iru}	131	45.27	103	48.04	145	40.56	106	47.60
P_{irn}	29-30	66.64	x	61.78	X	80.27	x	59.86
P_{ir}	X	0.68	x	0.78	X	0.51	x	0.80

Source: calculated by the authors for [17]

The results of the calculation of the coefficient of investment attractiveness ($P_{ir} = 0.68$) indicate the low investment attractiveness of Ukraine. If, in the aggregate, the European Union's positions correspond to 29-30 places, then position 131 of Ukraine since the 190s is in need of a shift, because investment for Ukraine is industrialization, modernization of agriculture, the opportunity to change the sectorial structure of the national economy, to increase the efficiency and competitiveness of the sub management and improve socio-economic standards of living.

Assessing the impact of the inflation rate R_i is crucial to understanding the effectiveness of the mortgage market, as the mortgage is based on long-term relationships between market entities. The International Monetary Fund has been researching inflation around the world since 1980. According to the IMF for 2018, inflation in Ukraine

was 10.9%. Ukraine's inflation forecast for 2019 - 7.3% [13]. The results of comparing inflation indicators in the CIS and the EU and calculating the ratio of their correlation are shown in the Table 6:

Table 6. Dynamics of the ratio of the inflation rate in the CIS and the EU

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2024
CIS	12,1	9,8	6,2	6,5	8,1	15,5	8,3	5,5	4,5	5,7	5,0	4,3
EU	2,4	3,1	2,6	1,5	0,5	0,2	0,2	1,7	1,9	1,6	1,7	2,0
Ri	0,20	0,2	0,32	0,42	0,23	0,06	0,01	0,02	0,31	0,42	0,28	0,47

Source: calculated by the authors for [18]

The inflation rate is negative, so the calculation is reversed. The CIS inflation ratios, both Ukraine and EU countries, show that there are very high inflation risks. In 2018 **Ri** = **0.42**, which is a negative indicator in the overall assessment of the mortgage market.

Consider the last component of the mortgage market risk assessment **Rm** - **Puc** part of unfinished construction.

There is an extremely negative situation in Ukraine regarding canned housing, the dynamics of which are also on the rise. In particular, according to the State Statistics Service, the construction or reconstruction of 2433 apartment buildings in Ukraine has been suspended or stopped.

In the European Union, the issue of incomplete or illegal construction is not at all due to the monitoring and timely regulation of this issue by public authorities and local self-government. Therefore, it is not possible to calculate the latest **Puc** ratio, which is a component of mortgage lending risk assessment **Rm**, given the calculation formula.

It was noted that this risk is the highest in Ukraine. Due to the lack of official statistical information, the conditional calculation of lost investments in housing construction is carried out: $2433 \times 200 \times 50\,000 = 24\,330\,000\,000$ \$ USA (200 - the average number of apartments in a residential complex, \$ 50 thousand - the average cost of an apartment). \$ 24.3 billion USA lost by the Ukrainians along with confidence in the country's financial system and government. It should be added that with such shameful statistics there is no official (public) data and monitoring by government agencies.

It is feasible to calculate the integrated risk index in the mortgage market using the formula D.2:

$$Rm = 0.48 \times 0.50 \times 0.68 \times 0.42 = 0.069$$

The final calculation of the assessment of the level of mortgage market of Ukraine **Am** will be performed according to the formula A.1:

$$Am = 0.746 \times 2.92 \times 0.069 = 0.15$$

Such an assessment means that Ukraine's mortgage market is embryonic in comparison with its EU mortgage market. The rather good potential is being destroyed due to the high risks, which are, first and foremost, not of banking institutions, as the conductors of funds, but of the population, which is a powerful source of income for each national economy, as a tool for building the national economy.

5. CONCLUSIONS. A methodological approach to assessing the level of development of the mortgage market involves research and settlement in three directions: 1) Assessment of the current state of mortgage lending in Ukraine; 2) Analysis of the potential of applying a mortgage loan; 3) Mortgage risk assessment. Each direction of the proposed approach involves the calculation of an integrated coefficient, which is carried out by multiplying several relative indicators.

An important feature of mortgage lending is the long term loan term, which casts doubt on the existence of a mortgage, as nearly 80% of the mortgages used have been received for less than 5 years.

The biggest risk of home mortgage lending in Ukraine is the problem of unfinished construction, while in the EU countries the issue of unfinished or illegal construction is not addressed at all due to the monitoring and timely regulation of this issue by public authorities and local self-government.

The final calculation of the relative valuation of the Ukrainian mortgage market **Am** = **0.15** means that the mortgage market of Ukraine is embryonic in comparison with the EU mortgage market. Quite a good potential is not used because of the high risks, which are, first of all, not banking institutions, as the conductors of funds, but the population, which is a powerful source of income for each national economy, a tool for building the national economy.

The development of mortgage lending in Ukraine requires legislative support to change the status of property rights; state support in guaranteeing loans and resolving unfinished issues; finding alternative sources of funding.

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