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Forecasting the development of leasing market (on the example of Ukraine)

Abstract

The purpose of the study consists in the investigation of the leasing market and determining the prospects of its development in Ukraine, which will make possible for lessors to justify the choice of their strategies. There were forecasted values of the analyzed indicators of leasing market for the following three periods: the third quarter of 2016, fourth quarter of 2016, first quarter of 2017. It was proposed to calculate the integral development index of leasing services in Ukraine based on the amount of leasing companies in Ukraine, the amount of financial leasing contracts, the share of long-term lease agreements, the value of financial leasing contracts, the proportion of borrowed funds in the structure of leasing transactions financing, the share reward the lessor for the leased property in the structure of the lease payments, in the amount of leasing companies in Ukraine, the amount of financial leasing contracts, the share of long-term lease agreements, the value of financial leasing contracts, the proportion of borrowed funds in the structure of leasing transactions financing, the share reward the lessor for the leased property in the structure of the lease payments. The authors defined the growth of Ukrainian leasing market in the first quarter of 2017. The proposed integral development index is applicable both on regional and international level. The results of study can be used for substantiation of the choice of lessors' strategies by developing alternative strategic decisions, the optimal use of which should lead to a further growth of the leasing market.

Introduction

In conditions of the crisis, the limited financial liquidity, the lack of the money, the importance of leasing as a way of funding settlement entities with contractors are increased. The need of the development the leasing activity in Ukraine are explained by the necessity of technical re-equipment and new capital assets, expansion of material and technical base of SMEs.

The research object of this paper is the leasing market. The main aim of the paper is to forecast the indicators of the development Ukrainian leasing market in short term period.

The aim necessitated the solution of the following research tasks:

♦ to identify trends in the market of leasing services (for example, Ukraine);
♦ to predict the value of certain parameters that characterize the level of development of the leasing market;
♦ to build an integrated indicator of the development of the leasing market and to analyze its dynamics.

The rest of the paper is organized as follows: Section 1 reviews the literature on forecasting the development of leasing market. Section 2 presents the authors' methodological approach to forecasting the development of leasing market. Section 3 describes the data and variables used for forecasting and the empirical results which were obtained. Finally, Section 4 presents the main conclusions.

1. Literature Review

The study of ways of solving problems of leasing were engaged foreign scholars J. Adams (2003), T. Clark (1978), E. Robinson (1985), S. Sharpe (1995) and Ukrainian scientists O. Bielousova (2008), N. Bila (2006), O. Dorofiieva (2005), N. Karasov (2008). Thus, in the work of O. Bielousova (2008) [5] there were investigated the features of leasing relations in the conditions of forming the developed economy. The paper of N. Bila (2006) is dedicated to investigation of the investment potential of leasing and directions for its implementation in Ukrainian industry. In the work of O. Dorofiieva (2005) the ways to optimize sources of financing leasing projects were studied. In the paper of N. Karasov (2008) there were investigated the features of development of leasing in foreign countries. Some aspects of forecasting performance of financial institutions were considered in the works of I. Chmutova (2014), O. Kolodiziev and S. Kirkach (2013). However, the problems of forecasting the development of the leasing market are not enough studied.

According to the chapter 1 of the article 292 of the Commercial Code of Ukraine (CCU), leasing – is an economic activity, which aims to invest their own or borrowed funds, where one party of leasing agreement (the lessor) passes property for exclusive use

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to other party (lessee) for a fixed term, which belongs to the lessor or acquired by him in ownership (economic management) on behalf of the lessee or agreement from the relevant supplier (seller) provided the lessee pays a periodic lease payments.

The main participants of the leasing agreement are (article 4 of the Law of Ukraine "About Financial Leasing"):

♦ lessor is legal person, who transfers the right to possession and use of leasing object to lessee;

♦ lessee is a natural or legal person, who acquires the right to possess and use the leasing object from the lessor;

♦ seller (supplier) is a natural or legal person, from whom the lessor acquires the thing, that can be transferred as a leasing object to the lessee.

There are many ambiguous definitions of "leasing" in the economic literature and legal documents, because the leasing operation, which is based on the separation of ownership of the asset and the right to use the asset, as a form of economic activity carries the elements of credit, lease and investment. Therefore, leasing is proposed to define a set of civil, economic, trade and credit, property, industrial relations, where the lessor passes leasing object purchased from a seller for temporary use on a contract basis to lessee with the right to repurchase.

Having analyzed all the above-mentioned studies, the authors of this paper suggested improving the existing approaches to forecasting the development of leasing market on the example of Ukraine using the combination of methods (non-linear functions, the exponential smoothing, the Holts' model). The adopted approach is presented in detail in the next section of the paper.

2. Forecasting the development of leasing market

2.1. Research methodology. Over the last several years the popularity of leasing as an alternative financial instrument has grown significantly according to studies conducted by international financial institutions (such as the study of International Finance Corporation "Development of Leasing in Ukraine"), Ukrainian Union of Lessors and local researchers.

Key survey findings include the following data. Changes in the amount of leasing companies during 2006-2015 are shown in Figure 1.
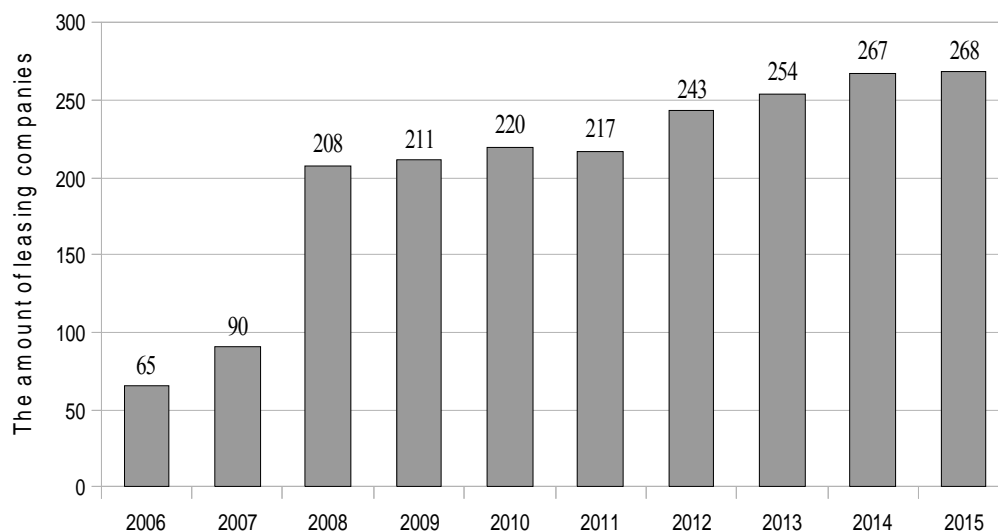

Fig. 1. Changes in the amount of leasing companies, 2006-2015.

Source: information on the status and development of financial companies, lessors and pawnshops in Ukraine.

As shown in Fig. 1, in 2007, the amount of leasing companies, which conducted leasing transactions in Ukraine, has increased significantly compared to the previous year (from 65 to 90 companies). This was facilitated by several factors: increased interest to leasing from foreign banks, which entered the Ukrainian market last year; increased awareness on leasing among the general public. The following year, despite the start of the financial crisis, the amount of leasing companies in Ukraine continued to growth.

In 2008 the amount of leasing companies was 208, but in 2009, the growth rate of the amount of leasing companies slowed considerably, their amount was 211. The amount of leasing companies was increasing during 2011-2015. There were 268 leasing companies in Ukraine at the end of 2015.

The dynamics of the value and amount of financial leasing contracts during 2006-2015 are presented in Table 1.

Table 1. The dynamics of the value and amount of financial leasing contracts, 2006-2015

Year	The cost of financial leasing contracts, billion	The share value of financial leasing contracts in GDP, %	The amount of concluded leasing agreements, pcs.
2006	3.39	0.66	6089
2007	16.88	2.34	9275
2008	9.98	0.98	9766
2009	2.47	0.27	3007
2010	4.97	0.46	5095
2011	11.33	0.87	10906
2012	14.70	1.04	10826
2013	31.54	2.17	11051
2014	7.18	0.47	8940
2015	6.24	0.32	4098

Source: information on the status and development of financial companies, lessors and pawnshops in Ukraine.

As shown in Table 1, the rapid increase in the value and amount of financial leasing contracts was observed in 2006-2007. Thus, the cost of leasing agreements increased from 3.39 billion UAH in 2006 to 16.88 billion UAH in 2007, while their amount was 6089 in 2006 and 9275 in 2007. However, since 2008 the situation had changed due to the crisis in the financial markets and the economy, worsening access to credit (which is the main source of financing leasing operations). During this period the Ukrainian leasing companies signed 9766 deals worth 9.98 billion UAH. The amount of concluded leasing agreements increased by more than three times in 2009 and was 3007 contracts. The volume of contracts was 2.47 billion UAH. This figure decreased by more than 3 times compared with 2008, which indicates the negative trends of leasing in Ukraine. However, the following year the value of financial leasing contracts increased to 4.97 billion UAH and the amount of these contracts was 5095. The value and amount of financial leasing contracts increased in 2011-2013, but since 2014, these figures began to sharply decline due to the worsening economic and political crisis in the country. The share value of financial leasing contracts in GDP was remaining low compared to Western Europe during the entire study period.

The structure of leasing transactions during 2006-2015 is shown in Table 2.

Table 2. The structure of the lease payments and the sources of leasing operations, 2006-2015.

Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
The structure of the lease payments										
Amount for compensating the part of the cost of the leasing object	79.2	78.3	68.8	55.5	56.2	61.1	60.6	69.1	55.5	54.3
Payment as a reward the lessor for the leased property	18.56	19.5	24.3	33.2	35.4	32.1	31.3	25.4	33.6	34.6
Compensation for loan interest	2.04	1.7	5.1	7.6	6.0	5.4	6.0	4.2	7.7	8.1
Other expenses lessor under the lease agreement	0.2	0.5	1.8	3.7	2.4	1.4	2.1	1.3	3.2	3.0
Total	100	100	100	100	100	100	100	100	100	100
The structure of the sources of leasing operations										
Own funds	10.4	10.7	21.7	35.5	13.5	16.9	9.9	16.0	27.6	40.6
Borrowed funds	89.6	89.3	78.3	64.5	86.5	83.1	90.1	84.0	72.4	59.4
Total	100	100	100	100	100	100	100	100	100	100

Source: information on the status and development of financial companies, lessors and pawnshops in Ukraine.

As shown in Table 2, compensation the part of the cost of the leasing object and reward the lessor for the leased property were taking the main part in the structure of the lease payments during the analyzed period. Proportion of the reward the lessor for the leased property increased from 18.56% in 2006 to 34.6% in 2015. The proportion of compensation for loan interest was growing steadily and reached 8.1 in 2015. The share of borrowed funds in the structure of the sources of leasing operations was quite high (89.69%), but in subsequent years it was declining to 59.3% in 2015. This was due to reduced funding, falling demand, which also confirmed the reduction of the total cost of the leasing agreements and average terms of leasing loans.

These changes were caused by the economic crisis of Ukraine and difficulties of obtaining bank loans.

Thus, according to the analysis the leasing market in Ukraine for 2006-2015 authors found that financial leasing is one of the most feasible ways of renewal and updating of technical base Ukrainian enterprises in the financial crisis and the fall in lending.

In addition, the extension of using the leasing will encourage improving the efficiency of loan policy will encourage improving the efficiency of loan policy of the banks as a result of creating a competitive environment between funding sources and development of an organized secondary market for many types of equipment.

Therefore, this type of activity thanks to its special economic nature is able to make a significant contribution to the development of national economy.

The analysis of existing market trends leasing shows the lack of effectiveness of the existing system of monitoring its economic growth, which leads to the formation of conflicting decisions on study various aspects of leasing companies.

It is necessary to predict the meanings of some partial indicators for forecasting the integral index of development. To solve this problem, it is advisable to built a model of time series trend for each analyzed indicator, time series decomposition model or adaptive forecasting model, by which are possible to determine the forecast value of the analyzed indicators of leasing for the following three periods: the third quarter of 2016, fourth quarter of 2016, first quarter of 2017.

It is necessary to use the method of characteristics for the selection of the type of function that can be considered as a model trend of time series. This method is based on the fact, that the most typical nonlinear function can be recognized by specific calculated characteristics amount of output data.

If some characteristics for a range of input data is constant, it corresponding function will be most appropriate to model this series.

According to the work of L.S. Hurianova (2011), the algorithm of the method of characteristics includes the following steps:

♦ Step 1. The initial amount of levels smoothed using moving average.

♦ Step 2. The calculating the characteristics for smoothed series.

♦ Step 3. The evaluation using coefficient of variation uniformity of each series of characteristics.

The lowest coefficients of variation correspond to the non-linear functions, which are most essential to describe the non-linear trend.

2.2. Data. The properties of economic events, eg leasing market, are usually characterized set of features (m≥2). Therefore, it is necessary to aggregate all signs of plural in an integrated assessment, when ordering units together, that will help assess the level of development of the leasing market. As indicators characterizing the level of development of the leasing market of Ukraine, the authors proposed to use these quarterly values:

♦ the amount of leasing companies, pcs.;

♦ the amount of financial leasing contracts, pcs.;

♦ the share of long-term lease agreements, %;

♦ the value of financial leasing contracts, mln. UAH;

♦ the share of borrowed funds in the structure of leasing transactions, %;

♦ the share of reward the lessor for the leased property in the structure of the lease payments, %.

2.3. Empirical results. On the basis of applying the above algorithm authors determined that polynomial of second degree is the most likely trend model for describing the dynamics of the amount of leasing companies by the method of characteristics (Fig. 2).

The model of investigated of time series trend used for forecasting the amount of leasing companies in Ukraine looks like:

$$Var_1 = -2.74 + 13.77 \times t - 0.17 \times t^2 \qquad (1)$$

where: t is the time period.

To describe the dynamics of the amount of financial leasing contracts it is advisable to decomposition of time series for the following components: trend, cyclical, seasonal and random using additive of time series model. Then forecasted values of the amount of financial leasing contracts may be calculated using the formula provided in work of L. S. Hurianova (2011):

$$Y_2 = TC + CK + SK \qquad (2)$$

where: TC is a trend component; CK is a cyclical component; SK is seasonal component.
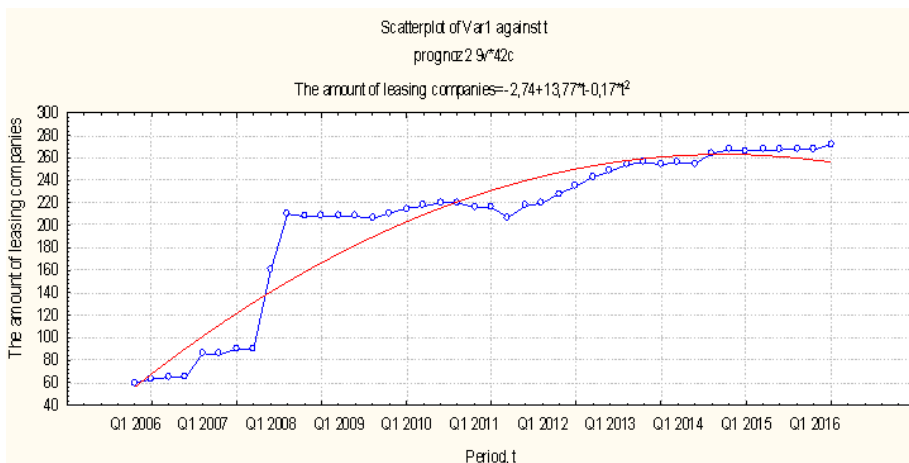
Fig. 2. Forecasting the amount of leasing companies in Ukraine

Source: elaborated by the authors.

It is advisable to make exponential smoothing to describe the dynamics of the share of long-term lease agreements. Exponential smoothing is used to align time series. According to this method, the meanings only of previous levels of the amount are used in the process of finding a smoothed level. The meanings of previous levels are used with a certain weight, where observations weight decreases with the distance from its point of time for which is determined by the smoothed meaning of the series.

For the original time series $y_1, y_2, ... y_n$ the authors designated appropriate levels of smoothing value as S_t, where $t = 1, ... n$. The authors conducted the exponential smoothing by the recurrence relations:

$$S_t = \alpha_{yt} + (1 - \alpha) - S_{t-1} \qquad (3)$$

where: α is a smoothing parameter ($0 \le \alpha \le 1$, α – const).

The value $(1 - \alpha)$ is called the discount.

There are two problems when using exponential smoothing:

The first problem is selecting the parameter α. If you want to increase the contribution of the previous value, the parameter α is chosen close to unity. If the goal is to eliminate the influence of some past time series values, it is necessary to use a fairly small parameter α;

The second problem is selecting the initial value of S_0. Usually it is equal to the value the first time series or the arithmetic mean of several elementary level series.

Exponential mean is more often used for short-term forecasting. It advantage is to adapt the model to the development of the economic process at different values of α.

The quality of forecasting model is the criteria for selecting the various procedures of time series study:

1. mean error (m.e.);
2. mean absolute error (m.a.e.);
3. sum of square error (s.s.e.);
4. mean squared error (m.s.e.);
5. mean average percentage error (m.s.e.);
6. mean average percentage error (m.a.p.e.).

The result of building model in Statistica 6.0 is the schedule of output data, smoothed data and estimated data (Fig. 3).
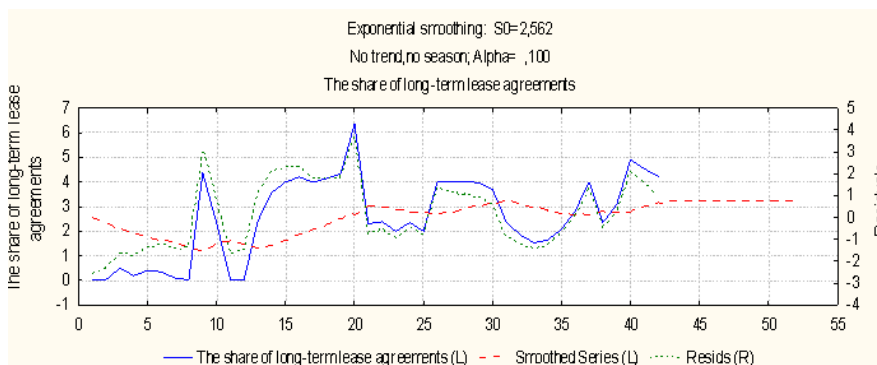

Fig. 3. The schedule of output meanings, smoothed meanings and estimated meanings of the share of long-term lease agreements

Source: elaborated by the authors.

The value of the average absolute percentage error is small enough (less than 10%), which indicates the high predictive quality of the resulting model of exponential smoothing. Thus, it is necessary to use exponential smoothing model with parameters $S_0 = 2.562$, $\alpha = 0.1$ for predicting the share of long-term lease agreements.

It is also necessary to apply exponential smoothing for predicting the value of financial leasing contracts (Fig. 4).
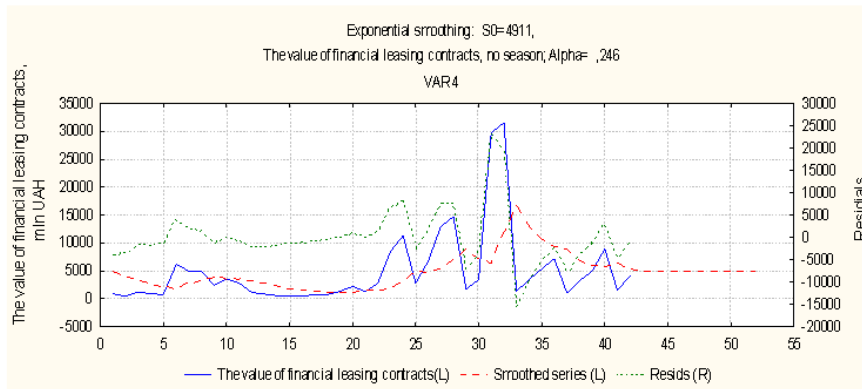

Fig. 4. The schedule of output meanings, smoothed meanings and estimated meanings of the value of financial leasing contracts

Source: elaborated by the authors.

Thus, the model for predicting the value of financial leasing contracts has the parameter $S_0 = 4911$, $\alpha = 0.246$.

The authors conducted the exponential smoothing of investigated time series with the release of the trend components for predicting the share of borrowed funds in the structure of funding of leasing transactions. Holts' model looks like this:

$$y_{t+L} = a_0(t) + a_1(t) \times L, \qquad (4)$$

where: $a_0(t)$ is parameter, which characterizes the change in the average level of process; $a_1(t)$ is parameter, which determines the process variability per unit of time.

In Holts' model coefficient is defined as follows:

$$a_1(t) = \alpha_2 p(t) + (1 - \alpha_2) \times a_1(t-1), \qquad (5)$$

where: $p(t)$ is growth of parameter $\alpha_0(t)$ at the time moment t, which is calculated as $p(t) = a_0(t) - a_0(t-1)$; $0 \le \alpha_2 \le 1$ is the second smoothing parameter.

The parameter $\alpha_0(t)$ is exponential average levels of an amount, that is calculated adjusted for the previous growth $a_1(t-1)$:

$$a_0(t) = \alpha_1 \times y_t + (1 - \alpha_1) \times (a_0(t-1) + a_1(t-1)), (6)$$

where: $0 \le \alpha_1 \le 1$ is the first smoothing parameter, which is not dependent from other.

The parameters of Holts' model are are $\alpha_1 = 0.4$, $\alpha_2 = 0,1$ (Fig. 5).
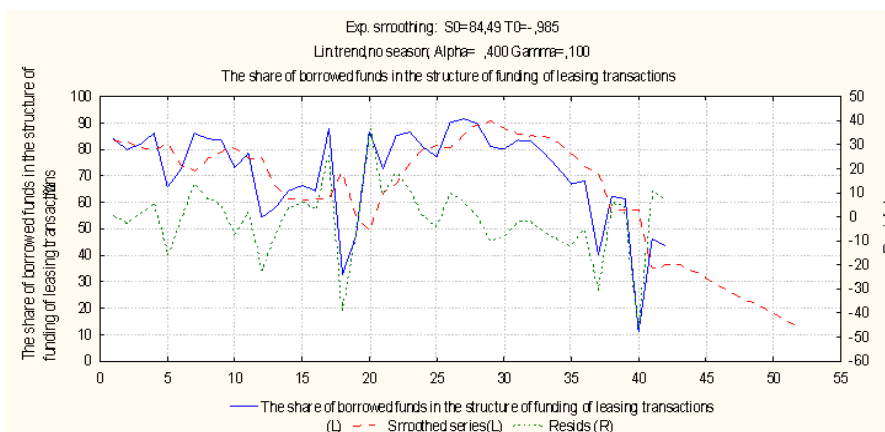

Fig. 5. The schedule of output meanings, smoothed meanings and estimated meanings of the share of borrowed funds in the structure of funding of leasing transactions

Source: elaborated by the authors.

Holts' model is also used for forecasting the share of borrowed funds in the structure of funding of leasing transactions. The smoothing parameters are $\alpha_1 = 0.2$, $\alpha_2 = 0.1$ (Fig. 6).
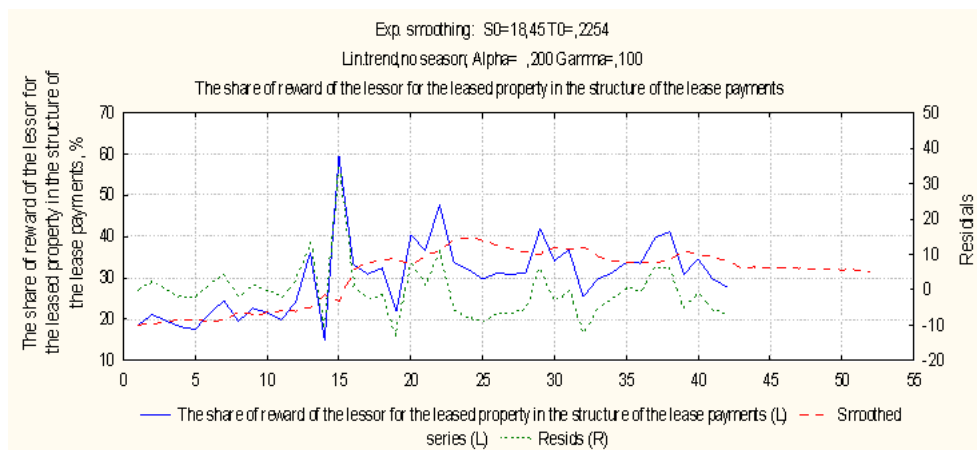

Fig. 6. The schedule of output meanings, smoothed meanings and estimated meanings of the share of reward of the lessor for the leased property in the structure of the lease payments

Source: elaborated by the authors

The forecasted values of analyzed indicators are calculated by the formulas (1)-(6) (Tab. 3).

Table 3. The forecasted values of the analyzed indicators

Period of forecasting	Indicator					
	The amount of leasing companies, pcs.	The amount of financial leasing contracts, pcs.	The share of long-term lease agreements, %	The value of financial leasing contracts, mln. UAH	The share of borrowed funds in the structure of leasing transactions, %	The share of reward the lessor for the leased property in the structure of the lease payments, %
3rd quarter of 2016	271	3411	3.26	5001	36.7	32.8
4rd quarter of 2016	269	3604	3.27	5001	34.0	32.7
1rd quarter of 2017	268	3701	3.27	5001	31.3	32.6

Source: authors.

Thereafter, the authors conducted the aggregation of these features, including forecasting, which is based on the theory "additive value". According to this theory, a value of integer equals the sum of the values of its components. The signs of the set have different units, so it is necessary to bring these signs to one basis and to provide normalization. According to the work L. S. Hurianova (2011), the vector of original $[x_1, x_2, ... x_m]$ is replaced by the vector of normalized values $[z_1, z_2, ... z_m]$:

$$z_{ij} = \frac{x_{ij} - \overline{x}_j}{S_j}, \ j = 1 .... m, \qquad (7)$$

where: x_{ij} is the empirical value of the j-th diagnostic variable for i-th; $\overline{x}_j$ is the arithmetic average in the distribution of the diagnostic variable x_j; S_j is the standard deviation in the distribution of the diagnostic variable x_j.

The authors selected the stimulants and destimulants, which are used in this research. Stimu-lant is a diagnostic variable that higher value indicates the better situation of the object. Destimulant is a diagnostic variable that higher value indicates unfavorable position of the object. In this paper all variable are stimulants.

After determination of the stimulants and destimulants, the authors determined the reference point $p_0 (x_{01}, x_{02}, ... x_{0j}, ... x_{0m})$.

The reference point in this task is an artificial condition of the leasing market, which is characterized by the best value for each of the indicators during the study period. If the chosen indicators are stimulants, their values for the reference point are calculated as $x_{0j} = \max_i x_{ij}$. The next step is to determine the distances between the individual points that characterize the objects and the reference point. If the indicators of the company are closer to the reference point, the company is more developed. The distance between the object and the reference point is determined by Euclidean distance formula, which is provided in work of N.N. Bureeva (2007):

$$d_{0i} = \sqrt{\sum_{j=1}^{m}(x_{ij} - x_{0j})^2} \qquad (8)$$

where: d_{0j} is Euclidean distance between i-th object and j-th object; x_i^l is l-th coordinate of i-th object (the value of l-th indicator for i-th object); m is an amount of characteristics (indicators), which describes the objects.

The taxonomic development index is determined by the formula (9):

$$K_i = 1 - \frac{d_{0i}}{d}, \; d = \bar{d}_0 + 2\sigma_0 \qquad (9)$$

where: $\bar{d}_0 = \dfrac{\sum\limits_{i=1}^{n} d_{0i}}{n}$ is the arithmetic average of Euclidean distances between the objects and the reference point; $\sigma = \sqrt{\dfrac{\sum\limits_{i=1}^{n}(d_{0i} - \bar{d}_0)^2}{n}}$ is the standard deviation of Euclidean distances between the objects and the reference point.

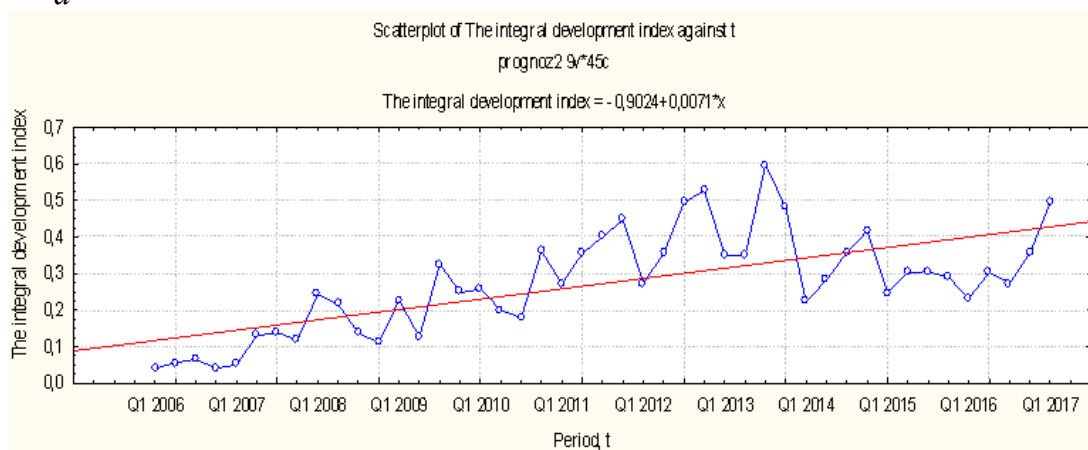The taxonomic development index is shown in Figure 7.

Fig. 6. Forecasting the integral development index of leasing services in Ukraine

Source: elaborated by the authors

Conclusions

Basing on the obtained results the authors drew to the following conclusions:

The results of the rankings of the integral development index show that the lowest level of the development of leasing market was in the 1st quarter 2006. At the time the leasing market in Ukraine was in rudimentary condition, was characterized by low values of the analyzed indicators. In particular, the amount of leasing companies, the amount and value of financial leasing contracts were negligible. After increase to 0.243 in the 1st quarter 2008, the development index of leasing market began to decline very rapidly. In the 4th quarter 2008 the development index fell to 0.111, which was connected with the beginning of the financial crisis. The similar reduction of the integral development index of the leasing market (to 0.179) was in the 3rd quarter 2010, but from the 4th quarter 2010 the leasing market began to growth, in the 4th quarter 2011 integral index increased to 0.447.

The highest level of development the leasing market was in 2013 (0.597), when the amount and value of financial leasing contracts, the amount of leasing companies, the share of borrowed funds in the structure of financing of leasing transactions and the share of reward the lessor for the leased property in the structure of the lease payments increased. According to forecasts, in the first quarter of 2017 Ukrainian leasing market will grow (integral figure will be 0.496). For short term period the authors forecast the increasing the requirements of leasing companies to the financial status of potential customers, orientation on the existing customer base with positive credit history, increasing of advance payments of lessees (10-15%) and interest rates (2-3%).

In 2017 the experts predict a significant increase in problem debt, therefore the leasing companies will pay special attention to increase control over accounts receivable and problem assets, will develop strategies for working with problem debts and removal of leased assets. It is possible that in the near future small leasing companies will be closed due to worsening of payment discipline of customers, lack of funding and through the inability to pay off its obligations. Due to the significant limitations on bank car loans experts forecast the increasing demand for leased vehicles by individuals. Thus, the Ukrainian Union of Lessors pre-

dicts that by the end of this year the amount of individuals, who took a car lease, will increase considerably. Perhaps, leasing can replace consumer auto loans.

Thus, the authors obtained quite optimistic forecasts. Therefore, they forecast the growth of indicators, which characterize the level of development of the leasing market. This forecast is based on data from previous years without influence factors such as inflation, natural disasters and changes in the political situation. This forecast may be used in the case where all changes are considered and it is known that sudden changes are not expected.

The prospective of further research is selecting particular kinds of financial strategies of leasing companies using the results of forecasting the development of leasing market.

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