

---

## DEFINITION OF LIQUIDATION PROPERTY VALUE

Oleg Gnenny<sup>1</sup>, Stasys Dailydka<sup>2</sup>, Vytautas Lingaitis<sup>3</sup>

<sup>1</sup>*Dnepropetrovsk National University of Railway Transport,  
Lazaryan Str. 2, 49010 Dnepropetrovsk, Ukraine*

<sup>2</sup>*Vilnius Gediminas Technical University, Faculty of Transport Engineering,  
J. Basanavičiaus g. 28, LT-03224 Vilnius, Lithuania*

<sup>3</sup>*Vilnius Gediminas Technical University, Faculty of Business Management,  
Saulėtekio al. 11, LT-10223 Vilnius, Lithuania*

*E-mails: <sup>1</sup>dmuzt@diit.edu.ua; <sup>2</sup>s.dailydka@litrail.lt; <sup>3</sup>v.lingaitis@litrail.lt (corresponding author)*

*Received 4 April 2013; accepted 15 May 2013*

**Abstract.** The article examines the interrelation of market and liquidation value of the appraisal subject. It was established that the approach of “break-even” sale of a subject at liquidation value, which is predominating in the literature sources, shows the results essentially different from the ratio of the prices of free and accelerated sales that can be observed on the market. The article offers an alternative approach to definition of market value coefficient, which considers switching to liquidation value. This approach is based on functional dependence of the coefficient on the ratio of limited and unlimited period of exposition.

**Keywords:** rational investment, set function, multiobjective optimisation, income increase, investment volume, time of project realisation.

**Reference** to this paper should be made as follows: Gnenny, O.; Dailydka, S.; Lingaitis, V. 2013. Definition of liquidation property value, *Business, Management and Education* 11(1): 19–33. <http://dx.doi.org/10.3846/bme.2013.02>

**JEL Classification:** D46.

### 1. Introduction

Within the context of development of market relations, property appraisal as a result of professional appraisal operations has an increasing significance. Professional appraisal operations include the processes of property alienation, including privatisation; establishment, reorganisation and liquidation of enterprises; use of property to secure obligations; property rent; property insurance; fixed assets revaluation for accounting purposes; compensation of incurred damage, etc.

The National Standard of Appraisal No. 1 (Національний ..., 2003) stipulates that the main type of value determined by appraisal is market value. However, in some cases, when required for the purpose of appraisal, the basis for appraisal corresponds to liquidation value. It is used when property sale is implemented within the period significantly shorter than the period of similar property exposition.

The main method of definition of liquidation value is appraisal procedures based on information regarding similar agreements with similar property (Національний ..., 2003), i.e. based on information regarding transactions (or offers to sell property) with a limited period of sale. However, definition of liquidation value using such method is not always possible in practical sense as it is associated with certain qualities of some appraisal subjects or lack of relevant market information. In such case the Standard stipulates the definition of liquidation value by applying the decreasing coefficient, which reflects the interrelation of the above types of value on the market of similar property, to market value of the subject of appraisal. It is obvious that the use of this method raises the question regarding the technique of definition of the above coefficient.

Many scientists and appraisers were engaged in investigation of the issue of interrelation of market and liquidation value, such as Valery Galasyuk, Victor Galasyuk, Y. V. Kozyr, A. Y. Rodin, C. M. Chemerikin and others. However, not all issues are resolved; thus, the problem of definition of liquidation value requires further investigation.

**Formulation of the objective.** The purpose of this article is creation of the economic mathematical model, which would reflect the dependence of liquidation value on market value and limited period of realisation. To achieve the set objective, the following tasks must be achieved:

1. Identification of major factors defining the amount of liquidation value.
2. Mathematical interpretation of liquidation value and the specified factors.
3. Mathematical formulation of the objective of definition of liquidation value.
4. Construction of the function adequate to the objective set.

To resolve the tasks set, the methods of qualitative and quantitative analysis and synthesis, economic mathematical modelling, differential calculation and analysis of functions are used.

## **2. Previous research**

A number of researches (Al Janabi 2008; Almeida, Campello 2007; Baker, Wurgler 2002; Benmelech *et al.* 2005; Berger *et al.* 1997; DeAngelo *et al.* 2002; Fama, French 2002; Ghosh, Jain 2000; Ju *et al.* 2005; Giambona *et al.* 2008; Hardin *et al.* 2009; Harford 2005; Hill *et al.* 2010; Johnson 2005; Kahle, Walkling 1996; Maksimovic, Phillips 2001; Morellec 2001; Myers, Rajan 1998; Ooi *et al.* 2010; Pulvino 1996, 1998; Rajan, Zingales 1995; Shield, Schoneborn 2009; Schlingemann *et al.* 2002; Strebulaev 2007; Козырь 2001; Страхов 2003; Мжельский, Ахметов 2005; Родин 2003; Абалонин 2001; Фоменко 2006) was devoted to determination of the value of liquidity coefficient or liquidity discount. As a basis of determination of liquidity coefficient the papers (Козырь 2001; Галасюк, В. В., Галасюк, В. В. 2003) proposed the break-even principle, which considers the time factor to be adjusted in regards of “enforcement” of sale by means of expertise. The time factor is conditioned by seller’s readiness to cut the sale price in exchange for faster gaining of funds owing to reduction of the period of realisation of property.

**The time factor coefficient** is determined on the basis of the registration of value of money in time. Thus, to ensure the break-even of realisation of property the following formula will be effective:

$$C_m = \frac{C_{лв}}{(1+R)^{t_л}} = \frac{C_p}{(1+R)^{t_p}}. \quad (1)$$

Here:

$C_m$  means current value of property;

$C_{лв}$  means liquidation value (considering only the time factor) at the moment of time  $t_л$ ;

$C_p$  means market value at the moment of time  $t_p$ ;

$R$  means discount rate;

$t_л$  means period of exposition at speeded rate of realisation of property (period of liquidation);

$t_p$  means usual period of exposition when property is realised at market value.

Hence:

$$K_в = \frac{C_{лв}}{C_p} = \frac{1}{(1+R)^{p\pi t}}. \quad (2)$$

Thus, the issue of registration of changes in market value during the period of exposition remains debatable. The paper (Галасюк 2003) proposes to use market value at the end of crediting period for calculation in case of pledging a vehicle, that is in view of decrease in market value owing to wear and tear during the entire period of crediting. However, such consideration of changes in the value seems inadequate because there is a decrease in the amount of debt taking place along with depreciation of property to be pledged during the crediting period. Furthermore, if realisation of pledged property is necessary, it should be sold during the period considerably shorter than the period of crediting. Also, there is a problem of rise in the market value during the crediting period as a characteristic of real estate objects. In this case, the use of market value of pledged property at the end of the crediting period can lead to liquidation value exceeding the current market value.

It seems that to ensure a valid break-even, it is reasonable for the formula (1) to consider the rate of changes in the market value in time during the periods of exposition under investigation. Failure to consider this circumstance at high rates of reduction of property market value can lead to liquidation value exceeding the market value at the moment of tendering.

The paper (Козырь 2001) examines an alternative option of determination of estimated dependence for time factor coefficient based on the exponential function. The option of using a combination of both estimated dependences is also considered. However, there are no recommendations for selecting the most adequate model.

A number of works (Мжельский, Ахметов 2005; Родин 2003; Абалонин 2001; Фоменко 2006) propose to additionally consider market factor coefficient along with the time factor coefficient.

The market factor implies that the sale price cut leads to increase in the number of potential buyers of property, which should lead to additional reduction of period of exposition during the property sale.

Based on the above, the liquidity coefficient is usually represented as multiplication of two components:

$$K_{\pi} = K_{\epsilon} \times K_{\gamma}. \quad (3)$$

Here  $K_{\epsilon}$  means the component of liquidity coefficient conditioned by influence of time (time factor coefficient);

$K_{\gamma}$  means the component of liquidity coefficient conditioned by influence of market (market factor coefficient).

It is proposed to correlate **the market factor coefficient which considers** the impact of changes in demand for property to be sold when the period of exposition is reduced, with coefficient of price demand elasticity.

The value of coefficient of price demand elasticity is determined as (Абалонин 2001):

$$E = \frac{\Delta Q}{\Delta I}; \quad (4)$$

$$\Delta Q = \frac{Q_2 - Q_1}{(Q_2 + Q_1) / 2}; \quad (5)$$

$$\Delta I = \frac{I_2 - I_1}{(I_2 + I_1) / 2}. \quad (6)$$

Here  $E$  means elasticity coefficient;

$\Delta Q$  means relative change in demand at certain interval of price change;

$\Delta I$  means relative change of price;

$Q_1, I_1$  means demand and price before change of price;

$Q_2, I_2$  means demand and price after change of price.

Since the demand curves usually have negative slope (as a rule, demand declines with rise in price), in practice the minus is omitted and absolute value of elasticity coefficient is considered.

Until now, it was not possible to formulate the dependence  $K_{\gamma} = f(E)$  using an analytical method, therefore, a number of papers examine different approximation dependences. The main requirements of formulation of such dependences are as follow:

- The range of function should be in 0 to 1 interval;
- When the elasticity coefficient tends to zero  $K_{\gamma}$ , the value also tends to zero because the demand is absolutely inelastic and any reduction in price does not lead to increase in demand;
- When the elasticity coefficient tends to infinity ( $\infty$ )  $K_{\gamma}$ , the value tends to 1 because the demand is absolutely inelastic and any price cut leads to infinite increase in demand.

The following approximation dependences are used most often (Мжельский, Ахметов 2005; Родин 2003; Абалонин 2001; Фоменко 2006):

$$K_{\text{э}} = th(E) = \frac{e^E - e^{-E}}{e^E + e^{-E}}; \quad (7)$$

$$K_{\text{э}} = \sqrt{th(E)}; \quad (8)$$

$$K_{\text{э}} = 1 - \frac{1}{ch(E)}; \quad (9)$$

$$K_{\text{э}} = th(E). \quad (10)$$

The second dependence seems the most correct because, except for meeting the above-stated requirements, the following conditions are additionally met: when  $E = 0$  the function derivative tends to infinity, whereas when  $E = \infty$  the function derivative tends to zero.

Calculation with the use of the above dependences has demonstrated that uncertainty of values of market factor of coefficient, for example when  $E = 1$ , is within the range of 0.34 to 0.84.

Analysis of the above dependences can reveal the following defect. When  $t = t_p$   $K_{\text{э}} = 1$ , whereas  $K_{\text{э}} < 1$ . This means that liquidity coefficient at the point corresponding to typical (market) period of exposition is not equal to 1, which is inconsistent. In papers (Мжельский, Ахметов 2005), an additional factor characterising the product of coefficients of impact of other factors on liquidation value is included into estimated dependences for  $K_{\text{э}}$ . Though there are no recommendations regarding selection of its value, this coefficient can artificially ensure the equality  $K_{\text{э}} = 1$  at the point under consideration.

Moreover, it is obvious that in case of different types of property the demand-price dependences look differently (curve-type), which should affect the period of their exposition when selling at a reduced (liquidation) value; however, the examined dependences do not consider such impact.

It also should be noted that reasonability of the use of the break-even principle to determine the time factor coefficient is disputable. The fact is that the break-even principle reflects the position of the seller trying to not lose money in case of liquidation sale, yet in practice a seller is forced to sell property, as a rule, by means of sale through a public bidding process at the price, which the buyer is ready to pay. Thus, the property must be sold by all means (sometimes, through repeated bidding process) irrespective of whether the seller finds the sale price acceptable or not.

The market factor coefficient considers the change in demand when the price changes and, consequently, characterises the buyer's behaviour on the market during liquidation sale. In the case under investigation namely the interests of buyers are the determining factor provided there is competitiveness between them. Therefore, it is assumed that

only market factor coefficient should characterise the amount of liquidation value in view of its change in time.

In paper (Страхов 2003) attempts (although, it is not discussed in an obvious manner) to consider the form of demand-price curve in the formula to calculate the markdown considering the market factor:

$$U_g = 1 - K_g = e^{-k \times E} \quad (11)$$

To consider the temporary change in the discount considering the market factor (an equivalent of the time factor, yet not related to break-even of realisation), the quadratic dependence was formulated:

$$U_g = 1 - K_g = \frac{t_n^2}{t_p^2} - 2 \frac{t_n}{t_p} + 1 \quad (12)$$

The proposed dependences do not contain the above defect, i.e. the liquidity coefficient is not equal to 1 at the point  $t = t_p$ . However, as the value of form coefficient is fixed (to = 0.25), whereas the discount-time factor dependence is not universal, apparently, the estimated dependence is case-specific.

In paper (Мжельский 2005) proposes to use families of two types of curves: charts describing the change in demand in time and charts reflecting increase in demand in time. Calculation of liquidity coefficients are completed for each pair of curves from the proposed family with consideration of estimated statistical distributions of characteristics of demand and period of exposition, which are presented in table. However, for calculation of liquidation value of property the author offers to choose a corresponding pair of curves be means of expertise, which in practice introduces an element of subjectivity into calculation of liquidity coefficient. Moreover, the uncertainty of calculation of liquidity coefficient can make *two times and more*.

The paper (Родин 2003) examines the opportunity of making profit by investing funds into property through purchase at liquidation value using credit funds. However, the proposed method does not fully consider the structure of costs in such type of investment. Moreover, because a mandatory use of credit is offered, the proposed type of investment is case-specific.

The methods proposed in the paper (Фоменко 2006) are a further development of the methodical approach to assessment of liquidation value of real estate objects and allows applying this approach to other type of property. This method is based on the hypothesis stating that there is a maximum liquidation value ensuring “instant” sale of property for any type of property. The period of exposition in case of instant sale is sufficiently short and is determined by the technical component of the process of purchase–sale and actual transfer of ownership. For example, a real estate object is actually transferred into the ownership of a buyer after the agreement is entered into and payment of the purchase value is made. The period of such processes usually takes few days, though the legal registration of ownership of the buyer takes a more significant period of time. Instant sale of a car is usually done through a power of attorney with an authority to sell, which takes an insignificant period of time.

Viability of this hypothesis is confirmed in practice. For example, in case of a sufficiently liquid property there is a maximum liquidation value, at which purchase and further resale of an object at a market value is of commercial interest (an opportunity for a businessman to make profit). For example, there is a practice of instant buy-out of cars at a cut-rate price. Also, the buy-out of real estate objects profitable in terms of subsequent realisation by realtor agencies is widespread.

In case of insufficiently liquid property, there is an opportunity of its realisation at salvage value. Because there are organisations that have commercial interest in collection of secondary raw materials (for example, scrap metal), the buy-out and export of secondary raw materials meet the conditions of instant sale.

In case of the absolutely illiquid property, it is apparent that the concept of liquidation value is not applicable because such property has no demand for the market, irrespective of the number and period of its exposition. Hence, there is no opportunity to sell it at a speeded rate. At the same time, if the owner (seller) is forced to get rid of such property, there is an opportunity to utilise it for a fee (conditionally speaking, to export to a dump). Moreover, as the costs of the “seller” exceed his income, in this case the salvage value is negative.

### **3. Results of the research**

The national and Russian research of interrelation of liquidation and market values demonstrate predomination of the model based on discounting the market value for the period of time, which corresponds to the difference between the period of exposition and the limited period of realisation (Галасюк 1999; Галасюк, В. В., Галасюк, В. В. 2000, 2003; Козырь 2003). That is, the following model is the main model for definition of liquidation value:

$$C_n = \frac{C_p}{(1+E)^{T_3-T_n}}, \quad (13)$$

here  $C_n$  means liquidation value;

$C_p$  means market value;

$E$  means the rate of similar property investment income;

$T_3$  means the period of exposition corresponding to subject sale at market value (measured in units corresponding the income rate);

$T_n$  means the limited period of realisation corresponding to subject sale at liquidation value.

At first glance, the model (13) provides equality of interests of the buyer and the seller of property and “break-even” sale at liquidation value as the sale at a lower price is compensated by the opportunity to earn additional income. However, the attempt of practical application of the model (13) shows that it fails to correspond to the market situation. Thus, for example, having a typical 6 month period of exposition and 20% income rate (similar situation is characteristic, for instance, of the real estate market),

property sale within 1 month would require, according to formula 13, only 7.3% discount. It is obvious that such discount would not lead to a 6 time reduction of the period of sale. Such conditions of sale on the real estate market would require 20–30% discount. Namely, such ill-correspondence of the model (13) to the data observed has required the authors to introduce additional reducing coefficients that consider elasticity of demand (Галасюк, В. В, Галасюк, В. В. 2000, 2003), “enforcement” of sale (Галасюк 2003), etc. However, the introduction of these coefficients does not eliminate the main shortcoming of the model (13), i.e. it does not reflect the market mechanism of formation of liquidation value.

The use of income rate (discount rate) as the major factor affecting the interrelation of market and liquidation value is illegitimate as income rate, first of all, affects the level of market value; thus, it should not be additionally considered when switching to liquidation value.

The ratio of liquidation and market values is formed under the influence of market factors, such as market capacity, market activity, and the level of competition between sellers and buyers. In fact, sale at liquidation value is made to break the supply and demand balance on the market, which is developed at market value. Reduction of the price creates a situation when demand exceeds supply, which leads to upswing in the market in regards of specific subject leading to faster sale. However, as a rule the seller does not manage to break the market balance owing to “break-even” discount (13).

To describe the dependence of liquidation value on the period of realisation and its connection with market value in an adequate and formal manner, these concepts will be examined detail.

According to the Standard of Appraisal No. 1, market value is the value, at which alienation of subject of appraisal on the market of similar property is possible on the date of appraisal under agreement entered into between the buyer and the seller after completion of relevant marketing operations, provided that each of the parties was acting competently, reasonably and without coercion. Furthermore, the concept of “value” will be construed as the equivalent value of subject of appraisal expressed in the probable amount of money, which means the maximum amount of money that the seller may receive and the buyer may agree to pay.

From the perspective of this research, the following characteristics of market value are important:

- It corresponds to the maximum price of subject at which it can be sold on the date of appraisal under conditions of free sale;
- Market value is formed without limiting the period of sale.

Liquidation value is the value, which can be obtained under the condition of sale of subject of appraisal during the period which is significantly shorter than the period of exposition of similar property, during which it can be sold at market value (Галасюк 2003). That is, the difference between the liquidation value and the market value is

related to limitation of the period of realisation. Hence, for the purpose of formal description of the liquidation value, it will be considered as the function of the sale period.

On the assumption of the economic substance of the concepts of liquidation and market values and the period of exposition, such function should meet the following requirements:

1. The domain of the function is positive values of the argument on the interval  $(0; +\infty)$ .
2. As the argument tends to zero, the limit of the function is a certain positive number, which describes the minimal liquidation value of the subject of appraisal. This quality results from the benefit principle stating that if the subject is beneficial it also has value. Limitation of the period of realisation does not reduce the subject's benefit and, hence, the minimal liquidation value is positive (the case when the subject has used up its benefit is not considered here as in such case the basis of appraisal is the cost of liquidation).
3. As the argument tends to the unlimited increase, the limit of the function is the market value, which follows from its definition.
4. The function increases monotonically in the entire domain of the function.
5. The economic substance of the function does not require the point of inflexion of the function.
6. As the function is increasing, it has a horizontal asymptote and no point of inflexion, the function is convex in the entire domain of the function.

When considering liquidation value as a product of market value and certain reducing coefficient, such reducing coefficient is also a function of the sale period characteristic of the following properties:

1. The domain of the function is positive values of the argument on the interval  $(0; +\infty)$ .
2. As the argument tends to zero, the limit of the function is certain positive number, which describes the minimal coefficient of liquidation value in regards of market value.
3. As the argument tends to infinity, the limit of the function is one.
4. The function increases monotonically in the entire domain of the function.
5. There is no point of inflexion.
6. The function is convex in the entire domain of the function.

The following functional dependence of the coefficient of liquidation value and the realisation period corresponds to all the above properties:

$$K_{,l} = 1 - (1 - K_M) \cdot \left( \frac{1 - K_c}{1 - K_M} \right)^{\frac{T_n}{T_3}}, \quad (14)$$

here  $K_{,l}$  means the coefficient of liquidation value (the function of  $T_n$  sale period);

$K_M$  means the minimal coefficient of liquidation value characterising the ratio of liquidation value and market value under condition of the maximum limitation of the sale period;

$K_c$  means the coefficient of discount characterising the ratio of the observed and theoretical market value provided the sale period equals the period of exposition;

$T_3$  means the period of exposition corresponding to the sale of subject at the observable market value<sup>1</sup>;

$T_n$  means the limited period of sale (argument of the function).

$K_M, K_c, T_3$  parameters are the parameters of the model which are characterised by the following restrictions:

$$\begin{aligned} 0 < T_n < T_3 < +\infty, \\ 0 < K_M < K_c < 1. \end{aligned} \tag{15}$$

For the purpose of investigation of the function, the first and the second derivatives are defined based on  $T_n$ :

The first derivative:

$$\frac{dK_n}{dT_n} = -(1 - K_M) \cdot \left( \frac{1 - K_c}{1 - K_M} \right)^{\frac{T_n}{T_3}} \cdot \ln \left( \frac{1 - K_c}{1 - K_M} \right). \tag{16}$$

The second derivative:

$$\frac{d^2K_n}{dT_n^2} = -(1 - K_M) \cdot \left( \frac{1 - K_c}{1 - K_M} \right)^{\frac{T_n}{T_3}} \cdot \ln^2 \left( \frac{1 - K_c}{1 - K_M} \right). \tag{17}$$

Investigation of the function (14) has the following results:

1. The domain of the function is limited by the interval  $(0; +\infty)$ .
2. In the domain of the function, the function does not intersect with 0x axis. The function intersects with 0y axis at  $(0; K_M)$  point.
3. The function is not symmetric to the origin of coordinates and axes.
4. The first derivative (16) contains at all points of the domain of the function, hence, the function is continuous.
5. The function has a horizontal asymptote  $Y = 1$  as the limit of the function as the argument tends to infinity equals 1 because the base of the degree, based on restrictions of coefficients, is in the interval  $(0; 1)$ .
6. The first derivative is positive in the entire domain of the function as the logarithmic factor is the logarithm of negative number and, hence, is below zero. Hence, the function increases monotonically. Thus, it has no extreme points as the derivative of strictly above zero and contains at all points of the domain of the function.
7. As the formula (17) makes it evident, the second derivative is strictly below zero and contains on the entire domain of the function. Hence, the function is convex and has no point of inflexion.

<sup>1</sup> The theoretical market value is a limit value, which is obtained at unlimited increase of the sale period.

As the results of the analysis show, the function (14) corresponds to all theoretical requirements set in regards of the coefficient of liquidation value.

It should be noted that the value of the coefficient of liquidation value according to the formula (4) does not depend on the unit of measure of the period of time as the exponent is the relation of the sale period to the period of exposition.

The dependence of the coefficient of liquidation value on the period of realisation in various market situations is clearly demonstrated in Figure 1.

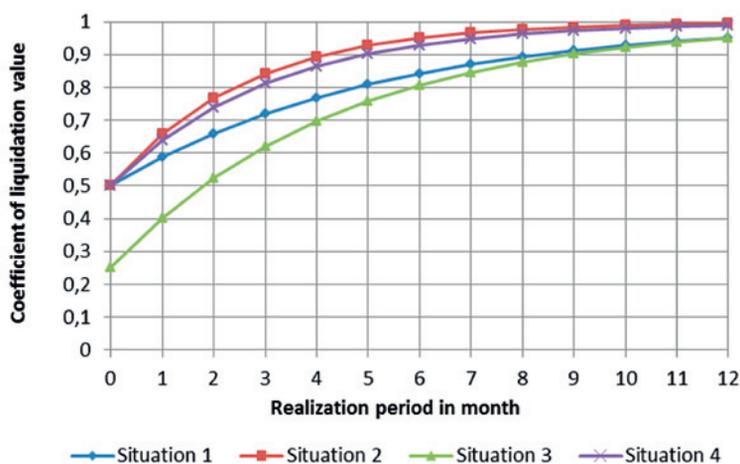


Fig. 1. The coefficient of liquidation value

In Figure 1, situation 1:  $K_M = 0.5$ ;  $K_c = 0.95$ ;  $T_{\theta} = 12$ . Situation 2:  $K_M = 0.5$ ;  $K_c = 0.95$ ;  $T_{\theta} = 6$ . Situation 3:  $K_M = 0.25$ ;  $K_c = 0.95$ ;  $T_{\theta} = 12$ . Situation 4:  $K_M = 0.5$ ;  $K_c = 0.99$ ;  $T_{\theta} = 12$ .

$K_m$ ,  $K_c$ ,  $T_{\theta}$  model parameters depend on market conditions in a specific market segment. Furthermore, they differ in different segments of the market and change in time. Definition of such parameters requires empirical research of specific market situations.

Correct definition of liquidation value using the model (14) is done according to the formula:

$$C_n = C_{p.m} \cdot K_n = \frac{C_{p.n}}{K_c} \cdot K_n, \quad (18)$$

here  $C_{p.m}$  means the theoretical market value defined without taking the bargain discount into account;

$C_{p.n}$  means the observed market value considering the bargain discount.

As the formula (18) suggests, the liquidation value under the condition of equal period of realisation and the period of exposition equals the observed market value, which is in complete correspondence to the economic substance of such values.

## 5. Conclusions

The research conducted allows making the following conclusions:

1. The income rate for the investment into similar property is not the major factor defining the interrelation of market and liquidation value. The procedure of discounting does not reflect the market mechanism of formation of liquidation value.
2. The major factors affecting the ratio of the liquidation value and the market value is market capacity, market activity, and the level of competition. In the model created, such factors define the value of its parameters: the minimal coefficient of liquidation value, the bargain discount coefficient, and the period of exposition.
3. To define liquidation value by adjusting the market value, liquidation value should be considered as the function of the sale period. Such function should possess certain qualities resulting from the economic substance of the concepts of “market value”, “liquidation value”, and “period of exposition”.
4. As a result of the research, the function meeting the set conditions was found.

## References

- Al Janabi; M. A. M. 2008. Integrating liquidity risk factor into a parametric value at risk method, *Journal of Trading* 3(3): 76–87. <http://dx.doi.org/10.3905/jot.2008.708838>
- Almeida, H.; Campello, M. 2007. Financial constraints, asset tangibility, and corporate investment, *Review of Financial Studies* 20: 1429–1460. <http://dx.doi.org/10.1093/rfs/hhm019>
- Baker, M.; Wurgler, J. 2002. Market timing and capital structure, *Journal of Finance* 57: 1–32. <http://dx.doi.org/10.1111/1540-6261.00414>
- Benmelech, E.; Garmaise, M.; Moskowitz, T. 2005. Do liquidation values affect financial contracts? Evidence from commercial loan contracts and zoning regulation, *Quarterly Journal of Economics* 120: 1121–1154.
- Berger, P.; Ofek, E.; Yermack, D. 1997. Managerial entrenchment and capital structure decisions, *Journal of Finance* 52: 1411–1438. <http://dx.doi.org/10.1111/j.1540-6261.1997.tb01115.x>
- DeAngelo, H.; DeAngelo, L.; Wruck, K. 2002. Asset liquidity, debt covenants, and managerial discretion in financial distress: the collapse of I.a. gear, *Journal of Financial Economics* 64: 3–34. [http://dx.doi.org/10.1016/S0304-405X\(02\)00069-7](http://dx.doi.org/10.1016/S0304-405X(02)00069-7)
- Fama, E.; French, K. 2002. Testing tradeoff and pecking order predictions about dividends and debt, *Review of Financial Studies* 15: 1–33. <http://dx.doi.org/10.1093/rfs/15.1.1>

- Giambona, E.; Harding, J. P.; Sirmans, C. F. 2008. Explaining the variation in REIT capital structure: the role of asset liquidation value, *Real Estate Economics* 36(1): 111–137. <http://dx.doi.org/10.1111/j.1540-6229.2008.00209.x>
- Ghosh, A.; Jain, P. 2000. Financial leverage changes associated with corporate mergers, *Journal of Corporate Finance* 6: 377–402. [http://dx.doi.org/10.1016/S0929-1199\(00\)00007-9](http://dx.doi.org/10.1016/S0929-1199(00)00007-9)
- Hardin, W. G. III; Highfield, M. J.; Hill, M. D.; Kelly, G. W. 2009. The determinants of REIT cash holdings, *Journal of Real Estate Finance and Economics* 39(1): 39–57. <http://dx.doi.org/10.1007/s11146-007-9103-1>
- Harford, J. 2005. What drives merger waves?, *Journal of Financial Economics* 77: 529–560. <http://dx.doi.org/10.1016/j.jfineco.2004.05.004>
- Hill, M. D.; Kelly, G. W.; Hardin, W. G. III. 2010. Market value of REIT liquidity, *Journal of Real Estate Finance and Economics*, published online on 21 September .
- Johnson, T. 2005. Dynamic liquidity in endowment economies, *Journal of Financial Economics* 80: 531–562. <http://dx.doi.org/10.1016/j.jfineco.2005.05.004>
- Ju, N.; Parrino, R.; Poteshman, A.; Weisbach, M. 2005. Horses and rabbits? Trade-off theory and optimal capital structure, *Journal of Financial and Quantitative Analysis* 40: 259–281. <http://dx.doi.org/10.1017/S0022109000002301>
- Kahle, K.; Walkling, R. 1996. The impact of industry classifications on financial research, *Journal of Financial and Quantitative Analysis* 31: 309–335. <http://dx.doi.org/10.2307/2331394>
- Maksimovic, V.; Phillips, G. 2001. The market for corporate assets: who engages in mergers and asset sales and are there efficiency gains?, *Journal of Finance* 56: 2019–2065. <http://dx.doi.org/10.1111/0022-1082.00398>
- Morellec, E. 2001. Asset liquidity, capital structure and secured debt, *Journal of Financial Economics* 61: 173–206.
- Myers, S.; Rajan, R. 1998. The paradox of liquidity, *Quarterly Journal of Economics* 113: 733–771. <http://dx.doi.org/10.1162/003355398555739>
- Ooi, J. T. L., et al. 2010. An analysis of the financing decisions of REITs: the role of market timing and target leverage, *Journal of Real Estate Finance and Economics* 40(2): 130–160. <http://dx.doi.org/10.1007/s11146-008-9127-1>
- Pulvino, T. 1996. Effects of bankruptcy court protection on asset sales, *Journal of Financial Economics* 52: 151–186. [http://dx.doi.org/10.1016/S0304-405X\(99\)00007-0](http://dx.doi.org/10.1016/S0304-405X(99)00007-0)
- Pulvino, T. 1998. Do asset fire sales exist? An empirical investigation of commercial aircraft transactions, *Journal of Finance* 53: 939–978. <http://dx.doi.org/10.1111/0022-1082.00040>
- Rajan, R.; Zingales, L. 1995. What do we know about capital structure? Some evidence from international data, *Journal of Finance* 50: 1421–1460. <http://dx.doi.org/10.1111/j.1540-6261.1995.tb05184.x>
- Shield, A.; Schoneborn, T. 2009. Risk aversion and the dynamics of optimal liquidation strategies in illiquid markets, *Finance and Stochastics* 13: 181–204. <http://dx.doi.org/10.1007/s00780-008-0082-8>
- Schlingemann, F., et al. 2002. Divestitures and the liquidity of the market for corporate assets, *Journal of Financial Economics* 64: 117–144. [http://dx.doi.org/10.1016/S0304-405X\(02\)00073-9](http://dx.doi.org/10.1016/S0304-405X(02)00073-9)
- Strebulaev, I. 2007. Do tests of capital structure theory mean what they say?, *Journal of Finance* 4: 1747–1787. <http://dx.doi.org/10.1111/j.1540-6261.2007.01256.x>

Абалонин, С. М. 2001. *Ценообразование – современные подходы. Ценовые факторы в деятельности автотранспортных предприятий*. Москва: Транспорт.

Галасюк, В.; Галасюк, В. 2003. *О нижнем пределе значений величины ликвидационной стоимости объекта оценки*. Available from Internet: <http://old.appraiser.ru>

Галасюк, В. Учет фактора изменения во времени рыночной стоимости объектов залога при определении их ликвидационной стоимости. Available from Internet: <http://galasyuk.com>, <http://old.appraiser.ru>

Галасюк, В. Учет фактора экономической вынужденности реализации объектов оценки при определении их ликвидационной стоимости по методу Галасюков. Available from Internet: [www.galasyuk.dnepr.net](http://www.galasyuk.dnepr.net), <http://old.appraiser.ru>

Галасюк, В. В. 1999. Практические аспекты определения ликвидационной стоимости объектов залога и активов ликвидируемых предприятий, *Академічний огляд* (1): 41–45.

Галасюк, В. В.; Галасюк, В. В. 2000. Способ учета эластичности спроса по цене при определении ликвидационной стоимости объектов, *Державний інформаційний бюлетень про приватизацію* (4): 71–73.

Галасюк, В. В.; Галасюк, В. В. 2003. Практические аспекты учета фактора эластичности спроса по цене при определении ликвидационной стоимости объектов оценки и характеристика их ликвидности, *Вісник оцінки* (4): 28–33.

Галасюк, В. В. 2003. Учет фактора экономической вынужденности реализации объектов оценки при определении их ликвидационной стоимости, *Государственный информационный бюллетень о приватизации* 5: 33–37.

Исследование «Обобщение теоретических предпосылок определения ликвидационной стоимости земельных участков» [online]. Available from Internet: Kwinto-Consulting. / <http://kwinto1.narod.ru/Lv.pdf>

Козырь, Ю. В. 2000. Оценка ликвидационной стоимости, *Вопросы оценки* (4).

Козырь, Ю. В. 2001. Оценка ликвидационной стоимости, *Вопросы оценки* (4). Available from Internet: <http://www.cfin.ru>

Мжельский, М. Б.; Ахметов, О. А. 2005. *Методические рекомендации по оценке ликвидационной стоимости оцениваемого имущества*. Москва: Международная академия оценки и консалтинга.

Національний стандарт № 1 «Загальні засади оцінки майна і майнових прав», затверджений постановою Кабінету Міністрів України від 10.09.2003 р. № 1440.

Родин, А. Ю. 2003. Методика определения ликвидационной стоимости имущества, *Вопросы оценки* (1). Available from Internet: <http://old.appraiser.ru>

Страхов, Ю. И. 2003. Вариант подхода к расчету ликвидационной скидки с рыночной стоимости залога, *Имущественные отношения в Российской Федерации* 8(23).

Фоменко, А. Н. 2006. Методический подход к оценке ликвидационной стоимости объектов недвижимости, *Бюллетень НП «СМАО» Оценочная деятельность* (1). Available from Internet: [www.anf-ocenka.narod.ru](http://www.anf-ocenka.narod.ru)

**Oleg GNENNY.** Associate Professor at Dnepropetrovsk National University of Railway Transport, Faculty of Economics and Management.

Research interests: efficiency of investment in rail transport, uncertainty, risk management.

**Stasys DAILYDKA.** Associate Professor at Vilnius Gediminas Technical University, Faculty of Transport Engineering. Doctor of Technological Science (Transport Engineering), Vilnius Gediminas Technical University. Director General of SC Lithuanian Railways.

*Research interests:* transport engineering and management, economics.

**Vytautas LINGAITIS.** Associate Professor at Vilnius Gediminas Technical University, Faculty of Business Management. Doctor of Social Science (Economics), Vilnius Gediminas Technical University. Head of Economic Division at Railway Infrastructure Directorate of SC Lithuanian Railways.

*Research interests:* economics, investment and transport management.