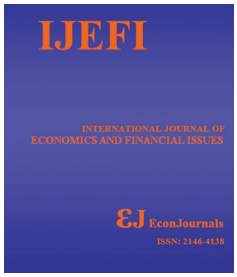

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The Use of Financial and Credit Tools to Minimize the Risks in the Organization of Production

Olga Muftahova*, Andrey Nechaev, Oksana Antipina

Institute of Economics, Management and Law, Irkutsk National Research Technical University, Russian Federation.
*Email: alia218@mail.ru

ABSTRACT

The article describes such form of financing as import revolving leveraged leasing for the purpose of fixed assets modernization. Mathematical modeling techniques are applied in the research. According to the results of the study, the mathematical model of the generalized method of the lease payment calculation is suggested by the authors. The presented method combines several types of leasing. The novelty of this method lies in the fact that on the basis of suggested leasing types the amount of the lease payment is calculated taking into account insurance, financial and currency risks aimed at minimizing losses at downtime due to the limited use of the basic pro duction assets of the company in the production process organization. The authors suggest calculating the payment amount using a floating rate of interest. This proprietary methodology is designed to minimize the risk of production equipment downtime, which ultimately will enable to provide the stability and continuity of the production process.

Keywords: Leasing Payment, Leveraged Leasing, Revolving Leveraged Leasing
JEL Classifications: C02, C69, G31, G32

1. INTRODUCTION

At present, industrial enterprises, acting on the background of a number of opposing factors, i.e., under the sanctions brought against the Russian Federation, the sharp devaluation of the national currency against the US dollar and the euro by 85% and 68%, high inflation, high loan interest rates, reduced investment demand and the imperfection of tax laws, are trying to optimize their costs. Total optimization is comprehensive, sometimes leading to a negative strategic consequences and tactical losses, because managers do not consider that in deciding to reduce the amount of the costs, it is necessary to allocate only inefficient, unproductive and unsustainable costs, affecting the organization of the production process (Rotman, 2014; Antipina and Nechayev, 2015).

We should also note that the low rate of renewal of fixed assets along with high capital intensity of production also cause significant consumption of low value and rapidly wearing items and are one of the negative factors hindering the continuing operations of the production process (Matveychuk, 2014).

2. LITERATURE REVIEW

2.1. Risks in the Organization of Production

The activities of any company, especially the company for the production of products is associated with a lot of risks. Most authors (Belykh, 2009; Prokopyeva et al., 2014; Lovells, 2000; Krugman and Obstfeld, 2008; Goodwin, 2000; Eckhoudt, 2008) define the entrepreneurial risk as the risk of losses from business activities beyond the entrepreneur's circumstances, including the risk of non-receipt of expected income. According to Belykh (2009), entrepreneurial risk is a potential possibility (risk) of occurrence or non-occurrence of the event (the aggregate of events) that resulted in adverse property consequences for the activity of entrepreneurs on circumstances beyond their control. This risk is expressed both in the loss of income (revenue) and incurred losses, curtailing the production of goods and services, the loss of customers and goodwill, closing a business and others (Belykh, 2009).

Business risks can be divided into:

- Production (e.g., the probability of a business default in its production goals);

- Financial (e.g., the risk of loss of profits or committing loss-making financial transaction);
- Interest (associated with an increase in interest rates);
- Commercial (e.g., the increase the purchase price of the goods);
- Loan (linked to non-payment of debt or interest on the loan) (Matveychuk, 2015; Eckhoudt, 2008).

One of the types of business risks is a production risk associated with the interruption of the production process in the event of unforeseen circumstances. The break of the production process takes place when the corresponding object of the insured property, which serves the production, cannot fulfill its purpose as a result of damage to property, and this entails a violation of the production process, which adversely affect the economic results. Downtime, as a kind of interruption, is a temporary suspension of work due to economic, technological, technical or organizational nature. That is, referring to the production process, it is necessary to take into account the stochastic nature of the sub-processes, taking into consideration the likelihood of downtime, delays in parts, assemblies of units in the production process, the possibility of equipment failure, the change of the technology used and other factors, without considering the manner in which the process is interrupted.

Downtime is divided into several groups according to the cause and duration of standstill. Downtime up to 3 min is a hidden standstill which is nowhere recorded and is within actual operating time. More than 3 min delays are the current delays, which are recorded, counting from the 4th min of every idle. Current and hidden delays have been combined for reasons of their occurrence in four groups: Technical, technological, organizational and independent of workshop. The first group includes technical delays caused by the failure of tools and equipment related to the equipment repair and maintenance. The second group includes technological reasons: Technologically necessary, such as, for example, replacement of parts caused by violation of the technology and related to the product quality. The third group includes reasons related to the organization of the workshop labor. Since the human factor is one of the participants of the production process in the system, it is necessary to distinguish two parts in the organizational reasons: Regulated downtimes for workers (cleaning the workplace, recreation, personal need) and ad hoc downtimes, independent of the workers, associated with the unsatisfactory organization of work of offices (waiting for materials or supplies from the other site, waiting for a crane, electrician, mechanic) and downtime due to workers' fault. Moreover, in this group there were identified hidden downtimes due to deviations from the standard time for manual operations and deviations from the desired speed of the equipment performance. At that the former may be explicit and implicit and the latter may be only implicit. The fourth group includes the reasons independent of workshop (lack of inventory in stock, lack of electricity, water) (Fomina and Musatova, 1999).

Therefore, accurate and timely management of fixed and current assets is necessary in the organization of the production process to reduce the risk of the production process interruption.

2.2. Lease Application

Today, both Russian (Yegorov, 2012; Ognyev, 2008; Slepov and Shcheglova, 2009) and foreign scientists (Champaud, 1965; Wong Jeffrey and Dubin Barry, 1995; Goodwin, 2000; von Westphalen, 2007; Nevitt Peter and Fabozzi Frank, 2000; Cuming, 2008) have paid enough attention to such financial instrument as leasing. Significant scientific contributions to the study of theoretical aspects of leasing and the foundations for the creation of methods of calculating the amount of the lease payments were made by such scholars as Ognyev (2012), Kuzovleva et al. (2012), Atkinson and Ezell (2012), Askari et al. (2003). At the same time, we will note that most of the techniques consider a certain particular type of lease. Most often a classic financial leasing is considered, operational leasing in rare cases. However, the insurance of both lease payment and leased property is not provided, as well as foreign exchange risks in international leasing are not included in the methods. As today most of the production equipment comes from abroad, it is necessary to take into account currency risks and risks related to the international situation in creating methodology for calculating the lease payment.

For example, the use of import revolving leveraged leasing for the purpose of modernization of fixed assets is the most appropriate form of financing, which will give the possibility to replace fixed assets objects with more advanced after a certain time depending on the their depreciation.

Revolving leasing or leasing with successive change of the property is a type of lease in which the lessee has the right to replace the leased property to the other after a certain period, which, in accordance with the technological characteristics of the production process must be consistently necessary for the lessee. The basis for the selection of this type of lease is a special type of financing in which the lease agreement is extended for the next period at the end of the first term. At that, the objects are replaced by more sophisticated samples after a certain time depending on the degree of wear at the request of the lessee (Kononova, 2006). Thus, with the help of imported revolving leasing the company will be able to purchase the necessary facilities of fixed assets abroad.

3. METHODOLOGY

There are different methods of calculation of lease payments. We have proposed a new effective method for the calculation of lease payments based on the Guidelines (1996), but it allows calculating lease payments in various forms of leasing (import leasing, revolving leasing, leveraged leasing) and taking into account indicators not considered previously, such as insurance of leasing property in the period of its delivery, financial risk insurance, exchange risk insurance. Besides, the proprietary methodology of calculation of the lease payment suggested calculating the payment amount using a floating rate of interest.

The calculation of the total amount of the lease payment will be based on the formula (1):

$$L = L_{PR} + L_{FR} + L_P + L_{DE} + L_{CD} + L_{CT} + L_{VR} \quad (1)$$

Where;

L_{PR} – Level of property risk;
L_{FR} – Level of financial risk;
L_P – Payments in respect of the leased asset;
L_{DE} – Level of insurance payment for the period of delivery of the leased asset;
L_{CD} – Level of the export customs duty on the leased asset;
L_{CT} – Level of customs duties on export of the leased asset;
L_{VR} – Exchange risk.

Let us gradually consider each component of this formula:

1. Let us calculate the level of property risk according to formula (2).

The level of payment for property risk over the term of the agreement amounts to:

$$L_{PR} = \sum_{y=0}^{N-1} L_{PRy} \quad (2)$$

Where;

L_{PR_y} – Property risk over *y* years, which is calculated according to formula (3):

$$L_{PRy} = \phi_{PR} * C_{Py} \quad (3)$$

Where;

φ_{PR} – Percentage of property risk;

C_{P_y} – Average annual value of the leased asset.

In its turn, the average annual value of the leased asset is calculated according to formula (4):

$$C_{Py} = Y * \left(1 - (y + \frac{1}{2}) * \phi_{Am}\right) \quad (4)$$

Where;

Y – Cost of the leased asset;

y - Year;

φ_{Am} – Percentage of depreciation.

1. Let us calculate the level of financial risk according to formula (5).

$$L_{FR} = \sum_{y=0}^{N-1} L_{FRy} \quad (5)$$

Where;

L_{FR_y} – Financial risk over *y* years, which is calculated according to formula (6)

$$L_{FRy} = \phi_{FR} * \left(L_{PRy} + L_{Py}\right) \quad (6)$$

Where;

φ_{PR} – Percentage of financial risk.

2. Let us calculate payments in respect of the leased asset (7).

$$L_P = \sum_{y=0}^{N-1} L_{Py} = (1 + \phi_{VAT}) * \sum_{y=0}^{N-1} P_{Amy} + P_{CPy} + P_{Cmy} + P_{Oy} \quad (7)$$

Where;

L_{P_y} – Progressive payment on the leased asset over y years;

φ_{VAT} – VAT rate;

P_{Am_y} – Depreciation expenses for *y* year.

In its turn, the amount of depreciation is calculated according to formula (8).

$$P_{Amy} = Y * \phi_{Am} \quad (8)$$

Where;

P_{CPy} – Payment of interest on the loan over *y* years.

We calculate the interest payment on the loan for *y* year according to formula (9):

$$P_{CPy} = \alpha_{CRy} * C_{Py} \quad (9)$$

Where;

$\propto_{CRy}$ – Rate on the loan over *y* years;

P_{Cmy} – Payment of interest on the lessor's commission fee over *y* years.

The payment of interest on the lessor's commission fee over *y* years is calculated according to formula (10):

$$P_{Cmy} = \alpha_{Cm} * C_{Py} \quad (10)$$

Where;

$\propto_{Cm}$ – Interest rate on commission fee;

P_{Oy} – Other payments over *y* years.

3. We calculate the amount of insurance payment for the period of delivery of the leased asset according to formula (11).

$$L_{DE} = \phi_{DE} * Y \quad (11)$$

Where;

φ_{DE} – Rate of the insurance premium for the period of delivery of the leased asset.

4. We calculate the amount of export customs duty rate on the leased asset (12):

$$L_{CD} = \phi_{CD} * Y \quad (12)$$

Where;

φ_{CD} – Rate of export customs duty on the leased asset.

5. We calculate the amount of customs duties for export of the leased asset (13):

$$L_{CT} = L_{CTR} + L_{CTF} \quad (13)$$

Where;

L_{CT} – Value of customs duties on export of the leased asset in rubles (14):

$$L_{CTR} = \phi_{CTR} * Y \quad (14)$$

Where;

φ_{CT_R} – Rate of customs duties for export of equipment in rubles;

L_{CT} – Value of customs duties when exporting the leased asset in foreign currency (15):

$$L_{CTF} = \phi_{CT_F} * Y \quad (15)$$

Where;

φ_{CT} – Rate of customs duties when exporting the leased asset in foreign currency.

6. Let us calculate the level of exchange risk according to formula (16).

$$L_{VR} = \phi_{VR} * (L_{PR} + L_{FR} + L_P + L_{DE} + L_{CD} + L_{CTF}) \quad (16)$$

Where;

φ_{CT} – Insurance payment rate of exchange risk.

Thus, the final formula is as follows (17):

$$L = \left((1+\phi_{FR}) * \phi_{FR} * \sum_{y=0}^{N-1} Y * \left(1 - \left(y + \frac{1}{2}\right) * \phi_{Am}\right) + (1+\phi_{FR}) * (1+\phi_{VAT}) * \sum_{y=0}^{N-1} \left[Y * \phi_{Am} + (\alpha_{CRy} + \alpha_{Cm}) * Y * \left(1 - \left(y + \frac{1}{2}\right) * \phi_{Am}\right) + P_{Oy} \right] + \phi_{DE} * Y + \phi_{CD} * Y + \phi_{CTF} * Y \right) * (1+\phi_{VR}) + \phi CT_R * Y \quad (17)$$

4. RESULTS

Let us consider the created situation of deterioration and renewal of fixed assets in Russia in the industry as a whole. First of all, we will analyze the degree of depreciation of fixed assets in the organizations according to economic activity status. Table 1 shows the relationship gained by a certain date depreciation of existing fixed assets (the difference of their total account and the net book value) to the gross book value of these assets at the same date expressed as percentage.

The degree of fixed assets depreciation in the organizations according to economic activity status is also presented in Figure 1.

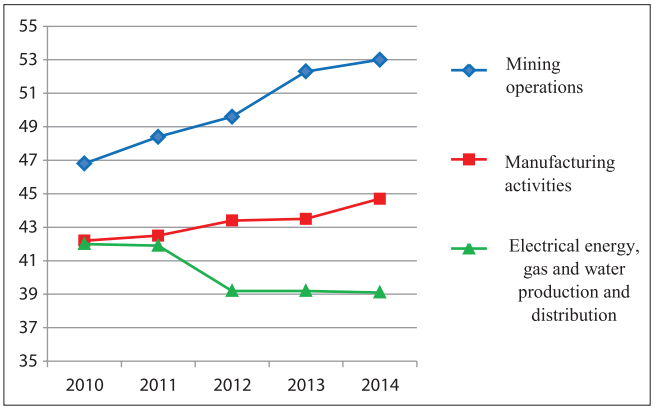
5. DISCUSSION

Depreciation of fixed assets in the industry is around 40%. At that time this Figure 1 is the highest for extractive sector and it is over 50%. In the field of mining production depreciation of fixed assets is increasing and at the end of 2014 it amounted to nearly 45%. There has been a clear downward trend in the depreciation of fixed assets in the production and distribution of electricity, gas and water, but whether it will continue in times of crisis and

Table 1: The degree of depreciation of fixed assets in the organizations according to economic activity status (by the end of the year, in %)

Activity status	2010	2011	2012	2013	2014
Mining operations	46.8	48.4	49.6	52.3	53
Including					
Extraction of fuel and energy minerals	47.4	49.1	50.4	53.2	-
Manufacturing activities	42.2	42.5	43.4	43.5	44.7
Including					
Chemical production	43.8	44.4	43.6	45.3	-
Metallurgical production and production of finished metal products	39.9	40.9	42.1	43.7	-
Machinery and equipment manufacturing	43.2	44.0	44.6	44.9	-
Electrical and optical equipment manufacturing	47.3	47.4	47.1	46.9	-
Transport equipment manufacturing	49.6	49.3	48.2	47.4	-
Electrical energy, gas and water production and distribution	42.0	41.9	39.2	39.2	39.1

Figure 1: The degree of depreciation of fixed assets in the organizations according to economic activity status



economic downturn is not known. In general, it should be noted that there is a trend to increasing the degree of depreciation of fixed assets in Russia, which may lead to its full one hundred percent depreciation in the future. According to some authors (Matveychuk and Yu, 2014; Kuzovleva et al. 2012), if left unchecked and not take measures that will stop the growth of depreciation of fixed assets, industries will have to work with a completely obsolete and worn-out equipment in the near future.

Proper management of fixed assets and current assets should minimize the risks of interruption of the production process, for example by means of insurance resources. The downtime in the production process takes place when the corresponding object serving to the production process cannot fulfill its purpose, which entails a violation of the production process, which in turn adversely affects the economic results.

The risks of delays in the organization of production due to the limited use of the basic production assets of the enterprise may be minimized through the use of various financial and credit tools, such as imported revolving leveraged leasing with progressive payments, reverse factoring with recourse.

6. CONCLUSION

As it is evident from the statistics for the last 5 years, the level of fixed assets depreciation in the industry is around 40% and it increases every year. This situation will create conditions of work with the worn-out equipment not only in the long term, but in the medium term, which surely will entail the production process violation, besides the frequency of these delays, as well as downtime length, will increase over time. In this case, the costs of restoring the production process will require additional lump sum investments. The solution of this problem may be the use of such financial tools as revolving imported leverage-leasing suggested by the authors, which allows gradually replacing fixed assets objects depending on the degree of wear for more sophisticated ones in certain time. The proprietary methodology is suggested for calculation of the lease payment, which takes into account such factors as the leased property insurance during the delivery period, financial risk insurance and foreign exchange risk insurance.

It is worth noting that the use of such forms of financing and methods of its calculation are intended to minimize the risk of production equipment downtime and to provide high quantity and quality indicators of the enterprise work, the stability and continuity of the production process.

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