

The Choice of a Compromise Rate for Intra-Company Lending of Enterprises

Mark Gorskiy¹, Mikhail Khalikov², Ivan Vnukov³

¹ Plekhanov Russian University of Economics,
36, Stremyanniy lane, Moscow, 117997, Russian Federation.
E-mail: gadjagaev@mail.ru

² Plekhanov Russian University of Economics,
36, Stremyanniy lane, Moscow, 117997, Russian Federation.
E-mail: Khalikov.MA@rea.ru

³ Plekhanov Russian University of Economics,
36, Stremyanniy lane, Moscow, 117997, Russian Federation.
E-mail: jvnukov@yandex.ru

The aim of the article is the development of a toolkit of models and methods for choosing a compromise rate for the management company and structural business unit within an integrated group of enterprises, making it possible to increase the efficiency of basic production activities of the holding company units and thus maintaining the stability of the financial sector and the profitability of corporate capital. The subject of the study is to investigate the influence of external factors of the market environment and controllable production factors of holding enterprises on the effective rate for intercompany loans. The model calculations were carried out by the example of a virtual enterprise with a hierarchical organizational structure, for which the neoclassical dependence "labor-capital expenditures – output of commodity products" is valid for the divisions (technological divisions). As methods the article provides relevant economic and mathematical models for determining the effective rate of intra-company credit and a description of the original analytical method of selecting the compromise rate proposed by the authors. This rate was calculated by the example of test data, and the influence of each of the external factors on its value was studied. Interpretation of the results and specific steps for the holding enterprises to maximize the return on credit in the production sector and efficient corporate resource allocation is proposed.

Mark Gorskiy – PhD in Economics, Associate Professor of the Department of Mathematical Methods in Economics.

Mikhail Khalikov – Doctor of Economic Sciences, Professor, Professor of the Department of Mathematical Methods in Economics.

Ivan Vnukov – Student.

The article was received: 22.06.2021/The article is accepted for publication: 12.05.2022.

Key words: integrated group of enterprises; structural business unit; production area of the enterprise; working capital; neoclassical production function; non-production consumption; intra-company loan rate; analytical loan rate selection method; external financing; financial dependence.

JEL Classification: C61, C65, D25.

DOI: 10.17323/1813-8691-2022-26-2-270-284

For citation: Gorskiy M., Khalikov M., Vnukov I. The Choice of a Compromise Rate for Intra-Company Lending of Enterprises. *HSE Economic Journal*. 2022; 26(2): 270–284.

Introduction

An essential factor in the growth of market efficiency and competitiveness of large Russian production corporations and integrated groups of enterprises, which form the basis of the corporate sector of the real economy, is further improvement of internal mechanisms for planning and management of the main areas of their activities: operational, financial, and investment. The implementation of the synergy growth strategy of the united company provides the intensification of intra-company material and cash flows and increasing the returns in the results of its activities of the cost of general corporate financial resources spent on projects throughout the integrated group, as well as advances to the holding company units in the form of intra-company loans for their production and investment programs. The value of these loans is difficult to overestimate due to the relative cheapness and preferential terms of allocation and use. However, these resources are not "free" and assume adequate assessment from the position of allied and internal "pro-interests" in the form of a "fair" rate of intra-company lending. Creating and adapting models and methods for selecting rates on intra-company loans are currently insufficiently developed. Effective models are often the know-how of large corporations, and the corresponding results rarely appear on the pages of professional publications on intra-company management.

Let us define intra-company lending as follows. The funds at the disposal of the structural business units (SBUs) within the integrated holding are formed from several sources:

- equity funds and financial resources;
- borrowed funds taken on credit in the foreign market;
- funds raised as part of an intra-company loan.

If there is a lack of equity funds and external loans to cover production activities, the SBU, as part of an integrated group of enterprises, needs a more affordable lending form. This task is solved by intra-company loans provided to the SBU by the holding's management company (MC) at a lower interest rate than the bank's rate.

There is a problem of intra-company loans related to taxation since the issuer must reflect the interest income on the loan. The receiving unit must reflect the interest expenses. Also, the tax rate should be the rate that might occur in an ordinary transaction with a third party. Inter-company loans are reflected in the financial statements of individual SBUs. However, they are excluded from the consolidated financial statements of integrated production structures.

Let us list the advantages of intra-company loans:

- cash provision in a short time;
- no need to apply for a loan application;
- favorable repayment terms compared to commercial borrowers.

Moreover, intra-company loans are beneficial due to direct government regulation of interest rates, control of foreign exchange transactions, and the volume of tax liabilities in various countries. This method of lending is legal for making financial transfers and reducing taxation.

There are also disadvantages of this type of lending; increased risks on both sides and overpayments due to interest if the conditions were set incorrectly.

Thus, transfer lending is the most important corporate governance tool, allowing a "profitable" way to transfer funds from the MC to subsidiaries. The purpose of this article is to develop and justify an economic and mathematical model for minimizing the holding company's costs for organizing intra-company lending to divisions and choosing the intra-company loan rate that provides equal efficiency for the donor MC and the recipient SBU.

Intra-company lending as an integral part of the system of intra-company financing and its connection with state regulation was studied by large corporations, business associations, and the scientific community [Chand, 2016], the impact of crisis phenomena in the economy on intra-company loans was considered [Kapoor et al., 2020; Kumar, 2020]. Taxation is also very relevant for intra-company lending [Russo et al., 2021]. Among the recent studies on this topic, the works [McClure, 2021; Reichert et al., 2012; Stein, 1997] can be noted.

The study objective is to develop and verify an analytical method for choosing a compromise rate for intra-company lending to enterprises of an integrated production structure, focused on increasing the cost efficiency of corporate monetary resources and reducing the risks of intra-company opportunism.

Methods

The problem of choosing the optimal rates of intra-company (transfer) lending to subdivisions of a hierarchical production structure is very new and moreover, the results obtained by the authors in the framework of modeling these rates using the tools of mathematical models and methods are quite original. Nevertheless, with good reason it should be noted the results of studies on similar problems previously obtained by other researchers and groups of authors. In this regard, it is necessary to recall the works [Stein, 1997; Buchuk, 2014; Nicodano, 2019, McNeil et al., 2005] in which the authors consider problem statements similar to the statements proposed by the authors. We also remind that this work is a continuation of the research by Khalikov and his students, previously published in [Khalikov, Rasulov, 2013; Khalikov et al., 2015].

The type and properties of the neoclassical dependence in the pair "commodity products output – the cost of production resources" are borrowed from the works of [Kleiner, 1980; 1986; Dorfman et al., 1958; Samuelson, 1979; Solow, 1957; Stein, 1997]. It is also necessary to emphasize a particular connection of the material presented with the works of [Bezukhov, 2014; Gorskiy, 2018; Gorskiy, Reshulskaya, 2016; Huizinga et al., 2008; Kolass, 1997; Krui, 2011; Minniti, Turino, 2013; Khrustalev, 2011; Viral V. Acharya et al., 2013], dedicated to improving the efficiency and sustainability of high-tech enterprises and holding companies. The authors developed the mathematical apparatus for calculations based on the model of optimal intra-company lending independently and also partially borrowed from the works of [Bakhvalov, 2013; Lienberg, 2008; Khalikov et al., 2015, Khasanov, 2013].

Results and discussion

Economic and mathematical model and theoretical foundations of the analytical method for calculating the compromise rate of intra-company lending

The calculation of the intra-company lending rate will be carried out using the static analytical method. This means that all model parameters will be calculated for a fixed period t .

The algorithm for finding the transfer rate begins with defining the input-output function for the selected structural business unit (SBU) as part of an integrated enterprise group. Let us assume that it is a neoclassical degree of homogeneity α ($\alpha > 0$). Then, for the production sector of the SBU, the following ratio (which, within the framework of the neoclassical theory of the firm, was proved in the work of one of the authors [Kleiner, 1986]) is true:

$$(1) \quad c(y_t) = c(1) \cdot y_t^{\frac{1}{\alpha}}, \text{ or}$$

$$(1)' \quad y_t = \left(\frac{c(y_t)}{c(1)} \right)^{\alpha},$$

where y_t – gross output in period t (in natural units); $c(1)$ – specific total costs (in units of cost); $c(y_t)$ – the total cost of production.

Equation (1) can be considered in more detail. The total costs of the enterprise directly depend on the variable assets in the working capital (WC_t) of the SBU at the beginning of the period. (Introduce the dependence of the volume of costs on demand for products (Sp_t)). Then it will be possible to determine the total cost based on the available data. Denote this parameter as VZ_t .

Calculate VZ_t :

$$(2) \quad VZ_t = \min \left\{ WC_t; c(1) \cdot Sp_t^{\frac{1}{\alpha}} \right\}.$$

Note that the ratio (2) is obtained on the basis that the costs of the production sector can not exceed neither current assets, nor the costs of the planned release program.

Since the real costs of the production sector coincide with VZ_t , taking into account the relations (1) and (2), write down the output of marketable products in the form:

$$(3) \quad y_t = \left(\frac{VZ_t}{c(1)} \right)^{\alpha}.$$

The next step is to determine the value of the final product by which in the framework of neoclassical theory, we mean gross post-tax profit. Assume that its calculation is related to the sales cost of commodity products, the costs of its production, payments on external loans, tax obligations, and loans to other SBUs in the holding. Thus:

$$(4) \quad \bar{y}_t = (1 - \tau)(p_t \cdot y_t - VZ_t - \rho_t \cdot SL_t) - w_t \cdot TR_t,$$

where \bar{y}_t – the final product of the enterprise for the considered period t (in units of value); τ – the income tax rate; p_t – the unit price of the goods sold; ρ_t – the loan rate; SL_t – the short-term external loan for the period t ; w_t – the intra-company loan rate; TR_t – the volume of intra-company loans.

The final product calculated by formula (4) is divided into production and non-production consumption, which, in turn, depend on the controlled parameter γ_t (the share of deductions for non-production consumption) and are calculated by the formulas:

$$(5) \quad \begin{aligned} DV_t &= \gamma_t \cdot y_t, \\ \overline{WC}_t &= \underline{WC}_t - VZ_t + \bar{y}_t \cdot (1 - \gamma_t), \end{aligned}$$

where DV_t – the amount of non-productive consumption costs at the end of the period t ; \overline{WC}_t – variable assets in the working capital of the enterprise at the end of the period t .

Calculate the variable assets in working capital \underline{WC}_{t+1} at the beginning of the next period. Working capital consists of the variable assets of the end of the period under report until the beginning of the next period, the volume of intra-company loans and short-term loans of the next period:

$$(6) \quad \underline{WC}_{t+1} = \overline{WC}_t + TR_{t+1} + SL_{t+1}.$$

For the period $t + 1$, consider the ratio β_{t+1} of financial dependence. Suppose an enterprise can take out an arbitrarily large loan that meets the condition $\beta_{t+1} \leq 1$. Then the value of the financial dependence ratio can be found as the ratio of the amount of funds borrowed from external sources to the working capital (6) at the beginning of the same period $t + 1$. Write down the resulting expression in a more detailed form, highlighting the elements included in the working capital:

$$(7) \quad \beta_{t+1} = \frac{SL_{t+1}}{\underline{WC}_t + TR_{t+1} + SL_{t+1}}.$$

From this, derive the following relations for \underline{WC}_{t+1} and SL_{t+1} .

$$(8) \quad \underline{WC}_{t+1} = \frac{1}{1 - \beta_{t+1}} \cdot (\overline{WC}_t + TR_{t+1}),$$

$$(9) \quad SL_{t+1} = \frac{\bar{\beta}_{t+1} (\overline{WC}_t + TR_{t+1})}{1 - \bar{\beta}_{t+1}},$$

where $\bar{\beta}_{t+1}$ – the maximum allowable value of the financial dependence ratio for the period $t + 1$. In this formula (8), this is exactly what is used. In the general case, formula (7) is used.

For each SBU of the holding, it is necessary to observe a positive flow of the final product for the period t , which will allow supporting its activities financially:

$$(10) \quad (1 - \tau)(p_t \cdot y_t - VZ_t - \rho_t \cdot SL_t) - w_t \cdot TR_t \geq 0.$$

If the inequality (10) is not met, the holding company incurs losses. Then a rational decision is to reduce the volume of intra-company loans provided by the SBU. Ensure the fulfillment of this inequality. This will allow calculating the limit on the rate of intra-company loans:

$$(11) \quad w_t \leq \frac{(1 - \tau)(p_t \cdot y_t - VZ_t - \rho_t \cdot SL_t)}{TR_t}.$$

From the obtained ratio, it can be seen that the increase in the rate is associated with an increase in production volumes (y_t) and a decrease in the intra-company loans (TR_t). Also, the decrease in the rate is associated with an increase in the tax burden (τ), total costs (VZ_t), and the loan rate (ρ_t).

Calculate the maximum w_t^{max} value of the compromise rate using the inequality (11):

$$(12) \quad w_t^{max} = \frac{(1 - \tau)(p_t \cdot y_t - VZ_t - \rho_t \cdot SL_t)}{TR_t}.$$

If the rate value (12) is greater than zero, then the compromise rate w_t^0 on the intra-company loan lies in the interval $w_t^0 \in (0; w_t^{max})$ and can be found using analytical models.

The analytical approach for finding the optimal compromise rate consists in the parity distribution of the final product between the recipient enterprise and the donor MC. The SBU must have sufficient funds to replenish the variable assets disposed of in the previous period and ensure a sufficient level of non-productive consumption. In turn, the centralized investment fund of the holding under the MC's control should grow at least at the planned rate.

From the position of an individual enterprise, as part of a group of companies, the compromise rate w_t^0 on an intra-company loan should ensure the planned volume \bar{y}_t of the final product, that is:

$$(13) \quad \bar{y}_t \geq \max \left\{ \frac{VZ_t}{1 - \gamma_t}; \frac{DV_t}{\gamma_t} \right\},$$

where DV_t – the minimum allowable level of non-productive consumption for the period t .

Then, making the corresponding deduction from the final product in the right part of the expression (12) (to ensure a positive balance), the following inequality is obtained:

$$(14) \quad \underline{w}_t^0 \leq \left[(1 - \tau) \cdot (p_t \cdot y_t - VZ_t - \rho_t \cdot SL_t) - w_t \cdot TR_t - \max \left\{ \frac{VZ_t}{1 - \gamma_t}; \frac{DV_t}{\gamma_t} \right\} \right] \cdot \frac{1}{TR_t}.$$

Denote the right side of inequality (14) as \bar{w}_t . This is the upper limit of the rate on intra-company loans. At this rate, the planned levels of production and non-production consumption are realized.

The rate on intra-company loans, due to the above justifications, should not exceed the rate on external loans. Therefore, the permissible rate from the borrower's point of view will be:

$$(15) \quad \bar{w}_t^0 = \min \{ \bar{w}_t; \rho_t \}.$$

Next, from the position of the donor-MC of the holding, calculate the lower threshold \underline{w}_t^0 of the intra-company lending rate for the period t :

$$(16) \quad \underline{w}_t^0 = \frac{\varphi \cdot TRO_t}{K \cdot TR_t},$$

where TRO_t – the volume of the centralized investment fund of the holding in period t ; φ – the planned growth rate of the centralized investment fund; K – the number of enterprises in integrated production structures.

If the inequality $\underline{w}_t^0 \leq \bar{w}_t^0 \leq w_t^{max}$ is satisfied, the compromise rate w_t^0 is calculated as the arithmetic mean of the found threshold values, i.e., $\frac{\bar{w}_t^0 + \underline{w}_t^0}{2}$.

However, if $\underline{w}_t^0 > \bar{w}_t^0$, then for the donor SBU, the compromise rate w_t^0 on intracompany loans will take a value equal to the upper threshold \bar{w}_t^0 . The choice of a compromise rate in this way allows the SBU to avoid high costs for its primary production activities, but in this case, the growth rate of the holding company's general fund will decrease.

Empirical calculations of intra-company loan rates

Calculate the compromise rate of the intra-company loan based on the test data of a virtual enterprise (the packaging department of a pharmaceutical company Elix, LLC was taken). Initial data are presented in Table 1.

After performing the necessary calculations, the data is summarized in a common Table 2.

Table 1.

Initial data for model calculations (1)-(14)
(unit of measurement of capital – conventional monetary units, production – pieces)

Parameter	Value	Parameter	Value	Parameter	Value
$c(1)$	4	TRO_t	300	TR_t	35
p_t (price)	21	K	10	SL_t	20
p_t (loan rate)	0.2	γ_t	0.4	w_t	0.1
τ	0.13	β_{t+1}	0.2	\underline{DV}_t	16
φ	0.06	Sp_t	20	TR_{t+1}	30
\overline{WC}_t	40	α	0.8	\overline{WC}_t	50

Table 2.

Calculation results for the model (1)-(14)

Parameter	Value	Parameter	Value	Parameter	Value
$c(1) \cdot Sp_t^{\frac{1}{\alpha}}$	169.1794	\overline{WC}_{t+1}	87.5	w_t^{max}	2.595014
$c(y_t)$	50	DV_t	34.9302	\bar{w}_t	0.114062
VZ_t	50	\overline{WC}_t	52.3953	\bar{w}_t^0	0.114062
y_t	7.54272	$\frac{VZ_t}{1-\gamma_t}$	83.33333	\underline{w}_t^0	0.051429
\bar{y}_t	87.3255	$\frac{\underline{DV}_t}{\gamma_t}$	40	w_t^0	0.082745
SL_{t+1}	17.5				

Note that the values calculated in two different ways for \overline{WC}_{t+1} coincide, which indicates the correct "operation" of the model. Also, based on the ratio (2), it is established that $VZ_t = \overline{WC}_t$. This means that the volume of production, the final product, and the compromise rate directly depend on the value of variable assets in working capital at the beginning of the period under review. At the same time, an increase in working capital leads to an adequate increase in the volume of production and the final product and a reduction in the compromise rate. The presented model allows choosing a balance between the level of profitability and the amount of costs so that the compromise rate meets the needs of the recipient SBU.

In the example, a positive flow of the final product is provided for the SBU, which indicates the profitability of its production activities.

The value w_t^{max} is greater than zero, therefore, the compromise rate w_t^0 on loan lies in the interval $w_t^0 \in (0; w_t^{max})$ and can be found using the analytical method.

In the calculations carried out, the inequality $\underline{w}_t^0 \leq \bar{w}_t^0 \leq w_t^{max}$ is satisfied, and the compromise rate on the intra-company loan is equal $w_t^0 = 0.082745$.

Analysis of the influence of external factors on the rate of the intra-company loan

Perform some manipulations with key external parameters to track the degree of their influence on the compromise rate of intra-company lending.

Change the values of the financial dependence ratio β_{t+1} from 0.2 to 0.8 in increments of 0.2. With the same sequence, change the parameter γ_t for each β_{t+1} – the standard of deductions for non-productive consumption. Also, depending on the compromise rate calculated according to the basic scenario, change the lending rate ρ_t . Due to the significant role of the cost of products sold in the market, the parameter p_t will also be changed.

After making calculations and monitoring the compromise rate of intra-company lending behavior, draw the main conclusions from the model (1)–(14).

After calculations, the change in the ratio of financial dependence does not affect the value of the rate of intra-company lending but affects the volume of working capital in the next period, which is a consequence of the ratio (8). The lower this ratio, the higher the volume of variable assets in working capital.

The ratio of deductions for non-productive consumption has the most significant impact on the intra-company lending rate. There is a strong inverse relationship between these values.

Also, a significant impact on this rate is the change in the cost of production; however, here, the relationship is direct. For large values of γ_t , it was necessary to significantly increase the price tinging the intra-company lending rate to an acceptable level, since at the "old" price, the compromise rate does not provide the specified volume of the final product. It can be concluded that the share of deductions for non-productive consumption should not be overstated. It is advisable to keep it at the level of 0.4 so as not to risk raising the price of products and to be able to provide intra-company loans.

If the loan rate changes, the compromise rate also changes. Here, the relationship is reversed, but it is much weaker than in the case of the parameter γ_t . At some boundaries, at high values of the share of deductions for non-productive consumption, the relationship changes direction, from which it can be concluded that it is not linear. In general, an increase in the loan rate negatively affects the final product volume and the compromise rate.

Let us trace the dependence of the compromise loan rate on the share of deductions for non-productive consumption and the rate on external credit separately on the diagrams. For this purpose, on the abscissa axis, plot the values of the studied values in increments of 0.2 in

the first case and 0.02 in the second, and plot the values of the compromise rate on the ordinate axis. The remaining factors will be fixed at the basic level corresponding to the one shown in Table 1.

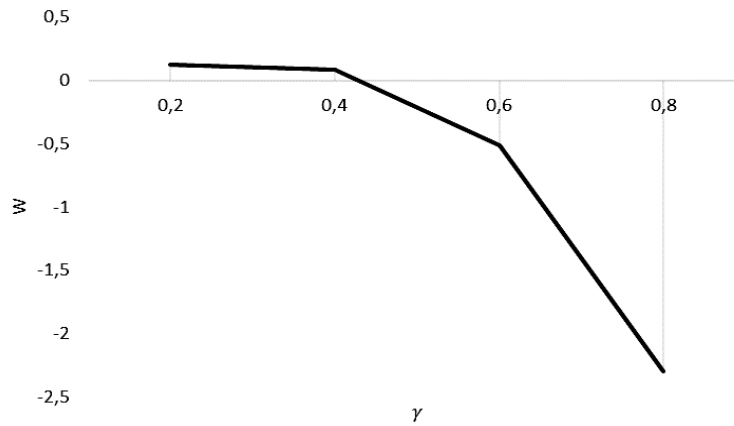


Fig. 1. Impact of the share of deductions (γ_t) for non-productive consumption on the compromise rate (Fig.1 only illustrates the monotonic nature of the estimated dependence which is not necessarily piecewise linear)

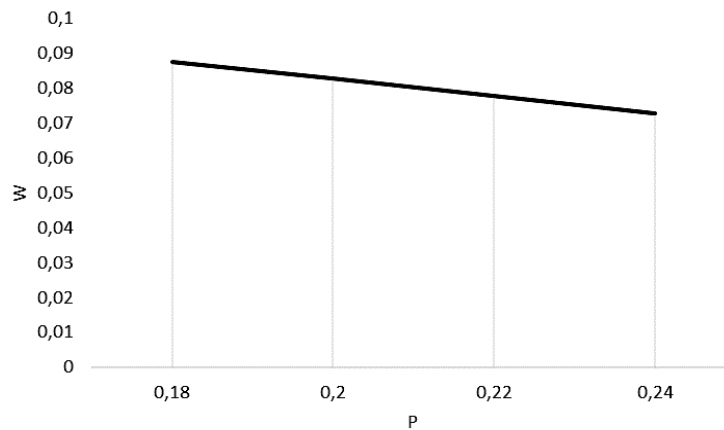


Fig. 2. Impact of the external loan rate on the compromise rate (Fig. 2 only illustrates the monotonic nature of the estimated dependence which is not necessarily piecewise linear)

The diagrams confirm the conclusions. Note that the value of the compromise rate of the intra-company loan is in the critical zone at $\gamma_t > 0.4$ and takes negative values (Fig. 1). This means that the assumed share of deductions for non-productive consumption is unacceptable since, in this case, the compromise rate does not provide the specified volume of the final product.

Next, calculate the compromise rate of an intra-company loan with a change in α of the homogeneity of the input-output relationship. Since the ratio of financial dependence does not affect the value of the compromise rate, leave it at the level of 0.8. Also, we will not change the price of marketable products. In cases where the compromise rate cannot provide the final product (non-compliance with condition (13)), the output for the enterprise will be an increase in the price of the product or a decrease in total costs and production volumes (Fig. 3–5).

For $\alpha = 0.8$ trace the dependence of the compromise rate on the rate on external loans and γ_i – the share of deductions for non-productive consumption for the levels of 0.4 and 0.6, respectively (Fig. 3).

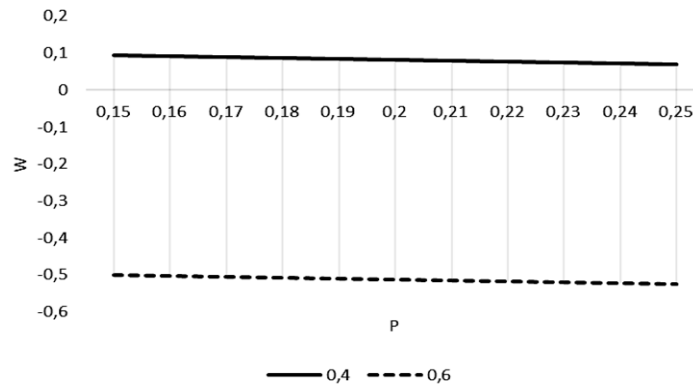


Fig. 3. The dependence of the compromise rate on external factors at $\alpha = 0.8$

The diagram above the horizontal axis has a decreasing character, which indicates the reaction of the loan rate on the compromise rate. At $\gamma_i = 0.6$ the compromise rate is negative, which indicates that the level of deductions for non-productive consumption is unacceptable for this enterprise.

Consider the studied dependence at $\alpha = 0.83$ (Fig. 4).

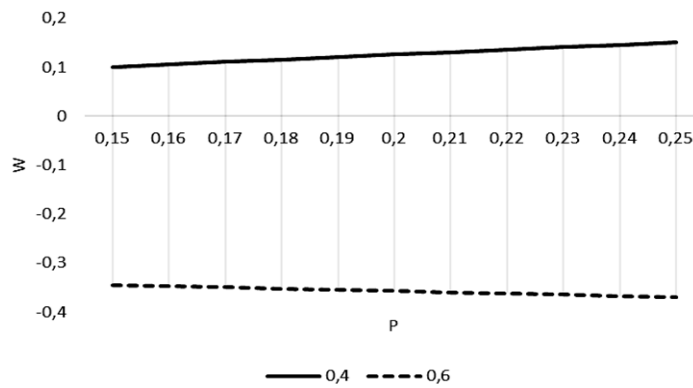


Fig. 4. The dependence of the compromise rate on external factors at $\alpha = 0.83$

The curve increases above the ordinate axis, indicating that the upper threshold of the compromise rate takes on high values with the established data. In this case, the required rate is directly related to the external loan rate (15).

At $\alpha = 0.86$ there is a similar situation (Fig. 5).

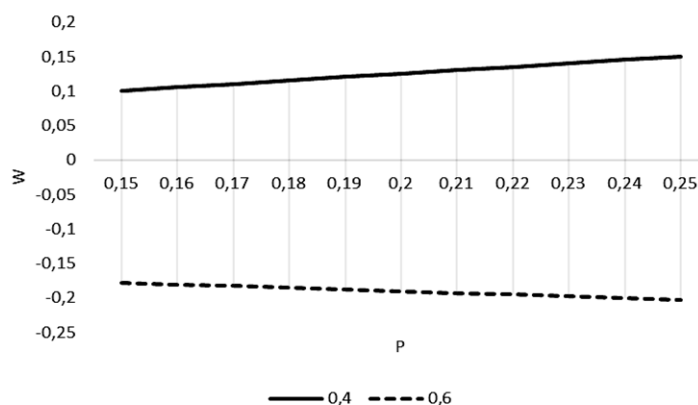


Fig. 5. Dependence of the compromise rate on external factors at $\alpha = 0.86$

A further increase in α did not lead to changes in the compromise rate at $\gamma_t = 0.6$, since the upper threshold only increased, indicating the need to calculate the rate based on the market level and the lower threshold (16).

The following conclusions can be drawn from the calculations carried out:

- the change in α has a significant impact on the value of the upper threshold of the intra-company loan rate and the final product. There is a rapid growth of the upper threshold of the rate with the growth of the uniformity degree, as a result of which the external credit rate becomes available to the SBU-borrower, then the compromise rate can be defined as the arithmetic average of the lower threshold of the intra-company credit rate and the external loan rate;
- the share of deductions for non-productive consumption has a similar effect on the rate. The favorable level with a low degree of uniformity remains at 0.4, but even in these cases, conditions such as an increased price for products and a reduced loan rate must be met;
- the intra-company loan rate at low values of γ_t can be quite high, and at the same time, a positive balance is observed, which makes the SBU-borrower independent of the level of interest rates in the creditor banks.

To keep the intra-company loan rate at a high level of γ_t , the SBU needs to reduce the total costs that are covered from variable assets in working capital at the beginning of the period under review (it is essential to choose the optimal cost level since too high or too low values will not allow the SBU to become a borrower) and/or increase the price of products.

Conclusion

The MC of the holding needs to ensure the following strategy in the financial sector:

- to ensure the implementation of a positive final product by the holding's divisions, which create conditions for the growth of the corporate investment fund and the possibility of intra-company lending to production and investment programs of individual enterprises;
- the effective rate of intra-company loan should ensure a positive final product spent on investments in the working capital of the SBU and on non-productive consumption in the amounts that allow additional financing of the corporate investment fund;
- the compromise rate should be calculated, taking into account the size of the centralized investment fund and the needs of the SBU, designated as the lower and upper thresholds of the effective rate. If the lower threshold is too high, MC should sacrifice the growth rate of the corporate fund in favor of enterprises in need of loans;
- the optimal rate of an intra-company loan depends not so much on the level of financial dependence of the SBU but on its ability to generate profit;
- the level of prices for products produced by SBU has a significant impact on the intra-company loan rate. As the price increases, the final product increases, and resources are released that can be redistributed between the SBU to increase the overall efficiency of the holding;
- the share of deductions for non-productive consumption significantly affects the ability of the enterprise to provide cash on credit, so to maintain the efficiency of the working capital of the SBU as part of the holding, the recommended value of the share of deductions for non-productive consumption is within the range of up to 0.5;
- the scale of production "comfortable" for the organization of an effective system of intra-company lending is the scale of production (equal to the total elasticity of the production function as costs) equaling to 0.83 or higher, which allows the SBU to provide a high upper rate threshold. If the upper threshold is high, the compromise rate will be accepted based on the level of the loan rate and the size of the corporate investment fund. Moreover, the compromise rate will continue to be lower than the market rate, which is certainly beneficial for the holding companies.

Thus, holding companies should gradually reduce the share of deductions for non-productive consumption to the level of 0.4 or lower and maintain the degree of uniformity of the production function in the range from 0.83 to 0.86. It is advisable to increase the price of products with sufficient demand. To increase working capital, the SBU shall ensure a low level of financial dependence (the value of the financial dependence ratio is recommended to be below 0.5). When choosing the rate of an intra-company loan, consider the external loan rate, with the growth of which the compromise rate decreases due to the large payments on the external loans already taken.

* *
*

References

- Bakhvalov N.S., Zhidkov N.P., Kobelkov G.M. (2003) *Numerical Methods*. Moscow: Binom.
Bezukhov D.A. (2014) The Choice of the Optimality Criterion of Working Capital Management for the enterprise. *Problems of the Development of Modern Society: Economic, Legal, and Social Aspects. A Col-*

lection of Scientific Articles Based on the Results of the All-Russian Scientific and Practical Conference, Volgograd, September 29–30, 2014. Volgograd: Volgograd Scientific Publishing House.

Bendikov M.A., Frolov I.E. (2007) *High-Tech Industry Sector in Russia: State, Trends, Mechanisms of Innovative Development*. Moscow: Nauka.

Buchuk D., Larrain B., Muñoz F., Urzúa I.F. (2014) The Internal Capital Markets of Business Groups: Evidence from Intra-group Loans. *Journal of Financial Economics*, Elsevier, 112, 2, pp. 190–212.

Dorfman R., Samuelson P., Solow R. (1958) *Linear Programming and Economic Analysis*. New York.

Gorskiy M.A. (2018) Parametric Modeling of Credit and Investment Activity of a Commercial Bank and its Applications. *Scientific Notes of the Russian Academy of Entrepreneurship*, 17, 4, pp. 187–208.

Gorskiy M.A., Reshulskaya E.M. (2018) Parametric Models for Optimizing the Credit and Investment Activity of a Commercial Bank. *Journal of Applied Economic Sciences*, 13, 8(62), pp. 2340–2350.

Huizinga H., Laeven L., Nicodeme G. (2008) Capital Structure and International Debt Shifting. *Journal of Financial Economics*, Elsevier, 88, 1, pp. 80–118, April.

Kleiner G.B. (1980) *Methods of Production Function Analysis*. Moscow: Informelectro.

Kleiner G.B. (1986) *Production Functions Theory, Methods, Application*. Moscow: Finansy i statistika.

Kolass B. (1997) *Management of the Enterprise Financial Activity: Problems, Concepts, Methods* (Translated from French). Moscow: Finance UNITY.

Krui M., Galay D., Mark R. (2011) *Fundamentals of Risk Management* (Trans. from English). Moscow: Urait.

Khalikov M.A., Rasulov R.M. (2013) Factors of "Input-Output" Dynamics: Problems of Estimation and Accounting in Enterprise Models. *Bulletin of the Plekhanov Russian State University of Economics*, 4, pp. 70–80.

Khalikov M.A., Khechumova E.A., Shchepilov M.V. (2015) *Models and Methods for Selecting and Evaluating the Effectiveness of Market and Intra-Company Strategies of the Enterprise*. Moscow: Kommercheskie tekhnologii.

Khasanov A.S. (2013) Individual Homework Assignments on the Basics of Linear Programming. *Proceedings of the Plekhanov Russian University of Economics*, 4, 14.

Khrustalev O.E. Methodological Foundations for Assessing the Economic Stability of an Industrial Enterprise. *Audit and Financial Analysis*, 5, pp. 180–185.

Luenberger D., Yinyu Y. (2008) *Linear and Nonlinear Programming*. Springer Science + Business Media, LLC.

Minniti A., Turino F. (2013) Multi-product Firms and Business Cycle Dynamics. *European Economic Review*, 57, pp. 75–97.

Nicodano G., Regis L. (2019) A trade-off Theory of Ownership and Capital Structure. *Journal of Financial Economics*, Elsevier, 131, 3, pp. 715–735.

Samuelson P.A. (1979) Paul Douglas' Measurement of Production Functions and Marginal Productivities. *Journal of Political Economy*, 87, 5, Part 1 (October), pp. 923–939.

Solow R.M. (1957) Technological Change and the Aggregate Production Function. *Review of Economics and Statistics*, 39, 3, pp. 312–320.

Pwc. (2018) *A Look at Current Financial Reporting Issues*. Retrieved June 1, 2020. Available at: <https://www.pwc.com/gx/en/audit-services/ifrs/publications/ifrs-9/ifrs-9-impairment-intercompany-loans-in-depth.pdf>

Intercompany Loans (2019) Retrieved February 28, 2021. Available at: <https://www.ey.com/Publication/vwLUAssets/ey-intercompany-financing-transactions/%24File/ey-intercompany-financing-transactions.pdf>

Intercompany Financing Transactions (2019) Retrieved March 1, 2021. Available at: <https://www.ey.com/Publication/vwLUAssets/ey-intercompany-financing-transactions/%24File/ey-intercompany-financing-transactions.pdf>

Deloitte (2018) *Financial Transactions Transfer Pricing. Revisiting Global Intra-Group Funding*. Retrieved March 1, 2021. Available at: <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/tax/deloitte-uk-financial-transactions.pdf>

- United Nations (2016) *Transfer Pricing Methods*. Retrieved March 1, 2021. Available at: [https://assets.kpmg/content/dam/kpmg/ua/pdf/2016/12/UN_Manual_TransferPricing%20\(6\).pdf](https://assets.kpmg/content/dam/kpmg/ua/pdf/2016/12/UN_Manual_TransferPricing%20(6).pdf)
- Courtnage M.C. (2015) *Important Considerations in the Pricing of Intercompany Loans and Financial Guarantees*. Retrieved March 1, 2021. Available at: http://www.willamette.com/insights_journal/15/winter_2015_3.pdf
- Kapoor V., Assef S., Clair B., Lugashi Y. (2020) *COVID-19 Transfer Pricing Implications for Intercompany Loans*. Retrieved March 1, 2021. Available at: <https://assets.kpmg/content/dam/kpmg/us/pdf/2020/05/tnf-tp-us-may5-2020.pdf>
- Kumar S. (2020) *Effects Of COVID-19 On Intercompany Loans*. Retrieved March 2, 2021. Available at: <https://www.valentiam.com/newsandinsights/intercompany-loans-interest-rate>
- McClure H. (2021) *Pricing of Intercompany Loans or Debt Versus Equity?* Retrieved March 2, 2021. Available at: <https://news.bloomberglaw.com/financial-accounting/pricing-of-intercompany-loans-or-debt-versus-equity>
- McNeil, Chris R., Moore W.T. (2005) Dismantling Internal Capital Markets via Spinoff: Effects on Capital Allocation Efficiency and Firm Valuation. *Journal of Corporate Finance*, Elsevier, 11, 1–2, pp. 253–275, March.
- Reichert T., Gray I., Callard N., Hutchinson E. (2012) *How to Accurately Price and Design Intercompany Debt*. Economics Partners, LLC. White Paper Series. Retrieved March 1, 2021. Available at: <https://www.econpartners.com/wp-content/uploads/2017/03/Accurately-Pricing-Intercompany.pdf>
- Stein J.C. (1997) Internal Capital Markets and the Competition for Corporate Resources. *Journal of Finance, American Finance Association*, 52, 1, pp. 111–133, March.
- Acharya V.V., Gottschalg O.F., Hahn M., Kehoe C. (2013) Corporate Governance and Value Creation: Evidence from Private Equity. *Review of Financial Studies, Society for Financial Studies*, 26, 2, pp. 368–402.
- Netherlands vs. Lender BV, June 2019, Tax Court, Case no 17/871* (2019) Retrieved March 3, 2021. Available at: <https://tpguidelines.com/netherlands-vs-lender-bv-june-2019-tax-court-case-no-17-871>
- S&P Global Market Intelligence (2016) *A Recipe for Intercompany Financing – Transfer Pricing Facts, Circumstances, and a Dose of Common Sense*. Retrieved March 4, 2021. Available at: <https://www.spglobal.com/marketintelligence/en/news-insights/blog/a-recipe-for-intercompany-financing-transfer-pricing-facts-circumstances-and-a-dose-of-common-sense>
- Chand V. (2016) *Transfer Pricing Aspects of Intra-Group Loans in Light of the Base Erosion and Profit Shifting Action Plan*. Retrieved March 5, 2021. Available at: https://serval.unil.ch/resource/serval:BIB_80AAB14955DA.P001/REF
- Netherlands vs. X B. V., July 2020, Supreme Court (Preliminary ruling by the Advocate General), Case no ECLI:NL:PHR:2020:672* (2020) Retrieved March 5, 2021. Available at: <https://tpguidelines.com/netherlands-vs-x-b-v-july-2020-supreme-court-preliminary-ruling-by-the-advocate-general-case-no-eclinlphr2020672>
- Bakker A., Levey M.M. (2012) *Transfer Pricing and Intra-Group Financing. International Bureau of Fiscal Documentation*. Retrieved March 7, 2021. Available at: https://www.ibfd.org/sites/ibfd.org/files/content/pdf/14_034_transfer_pricing_intra_group_financing_final_web.pdf
- Committee of Experts on International Cooperation in Tax Matters (2019) *Co-coordinators Report on Work of the Subcommittee on Transfer Pricing*. Retrieved March 7, 2021. Available at: https://www.un.org/esa/ffd/wp-content/uploads/2019/09/19STM_CRP15_Transfer-Pricing.pdf
- OECD (2020) *Transfer Pricing Guidance on Financial Transactions*. Retrieved March 8, 2021. Available at: <https://www.oecd.org/tax/beps/transfer-pricing-guidance-on-financial-transactions-inclusive-framework-on-beps-actions-4-8-10.pdf>
- Russo C.C., Blankenstein H., Lawson T. (2020) *Evaluating Inter-Company Loans in Switzerland*. Retrieved March 4, 2021. Available at: <https://www.internationaltaxreview.com/article/b110fq4djb2m4t/evaluating-inter-company-loans-in-switzerland>