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# A RISK-INCOME METHOD OF ROYALTY RATE CALCULATION IN CASE OF FRANCHISING

# МЕТОД АНАЛИЗЕ РИЗИКА НА ПРИХОД ЗА ОБРАЧУН РОЈАЛТИ СТОПЕ У СЛУЧАЈУ ФРАНШИЗИНГА

**Summary:** *The present article contains a description of a new method of royalty calculation based on analysis of risk decrease generated by franchisor's intellectual assets transmitted to franchisees.*

**Key words:** *royalty, royalty rate, franchising*
**JEL classification:** *C51, L11, L24*

**Резиме:** *Овај рад садржи опис новог метода обрачуна надокнаде на основу анализе смањења ризика који настаје при преносу интелектуалне имовине са франшизера на франшизанта.*

**Кључне ријечи:** *ројалти, ројалти стопа, франшизинг.*
**ЈЕЛ класификација:** *C51, L11, L24*

## 1. INTRODUCTION

Royalties represent regular payments for the right to use intellectual property (like trade marks, patents, know-how, books, music etc) for commercial purposes. There are different approaches to calculation of royalties, but the most common method is based on the following formula:

$$R = \frac{r}{100\%} V \ , \tag{1}$$

R – amount of a single payment of royalties;
$r$ – royalty rate, %;
$V$ – sales turnover (based on intellectual property).

It can be easily seen from the formula (1) that the key component of this algorithm of calculation is royalty rate. Therefore it is necessary to have a clear procedure of calculation of the value of royalty rate in order to use this formula.

Such a procedure exists for trade mark and patent licensing where the following method applies:

$$r = \frac{kP_{\text{sup}}}{P_{us}} \cdot 100\% = \frac{k(P_{lic} - P_{us})}{P_{us}} \cdot 100\% \, , \tag{2}$$

$k$ – licensor's share in the licensee's extra-income;
$P_{\text{sup}}$ – licensee's extra-income (earned thanks to intellectual assets provided by the licensor);

$P_{us}$ – licensee's regular income (the income that this company would have earned if it had sold the same quantity of similar non-licensed goods);

$P_{lic}$ – licensee's total income.

However, the formula (2) includes an indefinite component that has to be calculated so that this formula could be used. This component is obviously $k$. Unfortunately, there is no generally accepted algorithm of calculation of $k$, and in real business practice its value is defined according to traditions that exist in the industry. Its average value, according to experts, is around 25%.

The same model is usually applied to franchising. Different aspects of this method in case of franchising are discussed in the excellent monograph (Blaire, Lafontaine 2005) where detailed description of corresponding microeconomic models is given. Problems related to application of this model to business practice are described in (Stazhkova 2007).

However, in my opinion, this extrapolation of the formula (2) on franchising is not correct as the nature of relations between franchisor and franchisee is different from relations that exist between licensor and licensee. The goal of the present article is to analyze this difference and to propose a method of calculation of royalty rate that take this difference into account.

## 2. A MATHEMATICAL MODEL OF ROYALTY RATE IN CASE OF FRANCHISING

In my opinion, the main difference between licensing and franchising is as follows:

- in case of licensing the licensee simply includes licensed products into its product range, therefore, the main profit of licensee is indeed additional income generated by intellectual assets provided by the licensor;
- in case of franchising the franchisee sets up a new business which will act under the franchisor's brand and according to the franchisor's commercial technologies. It means that franchisee gets not only a possibility to earn extra-income – he/she gets a possibility to run his/her own business. Interestingly enough, this aspect of franchising is seen in sources as its key feature, but, to the best of my knowledge, there had been no attempts at its mathematical formalization.

So the benefits that franchisor offers to franchisee include the following:

- The possibility to earn an extra-income in comparison to other companies that sell similar products or services (this possibility is common for both licensing and franchising);
- Lesser business risks thanks to well-known trade mark and effective commercial technologies that attract customers and give a guarantee against failure. This advantage of franchising is crucial for potential franchisees as it protects their investments and provides them and their families (as franchisees are in most cases small businesses) with a guaranteed source of income. This aspect is absent in case of licensing where licensee is the only responsible for all risks related to sales of licensed products on a new market and licensor's trade mark (and products) are usually not well known to licensee's target audience.

It means that franchisee should compensate franchisor for both benefits – the franchisor should receive not only a share in the extra-income produced by the intellectual property he/she rented to franchisee, but also a fee for the risk reduction.

In order to simplify the modeling process I will presume that the only payment franchisee makes to franchisor is royalty. Initial fee is excluded from the model (however, as I will try to demonstrate below, the model can be easily modified to include initial fee).

As the model takes into account risks it would be logical to analyze not the total income of a franchisee $P_{fr}$, but his/her probabilistic income $V_{fr}$:

$$V_{fr} = W_{fr} P_{fr},$$

$W_{fr}$ – *ex ante* probability to earn total income $P_{fr}$.

Total income represents an average amount of money a franchisee is expected to receive thanks to the sales of licensed products and services in the prescribed area until the franchising agreement expires.

By analogy probabilistic income of an independent entrepreneur $V_{ind}$ can be introduced:

$$V_{ind} = W_{ind} P_{ind},$$

$P_{ind}$ – average total income of an independent entrepreneur (generated by sales of the same quantity of similar products or services under his/her own trade mark in the same area during the average period of franchising agreement);

$W_{ind}$ – probability to earn the income $P_{ind}$ by an independent entrepreneur. The key factor this probability depends on is the survival rate of new companies in this area.

Obviously:

$$W_{fr} P_{fr} = (W_{ind} + W_{\sup})(P_{ind} + P_{\sup}), \tag{3}$$

$W_{\sup}$ – additional probability to earn income thanks to intellectual assets provided by the franchisor. This additional probability reflects the fact that franchisee's business is less risky than independent businesses thanks to well-known brand and effective commercial technologies;

$P_{\sup}$ – additional income earned by franchisee thanks to franchisor's intellectual assets (in comparison to income that an independent entrepreneur can earn).

I receive, by expanding the formula (3), the following:

$$W_{fr} P_{fr} = W_{ind} P_{ind} + W_{\sup} P_{ind} + W_{ind} P_{\sup} + W_{\sup} P_{\sup}. \tag{4}$$

It means that the following formula should be used for royalty rate calculation:

$$r = \frac{AW_{ind} P_{ind} + BW_{\sup} P_{ind} + CW_{ind} P_{\sup} + DW_{\sup} P_{\sup}}{W_{ind} P_{ind} + W_{\sup} P_{ind} + W_{ind} P_{\sup} + W_{\sup} P_{\sup}} \cdot 100\%, \tag{5}$$

$A$, $B$, $C$, $D$ – franchisor's share in the respective component of franchisee's income (these shares are not equal).

Therefore, contrarily to licensee's income (that includes only two components), franchisee's income has four components. So in order to develop a correct method of royalty calculation for practical purposes one must find out how $A$, $B$, $C$, $D$ can be calculated. Obviously,

$$0 \le A \le 1,\ 0 \le B \le 1,\ 0 \le C \le 1,\ 0 \le D \le 1.$$

A closer look at the formula (4) shows that its right part includes "heterogeneous" and "homogenous" components. Homogenous components are those for which lower indexes of both factors are the same (it means that the respective component of franchisee's income is produced by one participant of the franchising agreement – either by the franchisee himself or by the franchisor). Similarly, heterogeneous components are those for which lower indexes of both factors are different (and, therefore, these components are generated by common efforts of franchisee and franchisors).

In my opinion, it is necessary to design a procedure of income sharing for heterogeneous components only, while homogenous components should go to the corresponding participant of the franchising agreement). So $A = 0$ (as this component of franchisee's income would have been earned even if the franchisee had not received intellectual property from the franchisor), while $D = 1$ (as this component is completely generated by the intellectual assets provided by the franchisor).

It is necessary to highlight that in addition to the formula (2) there is an alternative method of royalty calculation, according to which franchisee should pay to franchisor a lump sum that does not depend on his/her sales. I think that this lump sump $R_{fix}$ may be calculated as

$$R_{fix} = W_{\sup} P_{\sup}^{av}, \tag{6}$$

$P_{\sup}^{av}$ - average extra-income of a franchise of this franchising chain (obviously, $A = B = C = 0$, $D = 1$). This amount is the economically justified lower level of royalty. If the royalty amount is below this lump-sum (mathematically, if $D < 1$), then the franchisor not only does not perceive a part of franchisee's extra-income, but also he/she loses his/her income.

So the main task that has to be solved in order for the formula (5) to be useful for practical purposes is the procedure of calculation of $B$ and $C$. In my opinion, the most simple and logical formula from both economical and mathematical points of view would be the following:

$$B = \frac{W_{\sup}}{W_{\sup} + W_{ind}},\ C = \frac{P_{\sup}}{P_{\sup} + P_{ind}}. \tag{7}$$

It means that franchisor's share in heterogeneous components of franchisee's income are proportional to his/her contribution to these components. The same is true for franchisee as his/her share in heterogeneous components is also equal to his/her contribution – respectively,

$$1 - B = \frac{W_{ind}}{W_{\sup} + W_{ind}},\ 1 - C = \frac{P_{ind}}{P_{\sup} + P_{ind}}.$$

This model of heterogeneous income sharing should be considered basic.

However, franchisor may wish to choose other methods for calculation of $B$ and $C$ in order to adapt his/her royalty policy to specific conditions of the market or to maximize his/her income. Of course, all these methods cannot be discussed at length in one paper, so I will try to describe most evident cases below.

It is important to remember that contrarily to licensing, where the total license cost (including royalties) is generally set up on a basis of negotiations between licensor and licensee, in case of franchising royalty rate is normally set up by franchisor and franchisee may not negotiate its modification. So it is up to franchisor to choose any method of income sharing.

It is supposed in all further schemes that $A = 0$ and $D = 1$.

1. $B = C = 1$. It means that franchisor, in order to maximize his/her income, takes back all heterogeneous components of franchisee's income. This model may be used if franchisor's brand is well known on the market and the market itself is traditional for this brand (the same region where the franchisor himself operates, for example, and where customers know and like franchisor's trade mark, products and services). Of course, this model is uncomfortable for franchisee, as he/she looses all possible additional income, however, it is still acceptable for him/her – as franchising nevertheless guarantees that franchisee will survive with probability $W_{fr}$ (not $W_{ind}$), franchisee, while loosing income, still minimizes his/her risks.

From the mathematical point of view, this approach is justified when

$$W_{\sup} >> W_{ind}\,,\; P_{\sup} >> P_{ind}\,.$$

In other cases it is simply a confiscation of franchisee's income.

Interestingly enough, this approach to distribution of heterogeneous components of franchisee's income shows the difference between franchising in licensing. Licensee is interested in maximization of income and will not agree if licensor decides to take back all additional income produced by his intellectual assets that licensee uses. Contrarily to this, franchisee will accept this removal of all additional income as he/she is mostly interested in risk reduction which franchising ensures;

2. The following formula is used to calculate $B$ and $C$:

3. $$B = C = \max\left\{\frac{W_{\sup}}{W_{\sup} + W_{ind}};\quad \frac{P_{\sup}}{P_{\sup} + P_{ind}}\right\}. \qquad (8)$$

This model corresponds to maximization of franchisor's income at the expense of franchisee.

Franchisor's additional income (compared to formula (7)) $R_{add}$ is equal to

$$R_{add} = \left[\max\left\{\frac{W_{\sup}}{W_{\sup} + W_{ind}};\quad \frac{P_{\sup}}{P_{\sup} + P_{ind}}\right\} - \frac{W_{\sup}}{W_{\sup} + W_{ind}}\right] W_{\sup} P_{ind} +$$
$$+ \left[\max\left\{\frac{W_{\sup}}{W_{\sup} + W_{ind}};\quad \frac{P_{\sup}}{P_{\sup} + P_{ind}}\right\} - \frac{P_{\sup}}{P_{\sup} + P_{ind}}\right] W_{ind} P_{\sup}\,. \qquad (9)$$

It is obvious that one of the components of the formula (9) is equal to 0.

Probably this method may be used as an intermediary stage between the basic method (formula (7)) and the first method described above ($B = C = 1$) – when franchisor, while wishing to maximize his/her income, still does not want to seize all heterogeneous components. So it may be recommended for stable markets where franchisor's trade mark and products are well known;

4. $B$ and $C$ are calculated as follows:

5. $$B = C = \min\left\{\frac{W_{\text{sup}}}{W_{\text{sup}} + W_{ind}};\quad \frac{P_{\text{sup}}}{P_{\text{sup}} + P_{ind}}\right\}. \qquad (10)$$

Contrarily to the model (8), this approach helps franchisee to increase his/her income at the expense of franchisor. It may be used to motivate franchisee on hard markets where much efforts are required from franchisee in order to start and develop his/her business under franchisor's trade mark (for example, on new markets, where franchisor's commercial technologies are still effective, but the chain's brand and products are not well known).

Income $R_l$ that franchisor looses in this case (in comparison with the basic method (7)) can be calculated according to the following formula:

$$R_l = \left[\frac{W_{\text{sup}}}{W_{\text{sup}} + W_{ind}} - \min\left\{\frac{W_{\text{sup}}}{W_{\text{sup}} + W_{ind}};\quad \frac{P_{\text{sup}}}{P_{\text{sup}} + P_{ind}}\right\}\right] W_{\text{sup}} P_{ind} +$$
$$+\left[\frac{P_{\text{sup}}}{P_{\text{sup}} + P_{ind}} - \min\left\{\frac{W_{\text{sup}}}{W_{\text{sup}} + W_{ind}};\quad \frac{P_{\text{sup}}}{P_{\text{sup}} + P_{ind}}\right\}\right] W_{ind} P_{\text{sup}};$$

6. $B$ and $C$ are calculated as follows: one of them is equal to 1, while other is calculated according to the formula (7). In this case franchisor completely takes one of the heterogeneous components of income, while the second heterogeneous component is distributed among franchisor and franchisee proportionally to their contributions. From mathematical and economical points of views it means that.

7. $$B = 1,\ W_{\text{sup}} >> W_{ind},\ C = \frac{P_{\text{sup}}}{P_{\text{sup}} + P_{ind}},\quad \text{or}$$

$$C = 1,\ P_{\text{sup}} >> P_{ind},\ B = \frac{W_{\text{sup}}}{W_{\text{sup}} + W_{ind}};$$

8. One of the factors is equal to 1, while the second is equal to 0. In other words, one of the heterogeneous components goes to franchisors, the second – to franchisee. This approach is very simple and useful for practical purposes. However, it should be used very carefully, as its economical basis is ambiguous: if the situation

9. $C = 1,\ P_{\sup} >> P_{ind}$,

$B = 0,\ W_{ind} >> W_{\sup}$,

is normal and acceptable for franchisee, the situation:

$$B = 1,\ W_{\sup} >> W_{ind},$$
$$C = 0,\ P_{ind} >> P_{\sup},$$

is completely unacceptable and clearly shows that franchisee should avoid joining this network as franchisor is not able to decrease franchisee's risks;

10. Both factors *B* and *C* are equal to 0. There can be two variants of this methods:

- First variant corresponds to the situation when

$$B = 0,\ W_{ind} >> W_{\sup},$$
$$C = 0,\ P_{ind} >> P_{\sup}.$$

Obviously, this variant has no economical meaning and such a franchise represents no interest for potential franchisees;

- Second variant is managerial and corresponds to the situation when franchisor decides to reduce his/her income in order to motivate potential franchisees. For practical purposes it is better transform this model into lump-sum royalties (see formula (6) above) instead of regular income-based royalties (see formula (1)).

One should not think that the proposed model is purely theoretical – on markets with long franchising traditions reasonably detailed statistical data are available that can be used to calculate the parameters necessary for the formula (4) – incomes $W_{\sup}$ and $W_{ind}$ and *ex ante* probabilities $P_{\sup}$ and $P_{ind}$. Probably this information should be collected by franchisors themselves (as they have the full information about their franchisees' turnover and about competitors' activity) and presented to franchisees in order to show them the advantages of joining the franchising network. However, one should avoid average values of these parameters as it may lead to wrong decisions. Values of these parameters should be different for different areas where the franchising chain operates or plans to start operating.

If franchisor wishes to receive not only royalties but also an initial fee then the value of royalty rate can be found from the following equation:

$$\frac{r}{100\%} R_{tot} = IF + \frac{r_{IF}}{100\%} R_{tot},$$

$r$ – royalty rate (calculated according to the formula (5));

$R_{tot}$ – total income that franchisee will receive during the period of franchising agreement;

$IF$ – initial fee (its value is set up by franchisor);

$r_{IF}$ – royalty rate (in case when initial fee is also used).

## 3. CONCLUSION

In my opinion, the most important result of the present paper is that the principal difference between licensing and franchising – possibility to start one's own business and avoid risks – was taken into account for calculation of royalty rate. It clearly shows that royalty in case of franchising includes not only income sharing but also compensation for risk reduction.

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