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HOW DOES A POTENTIAL FRANCHISEE TAKE DECISION ABOUT FRANCHISE PURCHASE: A MATHEMATICAL MODEL

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Abstract

The article introduces the notion of probabilistic net present value which is used as a criterion for choice between a franchise purchase or creation of independent company.

Key words: franchise purchase; mathematical model; net present value

INTRODUCTION

Surprisingly enough, franchising has never been an object of scholarly approach: most publications dedicated to this business model are simple practical guides explaining how to become franchisor (or franchisee), but not dealing with scientific aspects of this problem – and let us forget about mathematical modeling. It may be understood if we remember that franchising is not closely related with finance (like leasing or factoring whose mathematical models abound), and given that most mathematical (and scholarly in general) attention is paid to financial aspects of business, it is clear that franchising will not attract specialists. This situation is completely unacceptable as franchising is becoming more and more popular, and in the present article I will try to fill in this gap and to build up a mathematical model of the process of decision making of a potential franchisee about franchise purchase.

A MATHEMATICAL MODEL

Let us introduce the following constraints:

- The potential franchisee acts rationally and has the full access to all statistical information available. It is very important to precise what we mean when we say "rationally". It is generally supposed that a business(wo)man acts rationally when s/he is interested in maximizing his/her income (or, more precisely, the net present value – *NPV*), and it is generally correct. However, this approach does not pay attention to a very important fact: the potential franchisee wants to set up a company that will belong to small and medium business sector and that will be a source of revenue for him/her and for his/her family. It means that the business(wo)man is interested not only in high income but also in financial stability – that is, that the company will exist long enough to provide resources for the family. So the rational choice will be in this case the optimal correspondence income/stability;

- The business(wo)man has already chosen the sector of business s/he wants to start his/her company within. S/he also knows who will be his/her franchisor if s/he decides to become franchisee. So, the only choice s/he has to make is to choose between becoming franchisee and starting a business under his/her own brand; the sector of activity and the potential franchisor have already been chosen. Of course, we may try to build up a general model where the business(wo)man has to choose between X sectors and Y franchisors – but this model will be more intricate and more complicated without being more correct, so we will study a simpler case that can easily be generalized if necessary;

- m is the average period of existence of an independent small or medium company (comparable with an average franchisee of the brand) in this sector, k – the average period of contract offered by the franchisor the business(wo)man is interested in. Let us suppose that $k=m$;

- The franchisor sold his first franchise T years ago, $T>m$ and $T>k$;

- During the period T there were no drastic changes on the market and no such changes are forecasted in the future (drastic changes are, for example, new technologies that will replace the franchisor's technologies etc);

- Let us suppose that all companies start working on 01.01 and stop working (if it ever happens) on 31.12. This will substantially simplify the process of model building;

M_0 is the number of independent small and medium companies founded during a year belonging to the period T (according to our hypothesis, all M_0 companies started working on the 01st January) within this sector of activity. Let us assign to this year the number y so that $y + m \le T$,

$y + k \le T$.

Let us suppose that y=1.

Let us also suppose that during the same year K_0 franchisees of this franchisor opened.

M_i and K_i are respectively the number of independent companies and the number of franchisees that did not stop working on the 31st December of the i-th year, i=1, 2,…, m (or k, as we agreed that k=m). PK_i is the probability that a franchisee will not stop his activity on the 31st December of the i-th year, PM_i – the same probability for an independent company. Obviously, these probabilities can be calculated according to the following formulas:

$$PK_i = \frac{K_i}{K_0};\ PM_i = \frac{M_i}{M_0}$$

It is important to highlight that these probabilities are complex and say nothing about reasons sue to which companies and franchisees turned bankrupt: but the analysis of these reasons is not the subject of the present paper.

BA_i, is the yearly revenue of a typical independent company (belonging to M_0), BF_i is the yearly revenue of a typical franchisee (these values are calculated as arithmetical average of all companies of this type – generally they are very similar in size and turnover and this procedure is acceptable). EA_i and EF_i are respectively the yearly expenses of an independent company and of a franchisee. Let us precise that the franchisee's expenses include an additional point – royalties. Initial investments into a franchisee and an independent company are IF and IA respectively. All these indicators are sufficient to calculate the NPV of a franchisee ($NPVF$) and of an independent company ($NPVA$). Till now we remained within the traditional model of decision making and the next step should be a comparison of $NPVF$ and $NPVA$. But this approach does not take into account the stability of the revenue – which is very important for family companies.

In order to solve this problem we will introduce a new notion – probabilistic net present value (NPV_p) – that is defined as the result of multiplication of the NPV and the probability to get this NPV. For a typical independent company and a typical franchisee the probabilistic net present value can be calculated according to the following formulas:

$$NPVF_p = \sum_{i=1}^{k} \frac{PK_i(BF_i - EF_i - R_i)}{(1+d)^i}, \qquad (1)$$

$NPVF_p$ – probabilistic net present value of a typical franchisee;

d – discount rate.

$$NPVA_p = \sum_{i=1}^{m} \frac{PM_i(BA_i - EA_i)}{(1+d)^i}, \qquad (2)$$

$NPAF_p$ – probabilistic net present value of a typical independent company.

Decision to purchase the franchise should be takes on the basis of comparison of probabilistic NPVs:

- If $NPVF_p>NPAF_p$, then the business(wo)man should acquire the franchise;
- If $NPVF_p<NPAF_p$, then the business(wo)man should set up an independent company, franchise purchase is not justified;
- If $NPVF_p=NPAF_p$, then the business(wo)man should purchase the franchise if for all PK_i and PM_i $PK_i>PM_i$. In all other cases the decision should be taken according to additional information (business(wo)man personal preferences, recommendations of experts etc).

Using the indicator of probabilistic net present value for the decision about franchise purchase has a very deep economic sense. The traditional *NPV* just permits us to evaluate our income generated by our participation in a financial project, but says us nothing about the possibility to receive this income; the probability of existence of a company in the *i*-th year shows us how much time the company can exist – but provides us with no information about its income during this time. Combination of these two characteristics in the probabilistic net present value helps us to compare projects with very different values of income and risk – as, for example, in the case of comparison of a franchisee and an independent company. Indeed, the franchisee;s income may be lower (sometimes – substantially lower) than the income of the owner of an independent company – not only because the franchisee has to pay royalties, but also due to the fact the franchisor normally insists on full financial transparency, while an independent company may use "black" accounting and tax schemes, pay less attention to service standards etc. But franchisees exists much longer than independent companies.

It is also interesting to study the case $k<m$. Let us suppose that $m=Zk$, $Z>1$, Z – an integer number (it will simplify formulas, but will not make the model less general). The hypothesis $y+m \le T$ is still true. We should therefore take into account the probability of prolongation of the franchising contact (let us suppose that the contact is each time prorogated for k years).

We will use the following formula to calculate this probability:

$$PPK = \frac{K_{k+1}}{K_k}$$

Then the full probabilistic net present income of the franchisee will be calculated according to the following formula:

$$NPVF_p = \sum_{j=1}^{Z} PPK_j \left[\sum_{i=1}^{k} \frac{PK_i(BF_i - EF_i - R_i)}{(1+d)^i} \right]_j , \qquad (3)$$

Then we will use the same comparison scheme as indicated above.

At last, let us suppose that the franchise contract is each time prorogated for a certain period k_j. Then the formula (3) may be written down as:

$$NPVF_p = \sum_{j=1}^{Z} PPK_j \left[\sum_{i=1}^{k_j} \frac{PK_i(BF_i - EF_i - R_i)}{(1+d)^i} \right]_j , \qquad (4)$$

It is easy to show that the formula (4) includes the case of Z not being an integer number.

The proposed method helps to take well founded decision in the situation of choice between becoming a franchisee and developing a company under its own brand on markets with free access to information and good traditions of franchising.

CONCLUSION

Using the indicator of probabilistic net present value for the decision about franchise purchase has a very deep economic sense. The traditional *NPV* just permits us to evaluate our income generated by our participation in a financial project, but says us nothing about the possibility to receive this income; the probability of existence of a company in the *i*-th year shows us how much time the company can exist – but provides us with no information about its income during this time. Combination of these two characteristics in the probabilistic net present value helps us to compare projects with very different values of income and risk – as, for example, in the case of comparison of a franchisee and an independent company.

The proposed method helps to take well founded decision in the situation of choice between becoming a franchisee and developing a company under its own brand on markets with free access to information and good traditions of franchising.

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KAKO POTENCIJALNI FRANŠIZANT ODLUČUJE O KUPOVINI FRANŠIZE: MATEMATIČKI MODEL

Sažetak

U ovom se radu daje model koji se temelji na konceptu probabilističke neto sadašnje vrijednosti a koji se koristi kao jedan od kriterija za izbor između kupovine franšize i stvaranja vlastite nezavisne tvrtke.

Ključne riječi: kupovina franšize, matematički model, neto sadašnja vrijednost

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