

# Licensor View of Royalty Rates

*Author suggests formula for determining royalty rates in a license bargain where information is scarce*

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In more and more areas of technology, license offering occurs in a market situation which Chamberlin would call of "monopolistic competition."<sup>1</sup>



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For almost every product a plurality of technologies is offered and for each technology a monopolist benefits by either a "legal monopoly" (patent) or a "monopoly of fact" (know-how) or both. No monopolist, however, is in a position to operate as such in the market, since his technology may be replaced by technologies suited to obtain the same product or substitute products.

What is the "right" royalty in a situation of "monopolistic competition"? The answer appears to be immediate: it is the royalty which is so low as to avoid losing the licensee and so high as to ensure for the licensor the maximum possible profit. But how can it be determined? Here, the answer is much less simple. In a situation of "monopolistic competition" or of "free market competition," nobody is able to fix the "right price" of his goods on the basis of a simple "cost analysis" and no offer can be successful if not supported by a "market analysis" giving full details about products offered, prices quoted and behavior adopted by the competitors.

But, in the technology market, an analysis is not possible except in very special cases, since each competitor jealously protects the secrecy of his technology (and hence of the characteristics of his goods) and of the terms of his offer. The information which the bidder has on the characteristics and consequently on the advantages and drawbacks of the technologies offered by competitors (specific consumption, investment and maintenance costs, stream factor of the plants, etc.) and on the conditions under which the competitors are prepared to grant the license (consideration, guarantees, liabilities, etc.) are not accessible or are accessible through sources which are not always reliable (promotional information, technical literature and, as far as the license conditions are concerned, often artful indiscretions of the potential licensee).

Furthermore, if we consider that the selection of the technology is determined also by nonquantifiable factors

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(reliability of the know-how, reputation of the owner, personal feelings of the people entrusted with the selection of the technology and, last but not least, the professional ability of the bidder's licensing personnel), we find that it is impossible in practice to obtain the "right royalty" by calculating it as a variable suited to put the offer into a break even (or advantage) position over the most competitive offers of competitors.

Such criterion would be equivalent to the conceptually unobjectionable one of proportioning the royalty to a share of the "incremental profit" afforded by the technology over the profit achievable by the most profitable among competing technologies.

A criterion which would not be based on the sharing of the "incremental profit" but on the sharing of the "profit" or of the "operative earnings" involves the drawback that it does not take into account the possible advantages or disadvantages of the offered technology over the competing technologies and does not utilize any reference to the market situation and to the behavior of the competitors. It is namely a criterion which has its natural field of application for technologies offered in monopoly conditions or for technologies having high advantages over the competing technologies.

This criterion, however, offers the advantage of using only data and information which are accessible to the bidder and, in view of the difficulties involved by the criterion based on "incremental profit sharing," represents in most cases the only practicable one.

The validity of the criterion proposed here consists in that, in economic choices there is always a leveling off of the behaviors and a uniformity of situations which enable work on average values, on "great numbers" which reduce most different situations to quantities oscillating within rather narrow limits.

This enables us, for example, to forecast that if an entrepreneur has decided to invest in a given sector of goods, it is because he calculated that the Return on Investment (ROI) of his investment oscillates within a certain range. This also enables us to forecast within which limits the ratio I/S (investment/yearly sales) oscillates for a given sector of goods.

An interesting criterion based on profit sharing and on the utilization of data relating to profit has been proposed by H.A. Janiszewski<sup>2</sup> The criterion proposed here is based on the sharing of "operative earnings" (that is the profit before depreciation and financial charges) and aims at reducing the problem of the determination of the royalty to one of knowing the range of oscillation of the product I/S ROI and to one of selecting the "right" share of the licensor in the operative earnings.

The reasoning in terms of share in operative earnings and not of share in turnover involves the doubtless advantage of offering a true picture of the profitability of the initiative and of the compatibility with said

profitability of the envisaged royalty. The proposed criterion is based on the use of a chart that relates ROI and running royalties. The relation is obtained by the method illustrated hereafter.

Term	Symbol and equation	Units
1. Total sales	S	Dollars per annum
2. Running royalty on Sales	R.R.	%
3. Licensor's income	$\frac{R.R.}{100} S$	Dollars per annum
4. Total operative earnings before royalties	O.E.	Dollars per annum
5. Investment cost	I	Dollars
6. Return on invest	$ROI = \frac{O.E. - \frac{R.R.}{100} S}{I} \cdot 100$	%
7. Licensor's share of operative earnings	$Z = \frac{R.R.S.}{O.E.}$	%

Through the equations 6 and 7, the Running Royalty may be expressed as follows:

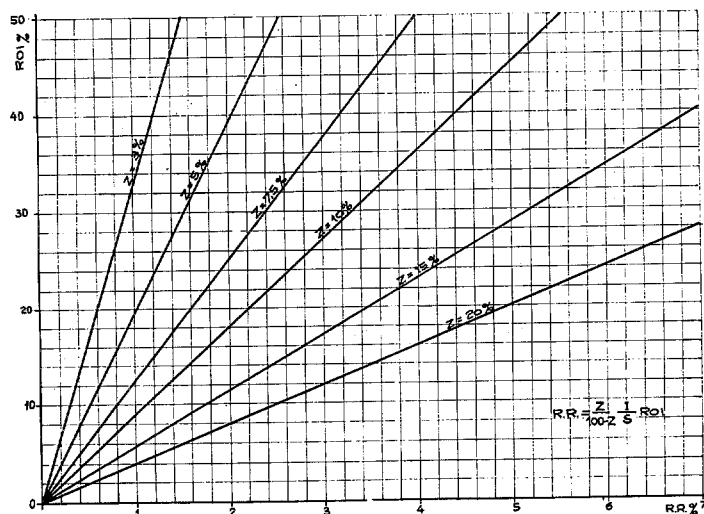
232 8.)  $R.R. = \frac{Z}{100-Z} \frac{I}{S} ROI$

The problem of knowing the limits of oscillation of ROI and of the ratio I/S does not exist in general for the licensee: who planned an investment for the construction of a plant and negotiates a license agreement for acquiring the technology to be used in that plant already knows the values of the ROI and I/S which he may expect from the investment. The problem often is not the same for him who owns a technology and offers to license it.

For the licensor operating in such a situation, it may be important to know the limits of oscillation of the two figures. The chart of Figure 1 was obtained from the equation 8, for a value of I/S = 1. Value of I/S around 1 prevail in vast sectors of industrial activity, e.g. for the petrochemical and plastics industry. The knowledge of this parameter should, however, not be a problem for the owner of the relevant technology.

The recent revolution in interest rates, the shortage of cash for industrial investments, the increased risk of investments, and the necessity of a rigorous selection of investments have considerably altered in recent years the limits of oscillation of the ROI: nowadays ROI within an oscillation range of 20-25 % are accepted only for conservative investments in long established competitive industries, while for higher-risk investments (chemicals, petrochemicals, plastics, etc.), ROI in the range of 25-35 % are required. Higher values of ROI are recorded for high-technology products or for production with a low investment rate. To conclude, in sectors where transfers of technology are most active, a range of 20-35 % may be considered.

The chart of Figure 1 indicates the royalty in function of ROI for values of Z of up to 20 %; sharings in excess of 15 %, however, are not frequent. Within the limits



Running Royalty -- ROI Chart for  $\frac{I}{S} = 1$   
FIGURE 1

defined hereafter the value of Z may be determined, taking into account:

1. The technological level of the process (nature of solved technical problems, degree of novelty and originality, technical and economical advantages over prior art, etc.).
2. The patent situation.
3. The development stage and reliability of the know-how (pilot scale, commercial scale).
4. The degree of competitiveness over competing technologies.
5. The licensing policy, practised by competitors (aggressive, selective, closed, etc.).
6. The factor of investment risk.
7. The planned capacity as compared with the standard capacity in the specific technological field (low capacities justify higher rates).

For values of ROI in the range of 25-35 % and values of Z between 3 and 15 %, the running royalty rate is comprised between 0.6 and 6 %. Higher royalty rates may be expected for high-technology products and therefore for productions having in general higher ROI values.

The criterion proposed here of course does not make it possible to determine unequivocally the "right royalty" (the parameters determining this value are so many and so complex that it is hardly thinkable for anyone to correlate and to represent them in a chart). However, if properly utilized, it may enable the bidder to check at least whether his proposal is reasonable and the licensee to obtain an immediate quantification of the incidence which the royalty may have on the operative earnings of the planned initiative. The bidder who proposes a 2 % royalty may, for instance, establish that (since an investment with a ROI of less than 20 % would hardly be accepted by the investor) his share in the operative earnings will not exceed 10 %. More accurate information on the ROI will enable him to determine the value of Z with a better approximation.

NOTES  
1 Chamberlin - "Theory of Monopolistic Competition" - Cambridge, 1936.  
2 "License Evaluation of Payments" by H.A. Janiszewski - Les Nouvelles - Vol. XIII No. 4 - December 1978 at page 248