Determining Royalty Rates in Health Care

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'Real World' experiences provide insights into setting royalty rates in pharmaceutical industry

I shall cover a number of methods by which royalties, sometimes in combination with other types of licensing fees, have been established. I will also discuss the principles underlying the process of calculating the royalties concerned.

Because the subject is very wide-ranging I have made a number of assumptions. The first of these is that none of you have ready any textbooks. If you have, you may be asking me some interesting questions that I am not prepared for. I certainly have not read too much on this subject, even though I was tempted to do so prior to preparing this presentation. I feel, however, that reading too much from other experts might make me nervous about making this presentation. As a result, everything that you will hear from me today is confined to examples drawn from my personal experience having worked for Faulding in a capacity that invariably involved licensing — primarily with overseas-based partners.

Although I have confined my examples to those derived from my own personal experience it is still impossible to cover every possible situation. Therefore, I have made a number of assumptions concerning the type of transactions I intend to analyze.

These are shown in Table 1.

First, we are talking about a pure technology transfer. The licensee assumes the financial burden and the risk inherent in building the plant to manufacture the end product. There are, of course, a number of other licensing procedures possible, and royalties can accompany the sale of product, which is supplied by the licensor without technology transfer. However, in this presentation, I confine my examples to technology transfer.

DETERMINATION OF ROYALTY RATES

- Technology transfer — licensee assumes the financial burden and risk inherent in building plant to manufacture.
- Arm's-length transactions.
- No external constraints.
- Sales are measurable and auditable.
- Licensor intends to share in licensee's income.

OR
- Licensor intends to recover investment in intellectual property/technology.

Table 1

Arm's-length transactions are assumed. I think these are natural, and rational setting of royalty is difficult to imagine without this assumption being fulfilled.

I assume that there are no external constraints. Such constraints might be imposed by a country's policy that royalties cannot exceed a certain percentage that the royalty-bearing period cannot extend beyond a certain number of years and the like. Rational setting of royalties in those circumstances cannot be made and are not covered by my examples. Such circumstances usually result in other types of arrangement made to circumvent the constraints imposed by the country in which the licensee is situated. They give rise to very clever maneuvers in which Taxation Departments take an academic interest.

The assumption is also made that sales, which are usually the basis of royalties are measurable and auditable. This assumption is made for obvious reasons.

Finally, I assume that in the licensing arrangement the licensor intends to share in the licensee's income, or the licensor intends to recover the investment in intellectual property or its technology.

Perhaps the distinction between the two intents gets a little blurred at times. It is still best to assume that the distinction between these two goals of the licensor exists for two reasons.

First, the perspective of the licensor and the licensee in this matter may differ (the licensee may not wish the licensor to share in its income). Second, the licensor's contribution to the final product, which the licensee sells, may not in fact truly justify sharing in the licensee's income over time and the licensor feels better justified in looking at its license income stream as a means of recovering its investment.

The latter distinction, as I have said, does blur at times. I find it useful to distinguish between the two to give structure to this presentation, lest it become merely a series of rambling thoughts.

SHARING IN THE LICENSEE'S INCOME

Without dwelling too much on the appropriate definition of what should constitute a royalty we can broadly accept that it is meant to be a return for a contribution. This contribution may be intellectual property inherent in technology, as is normally the case in the health care industry, or it may be for services rendered, or simply funding by a silent partner.

In the early days of commercial transactions, usually characterized by a single venture, a sharing of income was very easily achieved. The Crown financed the building of Sir

Francis Drake's ships and those that returned with a bounty offered it to the Crown. Sir Francis Drake and his surviving crew received a share of the plunder.

With the progress of time and commerce, multiple transactions, however, rapidly replaced single ventures. The sharing of profit became more complicated because profit was becoming more difficult to measure and the share, or royalty, was to apply over multiple transactions over long periods of time. So if you will join me in a rapid progress through history we come to Godfather Part II, where the Black Hand jumps on the little wagon of the hero and requests a share of the income, saying, "I only want to wet my beak." By this request he indicates that he intends the business to continue to flourish as a going concern and clearly enunciates the principle of sharing of profit.

With the progress of time and with the increasing sophistication of business, the measurement of income became more and more complicated. The bottom line became a less and less reliable basis for royalties. It is not surprising, therefore, that sales, which are clearly identifiable and easily auditable, are now recognized as the basis on which royalties are calculated.

**Simple Arrangement**

As a result the normal, simple licensing arrangement is depicted in Figure 1 and shown as royalty at a certain, fixed percentage of sales. Given, however, that the cost of entry usually results in a negative income for the first phase of the product cycle and given that promotional costs tend to remain fixed, or maybe even decreasing over time, the graph shows that royalty as a percentage of income, as distinct from sales, tends to decrease with increasing sales.

We therefore have to ask the question, "Is the conventional tying of royalty to sales consistent with the intent of royalty being a share of licensee's income? Sir Francis Drake having made such a good start, have we in the health care industry lost our way over time? The answer, of course, depends on how royalties are determined, which after all is the purpose of this paper.

For a reasonably important licensing proposal, it pays the licensor to make at least an estimate of what the licensee partner's income is likely to be. Such estimates are not accurate, but their articulation to the licensor's satisfaction are still important lest the licensor asks for too high a royalty, in which case the licensee may not progress further discussion, or too low a royalty with obvious consequences.

Naturally, the licensee is in a much better position to make such estimates, but the two partners, coming to an agreeable solution, stand a better chance if the licensor attempts this exercise. In the example shown in Table 2, a simple 10-year agreement has been selected for simplicity's sake, showing sales, estimated profits and calculating net present values of both profits and sales. In this example, the 21% discount rate used is made up of a normal long-term cost of money, in this instance 8%, normal commercial risk loading of 7%, and an additional 6% risk associated with the particular nature of the market and technology under consideration.

**Snapshot**

A simple way to determine royalty would be to take a snapshot in a maturity year of the product's life cycle, such as in Year 4, where 30% of the estimated profit of the licensee in that year is assumed to be attributable to the licensor as his share and this expressed as the percentage of the sales comes to 8%.

Such a calculation, however, does not take into account the development of profit over time and, if a serious attempt is made to participate in the licensee's share to a certain extent (in this instance 30%), then it is best to work on present
ESTIMATING PROFIT

<table>
<thead>
<tr>
<th>Year</th>
<th>$ Mill Sales</th>
<th>$ Mill Profit</th>
<th>21% Discount</th>
<th>Profit NPV</th>
<th>Sales NPV</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>(7)</td>
<td>0.8264</td>
<td>(5.785)</td>
<td>8.264</td>
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<tr>
<td>2</td>
<td>30</td>
<td>(2)</td>
<td>0.6830</td>
<td>(1.366)</td>
<td>20.49</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>14</td>
<td>0.5645</td>
<td>7.903</td>
<td>28.225</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td>16</td>
<td>0.4665</td>
<td>7.464</td>
<td>27.99</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>18</td>
<td>0.3853</td>
<td>6.939</td>
<td>23.13</td>
</tr>
<tr>
<td>6</td>
<td>50</td>
<td>18</td>
<td>0.3186</td>
<td>5.098</td>
<td>15.93</td>
</tr>
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<td>7</td>
<td>50</td>
<td>16</td>
<td>0.2633</td>
<td>4.213</td>
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<tr>
<td>8</td>
<td>50</td>
<td>16</td>
<td>0.2176</td>
<td>3.482</td>
<td>10.88</td>
</tr>
<tr>
<td>9</td>
<td>50</td>
<td>16</td>
<td>0.1789</td>
<td>2.862</td>
<td>8.99</td>
</tr>
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<td>10</td>
<td>50</td>
<td>15</td>
<td>0.1486</td>
<td>2.229</td>
<td>7.43</td>
</tr>
</tbody>
</table>

Maturity Year (4)

\[
\frac{0.3 \times 16 \times 100}{60} = 8.0\%
\]

Present Values For Forecast Period

\[
\frac{0.3 \times 33 \times 100}{164} = 6.0\%
\]

Table 2

To my mind a more appropriate calculation is to take the present value of the net profit, of which 30% accrues to the licensor, and expresses this as a percentage of the present value of the sales stream, resulting now in a more appropriate 6% royalty.

Calculation based on present values, while it does not ensure that a 30% share of the licensee's profit accrues to the licensor year by year, it does at least ensure that it accrues to it for the totality of the project. I stress again that it is more difficult for the licensor to make this calculation than for the licensee, but, for the reason stated before, it pays the licensor to do it. It is not surprising that, according to a recent survey, a far higher percentage of respondents who have undertaken an estimate like this were licensors, rather than licensees.

A further advantage of working on net present values is that it is relatively easy to work out a series of choices between lump-sum license fees and appropriate levels of royalties. Using the same figures that were shown in the previous example, let us assume again that the aim of the licensor is to recover 30% of the licensee's net income. This is shown to be $9.9 million. Suppose the licensor chooses and the licensee agrees that $2 million of this be taken up front, then the balance to be recovered works out at 4.8% of the sales. (Table 3) Once the attempt has been made to bring the forecast figures down to net present values, such combinations of royalties with lump-sum payments are very easy to make. I might add that a word of explanation for the choice of 30% should be given here.

NPV of income = $ mill 33
NPV of sales = $ mill 164

Pure Royalty

\[
0.3 \times 33 \times 100 = 6\%
\]

Upfront License Fee + Royalty

Aim to recover 0.3 X 33 = 9.9
Choose to take up front 2.0
Balance to be recovered 7.9

% Royalty = 7.9 X 100 = 4.8% 164

Resulting In

$2 million up front + 4.8% royalty

Table 3

Again, this is an example only. However, the choice is not purely arbitrary. I stress again that the assumption used was that technology will be transferred and the licensee is burdened with the building of the plant, commissioning it and facing the depreciation charges plus the risks inherent in that activity itself.

In most circumstances I believe that, unless technology is extremely important or unless it is of relatively minor importance, the range of shares of profit that the licensor can expect to get falls somewhere between one quarter and one third of the licensee's profit stream. I have simply used the mid point of the range and struck 30%.

In the previous examples used I have mentioned that

1. A forecast needs to be made. For a rational agreement to be struck, the licensor and the licensee must have a reasonable degree of confidence in those forecasts.

2. While working on net present values can ensure that a share of the licensee's net profit will be received by the licensor over the total term of the project, such an arrangement does not guarantee that this will occur year by year, should that be desirable.

There are, however, some circumstances where neither the licensor nor the licensee have faith in the forecasts. The technology may be completely novel. The market opportunity may not be clearly defined. In such a case, if royalties are meant to provide a stream of income to the licensor, which represents a given share of the licensee's profit, a more appropriate way might be to make an estimate of the likely profit, year by year, recognizing the fixed nature of some of the promotional costs over time and simply accepting that the level of profit may, in fact, vary considerably over time. One way to deal with that situation is to have an increasing scale of royalties tied to sales, shown in Table 4.

SCALE TIED TO SALES

<table>
<thead>
<tr>
<th>Total Sales in the Preceding Year</th>
<th>Royalty % of Total Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 999</td>
<td>1.0</td>
</tr>
<tr>
<td>1000 - 1999</td>
<td>2.1</td>
</tr>
<tr>
<td>2000 - 2999</td>
<td>8.5</td>
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<td>3000 - 3999</td>
<td>11.7</td>
</tr>
<tr>
<td>4000 - 4999</td>
<td>13.6</td>
</tr>
<tr>
<td>5000 - 5999</td>
<td>14.9</td>
</tr>
<tr>
<td>6000 - 6999</td>
<td>15.8</td>
</tr>
<tr>
<td>7000 - 7999</td>
<td>16.5</td>
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<tr>
<td>8000 - 8999</td>
<td>17.0</td>
</tr>
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<td>9000 - 9999</td>
<td>17.5</td>
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<tr>
<td>10000 - 11999</td>
<td>18.1</td>
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<tr>
<td>12000 - 13999</td>
<td>18.6</td>
</tr>
<tr>
<td>14000 - 15999</td>
<td>18.9</td>
</tr>
<tr>
<td>16000 - 17999</td>
<td>19.2</td>
</tr>
<tr>
<td>18000 - 19999</td>
<td>19.4</td>
</tr>
<tr>
<td>20000 - 24999</td>
<td>19.8</td>
</tr>
<tr>
<td>25000-and over</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Table 4

The example shown, in fact, re-
resents a frequency distribution of sales and an appropriate percentage of profit tied to each period of the frequency distribution. It may look quite complicated, but once agreed upon, it would not be difficult to administer. After all, the percent royalty is always tied to history rather than to a forecast. By calculating moving annual totals quarter by quarter the figures shown can easily be converted to quarterly royalties applicable to the previous quarter’s sales. Such a method, to my mind, is appropriate where neither partner has much faith in the forecast or their estimates vary greatly.

Therefore, unlike the normal situation in which royalty is fixed as a percentage of sales over time, an arrangement that I have outlined in Figure 2 results in an increasing percentage of royalty as a function of sales and, over the product’s life cycle the royalty would move quarter to quarter based on the previous quarter’s sales.

I stress again that it would be reasonable to administer such a scheme, but it may frighten off one of the parties simply because it is a scheme that they are not used to and, after negotiation, the proposal shown in the top graph may finish up in a licensing agreement depicted by the graph below as a compromise.

ROYALTIES ARE INTENDED TO PROVIDE A RETURN ON THE INVESTMENT BY LICENSOR

There are a number of situations in which it is more rational to regard royalties (and combinations of royalties and licensing fees) as meant to provide a return on investment by the licensor to develop the technology that it intends to license. Some of these situations are depicted in Table 5.

A technology license may form only a minor part of the final product’s worth. This is likely to be the situation where a very strong brand exists in the market and the particular technology license could never be commercialized quite as well if not coupled with the particular brand. Other goodwill associated with a whole range of products might also be appropriate as an example. In other cases, the technology license may be coupled with technology owned by the licensee to begin with. This is often the case in collaborative research ventures. A typical example is Faulding, whose technology is based on oral drug delivery. It is coupled with a new chemical entity, which is the intellectual property of the licensee partner. Again, in such circumstances, the licensee and the licensor might silently agree that an investment on the licensor’s contribution is a more appropriate way of rewarding than sharing in the licensee’s income.

Sometimes, of course, it may be the licensor that wishes to express a strong preference for recovering its investment over as short a period as possible. In this instance, the licensor will opt for that type of calculation, which, by its very nature, goes against the more normal intent of sharing in the income produced by the licensed product. This is quite typical of start-up companies or companies making an entry into a new market with significantly large investment in new technology.

Regardless of any of the scenarios outlined above, the intention to recover the licensor’s investment usually results in an outright sale of the technology or a combination of significant lump-sum payments plus a royalty or typically in a percentage royalty that is on a sliding scale and results in something like Figure 3.

Given again that in most circumstances, certainly in the pharmaceutical industry, with a signifi-
cant cost of entry and thereafter fixed or reducing costs of promotional costs sales, a sliding-scale royalty of the type shown will result in significantly decreasing royalty expressed as a percentage of income.

In real life, however, one finds, not unexpectedly, that at times the perception of the intent of the licensing arrangement differs between the licensor and the licensee. The licensee may wish to share in the income produced through the sales of the licensed technology, the licensor does not wish to share that income and also perceives that the licensor will probably accept a return on an investment rather than miss out on the deal. In such a case the different perceptions will produce a model of sharing income or return on investment depending on which view prevails. In other words, who has stronger muscle in the negotiating process.

**Return on Investment**

It is perhaps worth spending a few minutes on the concept of return on investment. There is no hard-and-fast rule of calculating what that return should be. Should it be a percentage of funds invested? How can it be rationalized?

All I can say is that, at Faulding, if we take the approach that our licensing arrangement focuses on a return of investment, we normally try to recover the cost of our investment in the development of the technology and then, wishing to recover the opportunity cost in addition of the actual monies invested in the activity itself.

The opportunity cost in turn is a difficult concept. We define it as the cost of the alternative foregone; in other words, the cost of having the project in our pools of activity crowding out other potentially worthwhile and profitable projects. We normally calculate these in accordance with a risk scale.

The first year of any project carries the highest risk, and in that year we want a higher return on our investment than the next year which might carry a lower rate of risk and so forth. The amount of return on the investment, therefore, will vary year by year or period by period during the development of the technology given that risk gradually decreases as the project is reaching its successful conclusion.

The second aspect of return-on-investment-type of arrangements is that often the type of reduction in royalty shown in Figure 4 is associated with the argument that it represents a depreciation in the value of the technology. I do not believe that a depreciation in the technology is a rational argument for striking an arrangement such as the sliding scale royalties shown. If attention is paid to the calculation of the royalty rate and, as in most cases, the appropriate way to do it is by working on present values, then the risks represented by the discount factors used really should take care of the depreciation in the value of the technology. Such an event is better handled by making specific provisions in the contract for a royalty reduction of a defined and highly competitive or substitutable technology should emerge during the period of time. When a sliding scale arrangement in combination with provisions for royalty reductions are coupled together in the name of providing for a depreciation of technology, then in my personal, albeit early, experience this usually represents some inequity in the relative weights of the negotiating parties.

**OTHER ISSUES**

I have not yet spoken about the term of the licensing agreements as they relate to royalties. These clearly vary, but in the pharmaceutical industry more often than not they are tied to the life of the patent governing the exclusivity of the
technology conferred by that patent. A sunset clause may or may not be present in such agreements, i.e. the royalty may or may not cease to be paid at the end of the term. It is very difficult to generalize on such subjects. They depend on many things, such as the importance of the technology, the importance of the role of the patent associated with it and, of course, the relative muscles of the negotiating parties. Companies' cultures have a lot to do with it.

There is one company with which Faulding has had association where the termination clause played a more significant role than any other part of the negotiations because the company concerned once had its fingers burned. It offered a modest royalty on a product developed by one of its employees. There was no termination clause in their contract. This happened two generations ago, and although they have tried to break that contract, they were not able to do so.

Another issue is technologies associated with products of a limited life cycle. In Figure 4 we see a typical example of technology associated with what we normally refer to as a generic product. Typically, such a product will be launched and, having a low cost of entry, have a very significant profit margin. However, as soon as a competitive product appears and, being in the generic market, it is only a matter of months sometimes before that happens, the price level and the relevant gross margin will drop severely. As further competitors appear the margin will drop to a very low level.

It is very difficult to forecast when new competitive entries occur and when the resultant price drops will result. It is not unusual, and perfectly rational, therefore, to tie the percentage of royalty in such arrangements not to sales but to the price levels. In this case, time proceeds from the right side of the horizontal axis so price level and royalty rates will drop as time goes by.

Finally, sales to the ultimate consumer may not be an appropriate basis for royalty payment in certain instances. Again, I speak of personal experience. We found that our licensing partner intended to sell to a number of sublicensees, some of whom were not commercial organizations and some of whose transactions could not have been regarded as having been concluded at arm's-length. Rather than engage in a terribly complicated system of accounting for such exotic transactions, we found it appropriate to opt not for a royalty as percent of sales but a kind of "gate toll," which is, in fact, royalty per unit of output by the licensee, as shown in Figure 5. Of course, the actual royalty could be fixed on any level of units or increase/decrease with units depending on the appropriateness of the intent behind the licensing arrangement.

Conclusion

During this brief presentation I have gone to some pains to present some examples of how royalty rates could be established and the intention behind them. Even though all of the examples were drawn from my previous personal experience, by no means could I cover all of the possible situations. I want to stress, however, that the amount of homework involved in some of the calculations presented does not necessarily have to be carried out project-by-project. As time goes along, new proposals and new licensing arrangements can be related to recent experience of something comparable and the same rules established before they can be used as rules-of-thumb. I wish to stress that, while rules-of-thumb are all very well, and one cannot live without them, in normal day-to-day business the best rules-of-thumb and the ones in which we can have most faith are the ones developed and tested by ourselves.