**Royalty rates, sub licensing considerations and joint ventures.**

In a previous article ("The Economic Sense of Royalty Rates", Economic Working Paper Archive, ewp-fin/970903, Sept. 1997) I have discussed the economic aspects of determining a fair royalty rate for a licensed therapeutic technology. The analysis shown there, using a simple financial model which takes into consideration the unique characteristics of the drug development process, demonstrated the main determinants of economically based royalty rates.

This article tackles two additional features of technology transfer compensations: sub licensing considerations and equity holding. Sub licensing considerations are received when the licensee grants a sub license to another company to produce and sell the licensed product. A portion of such considerations is due to the university that initially licensed the technology. Equity holding is sometimes offered when the licensee is a start-up company, usually backed by a Venture Capital fund. In such deals the university usually receives a share in the new company's equity and in return agrees to reduce its royalties. The determination of fair values to the university's portion in the sub licensing considerations or to its share of the company's equity is not straightforward. Obviously both compensations are substitutes for royalties and thus should be linked to the royalty rate due from sales, however the exact relation between royalty rate, sub licensing consideration and equity holding is usually controversial.

Splitting sub licensing considerations and sharing equity are similar in the sense that both compensations represent forms of profit sharing. By sub licensing its rights in the technology the company foregoes its opportunity to profit from manufacturing and selling the licensed products, and shifts this opportunity to another company in return to royalties, lump sum and milestones payments etc. Such considerations are in principle net income to the sub licensor, since they do not involve manufacturing and marketing costs (however these considerations are subject to income tax). Thus the percentage allocated to the university from such consideration should reflect its claim on part of the company's profit.

By definition a share in the company's equity is also a claim on part of the company's profit.

In the former article I have shown that a fair royalty rate, based on economic grounds, is that percentage of sales, payable to the university, that will ensure the company its required rate of return. By sub licensing the technology or by giving the university a share in its equity, the company saves the royalties payable to the university, but in return it is required to pay a portion of its net income. Thus, a fair portion of the company's net income, which completely substitutes the royalty obligation, is such portion that ensure the company the same rate of return.

By utilizing the financial model presented in my previous article (see full details in EconWPA, ewp-fin/970903), and assuming that the total cost of the therapeutic technology development is $100M during 10 years, and the required rate of return is 25%, I have calculated the portion of net income, payable to the university, that will ensure the company 25% return on its investment. These calculations are presented in tables 1:

**Table 1:**

| Sales volume (Million $) | Royalty rate (*) | University's share of net income |
|---|---|---|
| 600 | 2% | 10% |
| 700 | 4% | 20% |
| 800 | 6% | 30% |

(*) Royalty rate are taken from my previous article (ewp-fin/970903).

With expected sales volume of $600M, the fair royalty rate will be 2%, and the fair division of net income will be 10% to the university and 90% to the company. If, however, the expected sales volume rises to $800M the university's entitlement will rise to 30% of net income.

Obviously the company will be indifferent between the two alternatives: royalties or profit sharing since its required return on investment is not

altered. However, the university too will not be affected by which alternative is chosen if its appropriate discount rate is the same as the company's rate of return. In order to demonstrate this point I have calculated the net present value (NPV) of royalties versus profit sharing using 25% discount rate (The NPVs of both royalties and profit sharing are calculated on after tax basis) These calculations are presented in Table 2:

**Table 2:**

| Sales volume (Million $) | Royalty rate | NPV of royalties (Million $) | NPV of profit sharing (Million $) |
|---|---|---|---|
| 600 | 2% | 2.5 | 2.5 |
| 700 | 4% | 6 | 6 |
| 800 | 6% | 10 | 10 |

In the case of splitting sub licensing considerations it is straightforward to use the profit sharing percentages, presented in Table 1, as the appropriate ratio for such splitting. The connection between royalties and a fair ratio for splitting sub licensing considerations can be summarized by a simple rule:

1. *Determine the royalty rate payable from sales.*
2. *Multiply this rate by 5 to receive the splitting ratio of sub licensing considerations.*

This *"5 factor rule"* is quite robust and is not dependent either on expected sales volume or on the rate of return/discount rate.

The case of equity sharing, however, is not straightforward. The main difference is that when the university receives a share in the company's equity its compensation is not necessarily related to the success of its licensed technology. It is not uncommon for biotechnology companies to shift their focus from their initial technology to a different technology, if the initial one proves disappointing. Thus, its possible for the university to hold shares in a company without contributing to its technology and products. In addition royalties and sub licensing considerations are

payable only during the term of the license, usually while the patents are still in force. Equity holding, on the contrary, is not limited by the term of the license. For these reasons equity holding represents a premium to the university compared with simple profit sharing. Such premium should be taken into account when calculating a fair equity sharing.

In order to tackle this problem I will refer again to the basic feature of the joint venture: the university is giving away its entitlement to royalties and receives instead a share in the company's equity. Thus, the university should evaluate its share in the company's equity according the present value of its foregone royalties . These present values, using discount rate of 25%, are already presented in Table 2. Comparing the royalties present value with the initial investment in the new company gives a basis to a fair equity sharing.

The magnitude of the present value figures in Table 2 should be given a moment of consideration. A therapeutic technology, with a potential to generate $800M sales volume during 10 years with 6% royalty rate payable to the university, has a present value of merely $10M after tax. This alleged discrepancy is unique to biotechnology and pharmaceutical technologies due to the long time horizon and the high risk which characterize their development.

Assuming that a joint venture is established, based on the licensed technology, and such JV raises an initial investment of $5M (which is sufficient to fund the pre clinical stage during the first two years), I have calculated the university's share in the JV. These calculations are presented in Table 3:

**Table 3:**

| Sales volume (Million $) | Royalty rate foregone | NPV of royalties (Million $) | Investment (Million $) | University's share in the JV |
|---|---|---|---|---|
| 600 | 2% | 2.5 | 5 | 33% |
| 700 | 4% | 6 | 5 | 55% |

| | | | | |
|---|---|---|---|---|
| 800 | 6% | 10 | 5 | 67% |

The dominant role of expected sales volume is apparent in the case of JV too. If the expected sales volume is $600M the university should be satisfied with 33% of the JV's shares, however if the expected sales volume rises to $800M the university should have 66% of such shares.

The more deals, which involve equity holding, consist of a combination of royalties and share holding in the new company. I have analyzed an example of such deal, using the figures in Table 3, and assuming that the expected sales volume is $700M. This analysis is presented in Table 4:

**Table 4:**

| NPV of royalties (Million $) | University's shares value (Million $) | Royalty rate payable to the university | University's share in the JV's equity |
|---|---|---|---|
| 0 | 6 | 0% | 55% |
| 1.3 | 4.7 | 1% | 43% |
| 3 | 3 | 2% | 27% |
| 4.7 | 1.3 | 3% | 12% |
| 6 | 0 | 4% | 0% |

If the university receives royalty rate of 1%, its share in the JV should be reduced from 55% to 43%. However, increasing the royalty rate to 3% should reduce the university share holding to 12%.

These simple calculations demonstrate the complexity of technology transfer deals. I have discussed only the main features of such deals, but in reality we find a plethora of variations including among others: non dilution clauses, warrants, milestone and lump sum payments etc. However, I believe that such complexity should not deter technology transfer practitioners from sound evaluation of their technology in order to achieve a fair deal for their institution.