Licensing Out as a Form of Myopic Management.*

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Abstract

This article presents a model that relates a company’s financial situation with its licensing strategy. In particular, we posit that managers, under the pressure to achieve analysts’ forecasts, might license out their intellectual property to increase short-term earnings. However, since licensing out always implies a trade-off, we argue that companies that sign such contracts to increase short-term benefits and, in turn, to attain analysts’ forecast (\textit{revenue effect}) will find out a reduced market share in the long run (\textit{dissipation effect}). Moreover, we propose that licensing contracts signed by myopic firms present a distortion in their payment scheme. In particular, we expect the fixed fee to be greater than optimal and the royalties to be lower than optimal, with respect to those firms that are not myopic.

\textbf{Keywords:} Technology Licensing, Intellectual Property, Real Activities, Myopic Management, Markets for Technology, Fixed Fee, Royalties.

\textbf{JEL Codes:} O32, O33

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1 Introduction

In the past two decades, licensing agreements have grown at an unprecedented rate, making their management a core competence issue, especially for high-tech companies (Kamiyama et al. 2006; Zuniga et al. 2009). The main reason for these expanded activities is the revenue that licensing generates. In particular, in a survey conducted by Zuniga et al. (2009), 51% of European companies and 53.6% of Japanese companies noted that their main motivation for licensing out their technology in the previous three years was revenue. However, licensing not only has positive effects and usually it entails a trade-off. In particular, through licensing companies might increase their revenues (net of transaction costs), but they also might lose market share or suffer from lower price margins because of the additional competition in the product market created by the new licensees (Arora et al. 2003; Fosfuri, 2006). Therefore, licensing decisions demand caution to balance short-term earnings against possible long-term harms because firms that underestimate the negative effects could put their competitive advantages at risk.

At the same time, financial analysts exert increasing influences on companies’ strategies, leading to disproportionate consequences for firms that miss forecasts, even by a small amount. For instance, Oracle on December 1997 had seen how its stock price declined by 29% as a consequence of not achieving the analysts’ forecast by 0.04 (even this result was 4% above EPS for the same quarter in last year) (Skinner et al. 2002). Also, Procter & Gamble has seen how its stock price was reduced by 30% when its managers warned that the company would not beat the analysts’ forecast in the first quarter of 2000.¹ In consequence, managers face extra pressure and incentives to manipulate current earnings. In fact, a survey of CFO (Graham et al. 2005) reveals that they attend carefully to meet earnings thresholds and are willing to inflate current earnings to achieve them, mainly using real activities rather than accruals.

Motivated by these two seemingly unrelated trends, this article presents a model that relates a company’s financial situation and its licensing strategy. The model help to determine the long-term consequences for companies that license out in response to the pressure to meet analysts’ forecast. In particular, we state that managers who feel pressured to attain analysts’ forecasts have incentives to inflate current earnings and, thus, they likely engage in myopic management.

By definition, these myopic managers put more emphasis on the short run than in the long run: when making the licensing decisions, a myopic manager is likely to overestimate the revenue effect (short-term) while underestimating the dissipation effect (long-term). This distortion leads managers to license out more technology than the optimal, offer inappropriate technology, or impose payment conditions different from the optimal, such as a high fixed fee in the short term and low royalties in the long run, all of which may have negative long-run consequences for companies.

The next section presents the theoretical background for licensing, myopic management and develops the propositions. In Section 3 we describe the model and present the main results. We conclude and present some extensions in Section 5.

¹A similar warning before the second quarter of the same year generated an additional decrease in the stock price of 10% and the CFO’s dismissal (Duncan, 2001).
2 Theory Development

In this section we present the theoretical background for licensing, myopic management and develop the propositions.

2.1 Licensing Theory

Modern companies have moved from fully protecting their knowledge to licensing it out (Vishwasrao, 2007; Yanagisawa et al. 2009). Licensing represents a critical route for technology transfer, and companies increasingly seek efficient corporate structures that can facilitate such knowledge transfer (Arora et al. 2013). Yet the most important motivation for licensing out technology is the revenue it generates, that is, the present value of the flow of fixed fee or the royalties that licensees pay to the licensor. Gambardella et al. (2006), Robbins (2009) and Zuniga et al. (2009) confirm that earnings revenue is the main motivation for companies that license-out technology.

However, the importance of licensing revenues actually depends on two features. First, transaction costs could make licensing less profitable. In general, licensing contracts are distinguished by high search costs, incurred as the firm searches for suitable licensees and/or licensors, as well as information asymmetries between parties that lead to incomplete contracts, bargaining difficulties reflecting the risk of sharing information before signing the contract, and a lack of any established mechanism for pricing technologies. Second, the rent profit dissipation effect seemingly could overwhelm licensing revenues and even produce negative long-term consequences for the company licensing out the technology. Through licensing, licensors grant access to secrets about the company’s technology and allow licensees to use it. By internalizing and understanding how the licensed technology works, licensees can invent around the technology, imitate the licensor, and compete directly with him in the product market, which would reduce the licensor’s market share and/or the price/cost margin. The rent profit dissipation effect reflects this reduction in the licensor’s benefits, as a consequence of additional competition in the product market created by the licensee (Arora et al. 2003; Fosfuri, 2006). Therefore, to really generate benefits from licensing, companies should license their technology if the revenue effect (net of transaction costs) is greater than the rent profit dissipation effect.

2.2 Myopic Management Theory

Effective management requires a long-term focus, prioritizing those projects that generate the greatest net present value for the firm (Mizik, 2010). However, the importance that the participants in stock markets market give to current earnings forces managers to adopt strategies seeking immediate pay-offs (Dechow, 1994; Degeorge et al. 1999). Usually managers’ compensation and evaluations are based on the company’s current stock price (Mizik, 2010), which in turn depends on whether the firm accomplishes three earnings benchmarks: zero earnings, prior comparable period’s earnings and analysts’ forecasts (Degeorge et al. 1999). The pressure to meet these thresholds provides managers incentives to manipulate the company’s results to inflate current earnings. The pressure even has changed the distribution of earnings reported: Few firms report losses, and the majority
cite small profits (Dechow et al. 2003). In a survey conducted by Graham et al. (2005), financial executives declared that to avoid negative surprises, they were willing to inflate current earnings and preferred to do so through real activities rather than accruals. The objective of both strategies is to inflate current earnings, but the implications and costs differ greatly. Manipulating discretionary accruals aims to adjust the time at which the firm realizes its earnings, not to modify the quantity or temporal flow of profits. Real activities instead entail engaging in myopic management, which means undertaking activities to inflate current earnings at the expense of long-term firm value. Managers prefer to manipulate earnings through real activities for two main reasons. First, auditors can detect accrual earnings management more easily than real activities manipulation: “While auditors can second-guess the firm’s accounting policies, they cannot readily challenge real economic actions to meet earnings targets that are taken in the ordinary course of business” (Graham et al. 2005, p.17). Second, inflating earnings with accrual manipulation alone is risky, because the amount of potential manipulation after the end of the fiscal period is limited: “If reported income falls below the threshold and all accrual based strategies to meet it are exhausted, managers are left with no options because real activities cannot be adjusted at or after the end of the fiscal reporting period” (Cohen et al. 2010, p.7).

Therefore, to inflate current earnings and meet analysts’ forecast, managers use the ‘safest’ method, but also the one that can lead to more negative consequences in the long run. Prior research on myopic management mainly concentrates on ways to reduce R&D investments and on those factors that determine this practice. In particular, managers reduce their R&D expenditures when they cannot ensure positive earnings for the next year (Baber et al. 1991), when their retirement is impending (Cheng, 2004; Dechow et al. 1991), when institutional ownership is not very high (Bushee, 1998), and when managers must repurchase stock to avoid dilution of their earnings per share (Bens et al. 2002, 2003). But managers also engage in other real activities to increase short-term earnings.

As Aaker (1991) shows, companies reduce their marketing expenditures to inflate their profits temporarily; Cohen et al. (2010) specify that managers reduce their advertising spending. Bartov (1993) and Herrmann et al. (2003) also find managers, who sell fixed assets strategically, benefit from acquisition cost principles. Jackson et al. (2000) mention examples of managers who provide sale price reductions in fourth quarters, whereas Hribar et al. (2006) note firms that use stock repurchases. According to Roychowdhury (2006), managers use price discounts and zero financing strategies, overproduce and reduce their discretionary expenses. Moorman and Spencer (2008) show that managers delay the introduction of innovations; Dechow and Shakespeare, (2009) find that companies record securitizations as collateralized borrowings at the end of the month. Despite such established evidence of myopic management practices, few studies quantify their financial impacts. Pauwels (2004) finds that sales promotions imply negative long-term effects for firm value, and Gunny (2005) links myopic practices to lower returns on assets in the subsequent year. In Mizik and Jacobson’s (2007) study, two years after reducing their marketing expenditures, companies suffered negative earnings, such that by the fifth year, their market value had fallen by 25%. Mizik (2010) similarly notes that companies that have reduced their marketing expenditures suffer greater negative abnormal returns in the future than other companies. Chapman and Steenburgh (2009) also show that companies can use marketing to increase quarterly net income by up to 5% but that this strategy will invoke a
7.5% reduction of the next period quarterly net income. All these evidence emphasizes the trade-off associated with myopic management: The use of real activities increases short-term earnings and helps managers beat analysts’ forecasts but also has negative long-term consequences for firm performance.

2.3 Propositions

In this section, we present our main propositions. As financial analysts become more influential and the consequences of missing forecasts grow more severe for companies (Skinner et al. 2002), managers are willing to engage in inefficient projects that threaten long-term firm performance but also help them to avoid a decrease in stock prices, keep their job leading the firm, and enhance their reputation (Degeorge et al. 1999). Stein (1989) argues that for managers interested in manipulating short-term earnings, the easiest method is to reduce intangible asset expenditures, which are not separately recorded in the balance sheet and do not relate directly to production. These two characteristics also apply for licensing agreements. Usually, contracts are private and confidential, and accounting rules do not require companies to recognize licensing revenues as a separate item in corporate reports. When a company receives licensing revenues, external observers only perceive an increase in earnings; they cannot know if the reported earnings provide a valid proxy of future performance or if the earnings actually are coming at the expense of future profits. Licensing out intellectual property also does not affect short-term production. Even if companies license out their core technology to competitors, it takes time before they can observe any reduction in the firm’s market share. This inability to identify licensing out practices immediately provides managers with an opportunity to inflate current earnings and benefit from it for some time.

Therefore, managers under pressure to beat analysts’ forecasts likely overestimate the revenue effect and fail to make an efficient licensing decision. This distortion leads to licensing out more technology, without accounting for the negative long-term consequences. In other words, at the margin, licensing decisions that would not be undertaken in normal conditions become attractive to managers under pressure, because they discount the future more. We can state this issue in the following hypotheses.

**H1.** Companies are more likely to license out their intellectual property when they failed to achieve analysts’ forecasts in the previous year.

In addition, companies that increased their licensing out agreements in response to pressures to meet analysts’ forecast are more likely to suffer a greater market share reduction than companies that did not. This can be stated in the following additional hypotheses.

**H2.** Companies that have increased the number of licensing out contracts in a pressurized situation experience a stronger reduction in their market share in subsequent years than companies that have increased the number of licensing out contracts but not because of earnings pressure.

Finally, licensing contracts are characterized by a double-sided moral hazard problem. Evidence has shown that, in uncertain contexts, royalties are better than fixed fees because
they reduce this moral hazard problem (Arora, 1996) and because they represent better the price of the technology licensed (Sakakibara, 2010). However, as myopic managers has been previously characterized, they aim to accomplish good current results even at the expense of a negative impact on the long-term earnings, we expect that they prefer to “borrow” as much earnings as they can from the future rather than minimize the moral hazard problem or represent in a better way the patent licensing price. In other words, myopic firms establish the maximum quantity as they can as fixed fee and the minimum as royalties, even at the expense of not reducing the moral hazard problem and of not capturing all the licensing revenues. This can be stated in a third hypotheses.

H3. Licensing contracts by firms engaged in myopic management will present a distortion in the fixed fee (that will be greater than optimal) and in the royalties (that will be lower than optimal) with respect to those that not, ceteris paribus.

These hypotheses are the main core of this paper, as the summary of the literature on licensing and myopic management. In the following section we present a theoretical framework that rationalize this arguments expressed literary in the literature.

3 A Simple Model of Myopic Management

In this section we present a simple model of licensing out as a form of myopic management.

Consider that there exists a firm operating in two periods: short term and long term, denoted by \( t = 0 \) and \( t = 1 \). The firm ownership and management are separated.

The owners of the firm are interested on the intertemporal profits

\[
\pi_0 + \frac{1}{R} \pi_1,
\]

where \( \pi_t \) is the profits at period \( t = 0, 1 \); and \( R \) is the interest rate. These profits should be reduced by the payment of the manager, a fraction \( \phi \in (0, 1) \).

The manager is hired at period \( t = 0 \), where he will be compensated by a fraction \( \phi \) of the profits at the periods she is hired. By certain, she will receive a compensation \( \phi \pi_0 \) at period \( t = 0 \). Yet, she considers that with a probability \( \psi \geq 0 \) she will be the manager of the firm at period \( t = 1 \). Thus her objective function is

\[
\phi \left[ \pi_0 + \psi \frac{1}{R} \pi_1 \right].
\]  

(1)

The profits at period \( t = 0 \) comprises its returns less its costs. Its returns depends on the firm’s market share. We will assume that the firms’s market share is \( \alpha \) so the competitors has \( \beta = 1 - \alpha \). That is, the firm’s returns is \( \alpha D_0 \), where \( D_0 \) is the total market demand at period \( t = 0 \). We will assume that the market demand grows at a rate \( (1 + \delta) \) at period \( t = 01 \).

The market share \( \alpha \) will be thought as the input patents, a knowledge that allows the firm to produce goods that will be demanded in the market. This input is knowledge, so it can be sold to other firms at price \( q \). We will denote by \( \gamma \) the amount of knowledge sold
by the firm at period $t = 0$. If sold, this knowledge becomes publicly known. Upon this knowledge, more patents can be created from an R&D process. This process requires a cost $C$, and the research process is an increasing function $n(C)$, with $n'(C) > 0$. We will suppose that this is a gross knowledge production, so $n(C) ≥ 1$ and $n(0) = 1$. We will assume that the competitors will create knowledge at period $t = 0$ upon the knowledge they have at period $t = 0$, $β$, and that purchased, $γ$, at a rate $(1 + η)$.

Then, the firm’s profit at period $t = 0$ is

$$\pi_0 = \frac{α}{α + β}D_0 - C + qγ,$$

with $α + β = 1$; while the firm’s profit at period $t = 1$ is

$$\pi_1 = \frac{αn(C)}{αn(C) + [β + γ](1 + η)}(1 + δ)D_0γ.$$

### 3.1 The manager’s problem

The manager chooses the R&D investments $C$ and the number of licensing out agreements $γ$ at period $t = 0$ that maximizes her objective function (1), given her probability of being hired at period $t = 1 (ψ)$, the interest rate $(R)$, the income effect $(q)$, the initial market size $(D_0)$, the market demand expansion $(δ)$, the initial patents endowments $(α$ and $β)$, and the competitors patent’s growth $(η)$. The first order conditions becomes

$$n'(C)(β + γ)ψ \frac{α(1 + η)(1 + δ)D_0}{R [αn(C) + (β + δ)(1 + η)]^2} = 1$$

$$n(C)ψ \frac{α(1 + η)(1 + δ)D_0}{R [αn(C) + (β + δ)(1 + η)]^2} = 1. \quad (2)$$

Dividing both we find

$$q(β + γ) = \frac{n(C)}{n'(C)}.$$

Now, substituting by (2) we obtain

$$n(C) \left[qα + \frac{1 + η}{n'(C)}\right]^2 = qα(1 + η)Δ, \quad (4)$$

Where $Δ = \frac{ψ}{R}(1 + δ)D_0$

### 3.1.1 A solution for an R&D function

To find an explicit solution, we will assume that the R&D function takes the following functional form

$$n(C) = e^{σC}$$

with $σ > 0$, which verifies $n'(C) > 0$, $n(C) ≥ 1$ and $n(0) = 1$. 

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In this case the amount of licensing out agreements (3) is
\[ \gamma^* = \frac{1}{\sigma q} - \beta \in [0, \alpha]. \]
Note that \( \sigma \in [1/(q(\alpha - \beta)), 1/((q\beta))]. \)
Also, from (4) we find a second-order equation
\[ [q\alpha \sigma] (e^{\sigma C})^2 + q\alpha (1 + \eta)[\sigma^2 \Delta - 2\sigma]e^{\sigma C} + (1 + \eta)^2 = 0. \] (5)
Taking a positive root, we obtain the optimal R&D investment
\[ C^* = \frac{1}{\sigma} \ln \left[ \frac{1 + \eta}{2q\alpha \sigma} \right] + \ln \left[ (\Delta \sigma - 2) + (\Delta^2 \sigma^2 - 4\sigma \Delta)^{1/2} \right]. \] (6)
Note that \( \Delta \sigma \geq 4 \) in order to have a solution.

4 Main results and Discussion

We can present the optimal manager decisions. First, if the manager considers that she will not be hired at period \( t = 1 \), she will reduce R&D investment and license out all the patents to increase profits at period \( t = 0 \) and then maximize her income.

Proposition 1 Managerial myopia. If \( \psi = 0 \), then \( C^* = 0 \) and \( \gamma^* = \alpha \).

Note that this myopic strategy is rational for the manager, but it is a bad outcome for the owners.

Second, if it is a chance for the manager to be hired at period \( t = 1 \), then the manager will choose a non-zero R&D costs and will not sell all the patents

Proposition 2 Managerial decision if the manager is likely to remain at the firm. If \( \psi > 0 \), then the manager’s optimal decisions are \( C^*(q, \phi, \eta, \delta, \sigma) \) and \( \gamma^*(q, \phi, \eta, \delta, \sigma) \) \leq \( \alpha \) found at (6) and (5).

Is this behavior optimal for the owners? The following result shows that the more linked the manager period \( t = 1 \’s income with the firm’s results are, the more aligned the manager and the owner’s incentives will be.

Lemma 3 \( \partial C^*(\psi)/\partial \psi > 0. \)

We can find additional results. The higher the competitors creation of knowledge or the higher expansion of the market demand, the more R&D costs are required

Lemma 4 \( \partial C^*(\eta)/\partial \eta > 0 \) and \( \partial C^*(\delta)/\partial \delta > 0. \)

Finally, the more efficient is the firm in creating knowledge, the less patents will send

Lemma 5 \( \partial \gamma^*(\sigma)/\partial \sigma > 0. \)
The main objective of this paper was to present a model that explain the relationship between the company financial’s situation and its licensing strategy. In recent years, financial analysts have changed the way managers run their businesses. The consequences of failing to meet analysts’ expectations have been so severe that managers increasingly focus on the short term, with greater creativity, such that they employ real activities to inflate current earnings, even if those activities come at the expense of long-term firm performance (Aaker, 1991; Bartov, 1993; Herrmann et al. 2003; Moorman & Spencer, 2008; Roychowdhury, 2006). As its main contribution, this article proposes that licensing out technology could be one such creative, real activity. On the one hand, licensing out technology increases current benefits for companies by enhancing their licensing revenues (net of transaction costs); on the other hand, these companies could suffer from reduced market share or price margins, because they increase competition in the product market. Finally, we also propose that myopic managers also will try to ”borrow” as much earnings as they can from the future. Therefore, we expect a distortion in the way in which managers establish the payment: higher up front fixed fee and lower royalties.

This article also offers practical insights for companies. First, managers need to learn about the potential long-term consequences of licensing, so that they can analyze their licensing decision carefully and with consideration of the net harms and benefits. Second, managerial compensation plans should encourage managers to undertake projects that maximize discounted future profits, rather than immediate results. Third, a centralized licensing structure might be helpful; companies with an independent licensing department, with incentives that differ from those motivating managers, can prevent managers from simply licensing out technology to benefit from inflated current earnings. Fourth, for society in general, it would be beneficial to mitigate the negative consequences of imposing earnings pressures on managers. This pressure prevents managers from focusing on long-term strategies, such that it puts firms’ survival at risk and thus may limit the level of productivity in society as a whole.

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