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Cooperation or Competition: Grant-Back Clauses in Technology Licensing Contracts

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Abstract

This paper disentangles the tension between cooperation and competition that exists in technology licensing agreements. The grant-back clause is designed to manage the potential loss of competitive position experienced by the licensor due to learning and follow-on invention effects of the licensee. The clause may, however, also lead to lowering of the licensee?s incentives to further invest in the licensed technology thereby inducing a loss in overall benefits of technology licensing. We seek to uncover whether the tension between cooperation and competition leads to a grant-back clause when the licensed technology is core to their business, when they are competing in the same market or when both circumstances are met. We employ a nested logit model in which the decision to include a grant-back is

nested in the decision to be on the demand or supply side of the market for technology. Our results indicate that the tension swings towards competition rather than cooperation only when both circumstances are met.

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COOPERATION OR COMPETITION: GRANT-BACK CLAUSES IN TECHNOLOGY LICENSING CONTRACTS

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ABSTRACT

This paper disentangles the tension between cooperation and competition that exists in technology licensing agreements. The grant-back clause is designed to manage the potential loss of competitive position experienced by the licensor due to learning and follow-on invention effects of the licensee. The clause may, however, also lead to lowering of the licensee's incentives to further invest in the licensed technology thereby inducing a loss in overall benefits of technology licensing. We seek to uncover whether the tension between cooperation and competition leads to a grant-back clause when the licensed technology is core to their business, when they are competing in the same market or when both circumstances are met. We employ a nested logit model in which the decision to include a grant-back is nested in the decision to be on the demand or supply side of the market for technology. Our results indicate that the tension swings towards competition rather than cooperation only when both circumstances are met.

Keywords: Grant-back Clause, Technology licensing, Competition, Cooperation

INTRODUCTION

Technology licensing, as a main vehicle for technology-exchange (Rigby *et al.*, 2002), is increasingly acknowledged to play a fundamental role in promoting the diffusion of technology within and across industries and economies (Anand et al., 2000; Arora et al., 2003; Arora et al., 2001; Athreye et al., 2007; Chesbrough, 2003; Fosfuri, 2006; Grindley et al., 1997; Gu et al., 2004; Kim et al., 2006). As a consequence, licensing parties are progressively seizing the opportunity to open their internal knowledge base and enjoying the benefits produced by licensing, as technology amplifier (see e.g. Anand *et al.*, 2000; Arora *et al.*, 2003; Gu *et al.*, 2004; Kim *et al.*, 2006). Since licensing is increasingly being used as a means to achieve the technological leadership, it becomes increasingly important to understand the contractual specifications of technology license agreements. These may have significant bearings on the benefits the licensee and licensor may expect to receive from their partnership.

The licensor will be willing to cooperate with the licensee to maximize the joint outcome and make sure to receive monetary gains from the full exploitation and development of the licensed technology. The licensor, however, may also find it difficult to commit to providing additional knowledge to the recipient firm for the fear of "ceding competitive advantage and learning opportunities to the licensee" (Pitkethly, 2001:439; Davies, 1977). Similarly, the licensee will be inclined to cooperate with the licensor in order to enjoy informational spillovers. The licensee, however, will try hard to exclusively capture the results of his serendipitous research activity in order to gain a technical lead in the next round of innovation (Pitkethly, 2001; Choi, 2002). In recognition of this interplay of opposing forces, the aim of the present paper is to disentangle the tension between cooperation and competition in technology licensing agreements to understand when it swings towards either one or the other and under which circumstances. We focus our argumentation on the technology-flow back provision (grant-back clause) which is often included in licensing contracts and which plays a decisive role in ex post commitments by shifting incentive between parties. According to a recent survey by Cockburn (2007:10) about 22,9% licensees are not happy about the grant-back provisions. This encourages our investigation in this direction.

A grant-back clause obligates the licensee to grant the rights on future advances or improvements in the licensed technology to the licensor (Shapiro, 1985). The grant-back clause acts as a protective shield which allows the licensor to avoid future competitive pressures exerted by the licensee. The inclusion of the grant-back clause thus happens when

the tension between cooperation and competition (Hamel, 1991) swings towards competitive behavior rather than cooperation behavior. Studies have, among other things, investigated the role of the grant-back clause in mitigating future competition distortions (Choi, 2002) and in antitrust cases (Morris, 2008). Little, however, is known about the contingencies under which a grant-back clause is included in technology licensing agreements. Also, to the best of our knowledge, no works has so far provided any empirical test of the topic.

In the resolution of the tension between cooperation and competition (no grant-back versus grant-back), our paper identifies two elements which may influence this balance towards competitive behavior and hence the inclusion of a grant-back clause: market competition and technological familiarity. In other words, the choice of cooperating rather than competing depends on whether the firms operate in the same industry and how central the technology is to the licensor. We consider the decision to include a grant-back clause in the agreement to be nested in the decision to be on the demand or the supply side of the market for technology thereby employing a nested logit analysis for the study.

In the following we present the theoretical background of the paper, the data and the model used. This is followed by the results of the analysis and finally a discussion and conclusion section.

THEORETICAL BACKGROUND

There is a growing interest from economic scholars about the impact of grant-back clause in patent licensing (Choi, 2002; van Dijk, 2000; Shapiro, 1985). The inclusion of the grant-back clause in a license contract represents one of the battlefield in which the parties fight to achieve a balance of their opposite interests. The effect of this provision may be substantial and may cause reasons for not reaching a mutual acceptable agreement among parties (Cockburn, 2007). It in fact implies long-term considerations affecting firms' innovation strategy which should not be overlooked.

Licensing Motives and Grant-back clause

The licensors motives for licensing-out a technology are twofold. License contracts often include a remuneration structure in which the licensee agrees to a payment scheme in the form of an upfront fee or a royalty rates received by the licensor for providing the licensee rights to the intellectual property (Katz *et al.*, 1985). There are, however, also non-pecuniary gains (strategic) to be captured by the licensor related to innovation pre-emption (Gallini,

1984; Rockett, 1990) or access to future innovation (Van Dijk, 2000), access to complementary knowledge (Arora *et al.*, 2006; Teece *et al.*, 1994) or broadening geographic and product markets (Katz *et al.*, 1985). The decision of the licensor is hence based on the value captured through pecuniary gains and non-pecuniary gains relative to the loss of exclusive rights to the intellectual property in question.

From the licensees perspective, licensing-in a technology is a strategy that provides rapid access to already proven technologies while at the same time potentially reducing financial exposure (Chatterji, 1996). Additionally, technology licensing enable the licensee to *accumulate technological knowledge and strengthen its technological capability from the search and use of external technology* (Tsai *et al.*, 2007). Furthermore, the licensee will be in a favorable position to reap additional intellectual property rights through further invention which in turn provides a technological competitive advantage. However, the licensee may simply sign a license agreement with the aim of gaining market based benefits through sales and profits using the technology in question. From the licensee's perspective, the decision whether to engage in the contract therefore rests on whether the potential pecuniary and non-pecuniary gains are greater than the payments prescribed in the contract that the licensee has to pay the licensor for usage of the intellectual property rights.

While the grant-back clause is designed to allow licensors to avoid the loss of competitive advantages while retaining the benefits from engaging on the markets for technology, it may also have a hampering effect on the overall benefits since the inclusion of a grant back clause in a technology license agreement removes much of the incentives of the licensee to invest in the further development of the technology (Van Dijk, 2000). While licensing may act as a catalyst for follow-on inventions (Bessen, 2005), the grant-back clause may cancelling out much of the mutual learning that otherwise may flourish between the licensee and licensor thereby hindering the non-pecuniary benefits. In a incomplete contracting perspective, the grant-back clause may be seen as a way to capture a larger part of the part of the residual rights of control. Assigning more of the residual rights control to the principal (Licensor) will shifts the incentives for opportunistic and distortionary behavior due to lowering of the ex post returns of the agent which in turn leads to sub-optimal outcomes (Grossman *et al.*, 1986).

Cooperation or Competition?

The inclusion of the grant-back clause in technology licensing happens when the tension between cooperation and competition (Hamel, 1991) swings towards competitive

behavior rather than cooperation behavior. We here consider two contingencies which may influence this tension towards competitive behavior and hence the inclusion of a grant-back clause rather than a cooperation behavior in which the likelihood of an optimal outcome is higher; market competition and technological familiarity.

Market Competition: Firms operating in the same market are more likely to face each other in terms of market competition and hence exert higher competitive pressure on each other. Providing the competitor with technological advances may compromise the competitive position. Indeed, innovative propensities shape the extent to which firms are able to produce persistent abnormal profits through monopoly like positions in product markets (Roberts, 1999). However, licensing out technological advances to direct competitors may undermine the very source of the competitive advantage and hence weaken the performance of the firm. This may indeed call for a grant-back clause since the firm thereby may ensure both pecuniary and non-pecuniary gains which do not compromise the competitive position.

Technology Core Competence: However, licensing out a technology which is central for the firms competitive position also suggest diffusing in-house core competences and thereby compromising own technological advantages. Including a grant-back secures that any advances that are made to that core competence does not undermined the firm's position.

While there may be reasons why licensors would demand a grant-back clause when negotiating with a partner from the same industry or when licensing-out a technology which is a core competence, it may also be argued that none of these matters unless both circumstances applies. Licensing out a technology key to the competitive position may indeed not be considered risky in case the licensee is not in the same industry. The likelihood that it will translate into an increased market competition is very unlikely. Similarly, a licensor would possibly not demand a grant-back clause in case the technology is not core for its competitive position even if the two partners are in the same industry. In this case the licensed technology is less likely to in fact lead to loss of technological position for the licensor. However, when both are met, it is likely that the licensor will use the grant-back clause as a protective shield.

DATA AND VARIABLES

We employ a sample of 133 license agreements to investigate the contingencies of grant-back clauses. These agreements were extracted from the Financial Valuation Group Intellectual Property (FVGIP) database maintained by the Financial Valuation Group. We

coupled this data with the NBER patent database covering all USPTO patent applications up till 2002.This dataset also contains information that characterizes the patents. From the license agreements drawn from the FVGIP database we were able to identify 91 of the licensees and 107 of the licensors in the NBER patent database. This provided a total of 198 firms available for scrutiny.

Dependent variable

We studied all 133 license agreements in detail and created a dummy variable indicating whether the license agreement included a grant-back clause. We attached this dummy to both the licensee and the licensor of each license agreement. Accordingly, we obtained a dependent variable which had four potential outcomes: licensor with no grant-back clause, licensor with grant-back clause, licensee with no grant-back clause, and licensee with grant-back clause.

Explanatory variables

The first explanatory variable measures the degree to which the technology can be considered a core competence of the firm. We use the Ziedonis (2007) focus index which measures the degree to which the firm focuses o a particular IPC code in its patenting activities during the previous 6 years. We measured the focus considering the IPC code of the licensed patent. A high focus index would indicate that it is a technology which the firm has patented in extensively in the prior 6 years while a low index suggest limited patenting in that technological class.

The second explanatory variable indicates the whether the firms are competing in the same market. We search the Thompson Database and the SEC filings to classify each firm into a Standard Industry Classification (SIC) number. We considered the firms to have a competitive overlap in case the licensee and licensor could be classified in the same SIC code.

Control Variables

To explain the inclusion of the grant-back clause, we use two other control variables related to contractual specifications. We use whether the contracts include a sublicensing clause and whether there is a exclusivity clause in the agreements. We expect both to have a negative impact on the likelihood of finding a grant-back clause since sublicensing indicate

that the licensee is allowed to sublicense the technology to other potential partners. In this case, a grant-back clause would have little effect to protect the licensor form a potential future competitive pressure from the licensee. Regarding the exclusivity clause, we propose that agreements which do not allow the licensor to license the technology to other parties are negotiated in cases where the relative bargaining power is held by the licensee. In this case we would be less likely to observe a grant-back clause included in the agreement.

We use a number of technology related variables to predict whether the observed firm is a licensor. First, we use the *Inverse Herfindahl* index to measure the technological specialization of the firms. A positive estimate will indicate that licensees on average are more technologically specialized than licensors. We use a measure of how able the firm is to produce globally applicable technologies by using the maximum *technological generality* index which is calculated as the share of cites received from other technological classes. We use the maximum level of *complexity* in the firm's patent portfolio measured by the maximum number of claims on the prior patents. A positive estimate would suggest licensors to be more able to handle complexity than licensees. We employ a measure of *technological experience* using the data on the first patent applied for by the firm and the data on the license agreement. A positive estimate would suggest licensors to be more experienced than licensees. We use the number of patents applied for prior to the license agreement as a control. A positive estimate would suggest licensors to have a larger portfolio of patents compared to licensees. Finally, we use a level categorical variable to control or differences across technologies where the observations are classified according to which IPC code they are primarily patenting in. The six dummies are: *Performing Operations, Chemistry and Metallurgy, Mechanical Engineering, Physics, Electricity and Electronics, and Other*.

METHOD

We consider the choice of signing a grant back clause to be nested in the decision to be on the demand or the supply side of the markets for technology. Accordingly we employ a nested logit approach to model the grant-back clause in which the first equation determines whether the observation is a licensee and the second equation is whether the agreement contains a grant-back clause. The advantage of the nested logit compared to the multinomial and the conditional logit is that it relaxes the assumption that the outcomes are independent irrelevant alternatives. This is crucial since removing the possibility of using the grant-back as

a licensor is very likely to change the relative preferences with regard to the remaining three possible choices due to appropriability concerns. The model may be illustrated as shown in Figure 1. Grouping the choices as shown in Figure 1 only presupposes independent irrelevant alternatives within each nest (Train, 2003; Winkelman *et al.*, 2006). Since each nest only holds two outcomes, we can easily suppose this to be the case.

*** INSERT FIGURE 1 ABOUT HERE ***

As is shown in figure 1, the observations of the data is distributed with 86(43.4%) of them being classified as being a licensor which has signed a license agreement with non grant-back clause. 21(10.5%) of the observations are a licensor with a grant-back clause. 78(39.4%) and 13(6.6nn) are observations classified as licensees with no grant-back clause and with a grant-back clause respectively.

The first nest of the model determines the likelihood that the observed firm is a licensor. Variables indicating past technological achievements ($\mathbf{x_1}$) are used to explain this choice (l=0). The second nest uses the familiarity measure, the market competition variable, and the two contractual variables ($\mathbf{x_2}$) predicting likelihood of the license agreement includes a grant-back clause (g=1). There is, however, no within-case variability in the second nest. Accordingly, we follow Drucker and Puri (2005) by interacting the regressors with the outcome of the nest thereby creating a pseudo alternative specific outcomes of the variables.

Table 1 summarizes descriptive statistics and correlation estimates of the model variables using the nested logit converted data. Among the correlation estimates, we particular note that there is a substantial correlation between the familiarity variable and the market competition variable (0.78). This raise concerns regarding potential multicollinearity effects. Accordingly, we chose to adopt a stepwise regression approach in which we first consider a model only including familiarity, then a model in which we only consider competition, third, a model including both variables and finally a model which includes both as well as their interaction term. Differences in results across models would suggest the model to suffer from multicollinearity bias while consistency between the results across models would suggest the model to be robust with regard to multicollinearity.

*** INSERT TABLE 1 ABOUT HERE ***

RESULTS

Table 2 contains the results of the nested logit regressions. The outcomes are consistent across the models suggesting that we can disregard the results being a byproduct of multicollinearity. The table indicates that the inclusion of the grant-back clause is not triggered by market competition or technological familiarity. Both the estimates are negative suggesting the likelihood of negotiation of a grant-back clause to be lower when the firm is familiar with the licensed technology and when the involved firms are operating in the same market. However, in cases where the firms are both in the same market and familiar with the technology do we see a steep increased tendency for the inclusion of a grant back clause in the technology licensing agreement.

*** INSERT TABLE 2 ABOUT HERE ***

Among other findings, the table also suggests that licensors tend to be more specialized than licensees and tend to exhibit a higher complexity in their patent portfolio. Our model also indicates that the licensors on average exhibits lower technological experience compared to licensees. Finally, we observe that licensors tend to be more imbedded in chemistry and metallurgy than licensees.

DISCUSSION AND CONCLUSION

The aim of this paper is to disentangle the tension between cooperation and competition that exists in technology licensing agreements. For this reason, we focus on the grant-back clause which affects parties' incentives in ex-post commitment. We investigate how licensing out core competences and signing a license agreement with a partner operating in the same market affect the likelihood that a license agreement includes a grant back clause.

The analysis revealed that the tension between cooperation and competition tend to be intensified and shift towards competition only when both the licensed technology is the firms core capability and when the licensee and licensor is operating in the same industry. These results clearly advocate that firms seeking to promote non-pecuniary gains from entering into the markets for technology should solicit potential partners which either are in a different industry or do not consider the traded technology core to their business.

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Table 1: Descriptive Statistics and Correlation Coefficients

	Variable	Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	Observed Characteristic	0.25	0.43	0.00	1.00									
(2)	Familiarity × Grant-back	0.12	0.29	0.00	1.00	0.11								
(3)	Competitor × Grant-back	0.13	0.34	0.00	1.00	0.11	0.78							
(4)	Sublicense × Grant-back	0.35	0.48	0.00	1.00	0.28	0.34	0.24						
(5)	Exclusivity × Grant-back	0.28	0.45	0.00	1.00	0.21	0.29	0.22	0.65					
(6)	Technological Specialization	5.06	6.87	1.00	32.62	-0.00	-0.15	-0.11	0.00	0.01				
(7)	Generality	0.80	0.29	0.00	1.00	-0.00	-0.02	-0.04	-0.02	-0.03	0.35			
(8)	Complexity	48.25	61.83	1.00	642.00	0.00	-0.03	-0.04	0.04	-0.00	0.43	0.32		
(9)	Technological Experience	12.92	12.04	0.00	82.00	-0.00	-0.18	-0.11	-0.01	-0.02	0.57	0.34	0.46	
(10)	Patent Stock	855.41	3694.74	1.00	28138.00	0.00	-0.07	-0.04	-0.03	-0.05	0.34	0.16	0.37	0.49

Correlation coefficients above 0.07 are significant at a 5% level

Table 2: Predicting the Inclusion of a Grant-back Clause in Technology Licensing Agreements. Results of Nested Logit Regressions

	Model I	Model II	Model III	Model IV
Grant-Back Equation				
Familiarity × Grant-back	-5.706**		-3.396*	-8.879**
	(2.856)		(2.499)	(5.321)
Competitor × Grant-back		-4.871**	-2.957**	-9.081**
		(2.523)	(1.594)	(4.754)
Familiarity × Competitor				
× Grant-back				13.555**
				(7.002)
Sublicense × Grant-back	-1.828*	-2.322*	-1.419	-1.674
	(1.287)	(1.510)	(1.252)	(1.409)
Exclusivity × Grant-back	-0.288	-0.483	-0.313	-0.228
	(0.645)	(0.887)	(0.585)	(0.603)
Licensor Equation				
Inverse Herfindahl Index	0.153**	0.152**	0.160**	0.158**
	(0.074)	(0.079)	(0.082)	(0.078)
Generality	0.015	-0.141	0.037	-0.097
	(0.607)	(0.565)	(0.594)	(0.531)
Complexity	0.021**	0.022**	0.022**	0.021**
	(0.012)	(0.011)	(0.012)	(0.011)
Technological Experience	-0.032*	-0.041**	-0.037**	-0.042**
	(0.023)	(0.021)	(0.022)	(0.022)
Patent Stock	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Primary Technology				
Performing Operations	0.054	-0.078	0.053	0.044
	(0.513)	(0.532)	(0.528)	(0.548)
Chemistry and Metallurgy	1.152***	1.060***	1.169***	1.138***
	(0.417)	(0.394)	(0.403)	(0.410)
Mechanical Engineering	0.191	0.187	0.320	0.331
	(0.613)	(0.606)	(0.617)	(0.591)
Physics	0.295	0.248	0.229	0.361
	(0.434)	(0.456)	(0.442)	(0.461)
Electricity and Eletronics	0.455	0.444	0.486	0.608
	(0.592)	(0.589)	(0.621)	(0.648)
Other	Benchmark	Benchmark	Benchmark	Benchmark
Licensor Constant	-3.771***	-3.644***	-3.674***	-3.638***
	(1.154)	(1.288)	(1.070)	(1.143)
Licensee Constant	-1.101**	-1.484**	-0.925*	-1.030*
	(0.592)	(0.719)	(0.624)	(0.635)
Number of Observations	792	792	792	792
Number of Clusters	133	133	133	133
Log Likelihood	-217.989	-215.940	-214.506	-210.359
χ^2	30.084***	26.372***	30.648***	29.995***
χ^2 for IIA	8.757***	4.362***	8.748***	24.51***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ at a one sided test, Standard errors in parentheses

IIA tests are carried out on models not correcting for clustering of observations

Figure 1: The Nested Tree Structure