

# **Foreign Direct Investment and Intellectual Property Rights: Evidence from Hollywood's Global Distribution of Movies and Videos**

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## **Abstract**

Traditional thinking about intellectual property rights (IPR) suggests that as a country strengthens its IPR standards, firms will move their governance structures away from equity based institutions such as FDI and joint ventures, towards more market based relations such as licensing agreements. This hypothesis is explored by examining the behavior of the major Hollywood studios in both the feature film and video markets in 40 foreign countries. The analysis reveals that the behavior of Hollywood studios is more complex than this: although moderate IPR are associated with a high degree of licensing, both high and low standards of IPR encourage more integrated governance structures.

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## Introduction

The protection of intellectual property rights (IPR) has emerged as one of the most important considerations of contemporary international economic diplomacy. As firms have become increasingly dependent on copyrights, trademarks and patents to protect control of their goods and services in world markets, diplomatic efforts have sought to strengthen the protections available through a range of initiatives. The implications of these initiatives are a fundamental concern of many countries, especially those required to adopt a set of IPR standards that are higher than they would unilaterally desire.

Central among these concerns is the impact of IPR reform on foreign direct investment (FDI). Sorting out this issue is subtler than one might first imagine, as FDI is only one option that a firm has for serving a foreign market. Depending on the technological characteristics of the product, a firm may have the option of serving an overseas market through exports, FDI, or some form of licensing agreement. Therefore, the question of the relationship between FDI and IPR is fundamentally a question about how a multinational firm organizes its governance structure. Theoretical analyses of the various options have examined a rich set of circumstances chiefly from the perspective of contract theory.<sup>1</sup> This literature predicts that the relationship between governance structure and IPR is determined by a number of competing forces. While no general model exists that encapsulates all the forces, it appears that some broad conclusions can be drawn. In particular, models that generate a negative association between FDI and IPR emphasize contract *enforcement* concerns, with this mechanism likely to be most pronounced when the initial level of IPR is low. In contrast, models that focus on difficulty of contract *design* suggest that the incentive to conduct FDI is positively related to IPR. Since these latter models don't focus on enforcement, they are more naturally thought of as applying to environments where IPR are already relatively secure. Ultimately the relative contribution of the factors is an empirical question.

To date, empirical work has found evidence that, at an aggregate level, the flow of royalties from licensing is more responsive to IPR than FDI flows, with both increasing

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<sup>1</sup> For an overview of the literature see Markusen (1995), Caves (1996) and Maskus (2000).

in the standard of IPR (Smith, 2001).<sup>2</sup> This has been interpreted as support for the hypothesis that as IPR are increased, licensing is likely to be preferred to FDI. However, the degree of conflict between the theoretical models and the empirical findings is difficult to judge given that the theoretical models operate at the firm level while the empirical evidence is based on country level data.<sup>3</sup> Furthermore, the theoretical models are concerned with the choice of mode of service rather than size of investment.<sup>4</sup> Hence, it is difficult for an analysis based on aggregate flows of royalties and foreign investment to compare the relative impact of IPR on these options of governance structure.<sup>5</sup> Another difficulty is that the use of country level data obscures the degree to which different sectors are sensitive to IPR, a prominent stylized fact (Mansfield, 1994).

This paper addresses these issues directly by matching the unit of analysis of the data to the unit of analysis of the theory.<sup>6</sup> In particular, the paper examines the governance structures of the major Hollywood studios in 40 foreign markets. The data describe the governance structures in both the distribution of feature films and their subsequent distribution on video. One advantage of analyzing the behavior of the major Hollywood studios is that it highlights one aspect of the theory. Due to the technological characteristics of its output, the chief issue facing Hollywood studios is the internalization question (FDI or license) rather than the location question (export or produce abroad). So, the main decision that a studio has to make is whether its presence in a foreign market is most profitable in the guise of an affiliate or an agent. Focusing on this one aspect makes the empirical analysis much clearer and delineates the impact of IPR on internalization from its impact on the location decision.<sup>7</sup>

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<sup>2</sup> Lee and Mansfield (1996) also find that the *volume* of FDI flows are positively correlated with the strength of IPR.

<sup>3</sup> The benefits of using disaggregated data to analyze the location decision of multinationals are clear from Blonigen (2001).

<sup>4</sup> For an analysis of FDI that treats both the theory and the empirics at an aggregate level see Carr, Markusen and Maskus (2001).

<sup>5</sup> See comments contained in Yang and Maskus (2001).

<sup>6</sup> Smarzynska (forthcoming) also explores the relationship between IPR and FDI using firm level data. However, her focus is on FDI in Eastern Europe and her dataset does not have information on alternative modes of market service such as licensing or exports.

<sup>7</sup> See Maskus and Penubarti (1995) and Smith (2000) for studies that examine the relationship between IPR and trade flows.

Given the high upfront costs and the relatively low cost of duplication, the success of Hollywood relies heavily on the ability to protect its intellectual property both within the US but also in foreign markets. Indeed foreign markets now account for a greater share of revenue than the domestic US market, a situation that has contributed to the audio-visual sector being ranked as the second largest exporter for the US.<sup>8</sup> The global success that Hollywood has enjoyed also means it is often cast in the role of villain in debates over IPR standards; a dominant player seeking to further drive home its advantage by requesting that countries raise their standards of protection. This tension mirrors the pattern of IPR negotiations in general, and so provides a valuable and accessible template for exploring the implications of IPR reform more broadly.

The variation in the standards of IPR around the world offers one potential way of studying the association between IPR and governance structure. Based on this variation, the empirical analysis confirms the non-monotonic relationship suggested by the theory. In particular, increasing IPR from a relatively low base tends to increase the attractiveness of licensing relative to FDI. Broadly, the incentives that operate in this range relate to the enforceability of contracts, with an increase in IPR seen as enhancing the ability of both parties to insist on the fulfillment of contractual obligations. However, beyond a point, further increases in IPR are associated with an increase in the likelihood of FDI. At this stage, concerns move from the enforceability of contracts to considerations of contract design and/or issues of market power. These concerns are aggravated by increases in IPR and enhance the relative attractiveness of keeping transactions internal to the organization and therefore make FDI more likely.

Aside from predictions about IPR, the literature also contains a number of other hypotheses that are examined. First, the probability that FDI is chosen increases as the size of the market increases. This finds strong support in the data. Second, the likelihood of FDI decreases as the degree of substitution between the legitimate product and pirated

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<sup>8</sup> This is a claim that is routinely made, see for instance the discussion of Peter Sutherland (Director General of the GATT at the time) in relation to the Uruguay Round negotiations (Sutherland, 1993). For an attempt to establish the validity of the claim see Acheson and Maule (1999).

alternative increases.<sup>9</sup> This implies that FDI should be more prevalent in the feature film market than in the video market, a characteristic that is consistent with the data.

In addition to being consistent with the theory, the empirical results suggest that IPR can have a pronounced impact on the governance structure of a multinational firm. Reforms that see IPR increased from a low level to a medium level are likely to result in between 18% to 60% of the relationships converted from FDI to licensing agreements. Similarly, reforms that raise IPR from medium levels to high levels are predicted to change 20% to 40% of the relationships from licensing agreements to FDI. These results are large and suggest that IPR reform may have profound effects on the international organization of firms and the resources they control.

Finally, an important general point emerges from a comparative analysis of the feature film and video markets. While these markets are characterized by similar general behavior, the analysis reveals that there are in fact pronounced differences between these markets in how responsive studios are to changes in IPR. So even within industries the responsiveness of firm behavior to IPR is likely to be critically dependent on both the nature of the product and the degree of competition it encounters. These results augur against any simple prediction about the implications of IPR reform for FDI, instead suggesting that the nature and magnitude of the impact of IPR reform will depend not only on the characteristics of the product but also on the initial standard of IPR.

In order to establish these results this paper is structured as follows. Section 1 reviews the theory and formulates a number of hypotheses to be tested. Section 2 describes the data set and sets out the econometric methodology. Section 3 presents the results of the empirical analysis.

## **1. Internalization and IPR: Review of the Theory**

To date, empirical work on the relationship between the internalization decision and IPR has put the emphasis on contractual enforcement (see Smith 2001, Yang and Maskus

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<sup>9</sup> See Horstmann and Markusen (1987).

2001, and Ferrantino 1993). The main conjecture examined in these studies is that stronger IPR leads to an enhanced ability to write and enforce contracts, thereby making licensing a relatively attractive option compared to internalization.<sup>10,11</sup> This hypothesis has an intuitive appeal and is likely to be an important influence if the standards of IPR are initially quite low. Under these circumstances, a firm may have no choice but to serve a market through an affiliate since the legal infrastructure is insufficiently developed to allow a licensing contract to be written. If standards are raised then a firm might be more willing to write a licensing contract, especially (as is usually assumed) if the local firms possess an advantage relative to the foreign firm. Therefore, strengthening IPR from a low base may well increase the likelihood of licensing relative to internalization. For example, a Hollywood studio may be averse to entering a licensing agreement with a local distributor since they are concerned about the local distributor pirating the film through duplication or unauthorized public exhibitions. While these actions are clearly in breach of the contract, the contract itself may not be adequately enforced. In this situation serving the market through an affiliate may be the only viable option.

However, the theoretical literature on internalization also emphasizes the role of contractual imperfections in determining the governance structure. Therefore, it is worth considering how IPR reform is likely to interact with these considerations. A number of studies construct frameworks that yield the prediction that FDI is likely to be preferred to licensing the stronger is IPR. Employing a property rights framework, Chung (1999) develops a model that generates this prediction. In his setting the relationship-specific investment of the foreign owner of the intellectual property is most responsive to IPR. This sensitivity arises from the need for the foreign creator of the intellectual property to modify the product to suit local conditions. In the case of movies, editing the film to suit local tastes or making advertising campaigns more appropriate capture these types of

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<sup>10</sup> Markusen (2001) sets out a model that is broadly consistent with this prediction.

<sup>11</sup> Yang and Maskus (2001) also allow stronger IPR to decrease innovation that might result in reduced licensing.

considerations.<sup>12</sup> The sensitivity of these types of relationship-specific investments provides a mechanism for the probability of FDI to increase as the standards of IPR are increased.

Other frameworks can generate similar results. Horstmann and Markusen (1987) construct a model based on reputation that, when extended to incorporate IPR, generates the same positive relationship between IPR and the choice of FDI as the entry mode.<sup>13,14</sup> These reputational considerations reflect the need for the local distributor to protect the integrity of the film stock, which can degrade if not carefully maintained.<sup>15</sup> Therefore, viewed from the perspective of either the Chung or Horstmann-Markusen frameworks, the probability of FDI is positively related to the strength of IPR. To date, this prediction has not been examined empirically.

Taking into account the ability to write contracts that is conferred by stronger IPR (as has been emphasized in previous empirical studies) and the theoretical predictions of the internalization literature, the relationship between internalization and IPR is likely to be non-linear. In particular, the impact of the enhanced ability to write and enforce contracts is likely to be most pronounced when IPR are increased from a relatively low base. This suggests that the likelihood of licensing should be increasing when IPR is relatively low. However, beyond some point the advantages of being able to write contracts may be

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<sup>12</sup> For example, the release of a movie in China would require that it either be dubbed or subtitled. However, other changes may further add to the appeal, along with a local appearance of the “star” of the movie.

<sup>13</sup> One possible extension involves a model of fringe competition where IPR affects the marginal cost of the fringe firms. Such a model can be constructed along the lines of free entry model set out in Carlton and Perloff (2000). Alternatively, a model of fringe competition can be constructed (along the lines of Gelman and Salop (1982)) where IPR affects the capacity of the fringe (i.e. enforcement only occurs when the fringe/pirates reach a critical level of output).

<sup>14</sup> It is possible to think of even further ways to generate a positive relationship between IPR and the choice of FDI as the entry mode. For example, consider the standard case for vertical integration due to the double marginalization externality. Adopting a competitive fringe setup, where the competitiveness of the fringe is determined by the strength of IPR, it is possible to show (under standard conditions) that the size of the externality is increasing in the strength of IPR. Consequently, the likelihood of internalization is also increasing in the strength of IPR standards.

<sup>15</sup> Film stock typically has a shelf life of approximately 5-6 weeks and is very sensitive to temperature. In addition, the same film stock is typically used at a number of different cinemas. To ensure that a reel of film has the desired life and projects an acceptable quality requires the vigilance of a local distributor, which may be secured through appropriate (though sometimes costly) incentives.

offset by the interaction between stronger IPR and an inability to design an appropriate contract. If this point is reached, then the probability of FDI will increase with the strength of IPR. This suggests that the relationship between IPR and FDI is potentially U-shaped.

The Horstmann-Markusen framework generates two additional predictions that can be taken to the data. The first is that FDI is more likely to be chosen as the entry mode the larger is the market size. The second is that the greater the substitutability between the product of the multinational and the local version of the product, the more likely is licensing to be chosen as the mode of market entry.

The predictions of the theory reviewed in this section can be summarized as follows:

- i) possible U-shaped relationship between the probability of FDI and IPR
- ii) the probability of FDI is increasing in market size
- iii) the probability of FDI is decreasing in the degree substitution between the product of the multinational and the local version of the product/pirated version.

## **2. Econometric Specification and Data**

The empirical analysis is based on the governance structure of the operation of the major Hollywood studios in 40 foreign markets in 1997. Table 1 provides a list of the countries examined. Country coverage is limited primarily by data availability, with this data drawn from Screen Digest (1998). The only obvious regional omission is Africa, whose countries are under-represented in the dataset. For the purposes of this study the major Hollywood studios are: Disney, Sony, 20<sup>th</sup> Century Fox, Warner Brothers, Polygram and UIP. Of this list, only UIP would be unfamiliar. UIP is an international distribution company that is equally owned by the other three major Hollywood studios, Paramount, MGM/UA and Universal. The unit of analysis is a studio's mode of market service in a country. Finally, the data records the governance structure in two market segments, feature film distribution and video distribution. The data are coded as follows:



$$\begin{aligned}
y &= 1 && \text{if foreign affiliate} \\
y &= 0 && \text{if licensing agreement.}
\end{aligned}$$

While the value of the feature film and video markets is approximately equal, the governance structures adopted is generally different. Even though a studio may serve a foreign market through an affiliate in relation to feature films, this does not imply that the studio will also serve the video market through an affiliate. Table 1 gives an indication of the differences between these two markets and provides an initial indication of the consistency of the data with the theory. In particular, hypothesis iii) predicts that internalization is decreasing in the degree of substitution between the product of the multinational and the local version. Interpreting the local version of the product as pirated versions of a Hollywood movie (which are typically in the form of a video), this suggests that licensing should be more prevalent in the video segment of the market. This hypothesis is consistent with information presented in Table 1.<sup>16</sup>

Having information on two segments of the market also informs the econometric specification employed. To account for potential correlation between the disturbances of the feature film model and the video model, a bivariate probit structure is assumed:<sup>17</sup>

$$\begin{aligned}
y_f^* &= \beta'x + \varepsilon_f, && y_f = 1 \text{ if } y_f^* > 0, 0 \text{ otherwise,} \\
y_v^* &= \beta'x + \varepsilon_v, && y_v = 1 \text{ if } y_v^* > 0, 0 \text{ otherwise,} \\
E[\varepsilon_f] &= E[\varepsilon_v] = 0, \\
\text{Var}[\varepsilon_f] &= \text{Var}[\varepsilon_v] = 1, \\
\text{Cov}[\varepsilon_f, \varepsilon_v] &= \rho.
\end{aligned}$$

To examine the theoretical predictions, data on the standards of IPR and market size are employed, along with a number of other control variables. The measure of IPR is described in Ginarte and Park (1997) and has been extended to 1995.<sup>18</sup> In relation to IPR,

<sup>16</sup> Formally, the null that there is a higher proportion of FDI undertaken in the video market than the film market can be rejected at the 1% level of significance.

<sup>17</sup> See Greene (2000) for a discussion of the bivariate probit model.

<sup>18</sup> I would like to thank Walter Park for making this unpublished series available.

the predictions can be broken down into two hypotheses. The first relates to access to institutions that define intellectual property rights, with more secure institutions associated with a greater willingness to conduct commerce through contracts and licenses. The second prediction is that despite access to secure property rights, the problems associated with designing an appropriate contract are compounded by increases in IPR.

A simple way to formulate a test of these predictions is to include a quadratic term in the model. Since the motive to increase licensing due to enhanced access to institutions is likely to be most pronounced when IPR is low, the linear component should be negative. In contrast, the aggravation of contracting problems due to increased IPR is likely to occur when IPR is already at a relatively high standard, this suggests that the coefficient on the quadratic term should be positive. These two predictions form the basis of the hypotheses to be tested in both the feature film and video distribution markets.

The final prediction examined is that internalization is increasing in market size. In this study, market size is described by both population and GDP per capita, which are taken from the World Development Indicators for 1997. To account for other sources of variation, a number of other control variables are included, with a full list of variables and sources contained in Appendix 1.

### **3. Empirical Results**

Table 2 contains the maximum likelihood estimates of the bivariate probit model, where the standard errors have been corrected for correlation between observations with the same destination country. It should be kept in mind that the estimates from the bivariate probit model generally don't carry the same interpretation as the standard probit model since a joint likelihood function is maximized. However, since the estimate of  $\rho$  is close to zero, the parameters have an interpretation that is very similar to single equation estimates.

The hypothesis that internalization is increasing in the size of the market when measured in terms of either population or GDP per capita finds support in the data for both markets. Not only do the estimated coefficients have the correct signs, but they are also significant at the 1% level. This evidence strongly supports the prediction of the Horstmann-Markusen model with respect to market size.

The more nuanced prediction about the association between internalization and IPR are also consistent with the data. In particular, the null hypothesis that the linear component is positive can be rejected at the 1% level of significance for the feature film market and the 5% level for the video market. Similarly, the null hypothesis that the coefficient on the quadratic term is negative can be rejected at the 1% level of significance for the film market and 5% for the video market. These results offer strong support for the operation of the types of mechanisms that have been emphasized in the theoretical literature. Furthermore, the combination of the predictions from the various models and how they are likely to operate at different levels of IPR represents a set of hypotheses that heretofore have not been explored. The strength of these empirical findings suggests that the development of a more general theoretical model of the relationship between internalization and IPR would be very useful and may lead to additional insights.

Given the presence of the non-monotonicity in the data it is of interest to assess the relative importance of the linear and quadratic components. Since the measure of IPR ranges from 0 to 5, a natural question to ask is whether the maximum occurs within this range. Solving for the maximum reveals that it occurs at an IPR level of approximately 3.3 in the film market and 3.9 in the video market. This ordering seems intuitive since issues of piracy are likely to be more pronounced in the video market and therefore make this market more reliant on IPR. It also suggests that even in markets as closely related as feature film and video, small technological differences (such as vulnerability to piracy) can translate into differences in responsiveness to IPR reform. Moreover, since both of these are interior solutions, this suggests that IPR reform can potentially have differential impacts depending on the previous policies of a country.

Of the remaining variables that have been included as controls, a number stand out as particularly interesting. Prominent in this group is the impact of domestic production in each country on the internalization decision. The most intriguing feature of this control is that it is revealed to have the opposite impact in the two markets: in the feature film market, it is associated with a positive coefficient, while in the video market it is negative. However, the coefficient is only significantly different from zero for the video market.

Another control variable that displays an interesting sign pattern is associated with the share of the population under 14. In the feature film market the coefficient on this variable is positive and significant at the 5% level. In contrast, the coefficient on the share of population under 14 is negative and significant at the 5% level for the video market. One possible explanation is that teenagers behave differently in each segment of the market. A large teenage audience may be good news for the feature film market, since the range of entertainment options outside of the home for teenagers is limited. Therefore, more teenagers translate into a larger market for feature films. However, the same logic is unlikely to hold in the video market. The image of a cash strapped but tech savvy teenager making pirated copies of videos to distribute among friends is not an unfamiliar one. The end result is that a large fraction of the population under 14 may not translate into a large market for videos. While intuitive, these stories don't rule out other possible explanations of these interesting results.

Of the remaining control variables, economic growth, distance, the identity of your neighbors, and the identity of the studio all play statistically significant roles in the internalization decision in the feature film market. The video market also displays similar behavior with the exception that distance and region are not statistically significant factors.

While the role of individual factors in the two markets is interesting to analyze, it is important to assess how well the model fits the data. One measure is a comparison of the

actual proportion of FDI arrangements to the predicted proportion.<sup>19</sup> For the film market FDI is actually chosen 64% of the time, while the model predicts that it would be chosen 66% of the time. In the case of the video market, FDI is actually chosen 51% of the time, while it is predicted 46% of the time. The model seems to fit the data extremely well, with the difference between the actual and predicted proportions being less than 5 percentage points in either market.

While the aggregate proportions are interesting, it still may be the case that they mask a substantial number of individual errors. To gain more insight into how the model performs on an observation-by-observation basis we can examine the percentage of the predictions that are correct. One comparison to keep in mind when reviewing the evidence is to ask how well a naive model that only contains a constant would perform. Such a model would always predict FDI in both markets. The naive model is correct 64% of the time in the feature film market and 51% of the time in the video market. Keeping these benchmarks in mind, FDI is correctly predicted 89% of the time in the feature film market, while FDI is correctly predicted 79% of the time in the video market. Even with a lower bound of 64% and 51%, respectively, these numbers suggest a high degree of accuracy. The impressive fit of the model really stands out in the predictions for licensing. The naive model has a zero percent success rate for these activities. By comparison the model employed correctly predicts licensing in the feature film market 74% of the time, while licensing in the video market is correctly predicted 89% of the time. These results suggest that the model fits the data with a high degree of accuracy.

Given the good fit of the model it is worth exploring counterfactual experiments to gain some insight into the impact of IPR reform on the governance structure of multinationals. These counterfactual experiments also help to identify the marginal effects of IPR on the likelihood of internalization. Two types of experiments will be considered. The first adopts the structure of a classical treatment effect and asks the question: What would be the impact on a multinational's governance structures if all countries had the same

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<sup>19</sup> The .5 convention is followed for determining which outcome is predicted. Therefore, if the predicted probability for an observation is greater than .5, the predicted outcome is recorded as FDI.

standards and all countries increased their standards from X to Y. The potential standards considered in these counterfactual experiments are: low standards (IPR = 1.5), medium standards (IPR = 3) and high standards (IPR = 4.5).

The results for the classical treatment effects are given in Tables 5 and 6. These results suggest that the standards of IPR can have a substantial impact on the internalization decisions of multinationals. For reforms that raise standards from low to medium, of the studios that chose FDI under low IPR, 18% change to licensing under a medium IPR regime in the feature film market. In this setting, the predicted change is even more pronounced in the video market, with 61% of the studios that chose FDI under a low IPR regime changing to licensing under a medium IPR regime. In contrast, for reforms that raise standards from medium to high, of the studios that chose licensing under medium IPR, 39% change to FDI under a high IPR regime in the video market. Similarly, of the studios that chose licensing under medium IPR, 20% change to FDI under a high IPR regime in the film market. These impacts are substantial, and suggest that the marginal impact of IPR on the internalization decision can be very large.

While classical treatment effects give some insight into the marginal effects of IPR on internalization, as a measure of the real world impact of reform they suffer from an obvious deficiency - namely the assumption that all countries adopt either low standards together, medium standards together or high standards together. Therefore, using the classical treatment effects to gain a sense of the likely impact of the reform embodied in say the WTO's TRIPs agreement will result in an exaggerated picture of the likely outcome. In contrast, a more appropriate counterfactual experiment would involve status quo treatment effects. In this counterfactual setting, a country is only assumed to adopt a reform if it requires a standard higher than their current standard. Consequently, countries will be required to undertake different degrees of reform.

Tables 7 and 8 present the results of the status quo treatment effects of adopting high IPR standards. As would be expected the impact of IPR reform is smaller than predicted under the classical treatment assumptions. Nevertheless, the impacts can be substantial.

Of the relationships affected by reform, over 11% of the governance structures are changed in the video market. In contrast, in the feature film market, of the relationships affected by reform, over 21% of the governance structures are changed. This suggests that not only can IPR reform potentially have a large effect on the governance structure of multinationals, but that the nature of the product is likely to be of critical importance in the determining the size of this effect.

## **Conclusion**

A central issue in the recent debates over IPR reform is the potential impact on foreign direct investment. Previous empirical studies have put emphasis on a potentially negative relationship between IPR and FDI, a relationship that has been attributed to firms preferring to use market based licensing agreements if intellectual property rights are sufficiently secure. However, these studies have relied on aggregate data, a limitation that makes it difficult to draw inferences about firm level behavior. Unlike the previous literature, this study uses firm level data, which enables a more exact match between theory and data. This match is particularly critical in this setting. While theory does provide some guidance in thinking about the implications of IPR reform for the optimal choice of mode for foreign market service, ambiguities do arise. Given the nature of these ambiguities, the relationship between IPR and FDI is likely to vary with the characteristics of the industry. Therefore, aggregating over industries is likely to obscure much of the subtle detail, confounding efforts to interpret the results. By studying firm behavior in a particular industry, this paper is uniquely placed to shed light on the subtleties of the relationship between IPR and FDI.

In relation to these subtleties, the behavior of the major Hollywood studios is particularly interesting. Not only is Hollywood one of the major foreign export earners for the United States, but it is also critically dependent on the protection of intellectual property rights for its success. Analysis of this industry reveals that the nuances suggested by the theoretical models are present in the data. In particular, as suggested by theory, a non-monotonic relationship between IPR and FDI characterizes the behavior of Hollywood studios abroad: while Hollywood studios are likely to service a foreign market through an

affiliate if the standards are either low or high, they are more likely to enter into a licensing agreement if a country offers a moderate degree of IPR protection. This pattern characterizes Hollywood's behavior in both feature film distribution and video distribution markets. Further support is added to these results as a number of ancillary predictions of the theory relating to market size and the potential threat from pirates also find strong support in the data.

The robustness of these results allows an important general point to emerge from a comparative analysis of the feature film and video markets. Even though these markets are characterized by similar general behavior, there are marked differences between these markets in how responsive studios are to changes in IPR. Thus even within industries the responsiveness of firm behavior to IPR is likely to be critically dependent on both the nature of the product and the degree of competition it encounters. These results argue against any simple prediction about the implications of IPR reform for FDI, suggesting instead that the nature and magnitude of the impact of IPR reform will depend not only on the characteristics of an industry but also on the initial standard of IPR.



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Table 1  
Share of Major Hollywood Studios Serving a Country through FDI in 1997

<b>IPR</b>	<b>Country</b>	<b>Feature Film</b>	<b>Video</b>
4.57	Austria	0.83	0.33
4.38	Netherlands	1.00	1.00
4.24	Sweden	0.83	0.67
4.20	Korea	0.83	0.83
4.19	Finland	0.50	0.17
4.19	Italy	0.83	1.00
4.05	Denmark	0.83	0.50
4.05	France	1.00	0.67
4.05	Spain	0.83	1.00
3.94	Japan	0.83	0.83
3.91	Switzerland	1.00	0.50
3.90	Belgium	1.00	1.00
3.90	Norway	0.50	0.67
3.90	Singapore	0.83	0.33
3.86	Australia	1.00	1.00
3.86	Germany	1.00	1.00
3.86	New Zealand	0.50	0.50
3.57	Canada	0.83	1.00
3.57	South Africa	0.17	0.17
3.57	United Kingdom	0.83	1.00
3.37	Hungary	0.17	0.17
3.32	Ireland	0.83	0.50
3.19	Argentina	0.83	0.17
3.19	Czech Republic	0.17	0.33
3.19	Slovak Republic	0.17	0.33
3.07	Chile	0.50	0.67
3.05	Brazil	0.83	0.17
3.04	Russia	0.00	0.33
2.98	Portugal	0.33	0.50
2.90	Poland	0.17	0.33
2.90	Venezuela	0.00	0.17
2.86	Mexico	0.67	0.67
2.85	Malaysia	0.83	0.17
2.67	Philippines	0.50	0.17
2.65	Greece	0.50	0.33
2.57	Colombia	0.50	0.17
2.57	Hong Kong	0.67	0.33
2.24	Thailand	0.83	0.17
1.51	India	0.67	0.17
1.24	Indonesia	0.33	0.50
<b>3.34</b>	<b>Average</b>	<b>0.64</b>	<b>0.51</b>
<b>0.74</b>	<b>Standard Dev.</b>	<b>0.30</b>	<b>0.31</b>

Table 2  
Bivariate Probit  
(standard errors are adjusted for clustering by country)

<i>Variable</i>	<i>Film</i>	<i>Video</i>
IPR	-2.65 <sup>***</sup>	-3.28 <sup>**</sup>
IPR <sup>2</sup>	0.40 <sup>***</sup>	0.42 <sup>**</sup>
ln(GDP per capita)	2.78 <sup>***</sup>	2.99 <sup>***</sup>
ln(Population)	0.50 <sup>***</sup>	1.20 <sup>***</sup>
Growth rate	0.10 <sup>**</sup>	0.07 <sup>*</sup>
ln(distance)	0.55 <sup>**</sup>	-0.17
Domestic Film Prod	0.07	-0.68 <sup>***</sup>
English speaking country	-0.38	0.52
Share of pop. < 14	8.61 <sup>**</sup>	-9.45 <sup>**</sup>
Constant	-29.9 <sup>**</sup>	-20.8 <sup>**</sup>
Region Dummies <sup>1</sup>		
Asia	1.21	0.14
Americas	0.40 <sup>***</sup>	0.75
Studio Dummies <sup>2</sup>		
Disney	-0.78 <sup>**</sup>	-0.58 <sup>**</sup>
UIP <sup>3</sup>	0.36	11.21 <sup>***</sup>
Polygram	-2.38 <sup>***</sup>	-0.66 <sup>*</sup>
Sony	-0.20	-0.82 <sup>***</sup>
20 <sup>th</sup> Century Fox	-0.31	-1.24 <sup>***</sup>
N	240	240
$\rho$	0.0015	

<sup>1</sup> Europe is the excluded region

<sup>2</sup> Warner Brothers is the excluded studio

<sup>3</sup> UIP is a joint venture in foreign markets equally owned by Paramount, MGM/UA and Universal

\*\*\* statistically significant at the 1% level.

\*\* statistically significant at the 5% level.

\* statistically significant at the 10% level.

**Table 3**  
**Actual Versus Predicted: Film**  
**Actual**

<b>Predicted</b>	Licensing	FDI	Total
Licensing	64	17	81
FDI	23	136	159
Total	87	153	240

**Table 4**  
**Actual Versus Predicted: Video**  
**Actual**

<b>Predicted</b>	Licensing	FDI	Total
Licensing	104	26	130
FDI	13	97	110
Total	117	123	240

**Table 5**  
**Classical Treatment Effects: Feature Films**

<b>Low IPR</b>	<b>Medium IPR</b>		<b>Total</b>
	Licensing	FDI	
Licensing	65	0	65
FDI	32	143	175
<b>Total</b>	<b>97</b>	<b>143</b>	<b>240</b>

<b>High IPR</b>	<b>Medium IPR</b>		<b>Total</b>
	Licensing	FDI	
Licensing	38	0	38
FDI	59	143	202
<b>Total</b>	<b>97</b>	<b>143</b>	<b>240</b>

**Table 6**  
**Classical Treatment Effects: Videos**

<b>Low IPR</b>	<b>Medium IPR</b>		<b>Total</b>
	Licensing	FDI	
Licensing	59	0	59
FDI	70	111	181
<b>Total</b>	<b>129</b>	<b>111</b>	<b>240</b>

<b>High IPR</b>	<b>Medium IPR</b>		<b>Total</b>
	Licensing	FDI	
Licensing	103	0	103
FDI	26	111	137
<b>Total</b>	<b>129</b>	<b>111</b>	<b>240</b>

**Table 7**  
**Status Quo Treatment Effects: Feature Films**

<b>Status Quo IPR</b>	<b>High IPR</b>		<b>Total</b>
	Licensing	FDI	
Licensing	34	47	81
FDI	4	155	159
<b>Total</b>	<b>38</b>	<b>202</b>	<b>240</b>

**Table 8**  
**Status Quo Treatment Effects: Videos**

<b>Status Quo IPR</b>	<b>High IPR</b>		<b>Total</b>
	Licensing	FDI	
Licensing	103	27	130
FDI	0	110	110
<b>Total</b>	<b>103</b>	<b>137</b>	<b>240</b>

## Appendix 1: Data and sources

Governance structure by studio in 1997      Source: Screen Digest (1998)

IPR: Ginarte and Park index for 1995. Source: Walter Park (unpublished)

GDP per capita. Source: World Development Indicators

Growth of GDP per capita. Source: World Development Indicators

Population shares. Source: derived from World Development Indicators

Domestic Film Production in 1997      Source: Screen Digest (1999)