The Organizational Efficiency of Internal Capital Markets*

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Abstract

I investigate the effect of multidivisional structure on investment efficiency using project-level data from the motion picture industry in the United States. I find that the multidivisional structure of the largest Hollywood studios increases a movie's production budget and advertising expenses, but does not improve its box office performance. I arrive at this finding in two ways. First, I observe a decrease in the investment efficiency of focused studios after they become part of a multidivisional firm. Second, I account for the potentially endogenous relation of multidivisional structure and investment returns using instruments based on the internal configuration of movie creative teams. I propose and show evidence on agency and operating complexity as the causal mechanisms for the influence of multidivisional structure. Because this influence is negative, I conclude that internal capital markets in Hollywood do not improve investment efficiency.

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A GROWING BODY OF WORK IN CORPORATE FINANCE AND STRATEGY argues that the organization of activities within the boundaries of the firm affects the returns to investment (Stein 2003, Collis and Montgomery 2005, Maksimovic and Phillips 2006). The discussion is characterized by a duality. Diversification creates value or destroys value. Conglomerates should be dismantled or maintained. Firms have weak divisions or strong divisions. Capital allocation is "socialistic" or efficient. Socialistic investment is optimal or suboptimal. And so on. While internal organization plays a central role in this theoretical discussion, empirically assessing its efficiency consequences has proven to be difficult. As a result, in contrast to well-known theories of corporate investment, evidence linking multidivisional organization and investment returns is still scarce (recent work includes Whited (2001), Gertner, Powers, and Scharfstein (2002), Çolak and Whited (2007), Seru (2007), and Rawley (2007)). Moreover, much of this work has stressed the diversification aspect of divisionalization without examining its organizational component. The idea first proposed by Williamson (1975) and further discussed by Liebeskind (2000) that the relative efficiency of an internal capital market may depend on its organization remains appealing yet untested.

This paper provides an empirical investigation of the effects of multidivisional structure on investment efficiency through a large-sample study of the movie industry in the United States. The challenges facing this endeavor are clear. On the one hand, because firms endogenously choose their organizational structure, it is hard to assess causality when observing correlations between structure and investment returns. On the other hand, even if the identification of organizational structure as a causal driver is statistically clear, multiple theoretical mechanisms may account for such influence, blurring its meaning. This paper addresses both challenges, examining whether multidivisional structure affects investment efficiency, and if so, through what mechanisms.

Movies are an appropriate setting to study how organizational structure affects investment efficiency for at least three reasons. First, the dollar amounts of investment and performance are observable for thousands of projects in conjunction with variables accounting for alternative factors. Second, the setting allows for the observation of multidivisional

operation *within* the same industry. Starting in 1991, the largest movie distributors ("studios"), called the *majors*, pursued acquisitions and internal developments by which they subsequently operated in the same industry with two types of divisions: major and "specialty." This experiment of divisionalization without diversification allows for clearer inference than most multidivisional settings, where changes in structure and relatedness are indistinguishable. Third, the production arrangements in the industry motivate a novel identification strategy for the effects of multidivisional structure. Because studios rely on external creative teams for their films, the internal configuration of such teams provides a set of variables that evolve plausibly independently from the studios' propensity to adopt a multidivisional form.

My analysis of the consequences of multidivisional structure takes advantage of the good features of the data to explore alternative identification strategies. The key idea consists in exploiting cross-sectional differences in the configuration of project teams to instrument for the influence of multidivisional structure. By arguing and probing the validity of three team-level variables — the recent experience of team members with the major studios, the variety of interactions of team members with studios in the recent past, and the average size of team members' previous teams — as not obviously linked to unobserved drivers of investment returns but directly linked to the match of the team with a multidivisional structure type, I find these variables suitable to instrument for structure in a two-stage least squares design. In the first stage, I predict the binary match between a team and a multidivisional type using the instruments and relevant controls. In the second stage, I use the instrumented multidivisional structure variable as a regressor to explain production investment, advertising expenses, and box office revenue, the primary components of investment returns.

Using this instrumenting strategy, I find that multidivisional structure reduces investment efficiency because it increases investment but does not affect the revenue associated with it. After controlling for project and organizational characteristics, I find that multidivisional structure increases the production budget of a movie by $7 million relative to a comparable movie of a focused studio. In addition, multidivisional structure leads to an extra $5 million of advertising expenses relative to a focused firm. The point estimates are

economically significant and plausible. Moreover, the results are not subject to what type of movie is made — it could be expected, for example, that action movies receive much more investment in multidivisional studios — as the models include genre and year fixed effects. In contrast to increasing investment, multidivisional structure does not affect box office revenue — the 2SLS point estimates are insignificant. As an alternative approach to the instrumenting strategy, I conduct an event study of independent studios that enter an internal capital market by means of being acquired by large studios. I find that the investment of these formerly focused studios increases but their performance remains flat after the acquisition, thereby confirming the result of the instrumental variable design.

This study proposes and provides evidence on the coexistence of agency and operating complexity as the causal mechanisms linking multidivisional structure and a decrease in investment returns. In other words, structure leads to lower returns because of the managerial misalignment and the inherent difficulties of running the business in a multidivisional form. In addition, I find that the negative effects of multidivisional structure appear to be strongly associated with the existence of an internal capital market rather than with the influx of external capital. Despite the ex post evidence on decreased returns, however, I cannot rule out an ex ante motivation to create and capture value through organizational design. Using a variance components model (cf. Rumelt 1991), I show that a substantial portion of the variability of movie portfolios' performance is due to business-unit effects, suggesting that such micro-level locus of managerial competence may have motivated a multidivisional form.

The findings linking organizational structure, internal capital markets, managerial action and product market performance have broad application in many areas of corporate strategy beyond the movie industry. Although capital allocation has long fascinated financial economists, the hand of management has been largely overlooked in previous research. Narrow analyses of complex decisions such as diversification have led to an impasse in the literature (Amit and Villalonga 2006), and a "missing link" must address jointly internal capital markets and multidivisional structure (Liebeskind 2000). I call this link *the organizational efficiency of internal capital markets.*

1 Theoretical Background

Since Rumelt (1974), research on the multibusiness corporation, and multidivisional structure in particular, has been mostly driven by interest in corporate diversification. Though originally a strategy question, recent work on diversification has been most active in financial economics, with an emphasis on the measurement of value creation (see Maksimovic and Phillips (2006) for a review). Although the results of this strand of the literature are inconclusive —as alternative specifications have led to evidence on value destruction (e.g., Lang and Stulz 1994) or value creation (e.g., Villalonga 2004)— the diversification decision is widely acknowledged as being correlated with value differentials at the corporate level.

While diversification remains a central theme in strategy, research has paid less attention to a different yet essential element of divisionalization: the design and operation of an internal capital market. Indeed, Williamson (1975) argued that one of the most important functions of the M-form corporation is to operate as a micro capital market. More formally, Gertner, Scharfstein, and Stein (1994) proposed equilibrium conditions for how a firm could substitute for external capital markets through the internal allocation of funds. Because an essential aspect of this substitution is some advantage at monitoring or discovering opportunities internally rather than through the market, sometimes the investment rules of an internal capital market may differ from external allocation benchmarks. In particular, funds from profitable divisions could be allocated to unprofitable divisions in a systematic way. Hence the question of cross-subsidization and investment efficiency has raised significant interest among researchers (Lamont 1997, Shin and Stulz 1998), leading to a tension between the bright side (Stein 1997, Khanna and Tice 2001) and the dark side (Scharfstein and Stein 2000, Ozbas and Scharfstein 2007) of internal capital markets.

Underlying the two broad literatures outlined above are two constructs most relevant to strategy research: organizational design and managerial action. Because organizational design is one of the key levers by which strategy is implemented (Roberts 2004), understanding how the choice of multidivisional form enacts an internal capital market is critical to strategy.

Moreover, the managerial hand behind multidivisional operation and capital allocation is generally accepted as a fundamental component of corporate strategy, even if largely overlooked in research (Noda 1996). A notable exception is Liebeskind (2000), who develops a framework emphasizing the centralization of investment decisions and the change of fund provider type as key aspects of internal capital markets relevant to strategy. Despite these efforts, the idea that strategic organization plays a central role in capital allocation processes remains untested.

This paper attempts to fill a gap in the literature by studying the effects of multidivisional structure on investment efficiency. Theories of the *determinants* of organizational form have derived equilibrium conditions to adopt a specific type of structure (e.g., Maskin, Qian, and Xu 2000, Dessein, Garicano, and Gertner 2008). In contrast, I focus on the *consequences* of organizational form on investment efficiency.

The first-order question is whether multidivisional structure affects investment returns. Prior evidence has only shown results in aggregation, typically by comparing the stock price of multidivisional firms and focused firms. Such approach is not helpful to address the central issue of whether structure effects changes at the micro level of the projects carried out by corporate divisions. Indeed, theories of investment efficiency in multidivisional firms (e.g., Rotemberg and Saloner 1994, Stein 1997, Bernardo and Chowdhry 2002) are usually laid out at the project level, modeling how two divisions of the same firm pursue different projects, and comparing the projects' cash flow with that of stand-alone firms. In contrast to the top-down approach of tests such as those of the diversification discount, most theories view investment efficiency as a bottom-up phenomenon.

A second fundamental question is how structure affects the components of economic returns: investment and performance. Shareholders invest a unit of capital in order to collect a unit of net revenue plus some rent. Yet the channels for how multidivisional structure affects investment efficiency can be more directly linked with *investment* than with *performance*. Leaving spillover effects aside — as they would call for a cross-divisional approach, under the broad notion of "synergies"— multidivisional structure may enhance a project's expected revenue only through market power or transfer pricing. The link between multidivisional

structure and investment, however, is more direct. Multidivisional structure may lead firms to invest *less* than optimally because of some stringent investment rules, or in the opposite case, to invest *more* than in the first best because of some distortion in the assessment of investment opportunities. In sum, investment is a choice variable whereas market performance is oftentimes beyond managerial control. Thus it is likely that multidivisional structure affects investment returns mostly through investment rather than through performance.

Because most research on the value consequences of multidivisional structure has found a negative influence, I take this as the starting point to propose mechanisms why multidivisional structure may affect investment returns negatively.

The first clear mechanism is agency. Most agency theories of inefficiency in multidivisional firms claim that managers use divisions as feuds, therefore causing overinvestment (see Stein (2003) for a review). For example, divisional managers can extract personal benefits from their divisions more easily, as they know they will receive capital that is only partially linked to their own performance. Moreover, managers may not be willing to shut down inefficient divisions, and continue investing even if they shouldn't (Rumelt 2007). Another case is that of corporate managers using divisions to hedge (Froot, Scharfstein, and Stein 1993), sometimes in ways inconsistent with firm-wide profit maximization. In sum, multidivisional structure creates an environment where agency behavior is facilitated.

A second mechanism, perhaps more emphasized in strategy and organizational economics than in finance, is the operating complexity of a multidivisional form. For example, Alonso, Matouschek, and Dessein (2008) define equilibrium policies for coordination and centralization in multidivisional firms that hinge on how team members and employees organize their functions. When compared with a focused operation, the coordination of production policies to maintain high quality or low cost may delay project execution or exert more pressure on other functions. To the extent that these difficulties increase investment, a complexity mechanism linking multidivisional structure and investment efficiency is established.

The empirical goal of this paper is to exploit a rich database on the movie industry

between 1985 and 2005 to test for the effects of multidivisional structure on investment returns, and to provide evidence on the mechanisms leading to such effects. A discussion of alternative explanations is provided after reporting the empirical results.

2 Structure, Investment, and Performance in Hollywood

The motion picture industry has a history of over a hundred years. Since the 1910s, production has been concentrated in Los Angeles, thus the industry is colloquially known as Hollywood. The configuration of the industry follows its output, the feature film, and firms take various organizational forms from fully integrated to narrowly specialized. The risk of movie production and financing makes collaboration among *production* companies a common practice (Goettler and Leslie 2005), while theatrical *distribution* is performed by only one company per film. Firms compete actively in the market. For instance, in 2004 the median production budget was $20 million, and 504 films were released in the market. There exist a few dominant firms, called the *majors*, and hundreds of distribution and production firms of different sizes, called *independents* by opposition to the majors.[1] Distribution firms (called "studios") play a key role in investing and enhancing performance at different stages of a movie's cycle, and they are the focus of this paper. The key aspect of most feature film deals is distribution because a movie's financial performance hinges on good commercialization. Either directly or indirectly, distributors make decisions most critical to the economic success of a feature film.

The period 1985–2005 shows substantial heterogeneity in the behavior and performance of distribution companies. Reacting to changes in the competitive environment around 1991, some majors acquired independent distribution companies, while others developed quasi-independent divisions parallel to their core operation. These acquisitions and internal developments were essentially different from previous events in the industry because the majors changed their structure. That is, instead of merging the newly acquired independents into their distribution division, the majors let the new divisions have some autonomy in their operations (Natividad 2008). These divisions were staffed differently from the core divisions, maintaining

[1] Hereafter, the term *studio* is used to refer to distribution companies, as is the practice in the industry.

a different market focus and being recognized as distinct by the Motion Picture Association of America under the denomination "specialty divisions."[2]

Table 1 lists summary histories of major and specialty divisions in the period studied. This list is interesting, as it includes textbook examples of entertainment industry synergies. The sample for the empirical analysis draws from all these firms plus a large number of focused firms not listed here for brevity. What began in 1991 with Sony Classics and gained visibility in 1993 with Disney acquiring Miramax became a widespread organizational design by 2005. Industry observers believed that the arrival of specialty divisions helped revive the Hollywood economy. This paper investigates whether the multidivisional structure enacted by such strategic decision affected investment returns.

3 Empirical Design

3.1 Data

The data draw from the population of 7,491 feature films released in the U.S. between 1985 and the first quarter of 2005. The main industry data sources are *Variety*/ACNielsen EDI, Studio System, TNS Media Intelligence, and the Internet Movie Database (IMDb). Corporate information is obtained from Compustat, Hoover's Online, the *Wall Street Journal* archives, Wikipedia, and Dun & Bradstreet's *Who Owns Whom*. The project-level information reported by *Variety*/ACNielsen EDI assigns each movie to a single distribution company or division of a company (e.g., movies from the Walt Disney Corporation are reported as either distributed by Buena Vista or Miramax). I use these data sources to gauge the organizational design of studios and to control for other sources of heterogeneity.

The database also contains detailed project-level information. Production budget information is available for about 40% of all movies. The creative team information on actors, directors, producers, and writers is available for about 95% of the population of feature films (179,732 unique individuals). With these data, I construct personal track records to be

[2]The term "specialty" does not mean that these divisions only make niche movies.

analyzed at the team level.

Table 2 provides summary statistics on 2,150 movies with investment information between 1990 and 2005, which constitute the main sample of the study. The median movie costs \$14.7M and collects \$9.9M in box office revenue. (All figures are expressed in 1985 dollars to account for inflation). Over 65% of movies were distributed by multidivisional firms.

Before describing the tests, it is instructive to plot the key variables of the study. Figure 1 shows the average production budget and box office revenue for the four most popular movie genres, breaking down the estimates by type of organizational structure: focused or multidivisional. There is great heterogeneity in the influence of structure across genres. In some cases multidivisional structure is associated with higher box office revenues (e.g., comedy). But in the four cases displayed, multidivisional structure is associated with larger production budgets. The goal of the empirical design is to assess the causality of this asymmetric pattern.

3.2 Specification

To analyze the effect of multidivisional structure on project-level investment and performance, the main empirical models follow the general form:

$$DV_{itk} = \alpha + \beta \cdot Multidivisional_{itk} + \eta \cdot controls_{itk} + \delta_g + \gamma_t + \epsilon_{itk} \quad (1)$$

where DV_{itk} is a project-level measure of investment or performance of a movie k distributed by studio i in year t, $Multidivisional_{itk}$ is a dummy for whether studio i is part of a multidivisional structure in year t, $controls_{itk}$ is a vector of controls, δ_g is a genre fixed effect, γ_t is a year fixed effect, and ϵ_{itk} is an error term. The key dependent variables in the study analyze investment returns by separating their three main components: production investment, advertising investment, and box office revenue.

Production investment is gauged using a movie's production budget in millions of dollars. The items typically included in the production budget are the cost of the script, the salary of

the producer, director, leading actors and other cast members, as well as the sum of "below-the-line" expenses such as the salaries of the crew and material expenses incurred.

Advertising investment is modeled using television advertising expenses for a movie expressed in millions of dollars. The marketing of a movie typically involves several expense items, but the most representative is investment in television time. TNS Media Intelligence collects this variable directly from advertisers and media.

Performance is gauged with box office revenue, as is customary in research and practice. While alternative revenue sources for studios (e.g., DVD sales) are not included in this variable, previous work has shown that ancillary revenues are directly related to the performance of a movie in theaters. Additional models in Section 4.4 consider broader measures of performance.

3.2.1 Identification strategy

Because firms choose their organizational structure, the endogenous nature of this choice makes difficult to draw inference estimating equation (1) with ordinary least squares. For example, the characteristics requiring higher investment may drive the participation of a multidivisional studio in a movie, and not the converse. In this logic, the association of larger budget and multidivisional structure drawn from figure 1 could be a simultaneous correlation rather than a relation going from structure to investment efficiency in the causal sense.

The identification strategy to address this endogeneity problem consists in exploiting cross-sectional differences in the configuration of teams to instrument for the participation of a multidivisional structure in a project. This empirical strategy is enabled by the project-oriented focus of the movie industry in the period studied. Specifically, the conditions under which a multidivisional structure affects project operation depend on a match, namely, that creative teams participate in projects involving a multidivisional studio rather than a focused studio.[3] Because the match between a creative team and a studio type is cross-sectional, it is

[3]I do not impose the assumption that the creative teams select their distributors, but that there is a match based on team characteristics. My design is reminiscent of brokerage matches (e.g., Garmaise and Moskowitz 2003) without assuming explicitly which party selects the other.

inadvisable to estimate equation (1) using studio fixed effects. Nevertheless, genre and year fixed effects help isolate unobserved heterogeneity in the product and market-wide dimensions.

Three instruments for the participation of a multidivisional studio in a project are expected to be unrelated to investment returns, except through their effect on the match with a multidivisional or focused distributor. The first instrument is the average recent experience of a team in dealing with major studios, defined for team k as:

$$\text{Experience with majors}_{k,t} \quad = \quad \left(\sum_{i \in I^k} \frac{\sum_{i,t-3}^{i,t-1} \#MoviesM_{i,t}}{\sum_{i,t-3}^{i,t-1} \#Movies_{i,t}} \right) / n(I^k)$$

where I^k is the set of all "principals"[4] in movie k (i.e., actors, directors, producers, and writers), i is a principal, $\#MoviesM_t$ is the number of movies made with major distributors in year t, and $\#Movies_t$ is the count of all movies. The measure is calculated over the individuals' records in the three calendar years prior to the current movie. It is expected that creative teams with more recent work experience with the majors should be more prone to working with these firms or their specialty divisions by sheer familiarity.

The second instrument is the diversity of team members' recent interactions with distribution companies:

$$\text{Diversity of interactions}_{k,t} \quad = \quad \left(\sum_{i \in I^k} \#Distributors_{i,t-1} \right) / n(I^k)$$

where $\#Distributors_{i,t}$ is the number of distribution companies with which principal i made a movie in year t. It is expected that creative teams with more exposure to different distribution companies do not benefit as much from the greater variety offered by a multidivisional structure, thus being less likely to contract with a multidivisional studio.

The third instrument is the average size of teams on which individuals in movie k participated in the recent past:

[4] I use the term "principals" for all creative members of a movie's team, as used in research and practice, not to be confounded with a principal-agent terminology.

$$\text{Previous team size}_{k,t} \quad = \quad \left(\sum_{i \in I^k} \sum_{i,t-3}^{i,t-1} Av.TeamSize_{i,t} \right) / n(I^k)$$

where $Av.TeamSize_{it}$ is the average of the total number of individuals for each movie in which individual i participated in year t. It is plausible that teams with creative members exposed to more talent in the recent past may not greatly benefit from matching with a multidivisional structure, which offers such an environment because of its pooled talent across divisions.

Using a vector Z_{itk} of the three instruments described, the estimation follows a 2SLS (two-stage least squares) design in which the first stage has the form:

$$Multidivisional_{itk} = F(Z_{itk}, controls_{itk}, \delta_g, \gamma_t, \nu_{itk}) \tag{2}$$

where F is a function of the instruments and the controls, δ_g is a genre fixed effect, γ_t is a year fixed effect, and ν_{itk} is an error term. The second stage for the 2SLS design is equation (1). Although the endogenous variable $Multidivisional_{itk}$ is binary, the estimation uses a linear specification for equation (2), as suggested by Angrist (2001). For robustness, F is also estimated using a nonlinear Logit specification without changing the results. The 2SLS models are panel regressions that allow for correlation in the observations belonging to the same distribution company, that is, clustering standard errors by studio.

Exogeneity of the instruments.- Although I do not observe a single unambiguous natural experiment, the detail of the data at the person and project level allows me to construct team-specific variables that evolve plausibly independently from the unobserved parameters leading firms to become multidivisional. The core of this empirical strategy is based on assuming that I observe exogenous team-specific differences in the matching environment that also result in differences in structure matching outcomes. Certainly the reasons why individuals match are endogenous (e.g., Ackerberg and Botticini 2002, Karlan 2007). Nevertheless, my focus is on team-level variables only to the extent that they help predict a match at a higher level, not on their internal matching per se.

Exclusion restriction.- I argue that the diversify of interactions, the previous team size, and the experience working with majors in the past should not enter directly regression (1). Though it could seem that these variables have something to do with strength of network effects that may influence salaries, an important component of investment, it is worth noting that salaries are determined at the person level while these variables are defined at the team level. Moreover, a proxy for star power is already included as a control in the first and second stages of the specification, as star power should affect investment and performance directly. Thus the exclusion restriction is that the marginal effects of the three team-level instruments are wholly captured through the match with a multidivisional or focused structure. I provide some quantitative evidence on the exclusion restriction in Section 4.2.

3.2.2 Controls

- *Project-level control variables.* *Talent quality score* is the average of personal scores obtained summing the box office revenue of movies made by each creative member in the movie — producers, directors, writers, and actors — during the three years prior to the current movie. This value proxies for the star power of the team, and serves as a control for the investment opportunities of the project.[5] *Specialty* is a dummy indicating whether the movie was distributed by the specialty division of a multidivisional firm or whether the movie was considered specialty (niche) within a studio even if it didn't have a multidivisional structure.[6] *USA production* is equal to one if all production firms involved in the movie are U.S. based. *Film length* is measured in minutes and proxies for the type of production. *Talent experience in films* is the average of the count of previous feature films done by the principals participating in the movie: directors, producers, actors, and writers. *Number of principals* controls for the size of the project and the span of control of the director and producers. *New director dummy* is equal to one when the director of

[5]Investment regressions typically control for investment opportunities at the firm or divisional level. Because I am modeling project investment, I use a proxy that reflects opportunities at the micro level of each project. In the movie industry, the box office power of stars is a first-order indicator of the revenue potential of an investment prospect.

[6]One example is the case of MGM Studios, allowing to observe *Specialty* as not trivially related to *Multidivisional.*

the film has never directed a feature film before. *Debuts in role* is a ratio of the count of principals appearing for the first time in a role (i.e., actor, director, producer, or writer) divided by the number of principals.

- *Corporate and divisional control variables.* *Publicly traded* is equal to one if the distributor is or belongs to a publicly-traded firm, capturing differences due to the access to capital markets. *Herfindahl of genre* captures the product breadth strategy of each studio. *Movies distributed lagged* is the count of the distributor's movies in the previous year and controls for the effects of scale.

4 Results

4.1 Event Study: Investment Returns after Studio Acquisitions

Before laying out the instrumenting design, I exploit the within-firm variation of investment and performance in studios that switched from focused to multidivisional by means of an acquisition. The tests are centered on independent studios that were acquired by the majors and kept a semi-autonomous operation as part of a multidivisional structure.[7] The within-organization changes in investment and performance are obtained using studio fixed effects, and because studios tend to develop an expertise in genres that may be affected by an ownership change, all models use genre fixed effects as well.

Table 3 shows a positive significant increase in production budget after a focused studio is acquired by a major distributor. When measuring the effect using 4 and 5 year event windows, the point estimate is \$5.21 million and \$5.97 million, respectively.[8] The time window is chosen to be greater than the usual development time of 3 to 4 years a movie may require.

The increase in investment is further confirmed in table 3 when observing advertising

[7] All acquisitions in the movie industry in the sample period involved a major acquiring an independent, so no comparison can be drawn with the case of an independent acquiring another independent. The focus of the study, however, is on multidivisional form rather than on whether the acquirer is a major participant in the market.

[8] Note that the t-statistics are high but clustering standard errors at the distributor level reduces greatly the degrees of freedom, making the usual cutoff of 1.96 go up because of the small number of clusters.

expenses after an acquisition. Columns 3 and 4 show that focused studios increase their advertising investment by more than $2.67 million after being acquired by a major studio. The effect is strongly significant (t-statistics greater than 5.1) and insensitive to changing the window length. Because advertising investments have a shorter decision cycle than production investments, the results clearly reflect new investment policies in the multidivisional form.

In contrast to the increment in production and advertising investments, however, performance does not change after the independent studio becomes part of a multidivisional firm. Columns 5 and 6 show that the box office revenue of movies distributed by acquired studios does not increase significantly after the event. The t-statistics of the *After Acquisition dummy* are less than 0.1, and the result is due to a low estimate for the coefficients rather than a high variance. The results of the event study suggest that the investment returns of independent studios decrease drastically when they enter a multidivisional form.

4.2 Testing the instruments

The key endogeneity concern in relating investment efficiency to multidivisional structure is that investment is likely to be correlated with unobserved heterogeneity also related to structure. For example, the drivers of larger investment may cause the involvement of a multidivisional structure, and not the converse. As discussed in Section 3.2.1, the instrumenting strategy to address this concern consists in exploiting the project nature of the movie industry to predict the match between a creative team and a structure type. The sample is all movies with production budget information available from 1990 onwards, the period when multidivisional design was adopted in the industry.

The first three columns of table 4 show the explanatory power of the instruments for multidivisional structure. Column 1 shows that greater team-level experience with major studios in the past, lower team-level diversity of interactions with distribution companies in the recent past, and lower team-level record of experience with large teams significantly explain a match with a multidivisional studio.

The instruments are also highly significant when explaining the binary dependent variable with a Logit specification. Column 2 of table 4 demonstrates that the instruments are strongly driving the choice of a multidivisional structure in the presence of controls and fixed effects. The results of the equivalent linear regression, shown in column 3, are qualitatively the same as those in the Logit case, and the instruments are highly significant, with an F-statistic of 8.7. This fully specified linear regression will be used as the first stage in the 2SLS design.

Although the exclusion restriction for the instruments has been argued in economic terms and is generally untestable, I obtain evidence on its plausibility. In additional models, I introduce the instruments directly in the main regression while at the same time also controlling for movie profitability, defined as revenue minus cost. If the team level instruments had nothing to do with budget and revenue, the coefficient on the instruments in this modified regression should be zero. Indeed, that is the result of untabulated regressions of movie budget and box office performance, suggesting that the instruments are properly excluded from entering the main regression directly.

4.3 Multidivisional Structure and Investment

Table 4 shows that the influence of multidivisional structure on investment is sizable. Column 4 regresses the production investment in a movie on (instrumented) multidivisional structure and controls. The 2SLS estimate reveals that the participation of a multidivisional distributor in a movie adds $22.9 million to the production investment if it is carried by the main division of the distributor, or $7.7 million if it is carried by its specialty division. (This value is obtained adding $22.9 and -$15.2). The influence of structure is positive and significant after controlling for the quality of the team, suggesting that multidivisional structure has a distinct influence beyond the explanatory value of project-specific sources of heterogeneity. Because the models use three instruments to explain one endogenous variable, a test of overidentifying restrictions is suitable. The p-value of 0.39 for the corresponding Jensen test suggests no reason to challenge the validity of the instrumental design.

While empirical inference is enhanced by the instrumenting strategy, the heterogeneous

nature of production investment (the dependent variable in model 4) may lead to quite different interpretations. Specifically, in terms of the discussion in Section 1, one reason for larger investment could be complexity — multidivisional structure poses challenges to complete projects efficiently. Yet larger production budget could also be attributed to the consumption of personal benefits in the making of a movie, like socializing with Hollywood stars. To distinguish competing mechanisms, further tests will complement this result.

Investment in movie advertising is the new dependent variable examined. Column 5 of table 4 demonstrates that (instrumented) multidivisional structure has a positive and significant effect (t-stat=4.25) on advertising investment, with the additional insight that this investment should have little to do with agency-type consumption because it is an expense measured in TV-time dollars. The point estimates indicate that multidivisional structure increases advertising by \$13.5 million for the main division of the firm, or \$5.8 million for the specialty division. (This value is obtained adding \$13.4 and -\$7.6). Another feature of advertising investment is that it is determined later than production expenses, once managers have updated their beliefs about the project's potential. The result in column 5 suggests that, despite more information, multidivisional structure strongly affects advertising investment, after controlling for the quality of the stars in the movie. While the disaggregate investment items facilitate the observation of different motivations, I will further address the causal mechanisms relating multidivisional structure and investment returns in Section 4.5.

4.4 Multidivisional Structure and Performance

In contrast with the positive and significant effect of structure on investment, multidivisional structure does not improve the market performance of a movie. Column 6 of table 4 reports a 2SLS regression of box office revenue on (instrumented) multidivisional structure. The t-statistic for multidivisional structure is 0.62, and the insignificant point estimate is lower than the analogous coefficient estimates in columns 4 and 5 taken individually or added.

The high variance of box office revenue (e.g., De Vany and Walls 2002) is not likely driving the insignificant effect of structure, as some coefficient estimates on the controls in

column 6 show high significance. For example, movies with high-quality talent do better at the box office (t-stat=9.57). Suffices to note that in the 2SLS design of table 4, multidivisional structure does not drive performance while it does drive investment layouts.

4.4.1 Exploring the Ancillary Revenue Hypothesis

Movies may have more 'legs' in a multidivisional firm. I explore the possibility that the effects of a multidivisional structure on performance are hidden in ancillary sources of revenue beyond the box office. Because the data only allow me to see box office revenue as the measure of performance, I test the ancillary revenue hypothesis relying on external studies that link this measure with other sources of revenue.

The first approach is to predict *total* revenue based on the observable characteristics of a movie. Luherman and Teichner (1992) provide information on total revenue,[9] and I use this information to make out-of-sample predictions of total revenue for the same distributors as those in Luherman and Teichner's study. Then I regress via 2SLS the predicted total revenue on multidivisional structure and the usual controls. Panel I of table 5 confirms that the effect of multidivisional structure is asymmetric. There is a positive and significant influence of structure on production investments (t-stat=2.84) and advertising investments (t-stat=2.92), but no significant influence on total revenue.

In a second test of the ancillary revenue hypothesis, I predict a particular component of studio revenue, DVD sales, using coefficient estimates from Luan and Sudhir (2005). I impute the coefficients on the characteristics that most significantly predict DVD sales, and make out-of-sample predictions of DVD sales for the same years as those in Luan and Sundhir's study. The 2SLS results in panel II of table 5 demonstrate that the broader measure of performance including DVD sales is not significantly affected by (instrumented) multidivisional structure, thus finding no evidence for the ancillary revenue story.

[9]The Arundel case is fictional, but the data in the case are real.

4.4.2 Performance-enhancing effects of structure

Does multidivisional structure benefit performance at all? The insignificance of structure for performance can be further checked using a particularly important sample of movies: those with high talent quality. Anecdotal evidence suggests that the largest movie studios center their marketing strategy around movies with blockbuster potential. I modify the 2SLS specification to focus on how structure may affect investment and performance in the case of high star power movies. I first create an alternative control measure for talent quality based exclusively on top-billing actors. That is, instead of measuring talent quality as the track record of all actors on the team, I selectively include the histories of only the top-20 actors on the billing list. Then I select a sample of movies with a very high value for that control and estimate the effect of multidivisional structure via 2SLS with the usual controls. The untabulated results suggest that multidivisional structure actually benefits investment returns in this type of movies through enhancing box office performance to a larger extent than increasing investment.

4.5 Causal mechanisms linking structure and investment efficiency

The evidence discussed in Sections 4.3 and 4.4 suggests that multidivisional structure has a negative effect on investment returns. In this section, I test for the mechanisms for such influence: agency and operating complexity.

4.5.1 Agency I: R-Rated movies

Despite the fact that R-rated movies do not have wide commercial appeal and are less profitable than general-audience movies, studios persist making R-rated movies. This puzzle has several explanations (e.g., De Vany and Walls 2002), the clearest being agency. In particular, Ravid and Basuroy (2004) show that R-rated movies are a vehicle for agents to maximize utility in ways that may conflict with a firm's profitability, as R-rated films offer corporate managers an opportunity for hedging.[10] In addition, it is also possible that managers extract benefits from

[10] As Ravid and Basuroy put it, "the particular characteristics of this industry are likely to encourage seemingly suboptimal behavior on the part of managers, along the lines described in the literature. In particular, film

R-rated movies other than profit maximization — a preference for "art" only appreciated by small niches of the population, or for "creative complexity" advanced in movies with sex and violence. These tensions make agency a plausible mechanism for inefficiency.

I exploit the underlying difference between R-rated[11] and general-audience movies in the analysis of agency by conducting the main tests of the paper on the subsample of R-rated films. Panel I of table 6 reports 2SLS results. There are noticeable consequences of multidivisional structure in the returns of R-rated movies. The coefficients on (instrumented) structure are highly significant in columns 1 and 2, suggesting R-rated movies receive more investment attributable to being carried by a multidivisional studio. While performance increases with multidivisional structure, investment grows to a greater extent, so that the revenue increment is insufficient to compensate for higher costs. In untabulated results, I find that general audience movies do not receive more production investment due to multidivisional structure.

4.5.2 Agency II: Acquisitions vs. Internal Developments

As documented in Section 4.1, independent studios increase their production and advertising investments when they become part of a multidivisional structure by means of an acquisition. This finding motivates a further examination of agency by exploiting differences between divisions resulting from acquisitions and divisions resulting from internal development. Because acquired independent studios were allowed to keep their management in place, agency-driven decreases in investment returns should be more pronounced in acquired studios relative to divisions developed internally.

Panel II of table 6 reports regressions based on multidivisional studios resulting from acquired divisions, taking focused studios as the control sample. As shown in columns 4 and 5, multidivisional structure significantly increases production investment (t-stat=1.77) and advertising investment (t-stat=4.12). In contrast to that influence, however, box office revenue does not improve due to structure. In untabulated models, I find an insignificant effect of

studios have a collection of projects, which are difficult to hedge individually and as a group."

[11]The database includes the few NC-17 and X-rated films released in regular theaters and covered by *Variety*, but no movies of these types have budget information available.

multidivisional structure on the investment of internally-developed studios. Thus the second test of agency in the effects of multidivisional structure confirms that a tension in managerial incentives explains the decrease in efficiency, at least in part.

4.5.3 Complexity: Commercialization and Timing

One central issue in the management of multidivisional firms is the need for centralization and coordination. Compared with focused organizations, multidivisional firms need to coordinate many aspects inherent to running the business, where complexity is perhaps greater when divisions are closer to each other in the product spectrum (Zhou 2008). Corts (2001) addresses the efficiency consequences of vertical divisionalization and coordination. In contrast, I ask whether the complexity of horizontal divisionalization is a causal driver of lower investment returns.

To test this hypothesis, I exploit information on movie commercialization and scheduling as key managerial tasks where the influence of structure can shed light on causality. On the one hand, commercialization is the most important activity of movie distributors, and changes in commercialization policies are certainly associated with higher coordination costs. On the other hand, scheduling is paramount in the movie distribution business. Studying the effects of multidivisional structure on scheduling strategies can reveal the complexity argument linking structure and investment returns.

Table 7 reports the tests of complexity. In the first model, I estimate via 2SLS the impact of multidivisional structure on the lag between the current release date and the next release date of the studio measured in days. The coefficient on (instrumented) structure is positive (t-stat=1.59), suggesting that multidivisional structure leads studios to spread out their movies, possibly to avoid internal competition and strengthen the slate of the larger structure.

I also find a large increment in the number of opening screens associated with multidivisional structure. Column 2 of table 7 shows that (instrumented) structure has a positive influence on opening screens (t-stat=3.37). These findings suggest that the

commercialization of movies inside a multidivisional firm becomes more difficult, as manifested in the drive to coordinate the marketing of movies.

Multidivisional structure also affects decisions regarding the release of movies in the U.S. and abroad. In column 3 of table 7, I regress the absolute distance between the release dates of the same movie in the U.S. and abroad, measured in days. The estimate on (instrumented) multidivisional structure is negative (t-stat=-1.98), suggesting that multidivisional structure leads studios to shrink the window between release dates, a decision reflecting the increased complexity of distribution. In addition, I test how multidivisional structure influences the decision to release a movie in the U.S. before releasing it abroad. This binary variable is regressed via 2SLS on multidivisional structure and the standard controls. The result of interest, shown in column 4, is positive and significant (t-stat=1.93), confirming that a multidivisional design is associated with changes in releasing policies that may provide a mechanism for inefficiency.

4.6 Capital availability and managerial competence

To conclude the empirical analysis, I provide further evidence that the negative effects of multidivisional structure are specifically associated to the existence of an internal capital market. Table 8 models the changes in the behavior of movie studios that switched from privately to publicly held, or vice versa, in the period of interest. The sample is modified accordingly, including only distributors that went through both regimes. As before, business unit, genre and year fixed effects are included.[12] The results in table 8 show no significant difference in production budgets across regimes. All the contrary, box office revenues are significantly higher in publicly-held regimes. The results of table 8 suggest that access to external capital markets does not lead to lower investment returns, so that the body of evidence documented so far shall be attributed to internal capital availability.

Despite its consequences, however, a multidivisional design may have been a rational

[12]The models in table 8 use absolute, not relative, year fixed effects because most of the regime changes are to go private rather than to go public.

ex ante choice to capture the rents of managerial competence. Table 9 reports a variance components model analogous to Rumelt's (1991) analysis of business unit effects,[13] attempting to untangle the locus of success in the movie industry. The models attribute movie returns to the genre, the division (business unit), the year in which the movie is released, and interactions between genre and year, as well as genre and business unit. The results show that business unit effects are much more important than genre, year, and genre-year effects when explaining the variance of returns. This striking result, new to the literature, is suggestive that movie conglomerates may have rationally chosen to acquire independent firms, maintaining their previous organization to capture the rents of highly talented management.

5 Discussion and Concluding Remarks

It is now appropriate to discuss alternative explanations to the finding that multidivisional structure effects a decrease in investment returns. One explanation could be that these lower returns need not be associated with a decrease in efficiency. For example, a neoclassical model of firm behavior in equilibrium could attribute the decreasing returns to the larger scale of major studios as compared with focused firms. Two arguments provided in the paper make this explanation unlikely. First, the empirical design measures alternatively *within* changes in the investment behavior of focused firms that enter a multidivisional form and *between* differences in investment and performance after controlling for studio size. Because both specifications yield an increase in investment not accompanied by an increase in performance, the decreasing returns to scale story does not seem to carry much weight. Second, multidivisional operation in the distribution business is a relatively new design in Hollywood, and as recently noted in the press (e.g., The Wall Street Journal 2.11.08), several multidivisional studios have reverted back to focused. The conjecture of decreasing returns to scale, however, is ultimately empirical and has been recently shown to be invalid for the case of bio-pharmaceutical firms (Guedj and Scharfstein 2005). So even if efficiency is typically hard to pin down without a benchmark for

[13] Rumelt (1991) used variance components techniques to discover that the locus of performance differentials is not the firm but the business unit. The estimation is based on linear algorithms that do not prevent a variance component estimate to be negative.

optimality, the asymmetric effect of structure in the movie industry appears to be a clear sign that firms are becoming less profitable because of such organizational policy.

Another explanation could be that, even if multidivisional structure reduces investment returns in the way measured in the paper, it leads to other market advantages not accounted for in the empirical design. For example, multidivisional structure may help achieve bargaining power with suppliers (e.g., stars) or clients (i.e., movie theaters), and indeed multidivisional structure seems to be associated with higher investment returns in star-studded projects, as reported in Section 4.4.2. Although a detailed exploration of this possibility would be feasible with more data not available in my sources, it is unlikely that the conclusion about investment returns would be much different for two reasons. First, such aggregate analysis of performance is the focus of the cross-industry literature on the diversification discount, which has failed to find significant gains to multidivisional design. Second, a vast body of work on the movie industry has shown that theatrical results are strong predictors of further revenues (see Eliashberg, Elberse, and Leenders (2006) for a review). In light of these literatures, the finding that multidivisional structure does not boost box office performance is evidence that it may not help reap subsequent benefits, all else being constant.

The key theoretical contribution of this paper is to link capital allocation with managerial action. This relation is most revelant, as research has typically focused on the financial aspects of the investment process without considering its managerial dimension. For example, recent findings on the agency view of capital budgeting (e.g., Seru 2007) leave aside the possibility that multidivisional operation involves various organizational challenges that require more coordination (e.g., Rawley 2007), thereby increasing costs and leading to policy changes that may be suboptimal. Although agency cannot be dismissed, it should be considered in the context of other managerial mechanisms linking organizational design and value creation (or destruction) opportunities. A second theoretical insight provided in this paper is the need for a joint consideration of the advantages of a corporate design (Rumelt 1974) and the low-level locus of managerial competence (Rumelt 1991), a long standing puzzle in strategy. Recent work suggests that hybrid organizations could exploit generalization and specialization to achieve the

best of both worlds (Dessein, Garicano, and Gertner 2008). How effectively a multidivisional structure may allow for such possibility remains a promising avenue for future work.

The empirical novelty of this paper contributes to the growing interest in modeling the determinants and consequences of organizational form. Recent work has used industry characteristics (Hortaçsu and Syverson 2007), weather conditions (Lederman and Forbes 2008), and intra-firm system differences (Novak and Stern 2007) to address the endogeneity of organizational form, providing plausible instruments in the absence of natural experiments. It is worth noting, however, that all this work has sought to explain vertical integration as a relevant dimension of firm boundaries, while horizontal divisionalization remains relatively understudied, not without controversy (e.g., Villalonga 2004). Besides the strategic decision of interest, the instrumentation idea introduced by this paper is also new. The empirical design uses person-level variables averaged at the team level to gauge firm structure, bearing similarity to work by Garmaise (2008), who models corporate financial constraints using personal owner instruments. Moreover, the exogeneity assumption consists in observing variables outside the firm (i.e., teams of people external to a movie studio) and taking them as orthogonal to unobserved parameters linking divisionalization and investment returns at the corporate level. This idea bears similarity to work by Asker and Ljungqvist (2008), who observe mergers of investment banks to identify the threat of leakage leading to customer switching. In addition to probing the validity and significance of the instrumenting strategy, I perform an event study of within-studio changes due to organizational form, thereby showing the plausibility of the results.

A growing industry literature has questioned the efficiency of movie companies (e.g., Corts 2001, Chisholm and Norman 2006, Sorenson and Waguespack 2006, Einav 2007, Natividad 2008). The results of this paper shed new light on causality by proposing that a significant component of the negative returns observed in Hollywood is due to excessive structure leading to overinvestment. Several related questions can now be raised. How do multidivisional and focused studios differ in their project selection capabilities? Can multidivisional firms transfer knowledge and creative talent more effectively across divisions?

Are there spillover effects that enable some firms to achieve an advantage, even if temporary?

The study of firm boundaries and internal capital markets is particularly relevant in an economy where most large firms are diversified, and where more companies are striving to invest strategically given the volatility of external capital markets. New evidence on why internal markets for financial and human capital exist, what they do, and how they can be improved will have substantial welfare implications.

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Figure 1: Structure, Investment, and Performance in Most Popular Genres

This figure shows the average production budget and box office revenue of movies in the four most popular genres: action, comedy, drama, and suspense. The data are from 1990-2005, the period when Hollywood distributors participated with a multidivisional structure. Budget and box office revenue are in 1985 millions of dollars.

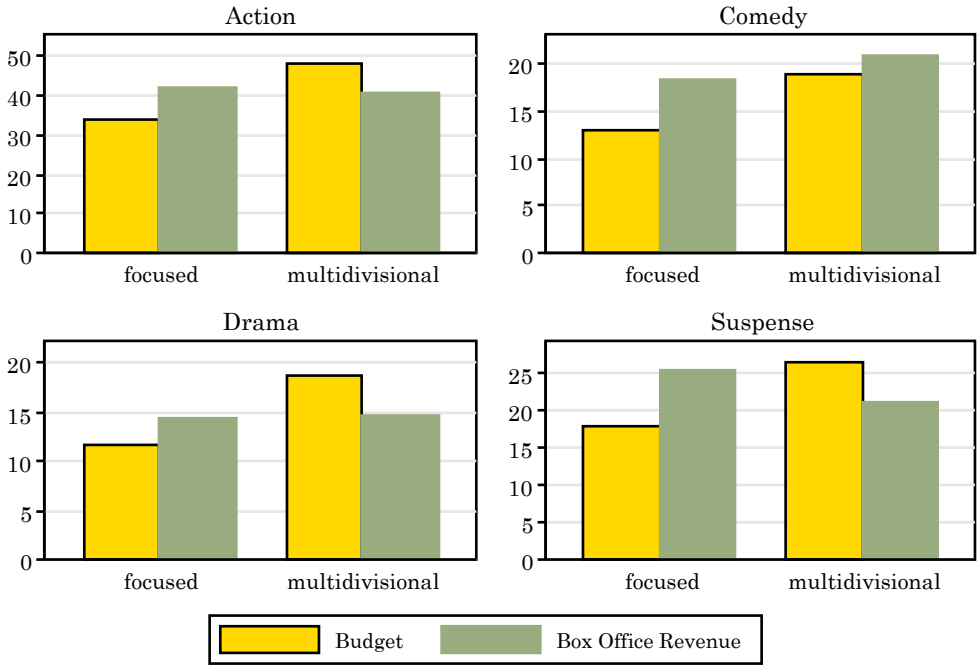

Table 1: Hollywood Major Studios, their Acquisitions and Internally Developed Divisions

This table presents information on the major Hollywood studios and their specialty divisions in existence through acquisition or internal development between 1985 and and the first quarter of 2005. Ownership information is from Hoover's, the *Wall Street Journal* archives, Dun & Bradstreet's *Who Owns Whom*, and Wikipedia. t_0 is the quarter of the first movie launched by the distributor in U.S. theaters in the period 1985.1-2005.1, covered by *Variety*/AC Nielsen EDI; t_f is the quarter of the last movie launched in the same period.

Distributor	**Classification and ownership summary description**	t_0	t_f
Buena Vista	Major, a division of Disney.	1985.1	2005.1
Columbia	Major, acquired by Coca-Cola, then acquired by Sony (1989), ceased distribution in 1993.	1985.1	1993.4
Fine Line	Independent, later specialty division of Time Warner, always related to New Line.	1991.2	2004.4
Focus Features	Specialty division related to Universal, formed merging USA Films and Good Machine.	2001.2	2005.1
Fox Searchlight	Specialty division of Fox Entertainment (News Corp).	1995.3	2005.1
Gramercy	Independent, later specialty division, sequentially owned by Polygram, Seagram, and USA Networks.	1993.2	1999.1
MGM / UA	Major, public and private at different times. Sold library to Turner (1986). Acquired by Sony (2005).	1985.1	2005.1
Miramax	Independent, later specialty division, acquired by Disney in 1993.	1986.4	2005.1
New Line	Independent, later specialty division, acquired by Turner (1993), absorbed by Time Warner (1996).	1985.2	2005.1
October Films	Independent, later specialty division, bought by Seagram (1997), sold to USA Networks (1999).	1991.4	1999.2
Paramount	Major, acquired by Viacom (1994).	1985.1	2005.1
Paramount Classics	Specialty division related to Paramount.	1999.2	2005.1
Sony Classics	Specialty division owned by Sony.	1991.4	2005.1
Sony Pictures	Major since acquisition of Columbia, owned by Sony.	1994.1	2005.1
Tristar	Major, joint venture of Columbia, HBO and CBS, absorbed by Sony.	1985.1	1993.4
Twentieth Century Fox	Major, public until 1981, then absorbed by News Corp.	1985.1	2005.1
Universal	Major, sequential owners: MCA, Matsushita, Seagram, Vivendi, General Electric/NBC.	1985.1	2005.1
USA Films	Specialty division owned by USA Networks, then Vivendi, General Electric/NBC, renamed Focus Features.	1999.2	2001.2
Warner Bros.	Major, a division of Time Warner.	1985.1	2005.1
Warner Indep. Pics.	Specialty division owned by Time Warner.	2004.3	2005.1

Table 2: Summary Statistics and Correlation Matrix (n=2,150)

The panels present summary statistics and correlations for the main variables of the study. The sample is for the period 1990 onwards and corresponds to all movies for which production budget information is available. The unit of observation is the feature film. The production budget, advertising budget, and domestic box office revenue values are expressed in 1985 dollars. The multidivisional structure dummy gauging the existence of an internal capital market is one if the distributor is affiliated by ownership with other distributors in the market, regardless of whether they were acquired or developed internally. The quality score of the talent is the team average of the individuals' 3-year moving average of box office receipts. The dummy for USA production equals one if all production firms involved in the movie are based in the U.S. The film's length is measured in minutes. The experience of creative talent in films is the average of the count of previous feature films done by the principals. The number of principals includes actors, directors, producers, and writers. Debuts in role are ratios for principals participating for the first time in a creative role (e.g., actor), while new director is a dummy for directors in their first feature film. The specialty indicator equals one if the movie was carried by the specialty division of a major studio. The Herfindahl index of genres is calculated for the distributor in the year previous to the release of the movie. Publicly traded is a dummy for studios belonging to publicly traded firms.

	Variable	**Median**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
1	Budget ($M)	14.72	22.24	22.69	0.00	155.57
2	Advertising ($M)	6.55	8.45	7.96	0.00	46.35
3	Box office revenue ($M)	9.86	23.16	34.31	0.00	402.77
4	Multi-division structure dummy	1.00	0.66	0.48	0.00	1.00
5	Talent quality score	35.28	37.82	25.01	0.00	223.38
6	USA production	1.00	0.88	0.32	0.00	1.00
7	Film length (minutes)	104.00	107.27	20.34	15.00	259.00
8	Talent experience in film	3.01	3.22	1.79	0.02	13.28
9	Number of principals	48.00	52.81	28.34	1.00	402.00
10	New director dummy	0.00	0.10	0.30	0.00	1.00
11	Debuts in role	0.00	0.01	0.02	0.00	0.50
12	Specialty	0.00	0.25	0.43	0.00	1.00
13	Herfindahl of genres	0.24	0.28	0.14	0.13	1.00
14	Publicly traded	1.00	0.85	0.36	0.00	1.00
15	Movies distributed, lagged	15.00	16.22	8.12	1.00	35.00

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1														
2	0.66													
3	0.60	0.57												
4	0.14	0.27	-0.04											
5	0.51	0.43	0.35	0.12										
6	0.22	0.26	0.19	0.00	0.35									
7	0.36	0.20	0.27	-0.06	-0.01	0.03								
8	0.30	0.32	0.13	0.21	0.76	0.30	-0.05							
9	0.30	0.28	0.22	0.07	-0.06	0.13	0.39	-0.20						
10	-0.15	-0.11	-0.07	-0.04	-0.02	0.05	-0.10	0.00	-0.08					
11	-0.13	-0.12	-0.06	-0.05	0.01	-0.02	-0.13	0.05	-0.17	0.45				
12	-0.30	-0.26	-0.22	0.39	-0.21	-0.23	-0.10	-0.04	-0.13	0.05	0.06			
13	-0.33	-0.33	-0.23	-0.16	-0.25	-0.27	-0.08	-0.14	-0.17	0.07	0.07	0.23		
14	0.14	0.15	0.13	0.21	0.10	0.06	0.04	0.07	0.11	-0.03	-0.04	0.13	-0.26	
15	0.18	0.09	0.10	0.39	0.10	0.05	0.07	0.08	0.09	-0.04	-0.04	0.07	-0.40	0.39

Table 3: Investment and Performance after Studio Acquisition Events

This table presents estimates of models following the form

$$DV_{ikt} = \beta_0 + \beta_1 1(\text{After acquisition}) + \beta_2 \text{Talent Quality}_{ikt} + \eta_i + \delta_g + \epsilon_{ikt}$$

for the sub-sample of independent distributors that were acquired by Hollywood conglomerates and started operating as part of a multidivisional structure. The unit of observation is the feature film. The dependent variable is the production budget, the advertising expenses, and the box office revenue for each movie, in millions of 1985 dollars. The quality score of the talent is the team average of the individuals' 3-year moving average of box office receipts. The tests use periods of 4 and 5 years around the acquisition events. t-statistics are reported in parentheses.

Dependent Variable:	**Production Investment**		**Advertising Investment**		**Box Office Revenue**	
	4y window	5y window	4y window	5y window	4y window	5y window
	OLS	**OLS**	**OLS**	**OLS**	**OLS**	**OLS**
	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)
After acquisition dummy	5.211*	5.966*	2.675**	2.766**	0.329	0.185
	(2.70)	(2.54)	(5.15)	(5.17)	(0.07)	(0.05)
Talent quality score	0.166	0.179	0.083**	0.086*	0.150**	0.170
	(1.64)	(1.51)	(3.26)	(2.80)	(3.53)	(2.05)
Constant	7.069*	6.912	−1.160	−0.533	20.261	23.886*
	(2.52)	(1.84)	(−1.91)	(−0.88)	(1.84)	(2.45)
Distributor Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Genre Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.49	0.49	0.38	0.38	0.20	0.24
N clusters	4	4	4	4	4	4
n	202	230	130	153	202	230

***, **,* significant at the 1%, 5% and 10% level. Standard errors are heteroskedasticity-robust and clustered by distributor.

Table 4: The Effect of Multidivisional Structure on Investment and Performance

This table presents two-stage least squares (2SLS) estimates of the effect of multidivisional structure on investment and performance

$$DV_{ikt} = \beta_1 \widehat{MD}_{ikt} + \beta_2 \text{Talent Quality}_{ikt} + \beta_3 X_{1,ikt} + \beta_4 X_{2,it-1} + \delta_g + \gamma_t + \epsilon_{ikt}$$

by modeling the choice of a multidivisional distributor using three team-level instruments: the average of individuals' share of movies with major distributors in the 3 years prior to the movie; the diversity of interactions, measured as an average of the total number of distributors with whom the team members worked in the year prior to the movie; and the average size of the teams on which the individuals participated in the last three years. The unit of observation is the feature film. The sample is all movies released from 1990 onwards for which budget information is available. The dependent variables are production budget, advertising expenses, and box office revenue, all in millions of 1985 dollars. X_1 are controls based on the movie k, and X_2 are distributor-level variables, mostly lagged; an unreported constant is also included. In the first stage, a linear model predicts MD using the instruments and all the variables of the main regression, including genre and year fixed effects. In the second stage, the instrumented MD and the main variables explain investment and performance, also using genre and year fixed effects. t-statistics are in parentheses.

Dependent Variable:	**Multidivisional structure (1/0)**			**Production investment**	**Advertising investment**	**Box office revenue**
	OLS	**Logit**	**2SLS** 1st stage	**2SLS** 2nd stage	**2SLS** 2nd stage	**2SLS** 2nd stage
	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
Experience with majors	11.714*	4.722***	0.465***			
	(1.94)	(3.48)	(3.00)			
Diversity of interactions	−8.346***	−0.832	−0.146***			
	(−2.74)	(−1.49)	(−3.38)			
Size of previous teams	−0.153***	−0.030**	−0.005***			
	(−2.72)	(−2.22)	(−4.04)			
Talent quality score	0.399***	0.006	0.001	0.310***	0.063***	0.567***
	(8.91)	(0.98)	(1.39)	(6.02)	(5.09)	(9.57)
USA production		0.469	0.042	−0.041	1.703**	4.535***
		(1.26)	(1.32)	(−0.05)	(2.46)	(2.76)
Film length		0.004	0.000	0.301***	0.086***	0.436***
		(0.99)	(0.87)	(6.45)	(5.34)	(7.22)
Talent experience in films		−0.016	0.003	−0.715*	−0.083	−4.074***
		(−0.12)	(0.27)	(−1.76)	(−0.60)	(−5.95)
Number of principals		0.009***	0.001**	0.110***	0.027**	0.114**
		(2.84)	(2.28)	(3.49)	(2.18)	(2.56)
New director dummy		−0.358**	−0.033	−4.616***	−1.065*	−2.015
		(−2.06)	(−1.56)	(−4.16)	(−1.70)	(−0.73)
Debuts in role		−1.438	−0.314	3.422	2.994	30.596
		(−0.35)	(−1.09)	(0.22)	(0.46)	(0.81)
Multidivisional structure (Inst.)				22.935*	13.450***	10.037
				(1.82)	(4.25)	(0.62)
Specialty		6.353***	0.384***	−15.221***	−7.637***	−7.217
		(3.96)	(3.63)	(−3.55)	(−4.12)	(−1.10)
Herfindahl of genres		−5.727**	−0.340	−3.522	−3.999	−4.328
		(−2.26)	(−1.52)	(−0.63)	(−1.22)	(−0.53)
Publicly traded		−0.783	0.050	0.858	1.916	4.860**
		(−0.48)	(0.26)	(0.27)	(0.77)	(2.55)
Movies distributed, lagged		0.268***	0.019***	−0.345	−0.257**	−0.226
		(3.70)	(3.21)	(−1.13)	(−2.04)	(−0.69)
Genre Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.41		0.56	0.53	0.37	0.34
Overidentifying restrictions (p)				0.39	0.98	0.61
N clusters	85	81	85	85	54	85
n	2150	2150	2150	2150	1323	2150

***, **,* significant at the 1%, 5% and 10% level. Standard errors are heteroskedasticity-robust and clustered by distributor.

Table 5: Multidivisional Structure and the Ancillary Revenue Hypothesis

This table presents linear panel and two-stage least squares (2SLS) estimates of the effect of multidivisional structure on investment and performance

$$DV_{ikt} = \beta_1 \widehat{MD}_{ikt} + \beta_2 \text{Talent Quality}_{ikt} + \beta_3 X_{1,ikt} + \beta_4 X_{2,it-1} + \delta_g + \gamma_t + \epsilon_{ikt}$$

using coefficient estimates from independent studies to produce performance measures in addition to box office revenue, or using box office data but restricting the sample to large studios. The unit of observation is the feature film. All instruments and controls are as in table 4, including a constant unreported. t-statistics are in parentheses.

Dependent Variable:	I. Based on Luherman and Teichner (1992)			II. Based on Luan and Sudhir (2005)		
	Production	**Advertising**	**Ultimate**	**Production**	**Advertising**	**BO+DVD**
			Predicted			Predicted
	2SLS	**2SLS**	**2SLS**	**2SLS**	**2SLS**	**2SLS**
	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)
Multidivisional structure (Inst.)	40.019***	9.039***	74.989	16.557	17.724***	−11.887
	(2.84)	(2.92)	(1.35)	(1.07)	(3.77)	(−0.63)
Specialty	−22.521***	−4.716***	−36.254*	−11.949***	−9.237***	−1.411
	(−4.00)	(−3.06)	(−1.65)	(−2.61)	(−5.10)	(−0.24)
Talent quality score	0.383***	0.078***	1.695***	0.289***	0.044**	0.666***
	(5.07)	(4.21)	(5.90)	(4.20)	(2.50)	(7.42)
USA production	−2.812	0.658	−1.035	0.744	2.089	11.825***
	(−1.35)	(0.89)	(−0.18)	(0.43)	(1.61)	(3.30)
Film length	0.227***	0.054***	0.904***	0.337***	0.139***	0.660***
	(6.48)	(5.45)	(4.02)	(4.21)	(5.41)	(7.08)
Talent experience in films	−2.346***	−0.375*	−15.589***	−0.027	0.076	−4.057***
	(−3.33)	(−1.77)	(−4.33)	(−0.04)	(0.32)	(−3.92)
Number of principals	0.084**	0.026***	0.269*	0.135***	0.032**	0.142**
	(2.22)	(2.80)	(1.85)	(3.54)	(2.57)	(2.11)
New director dummy	−3.490**	−1.041*	−0.328	−4.777**	−0.807	−2.265
	(−2.19)	(−1.71)	(−0.03)	(−2.32)	(−0.79)	(−0.57)
Debuts in role	4.126	5.743	118.848	2.639	−2.591	−57.166
	(0.33)	(1.24)	(1.04)	(0.07)	(−0.21)	(−0.84)
Herfindahl of genres	−11.164	−5.588	−39.663	−5.091	−3.676	−23.390*
	(−1.04)	(−1.39)	(−1.55)	(−0.56)	(−0.60)	(−1.69)
Publicly traded	6.932	2.519	23.099	−3.193	−2.511	11.356
	(1.10)	(1.34)	(1.57)	(−0.66)	(−0.52)	(1.33)
Movies distributed, lagged	−0.838*	−0.202*	−1.682	−0.179	−0.248	−0.108
	(−1.74)	(−1.96)	(−1.11)	(−0.74)	(−1.50)	(−0.47)
Genre Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.20	0.24	0.24	0.60	0.34	0.39
N clusters	51	36	51	60	40	60
n	1125	733	1125	1030	610	1027

***, **,* significant at the 1%, 5% and 10% level. Standard errors are heteroskedasticity-robust and clustered by distributor.

Table 6: Multidivisional Structure and the Agency Mechanism

This table presents two-stage least squares (2SLS) estimates of the effect of multidivisional structure on investment and performance

$$DV_{ikt} = \beta_1 \widehat{MD}_{ikt} + \beta_2 \text{Talent Quality}_{ikt} + \beta_3 X_{1,ikt} + \beta_4 X_{2,it-1} + \delta_g + \gamma_t + \epsilon_{ikt}$$

by modeling the choice of a multidivisional distributor using three team-level instruments: the average of individuals' share of movies with major distributors in the 3 years prior to the movie; the diversity of interactions, measured as an average of the total number of distributors with whom the team members worked in the year prior to the movie; and the average size of the teams on which the individuals participated in the last three years. The unit of observation is the feature film. The sample is all movies released from 1990 onwards for which budget information is available. The specification is as in table 4. The samples include movies with R-rating (left-hand panel), and movies brought about by focused or acquired studios (right-hand panel). t-statistics are in parentheses.

Sample:	**I. R-Rated movies only**			**II. Acquired Divisions**		
Dependent Variable:	**Production investment**	**Advertising investment**	**Box Office revenue**	**Production investment**	**Advertising investment**	**Box Office revenue**
	2SLS	**2SLS**	**2SLS**	**2SLS**	**2SLS**	**2SLS**
	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)	(6.6)
Multidivisional structure (Inst.)	30.783***	11.903***	21.552*	25.376*	15.699***	14.390
	(3.71)	(3.88)	(1.84)	(1.77)	(4.12)	(0.76)
Specialty	−18.953***	−7.251***	−12.064**	−12.966***	−6.388***	−5.553
	(−4.79)	(−4.40)	(−2.50)	(−3.45)	(−4.16)	(−1.03)
Talent quality score	0.233***	0.033*	0.256***	0.309***	0.056***	0.575***
	(4.23)	(1.85)	(5.69)	(5.25)	(5.12)	(9.24)
USA production	−0.267	0.978**	2.711**	−0.039	1.477	4.437*
	(−0.33)	(2.41)	(2.21)	(−0.02)	(1.40)	(1.80)
Film length	0.336***	0.113***	0.423***	0.311***	0.093***	0.455***
	(6.88)	(5.54)	(8.24)	(6.19)	(5.11)	(6.98)
Talent experience in films	−0.799*	0.182	−1.643***	−0.634	−0.040	−4.164***
	(−1.77)	(0.85)	(−3.92)	(−1.31)	(−0.26)	(−5.40)
Number of principals	0.081***	0.022*	0.051	0.111***	0.025*	0.117**
	(2.62)	(1.70)	(1.48)	(3.38)	(1.96)	(2.35)
New director dummy	−2.053	0.123	−0.736	−4.892***	−1.024	−2.295
	(−1.51)	(0.15)	(−0.34)	(−4.26)	(−1.54)	(−0.76)
Debuts in role	−9.890	−4.746	2.409	−5.518	1.063	31.300
	(−0.54)	(−0.69)	(0.10)	(−0.32)	(0.15)	(0.75)
Herfindahl of genres	−3.075	−4.374	−2.419	0.407	−0.571	1.409
	(−0.52)	(−1.45)	(−0.44)	(0.06)	(−0.16)	(0.14)
Publicly traded	0.653	2.136	1.590	1.748	2.404	5.851**
	(0.17)	(1.10)	(0.46)	(0.44)	(0.78)	(2.01)
Movies distributed, lagged	−0.452	−0.228*	−0.302	−0.486	−0.354**	−0.402
	(−1.58)	(−1.92)	(−1.01)	(−1.29)	(−2.37)	(−0.93)
Genre Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.33	0.30	0.50	0.30	0.32
N clusters	62	45	62	81	50	81
n	1138	717	1138	1933	1198	1933

***, **,* significant at the 1%, 5% and 10% level. Standard errors are heteroskedasticity-robust and clustered by distributor.

Table 7: Multidivisional Structure and the Complexity Mechanism

This table presents two-stage least squares (2SLS) estimates of the effect of multidivisional structure on investment and performance

$$DV_{ikt} = \beta_1 \widehat{MD}_{ikt} + \beta_2 \text{Talent Quality}_{ikt} + \beta_3 X_{1,ikt} + \beta_4 X_{2,it-1} + \delta_g + \gamma_t + \epsilon_{ikt}$$

by modeling the choice of a multidivisional distributor using three team-level instruments: the average of individuals' share of movies with major distributors in the 3 years prior to the movie; the diversity of interactions, measured as an average of the total number of distributors with whom the team members worked in the year prior to the movie; and the average size of the teams on which the individuals participated in the last three years. The unit of observation is the feature film. The sample is all movies released from 1990 onwards for which budget information is available. The first-stage is as in table 4. The dependent variables for the main regression are the days between the movie analyzed and the next movie on the slate of the distributor; the number of opening week screens; the absolute value of the days between the movie's release in the U.S. and the release in foreign territories; and a dummy for whether the movie was released in the U.S. before than in foreign territories. t-statistics are in parentheses.

Dependent Variable:	**Days until next release**	**Opening screens**	**Days between US and foreign**	**US release before foreign (1/0)**
	2SLS	**2SLS**	**2SLS**	**2SLS**
	(7.1)	(7.2)	(7.3)	(7.4)
Multidivisional structure (Inst.)	53.563	2099.105***	−143.865**	0.664*
	(1.59)	(3.37)	(−1.98)	(1.93)
Specialty	−25.531*	−1292.662***	48.451*	−0.337***
	(−1.69)	(−4.27)	(1.87)	(−2.72)
Talent quality score	−0.026	11.526***	−0.515***	−0.000
	(−0.38)	(3.97)	(−2.70)	(−0.03)
USA production	13.563**	328.861***	−138.499***	0.290***
	(2.06)	(4.31)	(−6.71)	(8.76)
Film length	0.143	0.738	−0.365*	−0.002***
	(1.25)	(0.47)	(−1.83)	(−4.47)
Talent experience in films	−1.591	−66.200**	−7.783**	−0.011
	(−1.61)	(−2.48)	(−2.13)	(−1.14)
Number of principals	−0.084	3.774**	−0.237	−0.001
	(−1.50)	(2.02)	(−1.29)	(−1.42)
New director dummy	−8.023	−70.610	−7.460	0.081***
	(−1.37)	(−1.06)	(−0.64)	(3.00)
Debuts in role	134.630	−229.383	28.071	−0.826
	(1.53)	(−0.28)	(0.12)	(−1.32)
Herfindahl of genres	199.809**	−506.493	100.495*	0.046
	(2.54)	(−1.09)	(1.95)	(0.24)
Publicly traded	−21.586	110.103	−35.772**	−0.010
	(−1.13)	(0.44)	(−2.26)	(−0.09)
Movies distributed, lagged	−1.782**	−33.781*	2.888*	−0.013
	(−2.08)	(−1.66)	(1.86)	(−1.58)
Genre Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
R^2	0.12	0.36	0.24	0.03
N clusters	77	85	75	85
n	2129	2150	2024	2150

***, **,* significant at the 1%, 5% and 10% level. Std. errors are heteroskedasticity robust and clustered by distributor.

Table 8: Investment, Performance, and External Capital Markets

This table presents estimates of models following the form

$$DV_{ikt} = \beta_0 + \beta_1 1(\text{Public}) + \beta_2 \text{Talent Quality}_{ikt} + \eta_i + \delta_g + \gamma_t + \epsilon_{ikt}$$

for the sub-sample of movie distributors i that switched from private to public (or vice versa) at some point in the period 1985–2005. The unit of observation is the feature film. The dependent variable is either production budget or box office revenue, in millions of 1985 dollars. t-statistics are reported in parentheses.

Dependent Variable:	**Production Investment**		**Advertising Investment**		**Box Office Revenue**	
	OLS (8.1)	**OLS** (8.2)	**OLS** (8.3)	**OLS** (8.4)	**OLS** (8.5)	**OLS** (8.6)
Publicly traded dummy	1.715	−0.144	−1.755	−1.611	1.115	2.200**
	(0.47)	(−0.05)	(−1.38)	(−1.47)	(1.27)	(3.54)
Talent financial score		0.399**		0.101**		0.390**
		(8.53)		(4.21)		(3.26)
Constant	36.699**	35.643**	7.723***	4.171**	23.556**	20.509***
	(6.37)	(7.61)	(7.40)	(8.20)	(5.65)	(5.93)
Business Unit Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Genre Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.48	0.57	0.60	0.64	0.30	0.35
N clusters	3	3	4	4	4	4
n	225	225	220	220	406	403

***, **,* significant at the 1%, 5% and 10% level. Std. errors are heteroskedasticity-robust and clustered by distributor.

Table 9: Decomposing the Variance of Movie Portfolio Returns

This table presents estimates of a variance components model based on a return relation

$$r_{ikt} = \mu + \alpha_i + \beta_k + \gamma_t + \delta_{it} + \phi_{ik} + \epsilon_{ikt}$$

where r_{ikt} is the return of distributor k on a portfolio of movies in genre i during year t, defined as the logarithm of the sum of box office revenue of those movies divided by the sum of production budgets, μ is a mean return, α_i are movie genre effects, β_k are business unit effects, γ_t are year effects, δ_{it} are genre-year interaction effects, ϕ_{ik} are business unit-genre effects, and ϵ_{ikt} are random disturbances. Organizational effects enter pure (represented by the business unit dummy β_k for each distributor k) or nested as an interaction of business unit and movie genre (entering as a dummy ϕ_{ik}). The estimation is based on linear algorithms described in the appendix of Rumelt (1991), and does not rule out negative values for variance components. The sample is based on the 2934 movies with production budget information available, for the period between 1985 and the first quarter of 2005. Observations are based on a total number of genres equal to 14 (Variety/EDI Nielsen) or 10 if rearranged in a broader way. The last four columns use the 14-genre classification. Columns 3 and 4 break down the sample in early and late periods. Columns 5 and 6 classify classify the data for publicly or privately held distributors.

		Number of genres		**Period**		**Type of firm**	
Component	**Symbol**	$g = 14$	$g = 10$	< 1992	≥ 1992	Public	Private
		(9.1)	(9.2)	(9.3)	(9.4)	(9.5)	(9.6)
Genre	σ^2_α	4.0	2.8	2.8	3.3	2.7	3.1
Business Unit	σ^2_β	31.3	32.8	25.7	35.6	14.3	23.5
Year	σ^2_γ	7.0	7.6	19.8	1.5	5.7	4.9
Genre-Year	σ^2_δ	2.7	1.5	−1.2	5.5	1.1	8.2
Genre–Business Unit	σ^2_ϕ	15.4	16.6	38.9	10.9	14.9	22.4
Error	σ^2_ϵ	39.6	38.7	14.0	43.2	61.3	37.9
Total		100.0	100.0	100.0	100.0	100.0	100.0