Do Firms and Markets Look Different?
Repeat Collaboration in the Feature Film Industry, 1935-1995[*]

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Comments welcome

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Abstract:

This paper contributes to a growing literature that finds a surprising degree of structure in the exchange networks that comprise a market. Standard neoclassical theory depicts the market as fluid system with little repeated exchange between pairs of agents. And while economists have recently begun to pay greater attention to more restricted networks of exchange, such networks are typically viewed as symptomatic of a nonmarket environment. The expectation that the market has little repeat exchange is particularly strong in such contexts as the feature film industry, where few transaction-specific investments are made and where third-parties are able to monitor and broadcast information about poor performance (Caves 2000: 96). Yet my analysis of comprehensive data from the Internet Movie Database shows a significant level of repeat collaboration among actors, directors, and producers throughout the period under study, 1933-1995. Moreover, the shift from the era of the studio system, when career choices were subject to the authority of studio management, to the contemporary market-based system was not associated with a corresponding decline in repeat collaboration. This result reinforces recent research indicating the need for rethinking traditional imagery of the market and the firm as fundamentally opposed modes of economic organization.

What do markets look like? And how do they look different from other economic institutions, such as firms? Our image of the market has long been shaped by the neoclassical idea that competitive markets maximize flexibility and minimize commitment, loyalty, and identity. Imagine, for instance, that one were given time series data that indicated the transactions that took place in various periods among a set of agents, but did not indicate how those transactions were governed. In particular, assume that we do not know if the transactions were conducted by legally-independent actors in a competitive market, if they took place among employees of the same firm. Could we discern on the basis of the pattern of transactions whether the system was a market or a firm? If indeed competitive markets are characterized by a high degree of flexibility, the problem should be easily solved. Insofar as it is easy to predict with whom an agent will transact in one period based on the identities of her counterparties from prior periods, one would think that the exchanges must not be conducted in a competitive market. After all, the competitive market is described by neoclassical theory is populated by "anonymous buyers and sellers" constantly in search of the best deal and without any "prolonged human or social contact among" them (Hirschman 1982).

But how accurate is this image of anonymity and flexibility? It is noteworthy that there is a growing line of work that uses an opposing imagery. Indeed, even economic theorists have recently modeled contexts where exchange among agents takes place through established relationships rather than via a wide scan of substitutable and anonymous others who remain at arm's length (e.g., Jackson and Wolinsky 1996; Kali 1999; Kranton and Minehart 2001). Such models are motivated by the growing evidence in work by sociologists and others that exchange between legally-independent buyers and sellers is often marked by a high degree of repeat contracting (e.g., Baker 1990; Bestor 2004; Kirman 2001; Podolny 1994; Uzzi 1996**,** 1999).

Yet note that these economic models do not call for a change in standard models of the market, but rather aim to clarify contexts that *contrast* with the market. For instance, Kranton and Minehart (2001) define networks as "nonmarket institutions… [within which] exchange is limited to linked pairs (p.487) ," where a "'link' is anything that makes possible or adds value to a particular bilateral exchange (p.485)." This opposition between networks and markets is also evident in the work of those who try to

explain when networks are likely to arise. Thus, Kali (1999: 615) asserts that "networks are substitutes for reliable institutional support that guarantees written contracts [and] the existence of these networks exerts a negative effect on the functioning of the anonymous economic market." For Jackson and Wolinsky (1996), the contrast between networks and markets is based on the type of good traded. Thus, they define the "informal social networks [as a common] means for communicating information and for the allocation of goods and services which are not traded in markets (ibid, p. 44)." In sum, whereas economic models focus increasingly on settings where buyers and sellers are well-known to one other through repeated engagements, the typical response has been to retain the image of anonymity and fluidity as defining the market and to turn attention to the network-like, *nonmarket* contexts within which a surprisingly high proportion of economic activity takes place.

The difficulty with this approach is that it risks turning the market into a theoretical construct with no real-world referent. This is particularly problematic when we confront examples of contexts that have the institutional features (e.g., transparency, legal protections) that support markets and are populated with large numbers of homogenous buyers and sellers, but are nonetheless marked by exchange via networks. Such network-based exchange may be defined as "a high degree of pattern in the [transactions among agents], where such high degree has particular theoretical or empirical meaning (Zuckerman 2003: 549; cf., Podolny and Page1998: 59)." Notable examples of network-based exchange in the market include Baker's (1984) demonstration that traders in option markets tend to concentrate their transactions within of identifiable cliques, and Kirman's (2001; Weisbuch, Kirman, and Herreiner 2000) finding that most buyers in the Marseille fish market display a high degree of loyalty to a single seller (cf., Bestor 2004: 193-213). Evidence that exchange in these contexts takes place through networks could be taken as implying that they are not really markets. Or perhaps it is our definition and corresponding image of the market that needs to change to include significant levels of repeat collaboration as a *central* feature of the market.

But even if we accept that markets are characterized by repeat engagements among participants, it might still be the case that repeat collaboration is *relatively* rare when compared to the patterns of exchange typical of alternative governance regimes. In

particular, there are strong reasons to expect that repeat collaboration is more characteristic of relationships among employees of the same firms than of independent contractors in the open market. This expectation flows naturally from the traditional imagery of the firm as a "hierarchy" that sets defined lines of communication and coordination (e.g., Weber 1978; Williamson 1975). Indeed, it is noteworthy that sociologists who have tried to predict when market exchange is likely to be embedded in social relations (e.g., Baker 1984; DiMaggio and Louch 1998) have tended to focus on mechanisms from transaction cost economics that predict the emergence of firms. The implication is that, even for sociologists, firms remain the standard as the form of economic organization that fosters the most structured levels of exchange, which are sometimes but typically not matched by markets.

There are at least three reasons to doubt whether this contrast of firm and market is accurate. First, it is well-known organizations are characterized by a great deal of informal interaction that deviates from the prescribed organization chart (Granovetter 1985: 502; Scott 1992: 51-75; but see Han 1996). Second, recent research has focused attention on a variety of firms that are governed by rather weak hierarchies that foster collaboration throughout divisions or organizations (e.g., Foss 2003 and Zenger 2002; Nickerson and Zenger 2004**;** Kogut and Zander 1996; Ouchi 1980 Williamson 1996). And finally, the absence of research comparing the level of repeat collaboration within firms and in the market means that the standard imagery has not been subject to empirical test. In sum, while recent research suggests that markets may be characterized by significant levels of repeat exchange, it is unknown whether such repeat exchange is so common that it challenges long-accepted contrasts between the market and the firm.

The present paper addresses this issue through an analysis of levels of repeat collaboration among key participants in the U.S. feature film industry over the course of a seventy-year period during which the industry transitioned from the firm-based studio-system to the market-based "package-unit", "independent production" (Staiger 1985), "flexible specialization" (Christopherson 1996; Christopherson and Storper 1988), or "short-term project" (Faulkner and Anderson 1987) system.[1] In particular, I analyze the

[1] Repeat collaboration is, in some sense, a very simple form of network pattern. Alternatively, one could test for the existence of higher-order structural features, such as cliques. Yet the presence of cliques or

extent to which pairs of collaborators-- directors and producers, actors and directors, and actors and producers -- tend to work together repeatedly over time and whether the tendency is greater during the period of the studio system than during contemporary, market-based system. As discussed in the next section, the feature film industry is a particularly good setting for such an analysis because the absence of long-term specific investments and the discipline on malfeasance provided by industry gossip about reputation suggest that industry personnel should not need to commit themselves to particular others (Caves 2000: 96). Moreover, the "remarkably efficient market for motion picture talent (Enright 1995: 119)" of today contrasts sharply with the centrally administered studios before their demise at mid-century. Thus, the history of the feature film industry provides an unusually good opportunity to see if a shift in the dominant governance regime changes the degree of structure in the exchanges among industry players.

The paper is organized as follows. The first section describes the data and provides the analysis of repeat contracting in the 1993-1995 period. The next section provides historical background on the studio system and discusses how the historical shift from the studio system to the contemporary system may be used to analyze whether the shift from a firm-based to market-based industry affected levels of repeat collaboration. In the third section, I then compare the levels of repeated collaboration during the studio system with the more recent period. The final section concludes.

Repeat Collaboration in the Contemporary Era

I begin by analyzing the tendency for repeat collaboration between key personnel on feature film projects-- actors, directors, and producers-- in the contemporary U.S. feature film industry. There are strong reasons to think that this setting should be a particularly auspicious one for finding collaboration patterns that are fluid and involve little or no repeat engagements. In his analysis of "creative industries," Caves (2000: 96) is explicit in his prediction that:

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communities of collaborators would be unsurprising in that they would largely reflect distinct sub markets (e.g., major vs independent segments; Zuckerman and Kim 2003). Indeed, such cliques could exist without any repeat collaboration (and with little relationship) between any pairs of actors.

> .. the heterogeneity of film production… means that the same ideal list of idiosyncratic talents rarely turns up for two different films. In humdrum industries, pairs of independent buyers and sellers commonly deal with each other repeatedly; to their mutual benefit they become locked in through compatible physical facilities, knowledge of the particulars of each others' needs, and other such uniting factors called 'transaction-specific assets.' Film production entails no apparent transaction-specific assets: the same cinematographer and set designer work on two films due to their rightness for both films, not because they work harmoniously with each other. Nonetheless, what induces each participant to give each project its best efforts is still the role of reputation...

Caves' prediction incorporates the recognition that departures from anonymity and fluidity are to be expected when either substantial transaction-specific investments must be made (see e.g., Baker, Gibbons, and Murphy 2002; Kranton and Miner 1996; Williamson 1985, 1991) or agents are not disciplined to honor commitments by the prospect of reputational costs. But where transaction-specificity is low and agents are both sensitive to their long-term reputations (i.e., they do not heavily discount long-term repercussions to their reputation), we would expect agents to move freely between collaborators such that the resulting pattern of collaboration resembles traditional images of the market.

I test this prediction with data for the study were taken from the Internet Movie Database (www.imdb.com), which maintains highly comprehensive information on virtually every feature film ever produced. I restrict attention to English language, non-pornographic, feature-length films. Following Zuckerman, Kim, Ukanwa, and von Rittmann (2003), I divide the data into three-year periods and analyze collaboration patterns across the films that were released within a given three-year period. In particular, I ask: does the observed level of repeat collaboration exceed what would be expected through random chance, and to what extent?

Directors with Producers, 1993-1995

To introduce the procedure and start to answer this question, I describe in detail my analysis of the level of repeat collaboration between directors and producers in the 1,690 films that were released in the 1993-1995 period. This sample size is reduced to 1,340 for three reasons: 41 films had no information on the identity of the director, 223 films

had no information on the identity of the producers, and another 127 films had no producers who were not also the films' directors. In addition to excluding producers who were also directors (and who would thereby artificially inflate the level of repeat collaboration), we exclude executive producers, line producers, and co-producers. In total, 1,065 directors and 1,863 producers worked on the remaining 1,340 film projects.

The first column of table 1 gives the distribution of the number of films directed during the 1995 period. The severe positive skewness is a well-known feature of the feature film industry (e.g., Faulkner 1982; Faulkner and Anderson 1987; Zuckerman et al., 2003) and of artistic markets generally (e.g., Giuffre 1999). The distribution of participation is similarly skewed for producers, with 78% of producers and 80% of directors participating in a single film project during this period. It is crucial to recognize that in a system where the vast majority of directors and producers participate only in one project over a three-year period, repeat collaboration is necessarily very rare. Yet since the system is so large, it is possible for the minority of directors and producers who do participate in multiple film projects to collaborate more often than would be expected through random pairings.

To test for this possibility, we first calculate a Herfindahl concentration score for an director's tendency to collaborate with a small set of producers (cf., Zuckerman et al,. 2003):

$$hdp_d = \sum_{p}^{P} \frac{w_{dp}}{N_d}^2, \qquad (1)$$

where d indexes directors, p indexes producers, w_{dp} is the number of films directed by d for which p was a producer, and N_d is the total number of films in which d served as a director. Note that, if a director never works twice with the same producer, then hd_d will equal the reciprocal of N_d.[2] Thus, an indicator of the extent to which directors tend to concentrate their collaborations with particular directors is:

$$fhdp_d = hdp_d - \frac{1}{N_d}. \qquad (2)$$

The distribution of *fhdp* for the English-language feature films released from 1993-1995, is presented in the left half of table 1. The 1,065 directors included in this sample consist

[2] For instance, if a director works with ten different producers, hp_d will equal 10*(0.1*0.1)=0.1.

of those directors that directed at least one movie for which information on the identity of the producers was available. The vast majority of these directors never worked twice with the same producer for the simple reason that they only worked on a single film. Of those 214 directors who worked on more than one film, 82 (38%) worked with the same producer at least twice, for a mean *fhdp* (or $\overline{fhdp}$) of 0.094. The $\overline{fhdp}$ is 0.019 if one includes the directors who directed only one film.

How significant is this level of repetition? Even in a system with random pairings, we would expect some repeat collaboration. And the likelihood of random repetition is higher the more films a director directs. The question then is whether and to what extent the observed distribution of *fhdp* reflects a level of concentration that exceeds that which would be expected through random chance. To analyze this question, I use a simulation procedure that fixes the level of participation by directors and producers in the three-year period under analysis and constructs 1,000 samples in which the *pattern* of collaboration is random (see Fernandez et al., 2000; Zuckerman and Kim 2000; Zuckerman et al., 2003; cf., Ellison and Glaeser 1997). In particular, I assume for each iteration of the procedure, that the number of films in each year is fixed, as is each of the director and producer teams (i.e., the set of directors and producers that work on a given film). Thus, a given director always works on the same number of films and is teamed with the same co-directors. Similarly, each producer works on the same number of film projects and collaborates with the same fellow producers. However, each iteration of the procedure randomly assigns the producer teams in a given year to films (and their director teams) from that same year. I then recalculate the $fhdp_d$ on such random collaboration patterns for the three-year period, denoted as $fhdp(r)_d$.

This procedure shows that the observed pattern of collaboration between directors and producers involves significantly more repeated engagements than would be observed through random chance. Even the random simulation with the highest $\overline{fhdp(r)}$ ($0.094*10^{-1}$) was twenty times below $\overline{fhdp}$ (0.019), and the mean $\overline{fhdp(r)}$ taken over the 1,000 simulations ($\mu_{\overline{fhdp(r)}} = .011*10^{-2}$) was over one thousand times lower than $\overline{fhdp}$. The significance of the difference between the observed concentration score and that found in the simulated data may be expressed through the following Z-score:

$$Z_{dp} = \frac{\overline{fhdp} - \mu_{\overline{fhdp(r)}}}{\sigma_{\overline{fhdp(r)}}},$$

This test statistic uses the standard deviation in the simulated data as a baseline against which to compare the deviation between the observed concentration score and the mean from the random simulations. For the 1993-1995 period, Z_{dp}= 116.92. That is, the observed tendency for directors and producers to collaborate repeatedly exceeds the level expected due to random chance by a factor of more than one hundred.

It is also instructive to look at concentration at the level of the individual director. In table 1, I display the distribution of the proportion of random simulations for which a director's observed level of concentration ($fhdp_d$) was matched or exceeded by the expected level from the random simulation [$fhdp(r)_d$]. Consider first the full sample, as presented in the left side of the table. We see that, for those directors who directed two or three films, the proportion of simulations for which $fhdp(r)_d < fhdp_d$, was almost exactly the same as the proportion of directors who had at least one repetition. This reflects the fact that having even one repeat collaboration in three movies is remarkable when there are thousands of producers with whom to collaborate. These two proportions differ somewhat for directors who directed four films, which indicates that only one repeat collaboration is no longer so surprising. Yet we see that the general trend is for directors with the largest body of work to collaborate at levels that depart most clearly from that which would be expected from random chance. For instance, all eight of Gregory Dark's films were produced by Andrew Garroni; four of Cirio Santiago's five films were produced by Roger Corman; and Tom Karnowski 2nd was a producer on eight of Albert Pyun's ten films.

TABLE 1 ABOUT HERE

These last examples suggest that repeat collaboration may be particularly common among "B" movie producers and directors, who are responsible for a significant proportion of our sample. Indeed, only 385 (22.78%) of the films in our sample were distributed by major Hollywood studios (Buena Vista [Disney], Columbia, MGM, Paramount, Twentieth Century Fox, Universal, or Warner Bros.). It is thus instructive to restrict our sample to such major releases. This restriction gives us a sharper definition of the market, one that is restricted not only to a particular type of film but also to a defined

geographic territory within which virtually all of the principal production decisions are made (Enright 1995). It will also facilitate comparison with the era of the studio system. Results are presented in the right set of columns in table 1. We see that, during the 1993-1995 period, only 58 persons directed more than one feature film released by a major studio and only three persons directed as many as three films (John Badham, Oliver Stone, and Joel Schumacher). Yet even this small sample displayed a significant tendency to engage in repeat collaboration. Just under a third (17 of 58) of these directors worked with the same producer on multiple films. Noteworthy collaborations included James Ivory with Ismail Merchant (22 lifetime collaborations as of 1999), Woody Allen with Michael Greenhut (18), and Ron Howard with Brian Grazer (7). Overall, Z_{dp}= 23.85 for this subsample, indicating a level of repeat collaboration that is about twenty times greater than would be generated by chance alone.

Actors with Directors and Producers, 1993-1995

We have seen then that the contemporary film market is marked by significant repeat collaboration between directors and producers. I next turn to collaboration patterns between them and actors. There are at least two reasons that evidence of significant repetition in collaboration involving actors would be even more noteworthy than that between directors and producers. First, the sheer scale of the acting labor market is vast, with 33,621 actors playing 47,339 screen roles in the 1993-1995 period.[3] And still more actors are working in theater, television, or commercials, looking for a chance to act in feature films. Thus, it seems unlikely that a director or a producer would ever feel constrained to work with a particular actor. Second, as in the example of James Ivory and Ismail Merchant, repeat collaboration between some producers and directors is formalized as a partnership in a production company (Merchant-Ivory Productions). Such a partnership does not "cause" the repeat collaboration. Nonetheless, it is useful to analyze repeat collaborations between film personnel that are never formalized in such a manner (in the post-studio era).

I present in tables 2 and 3 results from the analysis of repeat collaborations between actors and directors, and actors and producers. These analyses were performed

[3] Throughout, I use the term actors to refer both to male actors and female actresses.

using the same procedure as above. In the analysis of actor-director collaboration, had_a (hap_a) is the concentration of an actor's screen roles with particular directors (producers) and $fhad_a$ ($fhap_a$) is the difference between the observed level of concentration and what would be expected if the actor worked with a different director (producer) on each of his films. As before, I analyze the full sample as well as a subsample that is restricted to major releases. I also create an additional subsample that includes only the top five roles in the billing order.[4] This again gives a sharper definition to the market. I present the results for the last subsample only, though results here and in the analysis presented below are virtually the same as for the second subsample.

TABLE 2 ABOUT HERE

We see again that the vast majority of actors (79.5%) acted in only one film, thus making them ineligible for repeat collaboration. The distribution of participation for top-five actors in major releases was also positively skewed, though somewhat less so (53.7% with one film). Among those actors who were in two or more films, there is again evidence of repeat collaboration, though not to the same degree as between directors and producers. For instance, in comparing actors who worked on two films (second row of tables 2 and 3) with directors who directed two films (second row of table 1), we see that while 6.78% (7.16%) of such actors worked with the same director (producer) twice, just over a quarter (27.39%) of directors who directed two films worked with the same producer both times. Yet as before, actors who were in many films were particularly likely to collaborate, and given the scale of the market, even one such repeat collaboration exceeds what would be expected from random pairings-- as reflected in the proportion of random simulations for which $fhad(r)_a < fhad_a$. Overall, $\overline{fhad} = .006$ (.029 for those with roles in 2+ films) and $\overline{fhap} = .004$ (.019 for those with roles in 2+ films), which constitute mean levels of repeat collaboration that are considerably greater than expected given the random simulations ($\mu_{\overline{fhad(r)}} = .017 * 10^{-2}$ and $\mu_{\overline{fhad(r)}} = .016 * 10^{-2}$). When the difference between these observed means a simulation means scaled by the

[4] There is some ambiguity in the coding of billing order in IMDB in that actors are sometimes ranked in narrative order of appearance rather than their prominence in the cast. Zuckerman et al. (2003: 1053) analyze this issue by examining the year-to-year correlation in highest billing order. They find a very high serial correlation, suggesting that the billing order information is largely accurate.

standard deviations ($\sigma_{\overline{fhad(r)}} = .004 * 10^{-2}$ and $\sigma_{\overline{fhp(r)_a}} = .003 * 10^{-2}$), very significant Z-scores result ($Z_{ad} = 143.95, Z_{ap} = 118{,}06$), which again indicate a level of repeat collaboration that is about one hundred times what would be expected through random pairings.

TABLE 3 ABOUT HERE

Evidence of significant repeat collaboration is significant but reduced as one restricts the sample further. In particular, the Z_{ad} for the subsample that includes all major film roles is 25.81 (Z_{ap}=20.70), while that for the subsamples that include only the top-five roles was 6.65 (Z_{ap}=9.79). If we compare this last subsample with the full sample, as presented in table 2, we see that "top-five major" actors are less likely to collaborate repeatedly. Yet note that, while this may be a substantive effect, it also reflects the fact that there are so few directors and producers with whom one could collaborate multiple times. As I noted above, there are only 58 directors who directed two or more of the 379 major releases in this period. And there were only 147 such producers.

Comparison with the Studio Era

The results presented in the previous section indicate significant repeat collaboration in the contemporary feature film industry. As argued above, these results are surprising in that they do not sit easily with traditional images of competitive markets and with specific predictions concerning the feature film industry (Caves 2000: 96). In particular, while we might expect significant repeat collaboration in a setting where transactions involve specific investments, this does not appear to be the case in the feature film industry. An exception to this rule is the case of films that are part of a series--that is, where the characters or story line from an initial film are continued in subsequent sequels. However, such serialized films are relatively rare (4.6% of the 1,690 films released from 1993-1995 were part of a series with at least one additional film from that period), especially for major releases (2.6%).[5] Moreover, the removal of such films from

[5] I investigated whether films were members of a series with multiple films in the 1993-1995 period by grouping films that shared the first word or words in their titles (e.g., *3 Ninjas Kick Back*; *3 Ninjas Knuckle Up*) as well as those films that share a proper name anywhere in the title (e.g., *Ernest Goes to School*;

the analyses presented above does not change the results.[6] Finally, the other commonly cited reason for repeat collaboration in certain markets is the inability to rely on third-party gossip about reputation to discipline agents to honor commitments. But Hollywood is held out of an example of just the opposite kind of setting, where one conducts one work with the entire industry, if not the whole world, watching (e.g., Enright 1995).

Firm vs. Market

Yet it remains unclear how much these results should change our image of the market. First, even if collaboration-specific investments are rare in the feature film industry, it might be the case that industry personnel are less than fully substitutable for one another. Put differently, repeat collaboration might reflect the fact that certain people are experienced as particularly productive or enjoyable collaboration partners and are therefore preferred over others. The sheer vastness of this market seems to imply that multiple collaboration partners are always available, but this might be overstating the case. Furthermore, while the level of repeat collaboration through the market may be greater than random chance, it might still be the case that this level is *relatively* low compared to other governance regimes. In particular, there is strong reason to suspect that repeat collaboration should be much greater when it takes place between employees of the same firm rather than between independent contractors in a competitive market. Indeed, this expectation seems almost tautologically entailed by the definition of the firm and certainly if we embrace the traditional view of firms as "islands of conscious power" that are more apt to "waste resources" than is the market because of the decentralized price system's unique capacity "to place the factors of production where their value is greatest (Coase 1937**:** 394-5; cf., Hayek 1945)." In such a traditional "hierarchy" (e.g., Weber 1978; Williamson 1975), each role on the formal organization chart has a defined scope of activity and responsibility, including a set of prescribed and proscribed

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Ernest Rides Again; and *Slamdunk Ernest*) and then inspecting the description of candidates provided on imdb.com. Note that there were additional films that were part of series that did not include multiple films in the 1993-1995 period (e.g., *City Slickers II: The Legend of Curly's Gold*, which was released in 1994; the first film in this series, *City Slickers*, was released in 1991). While such films undoubtedly involve repeat collaboration, their inclusion cannot affect the results since I restrict attention to the 1993-1995 period.

[6] In particular, when I exclude members of series that had multiple films in the 1993-1995 period, the observed level of concentration is substantially the same as when they are included ($Z_{dp=}$25.30; Z_{ad}=10.30; and Z_{ap}=10.01).

relationships with other roles. Such a system thus guarantees repeated collaboration along particular lines of control.

The image of the firm has recently been broadened to include a variety of modes of governance, including even very flat or horizontal structures and ones that involve a great deal of choice on the part of (typically, professional) employees regarding the type of projects in which they work and with whom they collaborate (see e.g., Foss 2003 and Zenger 2002 on "intenal hybrids"; Nickerson and Zenger 2004 on "consensus-based hierarchy"**;** Kogut and Zander 1996 on the role of "community" in the knowledge-based theory of the firm; Ouchi 1980 on "clan" organizations**;** and Williamson 1996 on "relational team" organization). Thus, the legal designation of the firm encompasses a broad array of possible governance regimes and it stands to reason that those firms that give employees significant autonomy should be marked by lower levels of repeat collaboration than firms that are more hierarchical. Moreover, even very hierarchical structures tend to involve a great deal of informal interaction that does not follow the lines of the organization chart (Granovetter 1985: 502; Scott 1992: 51-75). And yet, the freedom to choose collaborators (granted in some firms and taken in others) does not generally extend as far as collaborating with outside contractors when there are employees who could do the same work.[7] That is, regardless of how hierarchical a firm is, there would seem to be a pronounced tendency to privilege internal collaborators relative to outside contractors. And this restriction in the pool of available transaction partners should increase the likelihood of repeat collaboration between particular pairs of agents. Thus, there are strong reasons to expect repeat collaboration to be greater when agents are employees of the same firm than when they are independent contractors. And this prediction is reinforced if the firm is administered in a relatively hierarchical manner.

From Firm to Market

This contrast of (hierarchical) firm versus market provides a strong motivation for placing our results on the contemporary film industry in historical context. In particular, U.S. feature film industry experienced a critical shift in the nature of governance from

[7] Possible exceptions include divisions that are given the right to exchange with firms that compete with other divisions (see e.g., Eccles and White 1988). Such arrangements tend to come under significant pressure since they raise the question of why the two divisions are under the same corporate roof.

that which dominated the industry from the 1920s through midcentury and that which has prevailed afterwards. The contemporary U.S. ("Hollywood') feature film industry is well-known as a market in which little work is conducted within the boundary of a single firm. Under what is variously known as the "package-unit", "independent production" (Staiger 1985), "flexible specialization" (Christopherson 1996; Christopherson and Storper 1988), or "short-term project" (Faulkner and Anderson 1987) system, the pre-production, production, and post-production stages of feature film creation are collaboratively produced by a set of independent contractors. Indeed, while independent production companies sometimes produce multiple films over a series of years, many firms are created to produce a single film and then cease to exist. And those production companies that do produce a series of films typically have almost no employees beyond the administrative staff. Rather, the producer secures capital (perhaps from a "studio" that also will be the distributor) and uses that capital to purchase rights to a screenplay; the services of the "talent" (i.e., director, actors); and the various craft personnel and their equipment (e.g., special-effects specialists; make-up artists); and rights to shoot the film in the desired location. Under this system, films are produced by independent producers who raise financing for the film and contract through the open market to obtain the creative talent. Essentially, the "studio" plays one main role (distributor) and will often play two additional roles (financier, provider of production space/equipment). Producers are almost always independent companies, though sometimes with multi-picture deals with a studio.

This contemporary system stands in strong contrast to the "studio system" that prevailed beforehand. The key point of contrast lies in the range of activities that were conducted in-house at the studios and the manner by which these activities were administered by studio management. One such activity was exhibition: prior to the *Paramount* antitrust decision of 1948 that outlawed such vertical integration (as well as anticompetitive bundling practices in selling to unaffiliated theaters), the major studios owned large theater chains and were often described as existing to support such chains. Indeed, the firms that owned the studios were typically administered from New York, where the theater operations were based (e.g., Behlmer 1985; Harmetz 1984; Schatz 1988). Another key contrast between the two periods is that, "rather than an individual

company containing the source of the labor and the materials, the entire industry became the pool for these (Staiger 1985: 330)." During the studio era, the myriad activities involved in pre-production, production, and postproduction stages were largely conducted by studio employees within permanent offices and divisions rather than by independent contractors, as is the rule today. And this was true as well for the key personnel analyzed above. Producers, directors, and many actors were often employees who worked under long-term contracts that significantly limited their autonomy over the duration of the contract.

For actors, the standard seven-year contract granted to "contract players" in the studio's "stock company" who were being groomed for possible stardom required an actor to remain with the studio for the duration of the contract. The primary attraction to the actor, especially for young performers during the Great Depression, was the prospect of job security coupled with a steady rise in income:[8]

> Assuming the artist did nothing to trigger the escape ("morals") clause [of the standard contract], he or she was guaranteed forty weeks of employment at a fixed salary. If the option was renewed each year, the artist enjoyed an escalating salary. The escalating salary offered more security than they had previously known. That factor, combined with the fact that all studios firmly controlled their artists, was enough to convince these artists to sign away their rights (Reddersen 1983: p.20).

What rights did the actor "sign away?" One involved the right to work with another studio if she so chose. While the studio had the option to terminate the contract after each year, the actor enjoyed no such option. In addition, the actor worked under a fixed salary and lost the ability to decide on which projects to work and with whom.

These contractual constraints are evident in well-known cases of stars who bridled under their restrictions. A well-known example is the case of James ("Jimmy") Cagney, who battled Warner Bros. throughout the 1930s to renegotiate his contracts (see Warren 1983; McDonald 2000: 65-69). These disputes, which involved two walk-outs and a lawsuit that was decided in Cagney's favor, revolved around several related issues: (a) a

[8] For instance, Judy Garland's initial contract with MGM paid $100 per week for the first year, an increase of $100 each year through year five, and then an increase to $750 per week for year 6 and $1000 per week for year 7 (Harmetz 1984: 104). In fact, the contract was rewritten after the fifth year to pay Garland $2000 per week for the next three years. Such renegotiations near the end of an actor's contract reflect attempts to gain access to the rent stream generated by the actor for a longer period of time, albeit with a lower share of that stream.

failure to raise his salary despite verbal assurances that it would be increased if his films were successful; (b) overwork (six films in 1934 despite the fact that his [renegotiated] contract stipulated no more than four films per year); (c) requirements that Cagney make personal appearances on the behalf of the studio; and (d) restrictive casting, whereby Cagney was given "tough guy" roles almost exclusively even though he wished to broaden his roles to include other dramatic parts and musicals. Cagney's willingness to take on the studio and his relative success in doing so were exceptions to the general rule and reflected his growing star power. Perhaps the strongest weapon that the studio had to gain the compliance of its contract personnel was the contractual clause that allowed them to suspend an actor without pay for insubordination and then to add the suspension time to the end of the contract. A second method of control was the "loan-out" whereby an actor's services were rented to another studio (who typically paid the actor's salary plus an average of seventy-five percent; McDonald 2000: 63) without the actor's consent. While such loan-outs were sometimes agreeable to the actor, they were also used as "the Hollywood equivalent of Siberia (ibid.)" when the project for which the loanout was made was not expected to succeed (Harmetz 1984: 115).

A final reason the studios enjoyed the upper hand in these struggles is because they engaged in more or less explicit collusion. Thus, an open letter in the *Hollywood Reporter* in 1931 cautioned Jimmy Cagney on fighting the studio after just two successful films by saying that:

> You are not sufficiently strong at the present time to do that walkout number. Others stronger than you have tried it and have checked in behind the eight ball. Don't get the casting powers at the studio down on you. Don't permit pictures as a whole to look on you as a 'walker-outer" (Warren 1983: 82).

A vivid exchange between studio head Jack Warner and Humphrey Bogart in 1944 regarding Bogart's reluctance to star in *Conflict* similarly illustrates the nature of the relationship between the studio and its contract players (Behlmer 1985: 229-233):

Bogart: Nothing you can say will convince me it is a good picture, or is in good shape, or for me. I consider you a personal friend of mine and do not think you will do all the things you say you will …

Warner: You must remember, Humphrey. It is not Jack Warner that is asking you to do this picture. You are doing this for the company, and the same thing would happen in the steel business …

Bogart: Allow me the privilege of making a decision. I work for Warner Bros. and am willing to die for Warner Bros. When you asked me to appear at the [Hollywood] Bowl on Easter Sunday at 4 a.m., and dance in a musical comedy, I did so. I will do anything, but I cannot do this picture.
Warner: Don't make the mistake that some people have made.
Bogart: What are you doing, threatening me?
Warner: No, I am not threatening you, but if you don't want to play ball I will have think along certain terms contractualwise (sic). We will suspend you and not put you in *Passage to Marseille*…
Warner: This is a potent business, that is why people respect the motion picture industry, and I know you are making an awful error.
Bogart: What are you doing, frightening me?

Bogart eventually acquiesced and starred in *Conflict*, which was relatively unsuccessful. This episode is particularly revealing because Bogart had was perhaps the biggest male star in Hollywood by this time, having his first success as a sympathetic, romantic lead with *The Maltese Falcon* in 1941 and then the huge success of *Casablanca* in the following year.

Thus, even stars and certainly the "feature" and "bit" players who formed the rest of a studio's "stock company" had much less control over their work than do actors today. The director's degree of autonomy was also much lower during the studio era. While film theorists once emphasized the importance of the *auteur* director as being responsible for the art produced in Hollywood (Sarris 1968), more recent research portrays the director as clearly subordinate to the producer and the studio production system more generally (e.g., Harmetz 1984; Schatz 1988). The director's subordination to the studio began under the "central producer" model that dominated the industry from the mid-1920s through the mid-1930s. Under this system, the exemplar of which was developed by Irving Thalberg at MGM, the principal managerial task of "orchestrat[ing] the entire filmmaking process from conception and story development through editing to release… steadily shifted to the producer" who was supervised directly by the central producer (Schatz 1988: 36). Indeed, Thalberg "controlled the entire [production] process [to the degree that,] without ever stepping onto the set, [he] was intimately involved in every MGM production (Schatz 1988: 108)." As Harmetz (1984: 137-8) emphasizes:

> Thalberg… expected to have his pictures shot the way he visualized them. The directors with whom he worked… were craftsmen rather than artists, and not unwilling to do as they were told. At MGM, the

> interchangeability of directors, like that of certain automobile parts, was taken for granted. Thalberg might ask the original director to do the necessary retakes. But if the original director was assigned elsewhere, Thalberg was hardly concerned-- some equivalent director was sure to be available.

A telling example of the limited control enjoyed by the director at MGM is the fact that *The Wizard of Oz* had four directors over the course of its production, each of whom was placed on the project and removed from it solely at the discretion of the producers (Harmetz 1984: 140).

We have thus far emphasized as a distinguishing feature of the studio system's mode of governance the relative lack of control enjoyed both by actors and directors who were under contract over the work that they did. It is important to note, however, that this mode of governance was not uniform either across studios or over time. For instance, while Warner Bros. through the mid-1930s was known for being "even more centralized than MGM (Schatz 1988: 139)," other studios such as Paramount and Columbia gave directors greater control, particularly if their films were successful (Harmetz 1984: 138; Schatz 1988: 75). In addition, the industry generally shifted in the mid-1930s from the central producer system to the "unit production" system, whereby individual producers gained a certain degree of freedom relative to central studio management and they were generally charged with producing a certain number of films per year in the same "star-genre combination" (Schatz 1988). Finally, David O. Selznick's success (particularly, *Gone with the Wind* in 1939 and *Rebecca* in 1940) with independent production provided an alternative model for both the producer's role (i.e, no direct supervision by studio management) and that of the director (in the person of Alfred Hitchcock, who enjoyed considerable control in directing *Rebecca* 1940 and in subsequent films that he directed and produced for Selznick, often under loan-out arrangements. While Selznick's model was rarely applied during the 1940s, it quickly became the dominant model after 1950.

Note finally that, while directors, actors, and even producers enjoyed relatively less control over their work under the studio system, and there was frequent conflict as a result, this does not mean that the system's constraints were always resented. Indeed, a common attitude seems to have been one expressed by

Humphrey Bogart above: the employee as the mid-twentieth century organization man (Whyte 1956) who displays loyalty to an organization because he sees himself as playing a role in a collective effort and sees the management as playing an essentially legitimate role of coordinating the various specialized tasks that are required. The director Frank Capra, who took a pay cut to leave MGM for Columbia and there by gain greater autonomy and the right to write and produce, described the "the directors at MGM [as] 'the crème-da-la-crème' [but also] "organization men, as anonymous as vice presidents at General Motors (quoted in Harmetz 1984:138)." As explained by John Lee Mahin, an MGM screenwriter, "Whatever we were working on was an MGM picture, and we all wanted MGM pictures to be the best (ibid: 12)." William Ludwig, another MGM screenwriter expressed similar sentiment when he related that "There was a sense of pride at [MGM], a sense of community. There were five major studios… and you supported your own (ibid)." Evidence for such loyalty comes also from cases like that of the actress Norma Shearer, who reportedly was offered $200,000 from a rival studio but signed with MGM for $150,000 because she "never wanted to desert the company that had made her a star (Carey 1981: 230)." While it is hard to know how widespread such loyalty to the studio was, it clearly had significant currency and it created a link between the personnel and the studios that has no parallel today.

A related feature of the studio system that bound actors to the studios for years was the significant investments in human capital that the studios often made in the actors that they had under contract. Indeed, young actors were often recruited not for their present ability or appearance but because they were seen as having raw potential that could be groomed for potential stardom by the studio's in-house drama coaches, dentists, hair stylists, costume designers, plastic surgeons, fitness trainers, etc. As Harmetz (1984: 107) writes:

> In signing Judy Garland, MGM had bought an extraordinary voice unfortunately attached to a mediocre body and a badly flawed face. In the next seven years, the voice would be trained, the teeth capped, the nose restructured, the think waist held in by corsets, and the body reshaped as well as possible by diet and massage. In greater or lesser measure, the same thing happened to everyone the studio put under contract. If nothing

> had to be done to improve Lana Turner's breasts, there was certainly enough to be done by the studio's hairdressers and dramatic coaches.

Such actor-specific investments were typical of the "star system" whereby "budding star and studio would benefit together from the studio's strong incentive to invest.. in promot[ing] the actor's career [during the period of the long-term contract]. In the meantime, the star received a low-risk and rising income while the studio assumed (and pooled) the uncertainties associated with star potential. When the actor's career flourished… the star ceded [temporary] rents to the studio… (Caves 2000: 89 cf., McDonald 2000)." Thus, the studio and actor were mutually bound not just by the studio's greater power in enforcing the terms of a restrictive contract, but by certain attractions that the contract entailed, at least to novice actors.

Comparing Firm and Market

The foregoing review of the studio system suggests that the two reasons given above to expect more repeat collaboration in (hierarchical) firms than in the market-- the preference for internal transactions and the limited autonomy granted employees-- apply to the studio system. The first factor seems operative since actors, directors, and producers tended to have long-term contracts with particular studios and consequently, were more likely to work with fellow studio personnel than with employees of other studios. Indeed, while it was always possible to hire an actor or director from outside the studio, there was a powerful incentive to ensure that no personnel under contract were idling. As MGM casting director Leonard Murphy said of Warner Bros.,

> They'd put their whole contract list in every picture, whether an actor fit or not. You couldn't even find a Warner Brothers picture without Pat O'Brien and Alan Hale in it. We always asked who fits a picture, chemically speaking (quoted in Harmetz 1984:122).

Yet even at MGM, which essentially pursued a high-cost, high-quality strategy in the 1930s and thus had a greater tolerance for idle personnel, Thalberg's "third commandment" of his "ten commandments for studio readers" [i.e., those who vetted screenplays] was "Analyze all material on the basis of the players who are working for us… (Schatz 1988: 106)." This directive reflected the logic that, once having taken on their contract players as fixed costs, it was imperative that they spread those fixed costs over as many films as possible. Thus, there was a strong tendency throughout the studio

system to give priority to the personnel that a studio had under contract in staffing a film project. And this tendency should presumably produce a greater tendency towards repeat collaboration than a system where employees and independent contractors are considered to be equally good alternatives.

The second factor seems operative as well in that actors and directors who were under contract, as well as producers during the central producer period, had much less control over their careers than is typical of the market-based system of today. Indeed, even during the era of unit production, the studios could be accurately described as quite hierarchical. As MGM producer Harry Warren colorfully asserted:

> Each studio was, in a sense, a fascist state… because then they were one-man studios. Harry Cohn ran Columbia like a dictator. Jack Warner ran Warners like a dictator. Zanuck ran Fox like a dictator. They say L.B. Mayer ran Metro that way, but I never saw it (quoted in Harmetz 1984: 82).

Such hierarchical control would seem to stand in strong contrast to the market-based system of today and thus provides us with a useful point of comparison: how does the level of repeat collaboration observed in the contemporary market compare with that which typified the era of the studio system?

Yet before I analyze this question, I must consider whether a comparison of the two eras is in fact a fair one. Three questions deserve our attention. First, why was the studio system replaced by the contemporary, market-based system? A comparison of the level of repeat collaboration in the two eras is useful only if the events that led to the downfall of the studios had little to do with the factors that directly change the likelihood of repeat collaboration. It seems that this was indeed the case. While many causes are cited for the demise of the studio system, two shifts are the most commonly cited (see e.g., Carey 1981; Caves 2000; Harmetz 1984; John, Ravid, and Sunder 2003; Schatz 1988; Weinstein 1998). The first was the series of antitrust actions culminating in the *Paramount* decision of 1948, which led to the divestiture of the studios' exhibition arms and the elimination of anticompetitive bundling practices. The second shift was the substantial drop in demand for feature films that began in 1947-1948 with a reduction in available leisure time and a change in post-war adult tastes (Carey 1981: 272-3). This drop in demand was then reinforced by the rapid diffusion of

television, which essentially replaced the low-budget 'B' pictures. Caves (2000:94) argues persuasively that the reduction in demand for feature films was probably more important than the antitrust actions because similar changes occurred in European film industries that were not affected by the *Paramount* decision.

And the most far-reaching of these changes was the move to reduce fixed costs by eliminating studio staffs. As Harmetz (1984: 116) vividly relates:

> Like frantic fisherman afraid that the fish they had hooked would swamp the boat, the studios cut loose their contract lists. The result was that in 1952 Clark Gable finished off his MGM salary at $7200 a week for the standard forty weeks. Ten years later, Elizabeth Taylor was paid $1 million for *Cleopatra*.

Once the various services that had previously been in-house were outsourced, competitive markets developed to the point that there was no turning back. Thus, the events that are most responsible for the demise of the studio system appear to have indirectly (by creating an incentive to eliminate fixed costs) led to the severing of the bonds between the studios and its employees. Yet except insofar as a shift from a firm-based to a market-based system lowers the level of repeat collaboration, there is little reason to think that these events were either caused by or had a direct impact on tendencies to engage in repeat collaboration.

A second issue concerns whether the nature feature films has changed such that one would expect greater or lesser repeat collaboration in the studio era versus the contemporary era regardless of any shift in the manner by which such collaborations are governed. To the extent that the literature has addressed this issue, it seems to imply films during the studio era may have been more likely to promote repeat collaboration. There are two main reasons for this assertion. First, the studio system is often described (and sometimes derided) for being a mass production system that produced various versions of the same film according to particular "star-genre combinations" (Schatz 1988). Indeed, references to Fordist principles abound not only in academic accounts of the studio system (e.g., Staiger 1985) but in contemporary industry discourse, as indicated by the references to the steel and auto businesses above. A second reason is that the clearest change in the industry product portfolio in the 1950s was the elimination of the low-budget, highly formulaic 'B' pictures. Thus, insofar as the remaining feature

films were less formulaic, and insofar as less repeat collaboration should be found in such a market, we would expect to see less repeat collaboration in the contemporary era.[9] Thus, these considerations serve to reinforce the expectation that repeat collaboration was more common in the studio era than it is today.

Finally, it is worth treating with some skepticism the assertions that directors, actors, and producers were strongly bound to particular studios and that that these bonds were severed with the collapse of the studio system around 1950. One reason to doubt the former assertion is that accounts of the industry tend to fixate on the stars who were under long-term contract. But the majority of the studio stock company had contracts that were shorter than seven years and many additional actors with credited, speaking parts were "feature" or "bit" players who were engaged by the week and day respectively, as well as "free-lance" players who played more prominent roles and were hired on a film-by-film basis, as is the norm today (Friedman 1937; Lasky 1992). The number of such free-lancers is reported to have "grown enormously during the 1940s" in the aftermath of the Revenue Act of 1941, which created an incentive to replace salaried income with capital gains (see Caves 2000: 93; McDonald 2000: 69; Staiger 1985). Another factor that seemingly loosened the bonds between employer and employee was the loan-out system described above. Schatz (1989: 323) cites an "industry study funded by the Rockefeller foundation that revealed that from 1933 to 1939, there were over 2,000 loans among the seven studio-distributors involving actors, directors, and cinematographers under studio contract." While this figure pales in comparison with the number of loan-outs possible, it raises some doubt as to whether the studio system cannot be described as abiding by firm boundaries in the staffing of projects to the degree that we have assumed.

A related concern involves the timing of the shift from the studio system to the contemporary system. On the one hand, the shift itself may have been more gradual than

[9] Some evidence consistent with this conclusion is that the mean number of genres assigned to films in the imdb database increased steadily from 0.996 1935 period to 1.55 in the 1995 period, with a mean period-to-period percentage change of 4.01%. However, this result may reflect a tendency for the community of hobbyists that maintains the imdb database to see more recent films as more complex than older films. Moreover, the modern blockbuster-driven major film market has also been described as highly formulaic, (e.g., Faulkner and Anderson 1987; Kael 1980; Litman 1998), thus suggesting little or no difference between the two eras in the likelihood of repeat collaboration due to change in the nature of films themselves.

the common depiction of an abrupt change around 1950. For instance, while the *Paramount* mandated the divestiture of the studios' theater operations in 1948, the studios' initial responses varied. At one extreme, Warner Bros. moved quickly to comply with the mandate and also engaged in a series of substantial downsizing moves. Yet MGM took the opposite tack. Indeed, after studio chief L.B. Mayer was replaced by Dore Schary in 1951, Schary returned MGM to the central producer system that had previously been abandoned for the somewhat more decentralized unit producer system. It was not until suffering major losses in the early 1950s that MGM "began in earnest" "to phase out its contract personnel" and MGM was separated from the Loews theater chain (Schatz 1988: 462). Moreover, some contract personnel remained on studio staffs into the 1960s. And just as vestiges of the studio system remained for years after 1950, various trends that foreshadowed the system's demise before 1950 may be discerned. These trends include the change in the tax code and increase in free-lancing noted above as well as a November 1940 consent decree that limited anticompetitive bundling practices (Schatz 1988: 298) and Olivia de Havilland's successful 1943 lawsuit against Warner Bros., which invalidated the contractual provision allowing studios to add suspension time to the end of contracts.

Distinguishing Firm from Market

The foregoing considerations suggest that, before we analyze the extent of change in repeat collaboration, we must first investigate the extent and timing of the change in the link between actors, directors, and producers with the studios. To do so, I use the same procedure described above but apply it to assess the level of repeat work by key personnel with the same studio. In this analysis, has_a (hds_d, hps_p) is the concentration of an actor's screen roles (a director's or producer's film projects) with particular studios (which are typically integrated distributor-producers in the era of the studio system and distributor-financiers in the contemporary period), and $fhas_a$ ($fhds_d$, $fhps_p$) is the difference between the observed level of concentration and what would be expected if the actor (director, producer) worked with a different studio on each of his films. And the corresponding Z-score for the significance of the deviation of the observed mean level of concentration from what would be expected is Z_{as} (Z_{ds}, Z_{ps}). As before, we compute the

expected levels of concentration based on 1,000 random simulations that fix the number of projects in which the various personnel and the studios participated. I then apply this procedure to the thirteen three-year periods that end each of the half-decades beginning in 1935 (by which time 100% of the feature films were talking pictures) and ending in 1995.

The results of this analysis, which are presented in figure 1, include several key findings. First, we do see evidence of a considerable fraying of the bond between studio and these key personnel. In general, the Z-score measures peak in the 1940 period and then fall steadily until a trough in the 1985 period. Note, however, that it is hard to find evidence of a particularly sharp drop around 1950. Rather, this period appears to have been the middle of a long-run decline. In fact, the greatest average percentage period-to-period drops in these trend lines occurred between 1970 and 1975 periods, when the mean percentage reduction in the Z-scores was 45% respectively.

FIGURE 1 ABOUT HERE

Three other results are worth noting. First, while we might expect the contemporary period to display insignificant levels of repeat collaboration between studios and these key personnel, this is not what is observed. This result is perhaps not surprising in the case of producers, whose production companies often enter into multi-picture contracts with distributors. However, although such arrangements are extremely rare for actors and directors, we find significant Z-scores for them as well. Indeed, only in the 1985 and 1990 periods were any of the levels of aggregate concentration found to be insignificant, in that the randomly-generated level of concentration was as high as the observed in one hundred or more simulations.[10] A second pattern is a reversal in the trends after the 1985 trough for directors and particularly for producers. Evidence for such a reversal is less evident for actors, though the Z-scores for actors rose 65% (84% from major releases) from a low-point in the 1975 period.

Some portion of the reduction in the Z-scores and their subsequent slight reversal appears to be an artifact of changes in the size of the market. As depicted in figure 2, there was a 2/3 decline in the number of films released in the 1935 period through the 1965 period and then a 137% rise from the 1975 period through the 1995 period (which

[10] In particular, neither the major directors in 1985 nor the top-five major actors in 1990 were found to have significant levels of repeat work with the same studios.

largely reflects the rise of video and cable as additional "exhibition windows" and the expansion of independent films; see Zuckerman and Kim 2003). The size of the major market saw a somewhat longer decline (79% from the 1935 period through the 1975 period) and a more modest increase more recently (70% increase from the 1975 period through the 1995 period). While such change in the size of the industry may be somewhat responsible for the rise and fall of the Z-scores, much of the latter fluctuation appears to be substantive. In particular, note that: (a) there were large increases in the Z-scores from 1935 to 1940 despite the fact that the market contracted over the same interval; (b) the Z-scores continued to decline after 1965 despite the fact that the market had bottomed-out by this period; and (c) the rise in the Z-scores in the more recent periods is not commensurate with the rise in the size of the market. Indeed, while the number of films released in 1995 was only slightly smaller than it was in 1940, the Z-scores for 1995 were substantially below those for 1940, which appears to represent the height of the studio system. Similarly, while roughly the same number of films were released through major studios in the 1960 and 1995 periods, the Z-scores for major releases were substantially higher in the former period, even though the studio system was by then beyond its twilight years.

FIGURE 2 ABOUT HERE

Overall, these results on repeat work with studios provide strong evidence for a loosening of the link between the studios and actors, directors, and producers. Furthermore, they suggest that, rather than assume that this change was substantial and occurred around 1950, that we use the actual timing and scale of the change in repeat collaboration between the key personnel and the studios as a baseline against which to evaluate whether levels of repeat collaboration among such personnel changed due to the shift from a firm to a market-based industry.

These trends for the full samples are presented in figure 3. In general, a comparison of these trends with those presented in figure 2 provides only modest support for the expectation that this historical shift resulted in a corresponding reduction in the repeat collaboration. Inspecting the trend lines in figure 3, we see that the significance of the level of repeat collaboration between directors and producers (Z_{dp}) did experience a secular decline from the studio era (Z_{dp}=112.67 in 1940) through 1985 (Z_{dp}=48.95). Yet

at the same time, note that: (a) this 57% decline was much less than the decline in the concentration of work by directors or producers with particular studios over the same period (88% and 92% respectively); and (b) the 138% increase in Z_{dp} from 1985 to 1990 entailed that the highest two levels observed were in the most recent two periods of the *contemporary* period. The trend lines for the level of repeat collaboration between actors and directors (Z_{ad}) and actors and producers (Z_{ap}) reveal similar patterns, with the most significant levels of repeat collaboration occurred during the most recent period. Note finally that the Z-scores for repeat collaboration are consistently higher than the Z-scores for repeat work with particular studios especially after 1950. For instance, while the post-1950 mean Z_{dp} was 77.54, the mean Z_{ds} for these periods was 17.62 and the mean Z_{ps} was 24.44.[11] In sum, these results scarcely provide support for the expectation that the shift from a firm-based system to a market-based system led to a reduction in the level of repeat collaboration. Rather, the trends in the significance of repeat collaboration seem merely to track the fall and rise of the size of the market.

FIGURE 3 ABOUT HERE

This conclusion is largely reinforced by the patterns in figure 4, which parallel those for figure 3 but apply to the subsamples that include (the top five roles in) major releases only. At first glance, these trend lines appear to correspond to the trends on concentration of work with major studios in figure 1 to a greater degree than we observed for the wider market. Indeed, collaboration between directors and producers of major releases witnessed a decline (72% reduction in Z_{dp} from 1950 through 1985) that approximates the reduction in the fraying of their bonds with the studios (a 98% reduction in Z_{ds} and a 94% reduction in Z_{ps} over the corresponding periods). Yet recall from figure 2 that, unlike the wider market, the number of major releases experienced a longer decline with a more limited recovery, which may be partly responsible for the patterns observed in figure 4.

FIGURE 4 ABOUT HERE

Moreover, examination of the period-to-period changes suggests that it is unlikely that the latter declines are responsible for the former. I display such changes in figure 5,

[11] Similarly, the mean Z_{ad} and Z_{ap} for these periods were 74.07 and 56.22 respectively. And Z_{as} was only 20.97.

which gives the logged percentage change from period-to-period in the concentration of directors and producers with particular major studios (Z_{ds} and Z_{ps}) as well as the logged percentage change in the repeat collaboration between directors and producers on films released through major studios (Z_{dp}). If changes in the bond between directors and producers with the studios were responsible for changes in the tendency for directors and producers to collaborate, we would observe that logged percentage changes that were roughly in line with each other. And there are indeed two period-to-period transitions for which it might be said that this is the case—the decline in all three Z-scores from 1960 to 1965 and the increase from 1985-1990. But there are at least as many transitions for which the change in the tendency for directors and producers to collaborate seems to tack in opposite fashion from the change in the tendency for directors and producers to work with particular studios (e.g., the 1945-1950, 1955-1960, and 1970-1975 periods). Overall, there is a weak, *negative* relationship (r=-.11) between the period-to-period logged percentage change in Z_{dp} and that for $Z_{ps.}$ And while there is a positive association (r=*.26*) between the period-to-period logged percentage changes in Z_{dp} and Z_{ds}, this association appears to be driven by the 1985-1990 transition (r=-.11 with this transition excluded). Thus, while collaboration among the key personnel involved in major film projects has declined over time, and this decline is especially marked for the relationship between directors and producers, it ultimately appears wrong to attribute such declines to the fraying of the bonds between the major studios and such agents. And substantially the same results are observed for the relationship between changes in actors' tendency to collaborate with directors and producers and each of these personnel's bond with the major studios.

FIGURE 4 ABOUT HERE

Where the Shift Really Occurred: Scale of Participation

I have to this point focused on aggregate indicators of the extent to which repeat collaboration is significantly more likely than would be expected due to random chance. However, as before, it is useful to examine the level of concentration at the individual level. I thus present in table 4 individual-level results on collaboration between directors and producers in the 1940 period, which appears to have been the peak of the studio

system, that parallel the results presented in table 1 for the 1995 period. A comparison of these two periods reveals that repeat collaboration was much more common in the earlier period. For example, while 38.32% of directors who directed two or more films in the 1995 period worked with the same producer twice, this was true for 76.15% for the 1935 period. Similar differences are observed when we compare the proportion of actors who collaborated more than once with the same director (9.50% in 1995 and 45.34% in 1940) or with the same producer (11.27% in 1995 and 44.95% in 1995). And as indicated by the trend lines in figure 6, the proportion of actors and directors with significant levels of repeat collaboration declined to a degree that seems to match the reduction in the tendency for actors to work repeatedly with the same studios.

TABLE 4 ABOUT HERE

FIGURE 6 ABOUT HERE

These results raise the question of how it is possible for a greater proportion of personnel to achieve significant levels of collaboration during the studio era but for the aggregate Z-scores to show little or no difference between the two periods. The answer to this question is that the main change that occurred between the two periods involved the *scale of participation* in the market rather than in the tendency to collaborate repeatedly. In discussing the 1995 period, we noted that the vast majority of personnel (80% of the actors and directors; and 78% of the producers) worked on a single film. This means that repeat collaboration is necessarily a very rare phenomenon. Matters were quite different during the era of the studio system, when a *minority* of these key personnel worked on only one film (44% of actors; 33% of directors, 43% of producers in 1940). Moreover, those personnel who did work on multiple films tended to work on more films than did their contemporary counterparts. For instance, more than half (53.52%) of the actors who worked on multiple films in 1995 were in only two films while this was true of just under one-fourth (23.61%) of the actors who worked on multiple films in 1940. Overall, the distribution of acting, directing, and producing declined steadily over the course of the period in question, as illustrated in figure7. This change in the concentration of work carries an important implication for the current analysis. In particular, while repeat collaboration was a much more common phenomenon during the studio era, such repeat collaboration was also much more likely

to be an artifact of random collaboration patterns. That is, simply by virtue of the fact that the typical actor, director, and producer tended to participate in more film projects than they do today, the studio era should display higher levels of repeat collaboration. But, as the aggregate Z-scores indicate, this does not mean that such repeat collaboration reflects a greater tendency for pairs of agents to choose to collaborate repeatedly.

In order to confirm this interpretation, I produce one additional random simulation of the actor-director vectors for the 1940 and 1990 periods. For each of these random simulations, I calculate $fhad(\rho)_a$, which as before is the difference between the Herfindhal of credited roles in the random data and what would be observed if the actor worked with a different director on each of her films. And I next compare $fhad(\rho)_a$ with the distribution of $fhad(r)_a$ from the original 1,000 random simulations. The results from this exercise are instructive. First, note that overall level of concentration in the additional random simulation is insignificant. In particular $Z(\rho)_{ad}$, which compares the mean concentration from the new random simulation $\overline{fhad(\rho)}$ with the mean from the original 1,000 simulations ($\mu_{\overline{dhad(r)}}$) and scaled by the standard deviation ($\sigma_{\overline{dhad(r)}}$) is 0.40 in 1940 and -0.35 in 1995. But when we examine matters at the individual-level, we find that the mean proportion of the 1,000 simulations for which the level of concentration ($fhad(r)_a$)was lower than that in the additional random simulation ($fhad(\rho)_a$) was 12.92% in 1940 and 0.54% in 1995. By contrast, the mean proportion of the 1,000 simulations for which ($fhad(r)_a$) was lower than that observed in reality ($fhad_a$) was 44.95% in 1940 and 9.43% in 1995. Thus, this analysis shows that in both periods, individuals tended to be more concentrated than might be expected due to random chance, and the departure from random chance could actually be said to be even higher in the latter period.[12] But the baseline levels were different. Since actors (and directors and producers) tended to work on many more films in the studio era, this produced more repeat collaborations simply due to random chance. Indeed, note that the level of repeat collaborations produced *randomly* in 1940 was higher than the level produced through *nonrandom* pairings in 1995.

[12] The log-ratio of the increase from the random-level was ln(44.95/12.92)=1.25 in 1940 and ln(9.43/0.54)=2.86 in 1995.

Discussion

The foregoing results stand as a strong challenge to the conventional imagery that pictures firms and markets as contrasting modes of economic organization. Recent research by sociologists and others have demonstrated significant network structure in the exchanges that comprise a market and, in particular, a significant degree of repeat exchange (e.g., Baker 1984, 1990; Bestor 2004; Kirman 2001; Podolny 1994; Uzzi 1996**,** 1999). Yet this research has heretofore not been recognized as a strong challenge to traditional imagery for two reasons. First, there has been a tendency to redefine contexts in which legally-economic agents exchange through network links as nonmarket settings (e.g., Jackson and Wolinsky 1996; Kali 1999; Kranton and Minehart 2001). Second, even those who interpret the recent research as evidence that the market itself is characterized by significant level of structure have neither argued nor shown that this level of structure is significant when compared with alternative governance regimes such as the (hierarchical) firm. The analysis presented here addresses this gap by providing the first glimpse at what happens to the level of repeat collaboration in an industry when it shifts from a firm-based system to a market-based system. And the surprising result is that little seems to change. Despite clear evidence that there was indeed a major fraying of the bond between studio and the film-project personnel, we found no evidence that repeat collaboration became less common.

How shall we interpret this finding? One possible interpretation is that the past research has greatly exaggerated the differences between the firm and the market in their manner of governance. Such an interpretation is consistent with recent theory that has emphasized the prevalence of “relational contracts” that operate similarly both within and between firms (Baker, Gibbons, and Murphy 2002) and empirical evidence that has found a surprising degree of authority exercised through the market (Bidwell 2004b; Stinchcombe 1990) and pointed to limits on managerial authority within the firm (Eccles and White 1988; Freeland 1996, 2001). Yet it seems hard to apply such an interpretation in the present case because the historical record strongly suggests that the studio system was governed in a manner that was quite different from the market-based system of today.

The alternative interpretation then is that quite different governance regimes may produce patterns of exchange that are remarkably similar. But why would repeat collaboration be as high in the market as it is within firms? Clearly, one reason is that markets are more structured than is commonly supposed even when specific investments are unimportant and third-party gossip can be expected to discipline economic agents to honor their commitments. As discussed above, repeat collaboration may still be common even under these circumstances because actors are not as interchangeable as might be supposed—or at least, they are not *experienced* as such. Thus, rather than searching widely for possible substitutes for one's former collaboration partners, actors may become (over-)committed to them because they believe that no good substitutes exist. Various versions of such a mechanism limiting broad scanning for partners are imaginable, ranging from a satisficing heuristic that limits search if existing alternatives meet some threshold of satisfaction (cf., March and Simon 1958; Cyert and March 1963) to social commitments that accrue, thereby preventing easy dissolution of ties (Sgourev and Zuckerman 2004). Clearly, there is much room for future research that helps to identify the mechanisms that produce repeat collaboration through the market.

Note that the real surprise may lie not in the significant level of repeat collaboration in the market but in the relatively *low* level in *firms* compared to what we might expect. One explanation for this might be that our standard image of the (hierarchical) firm does not fully appreciate the extent to which managers have a strong incentive to experiment with their personnel on different projects. Consider that, once a long-term commitment is made to an employee, the firm's profitability is maximized only if such employees are fully utilized. But if each employee is assigned to play a very narrow role, there is a threat that the employee will not be utilized during periods when that role is less in demand. Of course, one solution is to retain the flexibility to layoff workers when they are at needed and rehire them when they are. But such flexibility is often unfeasible for institutional or strategic reasons. Thus, an alternative is to move personnel from jobs that are temporarily in low demand to other jobs that are experiencing higher demand. And such practices will necessarily lead to experimentation of personnel in new jobs even if such experimentation was not the intention of the practice. The upshot is that the flow of employees across projects, and the corresponding

patterns of collaboration, will be much more fluid than if people remained in the same job. And as discussed above, there is considerable evidence that such unwitting experimentation occurred under the studio system, particularly in studios like Warner Bros., which would "put their whole contract list in every picture (Leonard Murphy, quoted in Harmetz 1984:122)."[13] Indeed, even MGM, which apparently had a higher tolerance for idling, the directors were treated as "interchangeabl[e] … parts" (Harmetz 1984: 138). By contrast, there are strong pressures in the labor market for agents to occupy clear categories so that they are more easily recognized as fitting into the available jobs. Such pressures serve to limit the degree of experimentation that the market fosters (Zuckerman et al., 2003).

Note finally that, while the main result of the present analysis is the absence of a clear difference between firms and markets in their level of repeat collaboration, this hardly means that firms and markets do not differ in other respects. For instance, while the level of repeat collaboration appears similar, this does not mean that the *quality* of the collaboration partners that emerge through the market is comparable to that which is coordinated by the firm. In addition, we have seen one clear difference even in the feature film industry: the tendency for firm-based systems to have much sharper boundaries (and higher rates of participation among those within those boundaries) than in market-based systems. While it appears typical of market-based labor markets, and perhaps art worlds in particular to have a large peripheral pool of participants who circulate rapidly in and out of the industry, such a pool may be absent in firm-based systems since firms typically make longer-term commitments to their staff. We have just discussed one possible implication of such commitments—that they may encourage experimentation. But there may be other implications as well that future research would do well to investigate.

Conclusion

I conclude on a methodological note. In particular, this paper joins an emerging stream of research that indicates the value of conducting research that explicitly compares how

[13] Reddersen's (1983) detailed analysis of Humphrey Bogart's career is instructive in this regard. While analyses of the studio system's grooming of stars sees this process as quite deliberate, Reddersen shows that Bogart's opportunity to break out of the "dirty heavy" roles and become a romantic leading man were the result of studio practices of utilizing its contract list as fully as possible. Due to this practice, Warner Bros. conducted experiments that they did not even intend.

economic activity operates under different governance regimes and, in particular, the firm and market (e.g., Bidwell 2004a, 2004b; Scharfstein and Mullainathan 2001). Recall that Coase's question of why firms exist in a capitalist economy was motivated by the observation that firms are more apt to "waste resources" by failing "to place the factors of production where their value is greatest," (Coase 1937: 394-5). One possible way of solving this puzzle is to question the premise that firms and markets really do operate according to fundamentally different principles. That is, perhaps the market does not really achieve greater allocative efficiency than does the market. Yet perhaps since this assumption seemed beyond question, Coase built his answer on the insight that, while markets are indeed more efficient than firms, the cost of transacting through the market may be so great that it outweighs its efficiency advantage. In addition to focusing on the role of transaction costs, Coase also made a second analytic move that has exerted great influence over subsequent research. In particular, Coase reframed the question of the firm vs. market in terms of the "make-or-buy" decision. The premise that underlies this approach is that, if we can understand which transactions are conducted through the market and which are conducted or brought in-house, we should be able to infer the differences between mechanisms at work in the firm and in the market and the relative advantages of the two economic institutions. This framing of the matter has been adopted across a wide spectrum of approaches to the theory of the firm (see Gibbons 2003 for review).

Yet the focus on the "make-or-buy" question cannot adequately address the fundamental question of how and to what extent economic activity is organized differently when it occurs in a firm or in a market. A key assumption of such approaches is that actors' revealed preferences for organizing in the firm versus the market reflect accurate understandings of the principles that underlie the two institutions and the criteria for preferring one to the other. That is, while social scientists have wrestled with the theory of the firm for generations, it is assumed that men and women of affairs are already guided by the correct theory. Such an assumption could be justified on evolutionary grounds. That is, given the strong competitive pressures operating on economic actors, the actors who survive in equilibrium will be those that operate according to the correct theory of the firm, even if they are not able to articulate that

theory (cf., Alchian 1950; Friedman 1953; Enke 1951). Yet such an evolutionary justification is problematic in general (see Winter 1987) and especially because it presumes that make-or-buy decisions are in fact consequential for firm survival. But if such decisions are relatively unimportant as determinants of firm life chances-- perhaps because markets and firms are really not that different in the way they organize economic activity or simply because other aspects of organization design and strategy are much more consequential, then there will be no evolutionary impetus for actors to converge on the same, correct theory of the firm. Thus, while research on the make-or-buy decision may indicate common *thinking* on how firms and markets differ, it is quite another matter to conclude that such theories are well-founded.[14] And such a conclusion can be obtained only from a direct examination of how firms and markets compare in the patterns of behavior that are observed within their boundaries (e.g., Bidwell 2004a, 2004b; Scharfstein and Mullainathan 2001).

[14] For instance, even if research showed that firm boundaries tend to be drawn in the locations predicted by Williamson (1985, 1996), this would indicate that managers tend to apply a lay version of Williamson's theory but it does not provide direct evidence that this theory is correct, especially insofar as it contrasts the organizing principles of the firm with that of the market. To conclude that the theory is correct, one must demonstrate that managers who apply different theories are penalized so strongly that they cannot persist in their ignorance.

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Table 1:
Distribution and Significance of Repeat Collaboration of Directors with Producers, 1993-1995*

	All English-Language Releases				Major Releases Only			
N of Films Directed	Frequency	% of Directors with 1+ Repeat Collaboration	$\overline{fhdp}$	Mean % of simulations where $fhdp(r)_d < fhdp_d$	Frequency	% of Directors with 1+ Repeat Collaboration	$\overline{fhdp}$	Mean % of simulations where $fhdp(r)_d < fhdp_d$
1	851	0.00%	0.000	0.00%	249	0.00%	0.000	0.00%
2	157	27.39%	0.066	27.26%	55	29.09%	0.054	28.72%
3	42	59.52%	0.114	57.76%	3	33.33%	0.010	32.97%
4	5	100.00%	0.196	94.30%				
5	6	83.33%	0.359	83.33%				
6	2	100.00%	0.328	100.00%				
8	1	100.00%	0.875	100.00%				
10	1	100.00%	0.204	100.00%				
All directors	*1,065*	*7.70%*	*Mean=0.019*	*Mean=7.58%*	*307*	*5.54%*	*Mean=0.052*	*Mean=5.47%*
Directors with 1+ Films	*214*	*38.32%*	*Mean=0.094*	*Mean=37.74%*	*58*	*29.31%*	*Mean=0.010*	*Mean=28.93%*

* Samples exclude films for which no information was available about the producer or the only producer was also the director.

Table 2:
Distribution and Significance of Repeat Collaboration of Actors with Directors, 1993-1995

	All Roles in All English-Language Releases				Major Releases, Top-Five Billing Only			
N of Films in which Acted	Frequency	% of Actors with 1+ Repeat Collaboration	$\overline{fhad}$	Mean % of simulations where $fhad(r)_a < fhad_a$	Frequency	% of Actors with 1+ Repeat Collaboration	$\overline{fhad}$	Mean % of simulations where $fhad(r)_a < fhad_a$
1	26,725	0.00%	0.000	0.00%	1,037	0.00%	0.000	0.00%
2	3,907	6.78%	0.033	6.75%	444	2.03%	0.010	2.02%
3	1,499	8.81%	0.024	8.78%	253	1.98%	0.004	1.96%
4	687	12.37%	0.028	12.31%	111	5.41%	0.007	5.30%
5	332	15.06%	0.018	14.90%	54	9.26%	0.007	8.97%
6	198	19.19%	0.021	19.02%	21	19.05%	0.013	18.76%
7	122	25.41%	0.020	24.91%	9	33.33%	0.014	30.98%
8	45	31.11%	0.028	30.43%				
9	51	31.37%	0.014	30.61%				
10	26	23.08%	0.010	22.71%				
11	13	61.54%	0.030	58.77%				
12	9	66.67%	0.012	62.57%				
13	3	33.33%	0.008	33.17%				
14	1	100.00%	0.020	99.70%				
15	1	0.00%	0.000	0.00%				
18	1	100.00%	0.011	97.80%				
21	1	100.00%	0.017	100.00%				
All Actors	*33,621*	*1.95%*	*Mean=0.006*	*Mean=1.93%*	*1,929*	*1.71%*	*Mean=0.004*	*Mean=1.63%*
Actors with 1+ Films	*6,896*	*9.50%*	*Mean=0.029*	*Mean=9.43%*	*892*	*3.70%*	*Mean=.008*	*Mean=3.52%*

Table 3:
Distribution and Significance of Repeat Collaboration of Actors with Producers, 1993-1995

	All Roles in All English-Language Releases				Major Releases, Top-Five Billing Only			
N of Films in which Acted	Frequency	% of Actors with 1+ Repeat Collaboration	$\overline{fhap}$	Mean % of iterations where $fhap(r)_a < fhap_a$	Frequency	% of Actors with 1+ Repeat Collaboration	$\overline{fhap}$	Mean % of iterations where $fhap(r)_a < fhap_a$
1	24,914	0.00%	0.000	0.00%	1,007	0.00%	0.000	0.00%
2	3,870	7.16%	0.020	7.06%	444	4.28%	0.009	4.26%
3	1,495	10.50%	0.018	10.44%	253	7.12%	0.007	7.05%
4	686	15.02%	0.015	14.89%	111	18.02%	0.010	17.57%
5	331	20.24%	0.017	20.00%	54	11.11%	0.003	10.56%
6	197	30.46%	0.017	29.87%	21	28.57%	0.007	26.88%
7	122	31.97%	0.014	31.16%	9	44.44%	0.011	41.50%
8	45	46.67%	0.019	45.38%				
9	51	33.33%	0.012	32.61%				
10	26	53.85%	0.019	50.74%				
11	13	38.46%	0.025	37.55%				
12	9	66.67%	0.007	62.14%				
13	3	66.67%	0.004	60.40%				
14	1	100.00%	0.112	100.00%				
15	1	100.00%	0.026	100.00%				
18	1	100.00%	0.003	83.00%				
21	1	100.00%	0.005	94.40%				
All Actors	*31,766*	*2.43%*	*Mean=0.004*	*Mean=2.40%*	*1,899*	*3.85%*	*Mean=0.004*	*Mean=3.76%*
Actors with 1+ Films	*6,852*	*11.27%*	*Mean=0.019*	*Mean=11.10%*	*892*	*8.19%*	*Mean=.008*	*Mean=8.00%*

Table 4:
Distribution and Significance of Repeat Collaboration of Directors with Producers, 1938-1940*

	All English-Language Releases				Major Releases Only			
N of Films Directed	Frequency	% of Directors with 1+ Repeat Collaboration	$\overline{fhp_d}$	Mean % of simulations where $fhp(r)_d < fhp_d$	Frequency	% of Directors with 1+ Repeat Collaboration	$\overline{fhp_d}$	Mean % of simulations where $fhp(r)_d < fhp_d$
1	109	0.00%	0.000	0.00%	58	0.00%	0.000	0.00%
2	34	29.41%	0.147	29.19%	38	34.21%	0.164	33.73%
3	38	55.26%	0.183	54.33%	24	41.67%	0.089	40.09%
4	28	71.43%	0.173	69.26%	20	70.00%	0.138	67.00%
5	25	92.00%	0.205	87.13%	14	85.71%	0.217	81.37%
6	25	100.00%	0.186	92.19%	13	100.00%	0.242	85.63%
7	9	100.00%	0.294	99.93%	15	100.00%	0.314	99.65%
8	24	95.83%	0.243	93.89%	9	100.00%	0.308	95.63%
9	9	100.00%	0.326	99.67%	1	100.00%	0.306	100.00%
10	5	100.00%	0.102	98.42%	3	100.00%	0.112	96.30%
11	4	100.00%	0.273	99.15%	1	100.00%	0.397	100.00%
12	6	100.00%	0.280	99.93%	1	100.00%	0.500	100.00%
13	4	100.00%	0.182	100.00%	1	100.00%	0.923	100.00%
14	2	100.00%	0.531	100.00%	1	100.00%	0.204	100.00%
15+	5	100.00%	0.449	100.00%	1	100.00%	0.941	100.00%
All directors	*327*	*50.76%*	*Mean=0.139*	*Mean=47.76%*	*200*	*47.50%*	*Mean=0.142*	*Mean=44.90%*
Directors with 1+ Films	*218*	*76.15%*	*Mean=0.208*	*Mean=72.93%*	*142*	*66.90%*	*Mean=0.200*	*Mean=63.95%*

* Samples exclude films for which no information was available about the producer or the only producer was also the director.

Figure 1:
Z-Scores for Concentration of Work with Particular Studios in English Language Feature Film Projects, 1935-1995 Periods

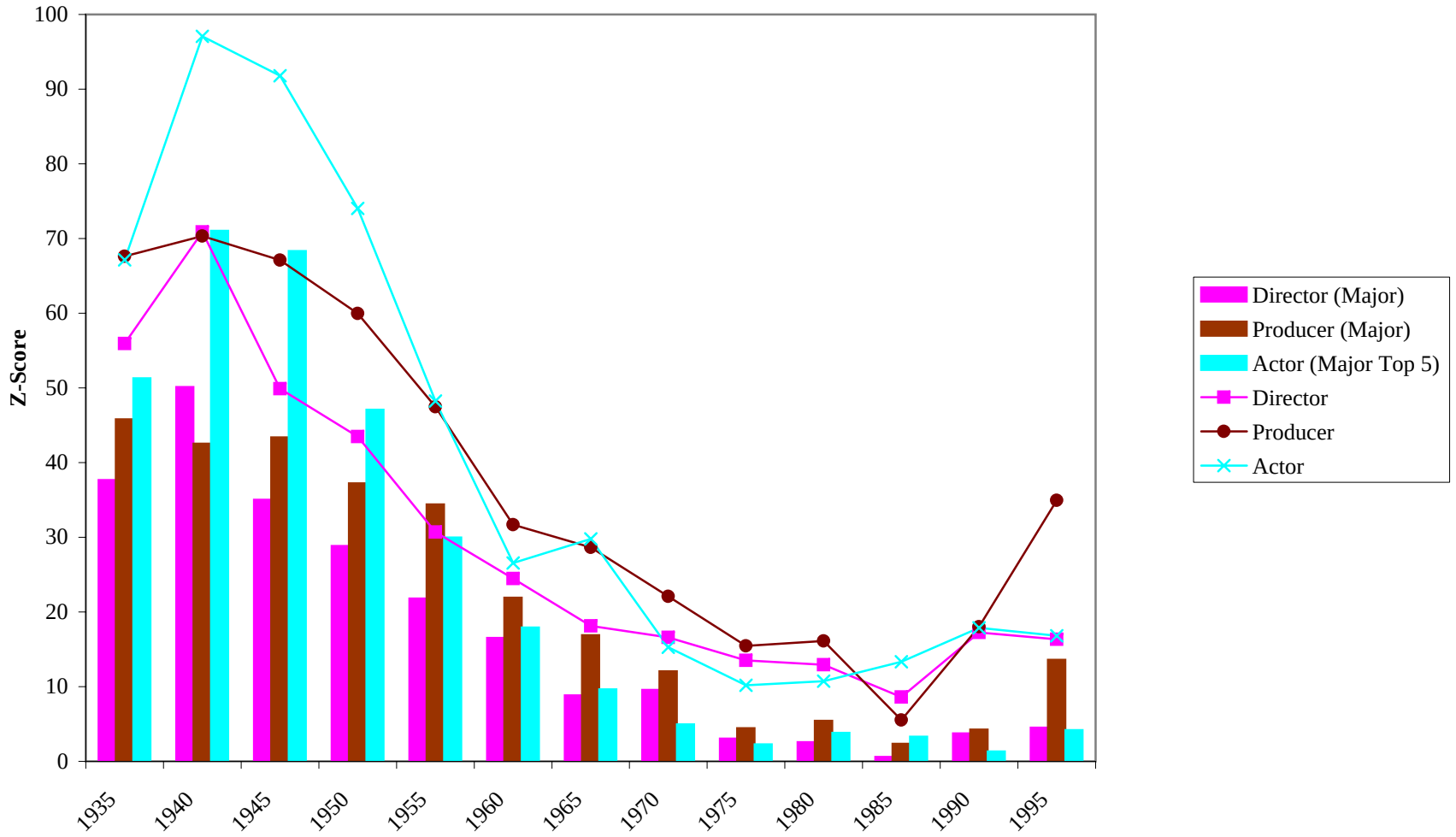

Figure 2: Number of English-Language Films Released, 1935-1995
Periods

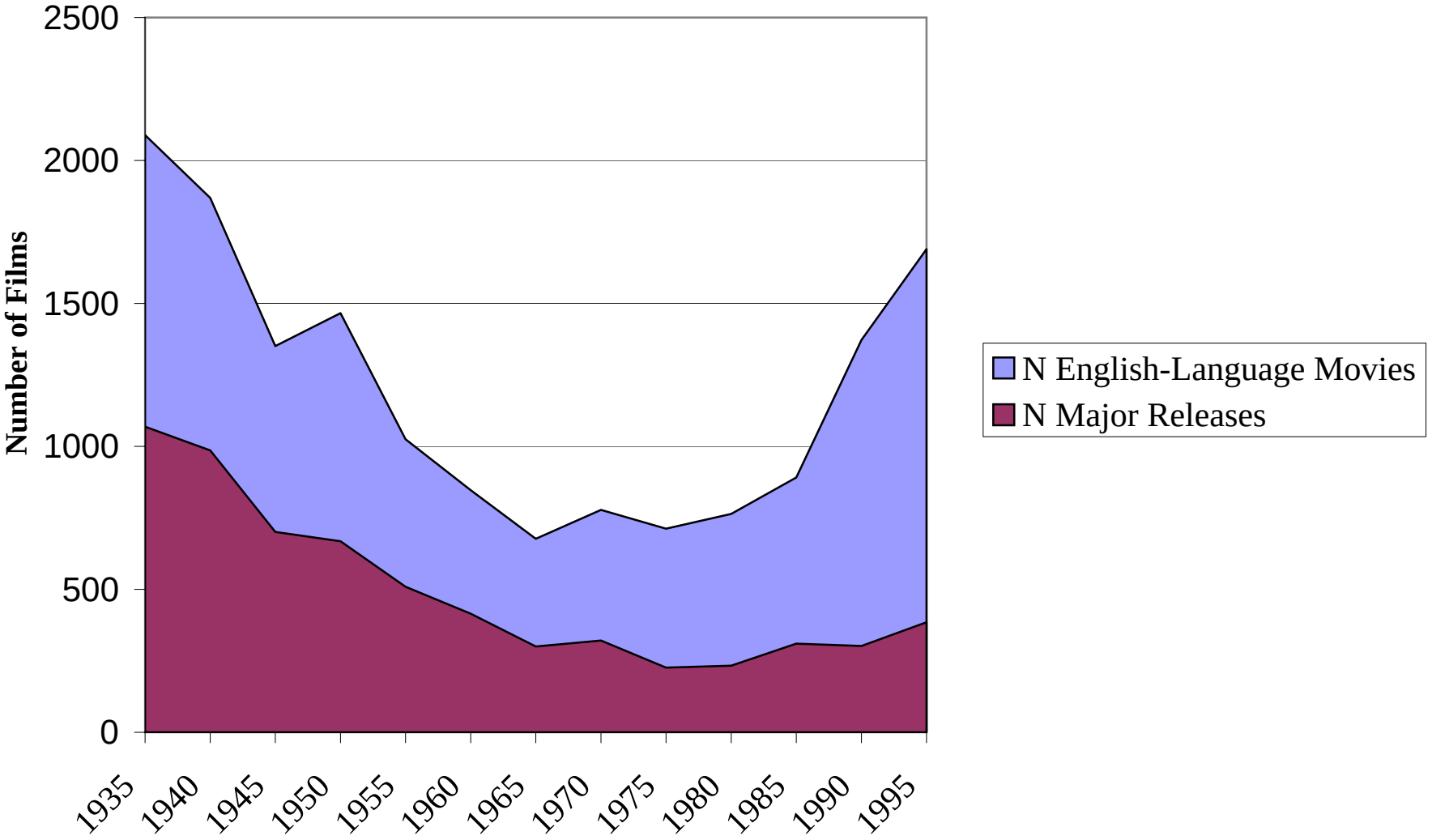

Figure 3:
Z-Scores for Concentration of Work among Directors, Actors, and Producers in English Language Feature Film Projects, 1935-1995 Periods

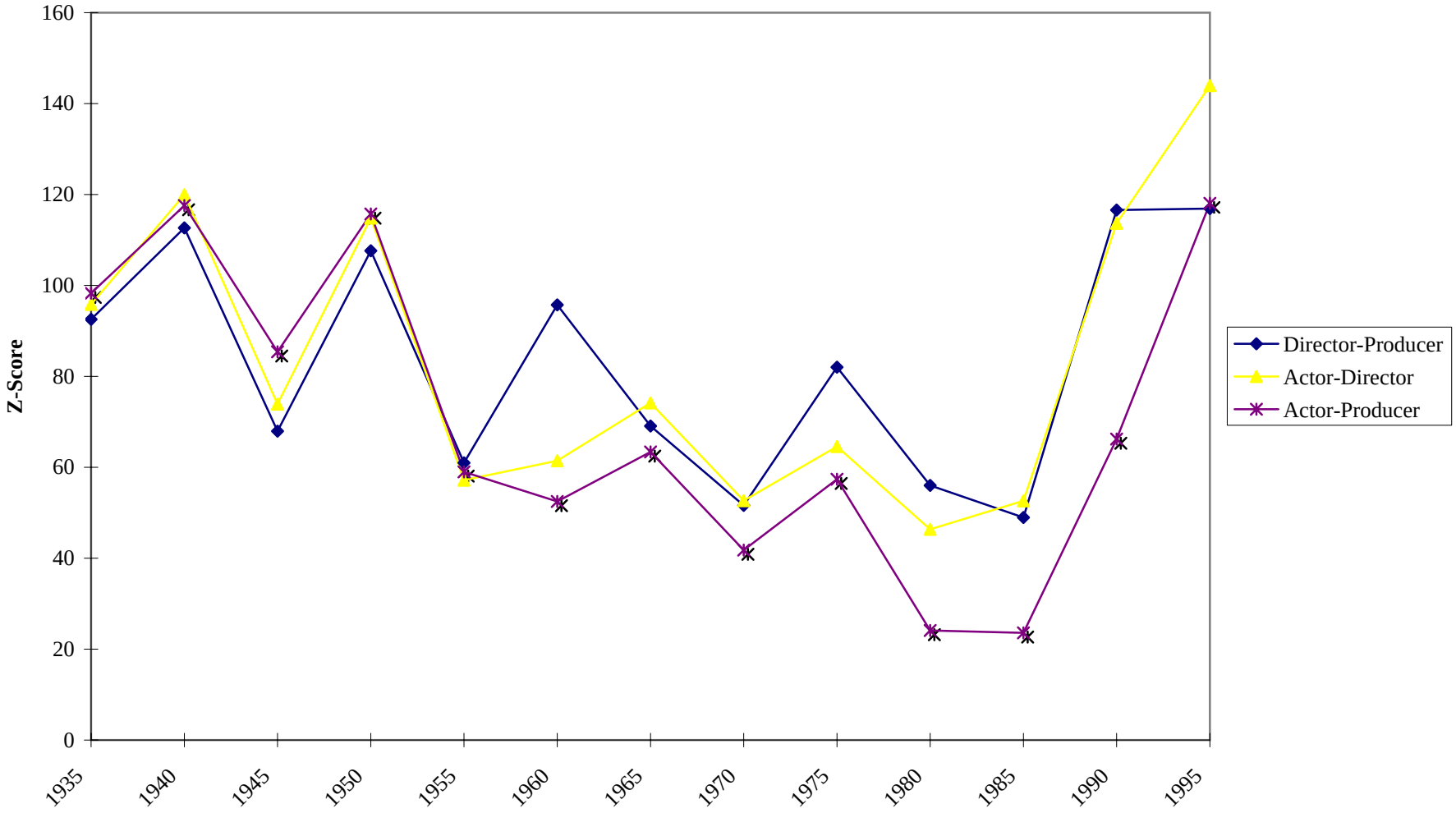

Figure 4:
Z-Scores for Concentration of Work among Directors, Actors, and Producers in English Language Feature Film Projects Released Through Major Studios, 1935-1995 Periods

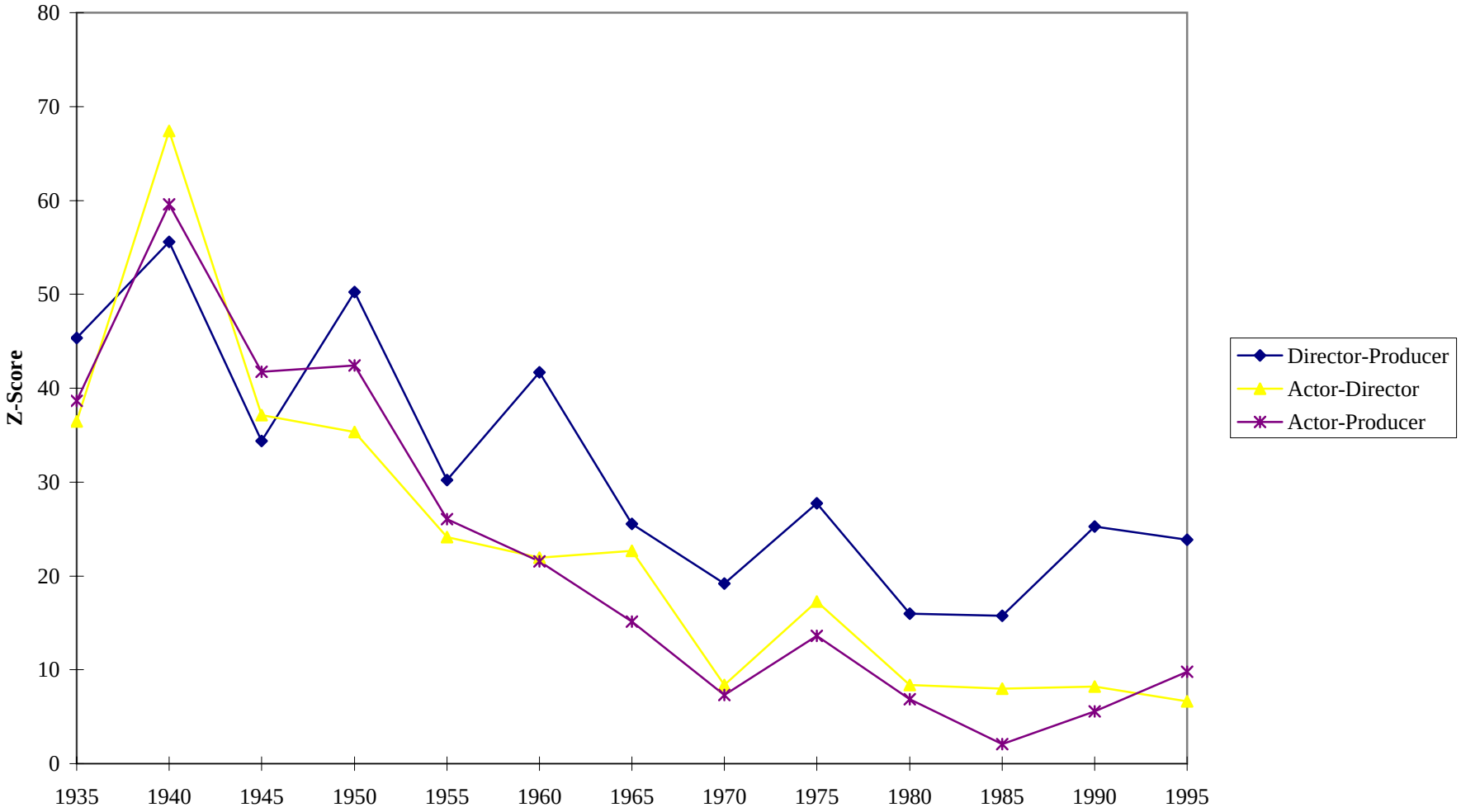

Figure 5:
Logged Percentage Period-to-Period Change in Z-Scores for Collaboration between Directors, Producers, and Studios on Major Releases, 1935-1995 Periods

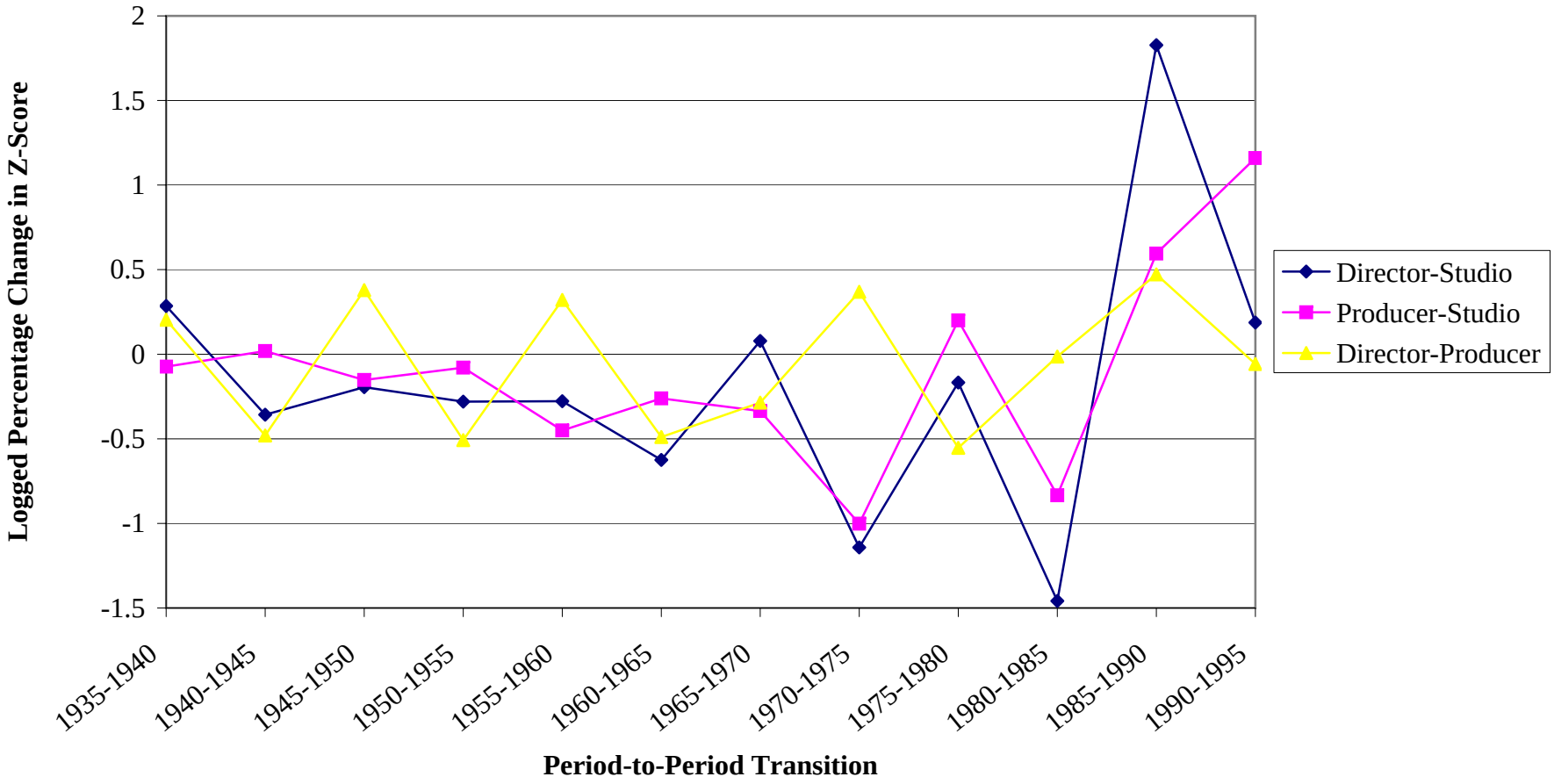

Figure 6:
Mean Percentage of Simulations with High Levels of Repeat Collaboration Among Directors, Actors, and Producers in English Language Feature Film Projects, 1935-1995 Periods

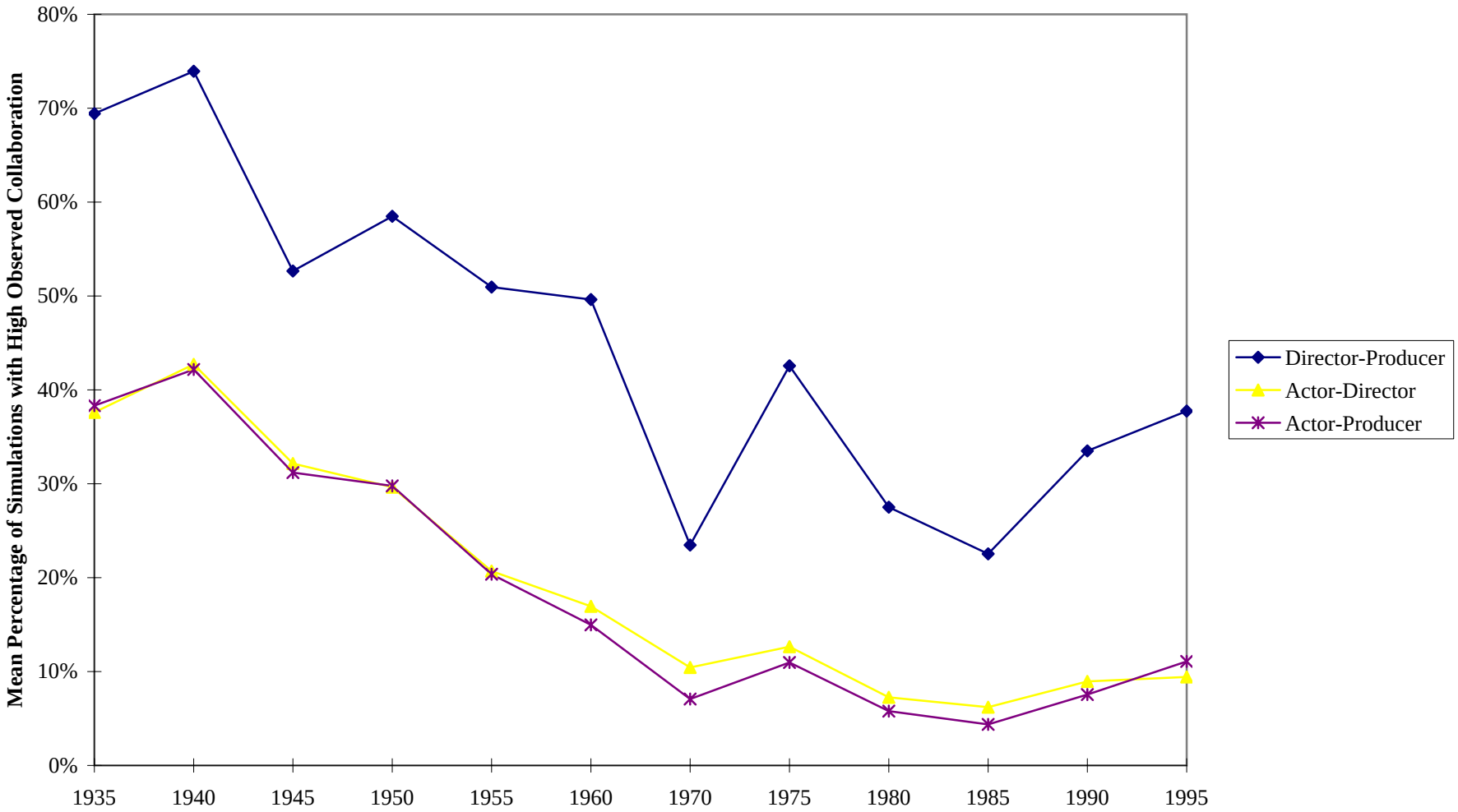
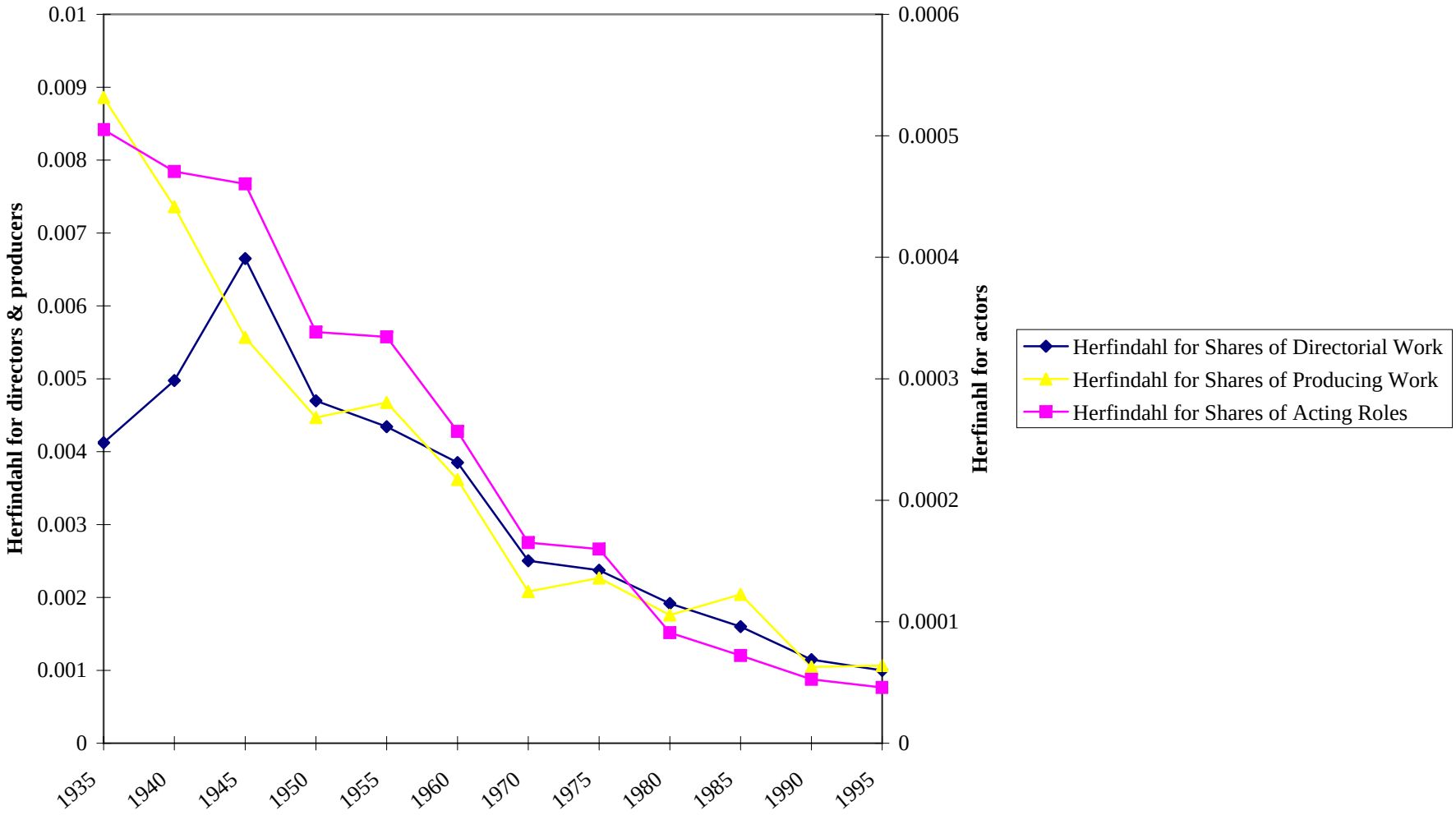
Figure 7:
Concentration of Shares of Acting Roles, Directorial and Producer Work in English-Language Feature Films, 1935-1995 Periods