I'd Like to Thank the Academy, Complementary Productivity, and Social Networks

Nicole Esparza
Department of Sociology,
Princeton University
nesparza@princeton.edu

Gabriel Rossman
Department of Sociology,
UCLA
rossman@soc.ucla.edu

Abstract:

This paper explores under what conditions a film actor will be nominated for an Academy Award. Our analysis is based on data from the Internet Movie Database on 171,539 performances by 39,518 actors in 19,351 films. There are a total of 1,394 nominations. Controlling for the actor's personal history and basic traits of the film we explore hypotheses related to two distinct sets of predictions about the actor's social ties. First, we test the extent to which the skill of team members (directors, screenwriters, and co-stars) complements the actor's performance. This allows us to test whether the efforts of high quality workers spill over onto their team members. In other words, does having Robert DeNiro as a co-star make one more likely to be nominated for an Oscar? Second, we test whether network ties to Academy members make an actor more likely to be nominated for an Oscar. That is, does your having worked with Robert DeNiro in the past make it more likely that he will nominate you for an award today? We find that spillover effects from team members are highly significant but network effects of knowing academy members are trivial.

Please direct correspondence to first author at nesparza@princeton.edu
The authors would like to thank Paul DiMaggio, Bill Mason, Laura Piersol, Martin Ruef, UCLA Academic Technology Services, the Academy of Motion Picture Arts and Sciences, and especially Phil Bonacich.

Embeddedness is a central concept in economic sociology. Typically this is held to emphasize that work occurs within a context of social ties and repeated transactions. However recent sociology has tended to forget that one aspect of embeddedness is that much of work occurs within teams. Since it is easier to measure a team's success than the contribution of each team member to that success, one sees spill-over effects whereby skilled workers benefit their colleagues. This paper uses peer nominations for a prestigious award to test the effects both of colleague skill spillover and of more conventional network effects.

Our test case is the complete set of Oscar nominations for lead and supporting acting from the Academy of Motion Picture Arts and Sciences. Unlike novelists, screen actors are not isolated artists, but perform within the context of films, which see the input of other artists, including directors, screenwriters, and co-stars. This allows us to test whether the efforts of high status workers spill over onto their team members. In other words, does having Robert DeNiro as a costar make one more likely to be nominated for an Oscar? The awards are based on peer nominations and votes and this allows us to test the effects of an actor's accumulated social network ties. That is, does your having worked with Robert DeNiro in the past make it more likely that he will nominate you for an award today?

Although most of the literature on work teams has focused on pecuniary compensation, we use the Academy Awards as a measure of reward and recognition. Awards have several properties that make them noteworthy for sociological analysis. Awards serve as tournament rituals that, like all rituals, serve to define their field (Anand and Watson 2004). The professions that constitute fields use awards to define themselves aspirationally, to show what sort of things the field ought to be doing. Although the Academy is sensitive to box office performance, the awards, like the film industry as a whole, retain an irreducible element of "art for art's sake" (Caves 2000). What constitutes "art for art's sake" is defined by field members – a powerful example of normative isomorphism (DiMaggio and Powell 1983). Thus awards are important because they help define what is valued, and by extension, what will be produced.

Beyond the pride one can take in industrial beatification, there are practical and concrete benefits for nominees as well. A nomination has a pervasive impact on an actor's career, "contributing to their visibility in the film industry through the immense exposure and publicity that follow the first nomination" (Levy 1987:69). Winning an Oscar can dramatically increase the fees a previously obscure Hollywood worker can demand (Gumbel et al. 1998). Likewise, Oscar winners actually live four years longer than otherwise comparable peers, and in this respect it is not an honor just to be nominated since the effect only applies to winners (Redelmeier and Singh 2001).

One problem with awards is that they are awarded shortly after release, denying the "test of time." Part of the problem is that a true innovation may so violate the conventions of its day that the unfamiliarity alienates audiences (Gitlin 1983). Some films that did not win any Academy Awards have been recognized in retrospect as masterworks (Ginsburgh 2003). For instance, most contemporary critics now recognize *The Searchers* (1956) and *Vertigo* (1958) to be two of the greatest films of the 1950s, but neither was nominate for a major Academy Award (Carr 2002). On the other hand, Marlon Brando's performance in *On the Waterfront* (1954) is probably the most influential performance in cinema, but its revolutionary nature did not keep it from winning the Academy Award for best actor (with the film earning a total of eight Oscars). Furthermore, the point of the exercise is not to measure the true artistic worth of the performance, but the perceived artistic worth. From this perspective, the biases inherent in short-term evaluation are not error, but data.

This paper brings together literature from economics and economic sociology, in the process reconciling the two by resurrecting an unjustly neglected sociological traditional. We show how rewards are structured by interpersonal networks and team effects. While economic sociology devotes great attention to the former, it largely neglects the latter.

We draw on three literatures in this paper. The first literature is on complementary productivity, which focuses on intra-work-team externalities of skill. The second literature is on reputation and status. Finally, we review how actors draw on resources through social networks.

Complementary Productivity

Stinchcombe (1963) distinguishes between industries in which "individual talent is clearly a *complementary* factor of production [whereas] in others it is more nearly *additive*" (p. 806). He hypothesizes that wage inequality will be greater in the former than in the latter industries. He gives the example that if Alec Guinness is thrice as talented as the typical actor, this will have a much greater effect on a film's quality than the efforts of a comparably prodigious house painter on a home's appearance. This implies that Guinness' compensation will be much higher above the mean for actors than a talented house painter's compensation will be above the mean for painters. As predicted by Stinchcombe, the variance in salaries for academics at research institutions is greater than that at teaching institutions (Abrahamson 1973). Likewise, industries characterized by complementary productivity exhibit greater productivity when using incentive structures sensitive to this characteristic (Petersen 1992). Jacobs contributes to Stinchcombe's additive versus complementary schema by suggesting a third sort of work, wherein "the chain of productivity can only be as strong as its weakest link" (Jacobs 1981:688). This last model, wherein exemplary performance is not as beneficial as poor performance is catastrophic, proves to be important in economics.

Originally, economists primarily used complementarity to as the opposite of substitutability in the context of price theory, usually in the context of goods that stimulate demand for one another, like coffee and sugar or cars and gasoline (e.g., Samuelson 1974). Economics' study of complementary productivity began as an outgrowth of Rosen's (1981) superstar theory, which holds that given low marginal costs of reproduction (a condition that prevails in the mass media), a small variance in the distribution of talent creates a massive inequality of rewards described by a power-law distribution. However, the original theory was methodologically individualistic. Shortly afterward, Rosen published another piece (1982) that did address complementary productivity. Here Rosen extended the argument from intellectuals and artists to professional managers, much as the earlier sociology tradition had done before (Stinchcombe and Harris 1969). Likewise, a comment and reply on the superstar piece (Bowbrick 1983; Rosen 1983) agreed that the theory must be expanded to include collaborative works and that the effects of each contributor are complementary, not additive.[1]

The elements came together in economics with "O-Ring Theory" or the multiplicative production function (Kremer 1993), which was itself an application to development, but has since been widely adopted in labor economics (e.g., Battu, Belfield, and Sloane 2003), sports economics (e.g., Scully 1995), and cultural economics (e.g., Caves 2000). The theory holds that since flaws and failures cascade through systems, inputs exhibit multiplicative productivity, with a given input of "zero" cascading catastrophically. The theory thus parallels (but does not acknowledge), Jacobs' (1981) earlier elaboration of Stinchcombe. Note that some economists who invoke O-Ring theory and multiplicative production are actually using a model closer to

[1] The focus of the discussion between Bowbrick (1983) and Rosen (1983) was not on complementary production *per se*, but how the interaction of it and heterogeneity in taste have the potential to create bland mass culture.

Stinchcombe's theory of complementary production. For example, Caves (2000) cites Kremer (1993), even though his model of productivity in the arts is actually closer to Stinchcombe (1963) since he emphasizes how an exemplary artist can benefit a collaboration, not how an inferior one can cripple it.

For our purposes there are two important implications. First, "when complementarity exists between labor inputs, individual productivity may be poorly measured by treating the individual worker separately from the character of the organization, or team, within which he works" (Idson and Kahane 2000:345). Second, worker productivity (and compensation) benefits (or suffers) from externalities of other team members' labor. In practice this should mean that workers will be evaluated more highly when they work in the company of skilled peers. For instance, Robert Forster has had a long but undistinguished career as a character actor, primarily appearing on television and in extremely low budget horror and crime films. His centrality for the period 1992-1996 (see methods section for details) ranked him as the 762nd highest status actor in Hollywood, hardly the A-list. Yet in 1998 he was nominated for the best supporting actor Oscar. Forster's nomination for the role of bail bondsman Max Cherry in *Jackie Brown* (1997) almost certainly reflects spillover effects. The film was written and directed by Quentin Tarantino who had previously been nominated for original screenplay and directing (winning the former) for *Pulp Fiction* (1994). Likewise, Forster's co-stars included prior nominees Samuel L. Jackson and Robert DeNiro. Such a prestigious cast and crew undoubtedly helped Forster, though it is difficult to say the extent to which they did so by eliciting a good performance versus bringing attention to that performance. That Forster's career immediately regressed to the mean after *Jackie Brown* only serves to demonstrate how much his performance in that film benefited from Tarantino, Jackson, and DeNiro. Extreme cases like this, where an obscure character actor gets nominated after working with an elite team, are rare. However, even actors who themselves have strong credentials may benefit from working with strong teams. For instance, Leonardo DiCaprio is an A-list actor on his own strength but his first nomination came from collaboration with a prestigious director (Lasse Hallström) and his second with Hollywood's top director (Martin Scorsese) and an Academy-nominated writer (John Logan). In this respect, we hypothesize that actors are more likely to be nominated for Academy Awards when they work with past Academy Award nominees.

H1: Actors are more likely to be nominated for Academy Awards when they work in the company of previously nominated peers.

Reputation and Status

Status is important in many fields as it provides a ready rubric for actors to quickly assess potential trading partners. Economists tend to focus on "reputation," which corresponds roughly to a track record of honorable behavior and high quality output (Axelrod 1980; Wilson 1985), but sociologists use the term "status" to denote a similar, but more embedded understanding. One of the ways in which one acquires status is through association with other high status actors, particularly when one outranks a high status partner (Podolny 1993).

In Hollywood, status is defined in the billing block just as it is by the tombstone on Wall Street. For all professions except writers, credits are negotiated between the professional and the studio, and include not just the order of listing but such details as typeface, opening versus end credits, whether the credit appears on the screen by itself or as a "shared card credit," and even whether an actor's picture must appear on all advertising (Resnik and Trost 1996).[2] A particularly keen point is that actors do not judge this deference in absolute terms, but according to the "most favored nation" principle that no other professional receives greater honor. For instance, a powerful actor may not be offended at a poster with just the name and release date of a film, but would be if that poster included the name of another professional without giving equal prominence to ego. In effect, getting higher credit listing than an alter demonstrates ego's higher status.

Fight over credit is notorious in Hollywood, regardless of whether it is the studio or the Writer's Guild that is allocating the credits. A manual for aspiring film workers notes that "credit is often the most fought-over issue in a negotiation, because credit represents a number of the juiciest points to win: Ego, power, and fame are all tied up in where your name appears on screen or in advertising" (Resnik and Trost 1996:262). In fact, "screen credits for film participants work exactly as vita entries for research scholars: the bricks from which the structure of careers and reputations are built" (Caves 2000:107). Recognition is less a function of screen time or any other tangible contribution to the film than it is to power and status. For example, Judi Dench

---

[2] For screenwriters, credit is allocated by the union according to how much each writer contributed at the story (conceptual outline) and screenplay (dialogue) stage

had only eight minutes of screen time in *Shakespeare in Love* (1998) but nonetheless was one of only five names on the film's poster and won an Oscar for her performance.

Just as status ultimately confers pecuniary advantage in investment banking (Podolny 1993), qualitative evidence suggests that it does in film as well. Workers in cultural fields with mass production, such as film or recorded music, are characterized by the "superstar effect," or massive inequality of returns to workers and products of only slightly unequal talent (Rosen 1981). Rosen postulates that in these fields, rewards are an exponential function of q, an unobserved variable that corresponds to quality or popular appeal. Attempts to concretely measure q have proven elusive. For instance, voice quality has only a weak relationship to success for pop singers (Hamlen 1991). This has led to several theories of the superstar effect that argue that superstars are no better than other cultural workers, but merely harnessed the lucky side of stochastic processes like the snowballing of herd effects (Adler 1985, Banerjee 1992, Salganik et. al. 2006). If quality is hard to observe directly, then socially constructed status becomes all the more important, not just for social scientists observing the field, but also for trading partners acting with in it.

H2: High status actors, as measured by centrality in the asymmetric network of screen credits , will be more likely to be nominated for Academy Awards.

Networks

Hollywood has been shown to be a field that is sensitive to network ties. Participants show a marked tendency to seek out repeat collaborators (Zuckerman 2004) and direct excessive resources to ensure the success of these partners' films (Sorenson and Waguespack 2005). One finding that looks unfortunate for the role of networks in Hollywood is that actors who specialize in working with particular directors are less likely to find work (Zuckerman et al. 2003). However the particular network specification only demonstrates that strong ties are ineffective at search – an alternative way to read the results is that diverse ties are best for search.

The collaboration network of film actors is a small-world network, a combination of short paths and a highly clustered structure (Watts and Strogatz 1998; Newman, Watts, and Strogatz 2002). A tie between two actors represents appearance in the same movie. Newman et al. (2002) argue that the distribution of edges, or the number of other actors with whom an actor has costarred, is highly skewed because collaboration among actors carriers a one-time cost—the time and effort to make a movie.

In the case of Academy nominations, we believe that strong ties with Academy members will increase the actors' likelihood of being nominated because Academy members are the ones doing the nominating. This follows from Granovetter's (1973) notion that while information flows through weak ties (and indirect paths), power flows through strong ties. For instance, when job seekers learn about job ties through short paths it carries with it a persuasive endorsement, whereas information conveyed through long paths grant no preferential treatment to ego's candidacy (Granovetter 1975).

H3: Degree centrality with Academy members will have a positive relationship with peer honors.

DATA

We use data from the Internet Movie Database (IMDB) to investigate the effect of embeddedness within a collaborative team on an actor's prestige. Although most literature is on pecuniary compensation, we use peer esteem as the outcome. With these data, we construct two data sets. First, our full data set includes all credited actors in feature-length, English-language, non-pornographic films. This data set includes 247, 926 actors in 44,454 films. We use this data set to calculate the covariates. Second, a subset of the full data set is limited to top ten credited actors in Academy Award eligible films. We use this subset as the risk set for our regression models.

Measures and Model Specification

Table 1 lists the variables to be used in the analysis. All variables are time-varying.

INSERT TABLE 1 ABOUT HERE

Academy Nomination. The dependent variable is the log-odds of an actor being nominated for an Academy Award. We count all Academy of Motion Picture Arts and Science (AMPAS) nominations from 1927 to 2005 in English language, feature length films for the categories of

"Best Actor in a Leading Role," "Best Actress in a Leading Role," "Best Actor in a Supporting Role," and "Best Actress in a Supporting Role." Only actors in films deemed *eligible* by the AMPAS are considered "at-risk" of nomination. According to Rule Two of the Academy Awards of Merit, films are considered eligible for an Academy Award if they are feature length (defined as over 40 minutes), meet minimal technical standards for quality, were screened in a Los Angeles County commercial motion picture theater for paid admission for a run of at least seven consecutive days, and were advertised during their Los Angeles run. We obtained nomination ballots for all years from the AMPAS Special Collection Archives located at the Margaret Herrick Library, Fairbanks Center for Motion Picture Study in Los Angeles. The nomination ballots contain only eligible films for consideration.

Furthermore, we consider only the top ten roles in each film to be at-risk of nomination. Although it is not unheard of for actors ranked lower than 10 in the credits to be nominated, it is very rare. By limiting the sample to the top ten roles, we still include 99.2 percent of the nominees in the lead categories and 95.5 percent of the nominees in the supporting categories.

Founded in 1927, the AMPAS is a professional honorary organization of approximately 6,000 motion picture professionals created to advance the arts and sciences of motion pictures. From its beginning the AMPAS began bestowing awards for film. From 1927 to 1928, the Academy did not have "official" nominations; however, the Academy's data base includes names of those being discussed for the award. From 1927 to 1935, the Academy had only two categories for acting, "Best Actor" and "Best Actress." Additionally, there were five cases during this period where an actor's nomination was not tied to a particular film, but rather several films they performed in that year. Here, we only count the first film listed. In 1936, the Academy switched to four acting categories with five nominations in each, a convention that lasts to the present. Each nomination is attached to one film performance. Although no one has ever been nominated in the same category for two different films, it is theoretically possible.

Academy nominations are made by Academy members. Originally the Academy's structure consisted of five branches: producers, writers, directors, actors, and technicians. Due to the increasing division of labor in the film industry, there are now 14 branches: producers, writers, directors, actors, and a variety of administrative and technical branches (Levy 2003). Although the nomination guidelines have changed throughout the years, for the most part, each branch is responsible for nominating candidates in their respective branches. Branch members receive lengthy nominating ballots from which they select up to five performances per award.

An independent accounting firm tallies the completed ballots and selects the top five selections per award as the official nominees. A second and final round of balloting is given to the entire Academy. All Academy members, regardless of branch, decide the winners. The important thing to note is that both nominations and final awards are decided by the Academy membership, an elite subset of the collaboration network. Although the Acting Branch has always been the largest in the Academy, representing approximately 25 percent of membership, compared with the three screen guilds, the Academy is very small. For instance, the membership of the Acting Branch accounts for approximately 2 percent of the membership of the Screen Actors Guild (Levy 2003).

Collaboration. Although the unit of analysis is the actor, the film is the tie connecting actors, writers, and directors in a collaboration. Each film is measured as a unique collaboration and attaches several traits to each of its participants.

Human Capital. At the most basic level, Academy nominations and awards should be awarded based on an actor's acting ability or skill. Therefore, we incorporate three human capital measures in the model. First, we include a past acting measure for the number of films the actor has been in to date. We argue that actors with more acting experience should be better than actors with less experience. Likewise, good actors are offered more jobs. We use the quadratic transformation of the variable because it has a slightly better fit than the logged transformation. We considered limiting the actor's past acting history to a rolling five window because it may be that only recent activity in the film industry matters. However, we decided to include the actor's entire career since a five year window does not take into account the actor's career trajectory. Second, we include a variable for past acting nominations received to date. Again we include all past nominations over the actor's career.

Finally, we include a variable for the actor's status. Our definition of status is defined as pseudo-eigenvector centrality on a directed graph (Bonacich and Lloyd 2001). This centrality metric approximates the Bonacich (1987) centrality metric used by Podolny (e.g. 1993) to measure status but is better suited for directed graphs. Furthermore, our metric corrects for the autocorrelation inherent in collaboration networks, such as the Internet Movie Database where actors are connected by shared participation in a field.[3]

An alter is defined as choosing ego when ego outranks the alter in the credits of a film. In other words, when you accept a position in the credits of a film, you are choosing everyone listed above you as your superior, and everyone listed below you chooses you as their superior. As described above, Hollywood workers are very attentive to their rank in film credits and devote great effort to maximizing their rank. Centrality is distinct from ego's average rank in the credits since the key fact is not how many, but which, alters ego outranks.

For instance, in the film *The Godfather, Part II* (1974) the first three names in the credits are, in order, Al Pacino, Robert Duvall, and Diane Keaton. This is coded as Keaton choosing both Duvall and Pacino, Duvall choosing Pacino, and Pacino himself choosing no one. Bruno Kirby is further down the credits, so he chooses all three of the leads. Being chosen by Duvall does far more for Pacino's centrality than does his being chosen by Kirby because in the scope of the entire IMDB network, Duvall is frequently chosen by other actors whereas Kirby is only seldomly.

Peer Human Capital. Several of our predictions center on the human capital of the cast and crew involved in the collaboration. We test this hypothesis through specifying cast members' past acting nominations, writers' past writing nominations, and directors' past directing nominations. Although many actors also write and direct films, we only include past award history for the occupation the individual performs in the current collaboration. For instance, Ben Affleck has never been nominated for an acting Oscar, but he won an Oscar in 1998 for writing. We thus treat Affleck as a skilled writer but not as a skilled actor. If Affleck were to write another film after 1998, the actors appearing in that film would receive a "point" for the vicarious human capital of using Affleck's writing. However, an actor who co-stars in a film with Affleck (not written by him), will not receive that point.

Network Ties to the Academy. Network ties to the Academy is defined as a subset of degree centrality; the number of alters to whom an actor is directly tied (Freeman 1979). We include a

[3] We are grateful to Phil Bonacich for introducing this correction to the metric and applying it to our data. Full details on the metric will be forthcoming in his own paper.

“network ties” variable measured as the actor’s recent direct ties to likely Academy members. We assume that Academy members are likely to nominate friends but not friends of friends since power is probably more relevant than search. As mentioned above, we believe that ties to Academy members will be a stronger predictor of nominations than ties to non-Academy members. Since the Academy membership is not made public, we can only proxy likely Academy members. We operationalize likely members as actors who have been nominated for Academy Awards in the past. Although it is not an exclusive route to membership, past nominations presumptively entitle one to membership (AMPAS 2006). Only Academy members in the Acting Branch may nominate people in the acting categories; therefore, we only count ties between actors. Since membership in the Academy is a lifetime membership, we count the individual as an Academy member from the year of their first nomination until the end of the period, 2005. However, we assume that ties degrade after five years.

Controls. We include five control variables. The first is the number of eligible films in a given award year. Since there are a fixed number of nominations available, by necessity the volume of competition is relevant to ego’s chances of nomination. The second control variable is a dummy variable indicating a genre of drama. The Academy is notorious for favoring biopictures (film’s inspired by actual events and personalities), serious-problem pictures (film’s dealing with “important social or political issues,”) historical epics, war films, and westerns (Levy 2003: 148). Note that in the IMBD most films have multiple genres and thus many so-called dramas are really hybrids of drama and other genres. We include a binary variable indicating that a major firm controlled the film’s first-run American distribution rights. These firms include all variations and subsidiaries of Viacom/Paramount, Metro-Goldwyn Mayer/Loew’s, Fox, Warner Bros., Radio-Keith-Orpheum, Sony/Columbia, Disney, United Artists, MCA/Universal, and Orion (Compaine and Gomery 2000; Vogel 2001). Additionally, we include a measure for cast size. We use this measure as an indicator of a film’s budget. Studios are loath to release budget figures and thus the IMDB has enormous levels of missing data for this variable. Since large casts are expensive, we use this as a crude proxy for budget. Films with larger budget have more resources; thus are more likely to be noticed by the Academy. For instance, *The Big Kahuna* (2000), starring Kevin Spacey, had a cast of four and a budget of $7 million while *Gladiator* (2000), with Russell Crowe, had a cast of 40 and budget of $103 million. Although both starred previous Academy nominees (in fact Spacey was a former winner), *The Big Kahuna* (2000) failed to impress the Academy. Finally, we include a binary variable to indicate if the actor is female. The logic being that there are fewer roles for women than men in Hollywood, but the same number of awards.

Estimation

The fully-specified model thus takes the form of

$$\ln\left(\frac{p(nom)}{1-p(nom)}\right)=\beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 X_4+e$$

Where:

X_1 = controls (genre, etc)

X_2 = human capital

X_3 = peer human capital

X_4 = degree centrality

Standard errors are clustered by film. Note that the data is actually cross-classified with multiple observations of both actors and films and ideally we would have modeled both types of autocorrelation. Unfortunately this is unfeasible since our data is cross-classified (as compared to nested), with 39,518 members in one class and 19,351 in the other. Furthermore observed combinations of the classes are extremely sparse since any given actor appears in less than one percent of all films and any given film has less than one percent of all actors in its cast. Such a data structure makes any analysis that would attempt to fully account for all auto-correlation under-identified. Therefore we are forced to settle for approximation and triangulation.

We experimented extensively with various specifications. First, we alternated between clustering standard errors by film or by actor. The results were largely robust, though of course parameters associated with a class decreased in significance slightly when standard errors were clustered by that class.

Next we used fixed effects models. Since a fixed effect captures everything about the class that it specifies, colinearity would result were one to specify fixed (or even fairly stable) traits associated with that class. Furthermore, there must be variance in the outcome or one faces a perfect prediction problem. Thus with fixed effects models one can ask among those films that generate an Oscar nomination, what were the traits of the actors that got nominated. Likewise, one can ask among those actors who at some point are nominated for an Oscar, what were the traits of the films for which they were nominated. Although these are much narrower questions than in the main analysis, the results are nonetheless consistent.

As all results are consistent regardless of how and by what class we model auto-correlation, we present results only for models that cluster standard errors by film. We settle on this specification for two reasons. First, very little auto-correlation is associated with actors but a moderate amount is with films. Second, since our analysis treats human capital, a set of actor-level traits, as a theoretical baseline, and peer human capital, a set of film-level traits, as the major object of inquiry, this specification results in a conservative bias to our hypothesis testing. Were a perfect estimation possible, it would probably leave the significance of film-level parameters (e.g. peer human capital) unchanged and slightly reduce the significance of actor-level parameters (e.g. human capital). Alternate specifications are available on request.

RESULTS

Table 2 presents summary statistics and a correlation matrix for the variables used in the models. As previously mentioned, this subsample of eligible nominees includes 171, 539 roles, 39,518 unique actors in 19,351 films. About one-third of the actors are female. 1,005 actors are also writers and 488 actors are also directors. Only 269 individuals do all three—acting, writing, and directing. However, these 269 "triple threats" include only those who wrote, directed, and acted in a *top ten role* in their film. These triple threats include such talent as Woody Allen and Spike Lee. It is more common, however, for writers/directors to have small parts or cameos in their movies. For instance, when including all roles, Quentin Tarantino and Alfred Hitchcock are among the 2,718 writers/directors who also appear as bit actors in their films.

INSERT TABLE 2 ABOUT HERE

From 1927 to 2005 there were a total of 1,394 nominations and 286 wins; therefore it is very rare to be nominated and even rarer to win. Out of the 1,394 total nominations, 778 actors had at least one nomination. Meryl Streep has the most nominations (13) and Katherine Hepburn has the most wins (4).

A first nomination, at the median, occurs on the actors' tenth film. However, the vast majority of actors are never nominated and the median non-nominated actor works in only one film over his or her lifetime. We find a strong relationship between being a past nominee oneself and having worked with past acting nominees. In other words, Academy Award nominees tend to work with each other. According to Levy (2003), the time span between film debut and first nomination is shorter for woman than for men. About half of nominated actresses, as opposed to one-third of men, were nominated within the five years after their first movie. Levy argues that this suggests that the "fate" of leading ladies is determined early on in their career. If they do not impress the Academy within their first five movies, they have a slim chance of ever being nominated in the future.

In table 3, we present logistic regression models that test our hypotheses. Results from the baseline model are presented as model 1. The effects of each of these control variables is strong and in the predicted direction. An actor is most likely to be nominated in a year with few films per year, and thus few other actors competing for nominations. Actors are also most likely to be nominated for films that are distributed by major studios, are dramatic in genre, and have large casts (and by inference, large budgets). Female actors have a better chance of being nominated for any given role than males since there are fewer roles and thus less competition. With the exception of cast size, these baseline effects maintain their strength and direction in all subsequent models.

INSERT TABLE 3 ABOUT HERE

Model 2 adds human capital variables to the baseline. As shown by the X^2 test, the human capital variables have strong joint significance in this and all subsequent models. In an illustration of Merton's (1968) Matthew Effect, a history of Academy nominations strongly predicts future Academy nominations. Status (as derived from credit ranking) strongly predicts nomination. This last effect confirms hypothesis 2.

In model 3, we add spillover effects from peer human capital to the baseline controls and individual level human capital. The set of peer human capital variables show strong joint significance in all models that is of the same order as the joint significance of the individual human capital effects. This implies that spillovers from team members are as important as individual skill. Prior Academy nominations of a film's cast, writer, and director all significantly affect an actor's likelihood of being nominated net of the focal actor's human capital. This confirms hypothesis 1, which predicted that high quality peers would make one more likely to be nominated. It is interesting that the skill of the writer(s) and the director has an even greater influence on one's prospects than does the skills of on one's co-stars. It is interesting that the skills of writer(s) and the director have a greater influence on one's prospects than do the skills of one's co-stars. Although actors react to one another's performances, it is nonetheless fairly easy for a film viewer to separate the delivery and performance of an actor's lines from the delivery and performance of a co-star's lines. In contrast, it is more difficult to separate the delivery of lines from the lines themselves. Likewise, it is difficult to separate a performance from the direction and framing given to that performance. Thus it is not surprising that good writers and directors provide more of a spillover effect than do good co-stars.

Model 4 specifies the baseline controls, individual human capital, and degree centrality to previously nominated actors. This model tests hypothesis 3, that ego knowing members of the Academy's acting branch makes it more likely for the branch membership to nominate ego for an award. Hypothesis 3 is confirmed, as ego's connections to academy members strongly predicts ego's own log-odds of being nominated. Note that introducing degree centrality into the model appreciably reduces the joint significance of the individual human capital variables from a X^2 of 665 to one of 450. This suggests that about a quarter of what appears to be a human capital effect is actually a social capital effect.

Model 5 is a fully specified model, including the baseline controls, individual human capital, peer human capital, and network ties to the Academy. The pattern of effects is consistent with prior models. Of note is that including peer human capital and network ties to the Academy in the same model takes away statistical power from Academy ties, driving it into insignificance. Peer human capital makes a much greater contribution to the model's fit and maintains more of its strength in the fully specified model. Intriguingly, the Academy ties effect is highly significant in model 4. This suggests that while economic sociology's attention to network effects is important, its relative inattention to spillover effects of teams is an unfortunate lacuna and in some cases the renowned former may actually be a spurious effect of the neglected latter.

Conclusion

This paper shows how professional recognition in Hollywood is driven as much by embedded processes than individual skill. Controlling for the quality of the major collaborators and the number of voters that ego knows greatly reduces the effect of human capital. The quality of a film actor's collaborators, particularly the writer and director, greatly increase her own chance of recognition. Collaborations are ubiquitous in many fields. Since advantageous collaborations help determine success, the process by which they form is an important intervening mechanism for individual life-chances. Most likely there is preferential attachment of high-skilled workers to one another and thus spillover effects form a powerful mechanism for cumulative advantage. By studying both how advantaged collaborations form and what benefits they accrue, one can ultimately explain the distribution of resources. In other words, there is a very good reason that Academy Award acceptance speeches are so long—they should be because the actor's collaborators are largely responsible for his achievement.

References

Abrahamson, Mark. 1973. “Talent Complementarity and Organizational Stratification” *Administrative Science Quarterly* 18: 186-193.

Academy of Motion Picture Arts and Sciences. 2006. “History and Structure of the Academy of Motion Picture Arts and Sciences” (website: http://www.oscars.org/academy/history.html).

Adler, Moshe. 1985. “Stardom and Talent.” *American Economic Review* 75: 208-212.

Allen, Michael Patrick and Anne E. Lincoln. 2004. “Critical Discourse and the Cultural Consecration of American Films” *Social Forces* 82: 871-894.

Anand, N. and Mary R. Watson. 2004. “Tournament Rituals in the Evolution of Fields: the Case of the Grammy Awards” *Academy of Management Journal* 47: 59-80.

Axelrod, Robert. 1980. "Effective Choice in the Prisoner's Dilemma." *The Journal of Conflict Resolution* 24: 3-25.

Baker, Wayne E. and Robert R. Faulkner. 1991. “Role as Resource in the Hollywood Film Industry” *American Journal of Sociology* 97: 279-309.

Banerjee, Abhijit V. 1992. “A Simple Model of Herd Behavior.” Quarterly Journal of Economics 107: 797-817.

Bonacich, Phillip and Paulette Lloyd. 2001. “Eigenvector-Like Measures of Centrality for Asymmetric Relations.” *Social Networks* 23: 191-201.

Carr, Jay, ed. 2002. *The A List: The National Society of Film Critics’ 100 Essential Films.* Cambridge, MA: Da Capo Press.

Caves, Richard E. 2000. *Creative Industries: Contracts Between Art and Commerce*. Cambridge, MA: Harvard University Press.

Compaine, Benjamin M., and Douglas Gomery. 2000. *Who Owns the Media?*, 3rd Edition. Mahwah, NJ: Lawrence Erlbaum Associates.

De Vany, Arthur S. and W. David Walls. “Motion Picture Profit, the Stable Paretian Hypothesis, and the Curse of the Superstar” *Journal of Economic Dynamics and Control* 28: 1035-57.

DiMaggio, Paul J., and Walter W. Powell. 1983. “The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields” *American Sociological Review* 48: 147-160.

Freeman, L.C. 1979. “Centrality in Social Networks: Conceptual Clarification” *Social Networks* 1:215-239.

Ginsburgh, Victor. 2003. “Awards, Success and Aesthetic Quality in the Arts” *Journal of Economic Perspectives* 17: 99-111.

Gitlin, Todd. 1983. *Inside Primetime*. New York: Pantheon.

Granovetter, Mark S. 1973. “The Strength of Weak Ties.” *American Journal of Sociology* 78: 1360-1380.

Granovetter, Mark S. 1975. *Getting a Job: A Study of Contacts and Careers*. Cambridge, MA: Harvard University Press.

Gumbel, Peter, John Lippman, Lisa Bannon and Bruce Orwall. 1998. “What’s an Oscar Worth?” *The Wall Street Journal* (March 20, 1998), p. W1.

Guimerà, Roger, Brian Uzzi, Jarret Spiro, and Luís A. Numes Amaral. 2005. *Science* 29: 697-702.

Hamlen, William A. 1991. “Superstardom in Popular Music: Empirical Evidence.” *Review of Economics and Statistics* 73: 729–33.

Idson, Todd L. and Leo H. Kahane. 2000. “Team effects on compensation: an application to salary determination in the National Hockey League” *Economic Inquiry* 38: 345-357.

Levy, Emanuel. 1987. *And the Winner Is…The History and Politics of the Oscar® Awards.* New York: The Ungar Publishing Company.
Levy, Emanuel. 2003. *All About Oscar: The History and Politics of the Academy Awards*. New York: Continuum.
Merton, Robert K. 1968. "The Matthew Effect in Science." *Science* 159: 56-63.
Miller, Danny and Jamal Shamsie. 1996. "The Resource-Based View of the Firm in Two Environments: The Hollywood Film Studios from 1936 to 1965." *The Academy of Management Journal* 39: 519-543.
Nelson, Randy A., Michael R. Donihue, Donald M. Waldman, and Calbraith Wheaton. 2001. "What's an Oscar Worth?" *Economic Inquiry* 39: 1-16.
Newman, M. E. J., Duncan J. Watts, Steven H. Strogatz. 2002. "Random Graph Models of Social Networks." *Proceedings of the National Academy of Science* 99: 2566-2572.
Petersen, Trond. 1992. "Individual, Collective, and Systems Rationality in Work Groups: Dilemmas and Market-Type Solutions." *American Journal of Sociology* 98: 469-510.
Podolny, Joel M. 1993. "A Status-Based Model of Market Competition." *American Journal of Sociology* 98: 829-872.
Prag, Jay and James Casavant. 1994. "An Empirical Study of the Determinants of Revenues and Marketing Expenditures in the Motion Picture Industry" *Journal of Cultural Economics* 18: 217-235.
Redelmeir, Donald A. and Sheldon M. Singh. 2001. "Survival in Academy Award-Winning Actors and Actresses." *Annals of Internal Medicine* 134: 955-962.
Reskin, Gail and Scott Trost. 1996. *All You Need to Know About the Movie and TV Business.* New York: Fireside.
Rosen, Sherwin. 1981. "The Economics of Superstars" *American Economic* Review 71: 845-858.
Salganik, Matthew J., Peter Sheridan Dodds, and Duncan J. Watts. 2006. "Experimental Study of Inequality and Unpredictability in an Artificial Cultural Market." *Science* 311: 854-856.
Samuelson, Paul A. 1974. "Complementarity: An Essay on The 40th Anniversary of the Hicks-Allen Revolution in Demand Theory." *Journal of Economic Literature* 12: 1255-1289.
Seaman, Bruce A. 2003. "Cultural and Sports Economics: Conceptual Twins?" *Journal of Cultural Economics* 27: 81-126.
Sorenson, Olav and David Waguespack. 2005. "Social Structure and Exchange: Self-Confirming Dynamics in Hollywood" (unpublished paper).
Stinchcombe, Arthur L. 1963. "Some Empirical Consequences of the Davis-Moore Theory of Stratification" *American Sociological Review* 28: 805-808.
Stinchcombe, Arthur L. and T. Robert Harris. 1969. "Interdependence and Inequality: A Specification of the Davis-Moore Theory" *Sociometry* 32: 13-23.
Uzzi, Brian and Jarrett Spiro. 2005. "Collaboration and Creativity: The Small World Problem." *American Journal of Sociology* 11: 447-504.
Vogel, Harold L. 2001. *Entertainment Industry Economics: A Guide for Financial Analysis*, Fifth edition. Cambridge: Cambridge University Press.
Watts, Duncan J. 2003. *Six Degrees: The Science of a Connected Age.* New York: W.W. Norton & Company.
Watts, Duncan J. and Steven H. Strogatz. 1998. "Collective Dynamics of 'Small-World' Networks." *Nature* 393: 440-442.

Wilson, Robert. 1985. "Reputations in Games and Markets." in Alvin Roth (ed.). *Game-Theoretic Models of Bargaining.* Cambridge: Cambridge University Press.

Zuckerman, Ezra W. 2004. "Do Firms and Markets Look Different? Repeat Collaborations in the Feature Film Industry, 1935-1995." (unpublished paper).

Zuckerman, Ezra W., Tai-Young Kim, Kalinda Ukanwa and James von Rittmann. 2003. "Robust Identities or Nonentities? Typecasting in the Feature-Film Labor Market." *American Journal of Sociology* 108: 1018-74.

TABLE 1

VARIABLES TO BE USED IN THE ANALYSIS

VARIABLE	DESCRIPTION
Academy Nomination	binary variable for if the actor was nominated for an Academy Award
Human Capital	
Past Acting	number of films the actor has been in to date
Past Acting^2	number of films the actor has been in to date (squared)
Past nominations	number of past nominations the actor has received to date
Status	pseudo-eigenvector assymetric centrality (corrected for two-mode clustering)
Peer Human Capital	
Cast's past nominations	number of past acting nominations other cast members have received to date
Writer's past nominations	number of past writing nominations the film's writer(s) have received to date
Director's past nominations	number of past directing nominations the film's director has received to date
Academy Network Ties	number of collaborators who are likely members of the Academy's Acting Branch within the last five years
Controls	
Films per year	number of films in the sample in the current year
Major distributor	binary variable indicating if the film was distributed by a major distributor
Drama	binary variable indicating if the film was classified as a "Drama"
Cast Size	number of actors in the film
Female	binary variable indicating if the actor is female

TABLE 2

SUMMARY STATISTICS AND CORRELATION MATRIX, ANALYSIS SUBSAMPLE

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Nomination	0.01	0.09	-												
2. Films per year	273.91	92.91	-0.03	-											
3. Major distributor	0.69	0.46	0.03	-0.03	-										
4. Drama	0.49	0.50	0.07	-0.05	0.02	-									
5. Cast size	22.78	17.47	0.04	-0.43	0.13	0.06	-								
6. Female	0.30	0.46	0.04	-0.02	0.01	0.03	0.01	-							
7. Past acting	18.79	25.59	0.00	0.23	-0.03	-0.08	-0.17	-0.18	-						
8. Past acting^2	1007.88	2990.22	-0.01	0.17	-0.05	-0.07	-0.13	-0.13	0.88	-					
9. Past nominations	0.13	0.58	0.14	-0.08	0.06	0.05	0.07	0.04	0.16	0.08	-				
10. Status	82.15	14.11	0.03	0.22	0.17	-0.04	0.09	-0.05	0.38	0.20	0.13	-			
11. Cast's past nominations	1.20	2.28	0.06	-0.22	0.14	0.12	0.25	0.02	-0.02	-0.03	0.15	0.07	-		
12. Director's past nominations	0.21	0.77	0.09	-0.05	0.11	0.10	0.07	0.01	0.01	0.00	0.10	0.04	0.25	-	
13. Writer's past nominations	0.66	1.78	0.06	0.03	0.12	0.06	-0.02	0.01	0.03	0.01	0.09	0.07	0.21	0.30	-
14. Academy Network ties	5.54	6.36	0.05	0.02	0.15	0.02	0.03	-0.12	0.39	0.23	0.22	0.47	0.27	0.13	0.16

NOTE. *N* = 171,539.
* All significant at *P* <.05.

TABLE 3

LOGISTIC REGRESSION MODELS OF ACADEMY AWARD NOMINATIONS, 1927 - 2005

	MODELS				
VARIABLE	1	2	3	4	5
Baseline					
Films per year	-0.003 ***	-0.004 ***	-0.004 ***	-0.004 ***	-0.004 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Major distributor	0.990 ***	0.749 ***	0.620 ***	0.730 ***	0.617 ***
	(0.081)	(0.081)	(0.082)	(0.082)	(0.083)
Drama	1.918 ***	1.887 ***	1.806 ***	1.871 ***	1.803 ***
	(0.085)	(0.085)	(0.086)	(0.085)	(0.086)
Cast Size	0.008 ***	0.003	0.002	0.003 *	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.771 ***	0.734 ***	0.736 ***	0.751 ***	0.742 ***
	(0.086)	(0.065)	(0.064)	(0.065)	(0.065)
Human Capital					
Past acting		-0.001	-0.002	-0.004	-0.003
		(0.005)	(0.005)	(0.005)	(0.005)
Past acting^2		0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Past nominations		0.451 ***	0.424 ***	0.446 ***	0.423 ***
		(0.029)	(0.026)	(0.029)	(0.026)
Status		0.047 ***	0.045 ***	0.039 ***	0.042 ***
		(0.005)	(0.004)	(0.005)	(0.005)
Peer Human Capital					
Cast's past nominations			0.035 ***		0.031 ***
			(0.008)		(0.008)
Director's past nominations			0.256 ***		0.254 ***
			(0.015)		(0.016)
Writer's past nominations			0.055 ***		0.054 ***
			(0.007)		(0.007)
Academy Network Ties				0.022 ***	0.007
				(0.005)	(0.005)
Intercept	-6.565 ***	-10.105 ***	-10.091 ***	-9.625 ***	-9.920 ***
	(0.167)	(0.365)	(0.358)	(0.356)	(0.363)
Test for Joint Significance					
Human Capital					
X^2(df)		636.43 (4) ***	665.86 (4) ***	450.64 (4) ***	488.71 (4) ***
Peer Human Capital					
X^2(df)			615.26 (3) ***		568.45 (3) ***
Log Likelihood	-7332.7172 ***	-6844.3486 ***	6674.35 ***	6833.8536 ***	6673.2447 ***

NOTE. *N* = 171,539.
* *P* < .05, ** P < .01, *** P < .001, two-sided *t* -tests.
SE in parentheses.