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Gokhan ERTUG
Singapore Management University, gokhanertug@smu.edu.sg

Fabrizio CASTELLUCCI
Bocconi University

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Gokhan Ertug
Assistant Professor of Strategic Management
Singapore Management University
50 Stamford Road, Singapore 178899
gokhanertug@smu.edu.sg

Fabrizio Castellucci
Assistant Professor of Organization Theory
Bocconi University
Via Roentgen, 1, Milan 20136 Italy
fabrizio.castellucci@unibocconi.it

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ABSTRACT

We study how the reputation and status of resource providers affect the two organizational outcomes of product quality and revenues, hiring decisions, and prices paid to resource providers. We argue that reputation and status have different effects on outcomes: reputation has a stronger effect on product quality, and status has a stronger effect on revenues. Building on this, we argue that actual quality mediates the effect of reputation on revenues more than the effect of status on revenues. Moreover, reputation and status have different effects on how organizations acquire resources: when their product quality is low relative to their aspiration level, organizations will display a preference for recruiting high-reputation resource providers over high-status ones. Conversely, organizations will display a preference for recruiting high-status resource providers over high-reputation ones when their revenue is low relative to their aspiration level. Finally, although both reputation and status have positive effects on the price paid for a resource, we argue that the relationship between reputation and pay is weaker for high-status resource providers. We find support for our hypotheses in a sample of NBA players and teams.

INTRODUCTION

In recent years, two related but distinct streams of research have focused on the value that reputation and status bring to organizations. The first stream argues that organizations use reputation, which is based on observed past actions, to infer the skills, knowledge, and quality of a resource provider (e.g., Lee, Pollock, & Jin, 2011). Organizations acquiring resources from high-reputation actors thus expect these resources to have a positive effect on their performance (Deephouse, 2000; Fombrun, 1996; Rao, 1994). The second stream argues that organizations use status, which is based on relative position in a hierarchical order, as a proxy for the quality of a resource provider (Podolny, 1993; Rindova, Pollock, & Hayward, 2006). Organizations acquiring resources from high-status actors receive certification benefits that affect the market's perception of the value of these organizations. Although these two streams have considered the role of either reputation or status on firms' assessment and selection of resource providers, attempts have also been made to consider the concurrent role of both types of intangible assets. For instance, Washington and Zajac (2005) have shown that reputation and status have independent effects on the selection of NCAA teams for post-season tournaments. Meanwhile, Jensen and Roy (2008) have shown that the choice of exchange partners is a sequential process whereby reputation is used to choose a specific firm after a particular status bracket is chosen. However, what remains lacking is an integrated understanding of the role these intangible assets play in achieving organizational goals and how this role affects the selection and pay of resource providers with different levels of reputation and status.

Because organizations have multiple and possibly interdependent goals (Cyert & March, 1963), the value of resources should vary depending on how reputation and status help organizations to reach their goals. Although both reputation and status are intangible assets that bring benefits to an organization, the nature of the benefits derived from each asset varies

(Groysberg, Polzer, & Elfenbein, 2011; Pfarrer, Pollock, & Rindova, 2010; Pollock, Chen, Jackson, & Hambrick, 2010; Wade, Porac, Pollock, & Graffin, 2006). By explicitly considering multiple organizational goals, this study extends our understanding of the effects of reputation and status on organizational outcomes as well as on recruitment and pay decisions. Because the effects that assets have on organizational outcomes differ, the recruitment of resource providers depends on the extent to which an organization requires particular types of assets to meet its goals and which resource providers possess these assets. Consequently, an organization's valuations of reputation and status are interdependent and not independent (Washington & Zajac, 2005) or sequential (Jensen & Roy, 2008), as might happen when considering one organizational goal at a time.

In line with the conceptualization and findings from past research, we begin by arguing that both assets have a positive effect on the product quality and the revenues of an organization, which are the two goals we consider. However, we argue that these intangible assets contribute differently to these two goals. Between the two types of assets, reputation has a stronger effect on quality, whereas status has a stronger effect on revenues. Consistent with the closer link between reputation and quality than that between status and quality, we also predict that the actual quality will mediate the effect of reputation on revenues to a greater extent than it will mediate the effect of status on revenues. Consequently, organizational actions will be directed toward obtaining resources whose level of intangible assets are more closely linked to the goal in pursuit of which remedial action needs to be taken more urgently. Therefore, to the extent that organizations' performance in terms of product quality is low relative to their aspiration level, they will be more likely to acquire more resources from high-reputation providers than from high-status ones. Conversely, to the extent that the organizations' revenue performance is low

relative to their aspiration level, they will be more likely to acquire more resources from high-status providers than from high-reputation providers. Finally, although the price organizations pay for resources depends positively on both reputation (Fang, 2005) and status (Benjamin & Podolny, 1999), the different effects of these factors on goals and hiring suggest that their effects on pay may not be independent of each other. In particular, because status is less sensitive than reputation to changes in past quality, and because high-status actors are less subject to scrutiny, we argue that there will be a weaker link between reputation and pay for resources obtained from a high-status provider.

To summarize, we study the concurrent effects of status and reputation on product quality and revenues. By doing so, we develop clear and consistent predictions regarding the different effects of each intangible asset on these two goals and on recruitment decisions, as well as the interdependence between them in determining the payment for these assets. Our predictions receive support from the analysis of longitudinal data on a sample of NBA teams and players.

THEORY AND HYPOTHESES

A central task faced by organizations is the acquisition of resources, which are then combined to develop, manufacture, and deliver products and services. Because they have multiple, potentially interdependent goals (Cyert & March, 1963), organizations assess resource providers on dimensions that are important for the organization to reach its goals. These dimensions can vary from attributes of materials, such as the quality or appellation of grapes in the production of wine (Benjamin & Podolny, 1999), to the attributes of employees, such as the productivity and visibility of securities analysts (Groysberg, Lee, & Nanda, 2008), the leadership, decision-making skills, or certifications of CEOs (Wade et al., 2006), to the effort resource providers expend to help organizations remedy their problems (Castellucci & Ertug,

2010). As these examples suggest, the attributes of the resource providers and the resources they bring need not be uni-dimensional in helping an organization pursue its goals, which leads organizations to assess resource providers on potentially more than one attribute.

The extent to which an organization can accomplish its goals depends on the resources it receives from its members or employees. Consequently, organizations enter the labor market, where employees exchange their participation, time, and effort in return for money (Coleman, 1990). Once individuals are members of the organization, an exchange between the parties is present in that individuals have something to contribute, i.e., their participation, knowledge, skills, and obtain continued employment, salary, or bonuses in exchange (Thompson, 1967). This exchange is maintained as long as the inducement provided by the organization to the employee balances the contribution offered by the employee to the organization (March & Simon, 1958).

Because organizations have multiple and distinct goals that might not be reached simultaneously (Cyert & March, 1963), they might build their expectations, shape their choices, and take actions to pursue at least one of these goals with greater effort. Two important goals worth examining are the quality of the products produced by the organization and the revenues generated by these products (Benjamin & Podolny, 1999; Stuart, 2000). Because reputation and status are intangible assets that affect organizational outcomes (Pfarrer et al., 2010; Pollock et al., 2010), we argue that both the reputation and status of a resource provider will have an effect on an organization's product quality and revenues.

Reputation has been introduced and used by different theoretical approaches, which have led to different definitions of the concept. Reputation is considered to be a signal that predicts the future behavior, performance, or quality of actors based on their previously observed behavior, performance, or quality in both economic (Shapiro, 1983; Weigelt & Camerer, 1988; Wilson,

1985) and sociological accounts (e.g., Raub & Weesie, 1990). In research on management and organizations, there are notable differences in how reputation is defined and operationalized (Lange, Lee, & Dai, 2011), and attempts to reconcile these differences have led to integrative definitions of the concept that include, for instance, both the past actions and prominence of an actor (Rindova, Williamson, Petkova, & Sever, 2005). In this paper, we follow Jensen et al. (2012) and Jensen and Roy (2008), who argued that reputation should be defined as an attribute-specific assessment, considering it an "expectation of future behavior that is directly based on past demonstrations of that behavior" (p. 497). Therefore, reputation is an intangible asset that produces value to the actor possessing it in that it signals to potential customers a specific attribute through the actors' past actions (Rindova & Martins, 2012). Because we consider firms in their efforts to acquire high-quality resources, the relevant attribute we use to define reputation in this paper is the quality of resources provided by an actor. Consequently, the value of the intangible asset of reputation for quality used to assess an actor will be based on the past demonstration of quality by that actor.

Status is based on the relative position of an actor in a hierarchical order and is not necessarily tightly coupled to past behaviors (Jensen & Roy, 2008; Podolny, 2005). Information about the status of actors can be gathered using observable factors such as the institution where they obtained their educational degree (Stuart & Ding, 2006), the awards they were granted (Wade et al., 2006), or the prestige of actors (Rossman, Esparza, & Bonacich, 2010) or firms they have previously worked with (Chen, Hambrick, & Pollock, 2008). Status is an intangible asset that produces value to the actor possessing it in that it signals to potential customers the actor's prestige or esteem accorded to actors by the positions they occupy in a social structure (Gould, 2002). The underlying assumption required for status to function as a valuable intangible

asset is that education, awards, and the prestige of either affiliates or previous places of work are more readily observable than quality itself. Nevertheless, education, awards, and the prestige of either affiliates or previous places of work are assumed to be correlated with quality (Podolny, 1994); consequently, high-status actors are expected to have superior abilities (Pollock et al., 2010; Stuart, Hoang, & Hybels, 1999). Organizations prefer to work with or employ high-status actors because by using their resources or employing them, an organization can increase its own status, consequently enjoying the benefits associated with it (Castellucci & Ertug, 2010; Pollock et al., 2010; Pollock & Gulati, 2007; Stuart, Hoang, & Hybels, 1999).

Focusing first on product quality, we know that the quality of a firm's products is partially determined by the quality of resources used as inputs (Barney, 1991; Moran & Ghoshal, 1999). Because resources from either high-reputation or high-status providers should be of higher quality than resources from either low-reputation or low-status providers, both intangible assets should have a positive effect on the quality of the final product. However, their relative effects may differ. On the one hand, actors who have a high reputation for quality are expected to provide high-quality resources and thus increase the quality of the final product of the organization that is using their resources. On the other hand, although a status ranking may have originally been formed on the basis of differences in performance (Podolny, 2005), the indicators of status are less directly tied to quality than reputation (Jensen & Roy, 2008; Podolny, 2005; Washington & Zajac, 2005: 294). To the extent that there exists some decoupling between past demonstrations of quality and status, an actor may maintain its high status for some time, even when its past demonstrations of quality have been declining. Therefore, it would be more likely for a high-reputation actor to provide high-quality resources than for a high-status actor to provide high-quality resources. Consequently, although both effects are expected to be positive,

an actor's reputation should have a stronger effect on the quality of the organization's final product than the actor's status.

H1a: The effect of the reputation of an organization's resource providers on the quality of the organization's products will be greater than the effect of the status of resource providers on the quality of the organization's products.

The second organizational goal that we consider is revenues. We argue that both reputation and status should have a positive effect on revenues through the two determinants of revenues: the sales volume and the product price. Insofar as customers prefer to consume products of higher quality, we can expect, *ceteris paribus*, products of higher quality to have higher sales. Therefore, products manufactured using higher-quality resources should have higher sales than products manufactured with lower-quality resources. Because both reputation and status should correlate with quality, we expect both of them to have a positive effect on the sales volume of the final product. Similarly, reputation and status should have a positive effect on the price paid for the final product. In their study of Californian wineries, Benjamin and Podolny (1999) showed that both the reputation and status of a winery have independent and positive effects on the price of a bottle of wine. However, if status acts as a certification of an actor's quality, it will be more readily observable than past demonstrations of quality, i.e., reputation (Podolny, 1993, 2005). In other words, by being more easily observable by the audience for the final product of the firm, status should have a larger impact than reputation on the perception of quality. Customers will be more influenced by status than by reputation in their perception of the quality of a product and thus will be more likely to pay a higher price for a product manufactured with resources from a high-status provider. As a result, the effect of a

resource provider's status will be higher on the revenues of an organization than the effect of reputation. We therefore hypothesize the following:

> *H1b: The effect of the status of an organization's resource providers on the organization's revenues will be greater than the effect of the reputation of resource providers on the organization's revenues.*

As we have suggested in developing H1b, the effect of status on revenues should be stronger than the effect of reputation on revenues because of the more visible endorsement effect derived from working with high-status resource providers. Status is then an intangible asset that is valuable for the organization in that, through endorsement, it makes the organization more visible, more valuable, and more desirable in the eyes of the organization's audience. However, although it is per se also a valuable intangible asset for the organization, reputation is mostly linked to increased revenues through increases in the quality of resources.

If these are indeed the different mechanisms through which the status and reputation of resource providers affect the organization's revenues, there should be a difference in the degree to which these effects are mediated by the actual quality of the organization's final products. Because it primarily takes place through the increased quality of resources, the effect of reputation on revenues, compared to the effect of status, should be mediated to a greater degree by the actual performance of the organization. In other words, we argue that the reputation of resource providers has an effect on revenues because it signals the quality of the final product, which in turn should produce an increase in both quantity and price. However, because customers will draw inferences on the quality of a product more directly when the product becomes available than through the reputation of the resource providers, the effect of reputation

should be mediated by the actual quality of the product. Conversely, because the status of resource providers will act as an endorsement of the final product, and because this endorsement might be more visible and easier to assess than the quality of the product itself, the mediation of the effect of status on revenues by the actual product quality should be smaller. Therefore, we predict the following:

> *Hypothesis 2: The mediation of the effect of the reputation of resource providers on revenues by the actual quality of final products will be greater than the mediation of the effect of the status of resource providers on revenues by the actual quality of final products.*

This hypothesis allows us to test one of the implications of our reasoning behind the different effects of reputation and status on different outcomes by providing evidence for why organizations may prefer working with high-status resource providers, even in the face of less than ideal quality. The positive effects of high-status resource providers work less through the mechanism of producing actual quality than through the endorsement mechanism on revenue goals.

Problemistic search, a central proposition of the behavioral theory of the firm, suggests that firms engage in search activities because they are confronted by a specific problem and are then directed to find a solution to that problem (Cyert & March, 1963). This proposition has led to a large body of research that studies the effect of a firm's performance on the likelihood of specific actions (Baum, Rowley, Shipilov, & Chuang, 2005; Greve, 1998, 2003b; March, 1988). In particular, the focus has been on how a firm's actions are influenced by how that firm's performance compares to the firm's aspiration levels. Aspiration levels are threshold levels

discriminating between a firm's success and failure, providing the firm with a reference point that triggers problemistic search. In general, firms will be more likely to seek solutions to problems when their performance is different from their aspiration levels (Baum et al., 2005; Greve, 2003a, 2003b; Iyer & Miller, 2008; Lant, Milliken, & Batra, 1992).

Cyert and March (1963) emphasized that organizations try to meet their aspiration levels for multiple goals, and scholars have since studied how such multiple aspirations affect firm behavior. For instance, Baum and his colleagues (Baum et al., 2005) studied how two different goals, market share and network status, affect a firm's propensity to enter nonlocal relationships, and Greve (2008) explored how sequential attention to performance and size goals affects firm growth. We suggest that because organizations have multiple goals, they will initiate problemistic searches to the extent that their performance is low relative to their aspirations for these different goals. Consequently, their actions will be directed toward obtaining resources whose level of intangible assets are more closely linked to the goal on which remedial action is more urgently needed. We have focused on two organizational outcomes, product quality and revenues, and argued that reputation has a larger effect than status on product quality and that status has a larger effect than reputation on revenues. This argument suggests that organizations facing performance issues on one outcome should focus on the intangible asset with the closer link to that outcome to address this issue, acquiring resources accordingly. Consistent with the idea of myopic search, whereby an organization seeks solutions in the neighborhood of a problem (Cyert & March, 1963), an organization that is performing low relative to its aspiration level on quality outcomes should be more likely to prefer high-reputation resource providers over high-status ones in their recruitment. To the extent that the reputation of resource providers has a greater effect than their status on the quality of the final product, this recruitment will allow

the organization to improve its quality performance. Conversely, an organization that is performing highly relative to its aspiration level on quality will be less likely to show a preference for high-reputation resource providers over high-status ones in their recruitment. Similarly, an organization that is performing low relative to its aspiration level on revenue outcomes is more likely to prefer high-status resource providers over high-reputation ones to improve its revenue performance. Conversely, an organization performing highly relative to its aspiration level on revenue outcomes will be less likely to demonstrate such a preference.

Clearly, organizations would like to obtain resources that are both high-reputation and high-status to allow them to perform better on both outcomes. However, to the extent that the reputation and status of actors are not perfectly correlated, organizations may not always be able to obtain resources that are both high-reputation and high-status. Because financial resources are also limited, organizations will need to constrain their choices by focusing on one intangible asset over the other. We thus hypothesize the following:

H3a: As the performance of an organization, relative to aspirations, on the quality of their products decreases, the organization will be likely to recruit more high-reputation resource providers than high-status resource providers.

H3b: As the performance of an organization, relative to aspirations, on revenues decreases, the organization will be likely to recruit more high-status resource providers than high-reputation resource providers.

Once organizations have determined the resources they require to meet their currently more pressing goal, they need to determine the price to pay for them. Because organizations

require either more high-reputation or high-status resources, we argue that this price will depend on the levels of such intangible assets possessed by resource providers.

In his seminal work on reputation, Shapiro (1983) demonstrated that high-reputation products sell at a premium in markets where the quality of products cannot be observed before purchase. Similarly, empirical studies have shown that negative reputation, measured as a percentage of negative feedback, reduces selling prices on eBay auctions (Mickey, 2010), that positive reputation increases the price premium in online auctions for mobile phones (Obloj & Capron, 2011), and that more reputable investment banks can charge higher fees and obtain lower yields (Fang, 2005). To the extent that the quality of resources acquired has an effect on the quality of an organization's own products (Barney, 1991), we expect organizations to pay higher prices for resources obtained from high-reputation providers because of the expected positive effect on the quality of the organization's final products, as hypothesized in H1a.

Research has shown that actors pay higher prices for services or resources obtained from high-status actors, such as higher prices of wines produced by high-status wineries (Benjamin & Podolny, 1999) or the higher compensation of prestigious executives and directors (Chen et al., 2008). These suggest that organizations are willing to pay higher prices to obtain resources that would certify their association with high-status resource providers, resulting in increased status-related benefits for the organization, such as higher revenues, as hypothesized in H1b.

However, the different effects of status and reputation on organizational goals and recruitment suggest that their effects on the pay of a resource provider may not be independent of each other. As a resource provider's status increases, and as the organization expects to secure the benefits associated with high status, the organization will be less concerned of also securing reputation-related benefits from that same resource provider. Conversely, the organization will

be more concerned about securing the benefits associated with reputation from a non-high-status resource provider.

Building on Weber (1978), Washington and Zajac (2005) clarified the analytical distinction between reputation and status. The authors argued that whereas reputation captures differences in quality or merit that generate performance-based rewards, status captures differences in social rank that generate privileges not related to performance. Actors that either display high-quality actions or produce high-quality products develop a reputation for high quality. Such a reputation will signal their ability to provide high-quality resources, thereby granting them the rewards associated with their merit. In contrast, status is based on a social ordering of actors agreed upon by relevant audiences. A high position in this ordering will grant privileges to actors occupying it. Whereas actors' positions in the status ordering are partly determined by their past quality or performance, once it is formed, a status ordering is slower to change – when compared to changes in one's reputation – in the face of changes in quality or performance, as has been suggested by Washington and Zajac (2005: 294). This phenomenon occurs due to the Matthew effect (Merton, 1968), whereby once a status ordering is established, it tends to perpetuate itself and the privileges associated with it, independently of a merit-based system (Podolny, 1993; Stinchcombe, 1965; Weber, 1978). Along this line, Washington and Zajac (2005) find that once NCAA basketball teams have been invited to a postseason tournament (i.e., become high-status), they are more likely to be invited to postseason tournaments independently of their performance in the current year and in the previous four years. Arguably, when trying to secure the participation of high-status teams, the organizers of postseason tournaments will be less interested in the teams' most recent performance than their status, as status is less sensitive than reputation to changes in performance. Similarly, Podolny

(1993) has argued that high-status investment banks are subject to less due diligence than low-status investment banks when asked to lead a syndicate to underwrite corporate securities. After an actor becomes high-status, the quality of that actor's products will be under less scrutiny than the products of non-high-status actors. This relationship suggests that there is a looser link between reputation and pay when determining the price to pay for resources from a high-status provider. Conversely, organizations impose a tighter link between reputation and pay for resources obtained from a non-high-status provider. Therefore, we hypothesize the following:

> *H4: The positive relationship between a resource provider's reputation and the price paid by the organization decreases as the resource provider's status increases.*

THE NATIONAL BASKETBALL ASSOCIATION

We tested our hypotheses on a sample of players and teams in the National Basketball Association (NBA). One of the four North American professional major sports leagues, the NBA was founded in 1946 as the Basketball Association of America, adopted the name "National Basketball Association" after merging with the rival National Basketball League in 1949, and in 1976, merged with the rival American Basketball Association. The NBA is currently composed of thirty teams, twenty-nine from the USA and one from Canada, divided between two conferences (Eastern and Western), each with three divisions (Atlantic, Central, Southeast and Northwest, Pacific, Southwest) containing five teams each. The rules of player contracts, trades, revenue distribution, the Draft, and the salary cap are dictated by the Collective Bargaining Agreement (CBA), signed between the NBA and the NBA Players Association.

Several features of the NBA make it particularly well suited for testing our hypotheses.

First, because we consider players to be the resource providers, there are objective measures of their quality. The quality of a player, despite the heterogeneity of players' positions, can be assessed by measuring his performance. For instance, the number of rebounds, the percentage of field goals, and total points scored are statistics readily available to audiences. However, despite such objective measures of quality, there is uncertainty in how well a player's current quality predicts his future quality (in our sample, the correlation of a player's performance between two seasons is .57). Consequently, the second reason for choosing this setting is that teams' decisions regarding which players to add to their roster, to retain on the team, or to trade/release are also based on certifications of quality. Similar to the evaluation of a CEO's quality (Wade et al., 2006), in this setting, quality is also assessed by certifications given to players through awards (e.g., the Most Valuable Player award) or selection for special teams (e.g., for the NBA-All Star Game or All-NBA Teams), whose composition is voted on by coaches, sportswriters, broadcasters, and fans. Third, although there are regulations governing the competitive balance among teams, the players' market is an active one. Players can change teams and negotiate salaries despite the presence of a soft salary cap. In addition, because of exceptions to the salary cap,[1] players can also renegotiate their salary with their current team. Therefore, the effects of a player's status and reputation on his salary are particularly relevant in this context. Fourth, teams have different objectives to pursue. On the one hand, they are interested in their athletic performance on the court. On the other hand, they are also interested in increasing their revenues through ticket sales, merchandise, and television rights. Although these objectives can be

[1] In addition to its presence in the 1940s, the NBA has had a salary cap, based on a percentage of the NBA revenues, since the 1984/5 season. The salary cap imposes a limit on the total salary of a team's players, aiming to ensure a balance among teams. There are several exceptions to the NBA salary cap, making it a "soft" cap. A soft cap allows teams to enter contracts with their current players at salary levels that would put the team above the cap. Therefore, teams can, de facto, exceed the salary cap to sign players. To curb this, a further luxury tax payment is required from teams whose payroll exceeds a "tax level." The "tax" for teams exceeding this is to pay one dollar to the league for each payroll dollar exceeding the level set. Even with this condition, teams do exceed the tax level to sign players. In 2005-06, with a salary cap of $49.5 million and a luxury tax of $61.7 million, the New York Kicks' payroll was $124 million, putting them $74.5 million above the salary cap and $62.3 million above the tax line.

regarded as complementary, we claim that they are distinct and pursued as such by teams through alternative strategies. In our sample, a modest correlation of .31 between athletic performance and ticket income in the same season suggests that focusing only on athletic performance may not guarantee adequate financial returns.

Our hypotheses translate to the NBA setting as follows: H1a predicts that the average reputation of players on a team will have a greater effect than the average status of the team roster (or, equally, the proportion of high-status players on the team) on the team's season performance; H1b predicts that the average status of players on a team (or, equivalently, the proportion of high-status players on a team) will have a greater effect than the average reputation of the team's players on the team's ticket income. H2 predicts that the effect of reputation on ticket income will be mediated by the team's actual on-court performance in that season to a greater degree than the effect of status on ticket income. H3a predicts that low performance in the previous season relative to aspiration levels will increase the likelihood that the team will recruit more new high-reputation players than new high-status players for the current season, whereas H3b predicts that low ticket income in the previous season relative to aspiration levels will increase the likelihood that the team will recruit more new high-status players than new high-reputation players for the current season. H4 predicts that the positive relationship between a player's reputation and his salary will be weaker if the player is high-status.

DATA AND METHODS

We tested our hypotheses using longitudinal data from the 1989/1990 season to the 2004/2005 season. Data on player performance, demographics, and team performance were coded from the Official NBA Guide 2005-2006 (Sporting News & NBA, 2005) and the official NBA website (www.nba.com). Data for player salaries were coded from the USA Today Salaries

Database (2009) and Patricia Bender's basketball website (2009). Data for ticket income were coded from annual reports by Financial World and Forbes.

We tested our hypotheses with three sets of models. First, we predict product quality with an ordered logit and predict revenues with a regression model for panel data with fixed effects. These models were also used to conduct our mediation analysis. Second, we predict the likelihood that a team will recruit high-status or high-reputation players using multinomial logit models for panel data with random effects. Third, we predict the salary paid to a player with regression models for panel data with fixed effects.

Dependent Variables

Team product quality. We used performance in a season as our measure of a team's product quality. We created an ordered variable, which took a value of 1 if the team did not qualify for the Playoffs, 2 if the team qualified for the Playoffs, 3 if the team advanced to the Conference Semifinals, 4 if the team advanced to the Conference Finals, 5 if the team advanced to the NBA Finals, and 6 if the team won the NBA Championship. This is the dependent variable we used to test H1a.

Team revenues. We used the teams' ticket income in a season as our measure of team revenues. Specifically, we used the log-transformation of the total ticket income (gate receipts) for a team for that season, excluding corporate seats because corporate seats are less sensitive to variation in team composition. We acknowledge that revenues result from not only people's willingness to attend games of teams but also, for example, in their willingness to buy merchandise. Although this would provide an additional measure of revenues, merchandise sales data are not available. Accordingly, the log-transformed ticket income is the dependent variable we used to test H1b and H2.

Preference for high-reputation/high-status resource providers. We define a new player as someone who was playing for a different team in the previous season but is playing for the focal team in the current season. Although our high-status measure, as we will describe in detail below, is already a dichotomous variable, our measure for reputation is continuous. Therefore, for the purpose of constructing this dependent variable, we dichotomized our reputation measure so that a player was coded as being high-reputation if he was above the 85th percentile in the performance distribution of our reputation measure in the current season.[2] Because a given high-status player can also be a high-reputation player, and vice versa, we used more precise indicators in calculating our dependent variable. In particular, we first created the indicator variables *new pure high-reputation player,* which represents a new player who is high-reputation but not high-status, and *new pure high-status player,* which represents a new player who is high-status but not high-reputation.[3] We then used these indicator variables to construct a dependent variable, which was coded as -1 if the team recruited more "new pure high-reputation players" than "new pure high-status players," as 0 if the team recruited the same number of players in these two categories (which could be zero for both), and as 1 if the team recruited more "new pure high-status players" than "new pure high-reputation players." In other words, -1 indicates a preference for reputation over status, 1 indicates a preference for status over reputation, and 0 indicates an equal preference for both. This is the dependent variable used to test H3a and H3b.

Player salary. We used yearly salary figures in $US to test H4. To reduce the skewness of the distribution, we used the natural logarithm of salaries.

Independent Variables

[2] We chose the 85th percentile to keep the proportion of high-reputation players close to the proportion of high-status players. The results we report are the same (significant at $p < .10$ or higher) if we use 82.5%, 87.5%, or 75% as the cutoff for dichotomizing. The marginal significance is a result of the increased noise in the indicator variable, as it becomes less selective in categorizing players as high-reputation. This results in less difference between high-reputation and non-high-reputation categories and also in greater heterogeneity within the high-reputation category.

[3] In our player-level estimation sample of 2075 observations, 251 (12%) are both high-status and high-reputation, 94 (5%) are high-reputation but not high-status ("pure high-reputation"), 116 (6%) are high-status but not high-reputation ("pure high-status"), and 1614 (77%) are neither high-status nor high-reputation.

Because many of the variables we use in our team-level estimations to test H1-H3 are built by aggregating player-level measures, we first list and describe the independent variables for the player-level models, followed by those for the team-level models.

Independent variables for player salary models

Player status. We measured player status using an indicator variable, which was coded 1 for high-status players and 0 for non-high-status players. To determine whether a player was high-status, we used information on awards and team-selection honors in the NBA. In particular, we used data on the Most Valuable Player award (MVP), selection into the teams for the NBA All-Star Game, and selection into any of the All-NBA Teams (1^{st}, 2^{nd}, or 3^{rd}). The winner of the MVP award is determined through votes cast by a panel of sportswriters and broadcasters throughout the United States and Canada. The starting players in the All-Star Game are chosen by a fan ballot whereby each position on the teams is filled by the player with the most votes for that position, and the reserves are chosen by the head coaches, who cannot vote for players on their own team. The compositions of the three All-NBA Teams are also determined by a panel of broadcasters in the United States and Canada. For each position, the player with the most votes gets selected for that position for the 1^{st} team, the player with the second most votes gets selected into the 2^{nd} team, and the player with the third most votes gets selected into the 3^{rd} team.[4]

If a player was selected for any of these honors in the previous three seasons, then we coded him as being high-status in the present season. Conversely, if a player was not selected for any of these honors during the previous three seasons, he would be considered non-high-status in

[4] For example: In the 2004-2005 season, the MVP was Steve Nash, the players on the three All-NBA Teams were (1st team) Tim Duncan, Dirk Nowitzki, Shaquille O'Neal, Allen Iverson, Steve Nash, (2nd team) LeBron James, Kevin Garnett, Amare Stoudemire, Dwyane Wade, Ray Allen, (3rd Team) Tracy McGrady, Shawn Marion, Ben Wallace, Kobe Bryant, Gilbert Arenas. In addition to the players we have listed, the teams in the NBA All-Star Game included Grant Hill, Vince Carter, Jermaine O'Neal, Zydrunas Ilgauskas, Paul Pierce, Antawn Jamison, Yao Ming, Ray Allen, Manu Ginobili, and Rashard Lewis. We do not use awards/honors focused on specific positions or tenure, such as "defense" or "rookies", as we aim to construct a measure that is comparable across positions.

the present season.[5] We tried 3-, 5-, and 7-year moving windows as well as a fixed one whereby awards/honors are considered since the player's entry in the NBA. Although all resulting measures produce consistent significant support for our hypotheses, we use the 3-year window for a number of reasons. First, this is a setting where the number of slots for these awards/honors – compared to the entire eligible population for the awards – is relatively high (about 10% of the population). Second, these awards are given every year, making it possible, and indeed not rare, for genuinely high-status players to accumulate multiple awards/honors over the years. Indeed, using the 3-year window, Kobe Bryant, Dwyane Wade, Tim Duncan, and Paul Pierce, for example, would be categorized as high-status every year from their first year of winning an award/honor onward. Third, of the four options, the 3-year window provided the greatest heterogeneity between high-status and non-high-status groups and the greatest homogeneity within the high-status group (as indicated by *t*-tests in which the measure used for heterogeneity and homogeneity was the cumulative number of awards/honors up to the present season).[6]

Player reputation. We measure the reputation of a player in a given season with his average performance during the previous three seasons, adjusted by an annual decay function so that performance in the previous year is divided by one, performance two years ago is divided by two and so on. Performance in each season was measured by the Player Efficiency Rating (PER), developed by John Hollinger (2005).[7] PER is a per-minute rating of a player's performance,

[5] We tried different combinations of awards as alternatives. Whether we used MVP, NBA All Star, and the 1st All NBA Team only, or added the 2nd All NBA team, or also added the 3rd All NBA team (the measure we use), the correlations of the resulting measures are very high (r = .98), and the results remain the same and statistically significant as those we report.

[6] To illustrate this with an example, whereas the 3-year window differentiates between the group of Bryant, Wade, Duncan, Pierce and, for example, Juwan Howard and Jerry Stackhouse, a measure that categorizes players as high-status players from their first award/honor onward would not. Based on his 1996 All-Star appearance, Juwan Howard would be high-status in 1997, 1998, and 1999 but not onward based on the 3-year window, whereas he would always remain a high-status player based on the alternative measure. According to the 3-year measure, Jerry Stackhouse is a high-status player in 2001, 2002, 2003, and 2004, on account of his 2000 and 2001 appearances in the All-Star team, but he would also be high-status in every subsequent season up to his retirement with a fixed window measure. These differences suggest that widely accepted high-status players (e.g., Bryant, Wade, Duncan, Pierce) are indeed categorized as high-status in every year from their first award/honor year onward based on our 3-year window, whereas the same measure, we believe correctly, also differentiates between these players and those such as Juwan Howard and Jerry Stackhouse – categorized as high-status for the 3-years following their honors but not afterward.

[7] Hollinger has been an NBA analyst since 1996. He has published four annual edition books analyzing the performance of NBA players and teams, and he currently writes for ESPN and the New York Sun.

standardized for each year. We provide a description of the calculation of PER, with all the formulae, in Appendix 1.

Although no measure can comprehensively capture all of the dimensions of a player's performance, we believe that the PER is a good measure of the performance of players. First, PER measures more than just points scored, which certainly represents an important component of a player's overall performance but is not all of it. Some players help others to score or prevent the other team from scoring, and a performance measure based only on points scored would underestimate their performance. In our sample, the correlation between points scored and the PER is .64, which is lower than the correlation of .81 between points scored and, for example, the measure used to determine IBM Award winners (awarded by the NBA between 1983 and 2002), which shows that PER captures other dimensions of a player's skills. Second, the PER is highly correlated with other measures of players' performance (i.e., toughness, quickness and scoring), as developed by Staw and Hoang (1995) in their analysis of playing time and survival in professional basketball. To assess the validity of our performance measure, we followed the methodology described by Staw and Hoang and calculated their three factors for our sample. Then, we summed these three factors to arrive at a single measure, whose correlation with PER is .80 ($p < .001$). Whereas Staw and Hoang developed the three factors as independent variables in their models to capture possible differences across positions, the PER was defined to capture overall performance regardless of a player's position. For these reasons, we use the PER in measuring player performance to construct our reputation measure.

Player-level control variables. We use an indicator variable to control for whether the current season is the player's first season with his current team (*First year in team*). We also control for the natural logarithms of the player's tenure with his team beyond the first season

(*Team tenure*) and the number of years the player has been in the NBA (*NBA tenure*) to capture experience effects on salary. Another factor that may affect a player's salary is how much he was utilized in the previous season. Therefore, we control for the natural logarithm of the minutes (plus one) that a player has played for in the previous season (*Past minutes played*). We also control for a player's performance beyond the previous three seasons by entering a variable, *Player historical performance*, which averages the player's performance (PER) between the fourth and seventh seasons before the current season. Finally, we use an indicator variable (*Free agent*), which is set to 1 if the player was a free agent before the beginning of the current season and 0 otherwise to control for effects on a player's salary based on whether he was a free agent.

Team-level control variables. Players might accept a lower salary to play for a team with a long heritage, good recent performance or a history of championships won. Therefore, we include the natural logarithm of the number of years from the founding of the franchise (*Team age*), an indicator variable that is set to 1 if the team won the championship in the previous season (*Team past champion*) and 0 otherwise, an indicator variable that is set to 1 if the team qualified for the playoffs in the previous season (*Team past playoffs*) and 0 otherwise, and a variable that counts the cumulative number of times a team has won the NBA championship (*Team cumulative championships*). A player's salary might also be affected by the performance of the players on the team who are in the same position as the player. Using the three positions of guard, center, and forward, we construct a control variable that represents the average reputation (performance in the past three years, weighed by an annual decay) of the players on his team in that season in his position (*Team performance at position*). We also include the team's payroll in the current season in millions of dollars (*Team payroll*)[8] and the team's total revenues from all

[8] The results for our hypothesized effects do not change if we use a variable that sums the salaries of all the players except the focal player, rather than summing across all the players, or if we instead use the log transformation of either variable.

sources in the previous season, divided by ten million (*Team total past revenue*). Finally, we control for the population (*Population*), divided by 100,000, and the per capita income (*Per capita income*), divided by 10,000, of the city of the franchise, as reported by the US Census Bureau, the US Bureau of Labor statistics and Canada's National Statistics Agency.

Team indicators. We include an indicator variable for each team to capture the remaining heterogeneity across teams not captured by the other variables.

Season indicators. We include an indicator variable for each season to capture possible variation in salary across seasons.

Sample-selection variable. While there were rare instances where a player switched teams two or more times during a season, players played for a single team in 91% of the player-season observations in our sample. To ensure the commensurability of our measures of players and teams, we focus on player-season observations where players did not change teams during the season. To address any potential bias (Heckman, 1979) introduced by our decision, we calculate the inverse Mill's ratio (labeled Lambda, λ) and include it in our estimation models. To calculate this variable, we added to the full specification (in Model 8) *the number of games the player started in the previous season* as the identifying variable. Players who start fewer games are utilized less by their teams and are thus more likely to be traded during a season. Lambda is then included in all player-level models.

Independent variables for team product quality and team revenues

Team status. We measured team status by the average status of the players on the team roster in that season. Because our player status measure is dichotomous, this measure is equivalent to the proportion of high-status players on the team roster.

Team reputation. We measure reputation at the team level in a season by the average

reputation of the players on the team roster in that season.

Control variables. We control for *Team past playoffs, Team past champion*, *Team age, Team total past revenue,* the proportion of players who are new in the team (*Proportion of first-year players in team*), the average historical performance of the team's players (*Average historical performance*), the average team tenure (*Average team tenure*) of players, and the average NBA tenure (*Average NBA tenure*) of players on the team. In the models predicting *team revenues* we also add the size of the stadium of the team (*Stadium size*) divided by 1000, and *Population* and *Per capita income*. In the models predicting *team product quality*, we add as a control variable the number of players on the team roster who are injured in the current season (*Players injured*). We used fixed-effects estimations where available or a full set of team indicator variables to further account for uncontrolled heterogeneity between teams. All the models also include a set of indicator variables to control for year fixed effects.

Independent variables for preference for high-status/high-reputation players

Product quality relative to aspirations. We use performance relative to the teams' historical aspiration levels[9] defined as a moving average of past product quality (Greve, 1998) and obtained using the following formula:

$$A_t = \alpha P_{t-1} + (1-\alpha) A_{t-1}$$

Where A is the aspiration level, P is performance (product quality), t is the time period, and α is an updating parameter. This parameter updates the previous aspiration levels by weighting the relevance of the additional information coming from recent performance. Low

[9] Aspiration levels can be measured by social aspiration levels, historical aspiration levels, or a combination of both. Whereas most research has used a combination of the two, the performance to be measured was often market share or return on assets (e.g., Baum et al., 2005; Greve, 1998; Mishina et al., 2010; Mitsuhashi & Greve, 2009), where the average performance of all firms or firms in a peer group, i.e., for a social comparison, would change according to the change in the number of firms comprising the social comparison group. The number of NBA teams was stable throughout our observation period, which produces no substantive variance for social aspiration in team performance. However, in the case of revenues, the stadium size of teams plays an important role, not to mention the limited geographic span/reach of each team (it is not an option for most fans living in Dallas to choose between attending a basketball game between Dallas or Miami – the realistic option is whether to attend a game in Dallas or not to attend one at all). Therefore, we use historical aspiration levels to measure aspiration levels.

levels of the parameter, such as .25, mean that the decision maker puts less weight on recent performance information and is confident in relying on the previous aspiration level. Conversely, high levels of the parameter, such as .75, mean that the decision maker places more weight on recent performance information and relies less on the previous aspiration level (Greve, 2003b). To test the sensitivity of our results, we used .25, .50, and .75 for the updating parameter. Because the results were similar for all values, and because there exists no strong information to prefer a high or low updating parameter, we report the results obtained using a value of .50. To arrive at our final measure, we subtract a team's past product quality (product quality in the previous season) from their historic aspiration level for product quality in the previous season.

Revenues relative to aspirations. To measure a team's aspiration level for revenues, we use historical aspirations as a moving average of past revenues, constructed in the same way as described in detail above for product quality aspirations. To arrive at our final measure, we subtract a team's past revenues (revenues in the previous season) from their historic aspiration level for revenues in the previous season.

Control variables. We control for *Team age*, *Team total past revenue*, *Average historical performance*, *Team status*, *Team reputation,* and the number of all new players recruited by the team in the current season (*All new players*). Finally, we enter one indicator variable per team to control for further unobserved heterogeneity between teams and a set of indicator variables to control for yearly fixed effects.

RESULTS

Tables 1 and 2 provide the summary statistics and correlations for the variables we use in estimating team-level and player-level models. The correlation between player reputation and player status, as presented in Table 2, is .62, showing that although our measures of the two

intangible assets are related, they are also distinct from each other, with only 38% of the variance in one being explained by the variance in the other and 62% of the variance attributable to other factors. Although we use the raw variables in reporting the correlations and the summary statistics, we orthogonalize our reputation and status measures (separately, both for the player-level and the team-level models) before entering them in our models. In particular, we employ a Gram-Schmidt procedure (Golub & Van Loan, 1996), as implemented in the *orthog* command in Stata 11, which generates new orthogonalized measures for reputation and status, such that each captures variance not explained by a linear relationship with the other variable. This procedure has been used to obtain estimates for two or more variables when their correlation might have been a cause for concern (e.g., Hiatt, Sine, & Tolbert, 2009; Pollock & Rindova, 2003).

Insert Tables 1 to 6 about here

Tables 3 and 4 present the results for the models predicting product quality and revenues for teams. Model 1 is the baseline model for predicting product quality. Teams that qualified for the playoffs or won the championship in the previous season, or consist of players with longer tenures in the NBA are more likely to have better performance. Model 2 adds the average status and average reputation of players on the team. Whereas the average reputation of players on the team has a positive and significant effect ($p < .05$), the average status of players on the team has no significant effect on season performance. We also ran this model using the non-orthogonalized reputation and status variables. The results are the same: the average reputation of players on the team has a positive and significant effect ($p < .05$) whereas the average status of players on the team has no significant effect on season performance. These findings, that there is a positive and significant relationship between average reputation and team performance but no

significant relationship between average status and team performance, suggest support for H1a.[10]

Whereas the sign and significance of orthogonalized variables can be interpreted conventionally, the interpretation of their magnitude is not as straightforward. Therefore, in comparing standardized effect sizes, we use the coefficients from estimations with non-orthogonalized status and reputation variables. As we have noted above, the difference in the significance and non-significance is clear: the positive coefficient for reputation has a *p*-value of .015, whereas the non-significant coefficient for status has a *p*-value of .46, indicating that the effect of status cannot be estimated with any precision and the confidence intervals are very large. The standardized effect of reputation on product quality is 3.19 times that of the standardized effect of status on product quality. Because the standard error of the coefficient estimate of status is so large, as the *p*-value indicates, a *t*-test of the difference between the standardized effects is not significant. However, based on the clear differences in the significance and non-significance of coefficients and the 3.19 times difference in the standardized effects, we take these results to support H1a. To put the magnitude of the effect of reputation into context, a one-standard-deviation increase in the average reputation of a team's players increases the log-odds of the team to progress to the next stage in the season by .50 (this figure is .33 if we use orthogonalized reputation; these effects are between one-half and one-third of the effect size of whether a team has advanced to the playoffs in the previous season).

Model 3 is the baseline model for predicting revenues. Teams with higher total past revenues, those that qualified for the playoffs in the previous season, and those with larger stadiums have greater revenues from ticket sales. Model 4 adds team status and team reputation to model 3. Although the average status of players has a positive and significant effect ($p < .01$),

[10] We use a pooled ordered logit estimation because the test for pooling indicates clearly that the panel-level/longitudinal variance component for our model was not significant and, thus, that pooling was appropriate. A panel random-effects ordered-probit estimation provides consistent and significant results, although convergence in model estimation could be achieved only after removing some control variables.

the average reputation of players has no significant effect on ticket income. These results support H1b. As above, we also ran the same model using the non-orthogonalized average status and average reputation measures to compare differences in magnitude. Once again, the differences in significance and non-significance are clear: average status is a positive and significant ($p < .01$) predictor of ticket income, whereas average reputation has no significant association with ticket income (at only $p < .23$). The standardized effect of average status on revenues is 2.67 times that of average reputation. In this case, the *t*-test for the difference of these standardized effects provides marginal support for the statistical significance of this difference ($p < .09$). Whereas average reputation is not significant, the *p*-value of .23 keeps the standard error at a reasonable level, thus allowing us to show the statistical significance of the difference, clearly indicated by the 2.67 times greater standardized effect of status on revenues. The standardized effect of status on ticket income (5%) is as large as the effect of either total revenue in the previous season or whether a team has advanced to the playoffs during the previous season. In absolute dollars, a one-standard-deviation increase in the status of players on the team is associated with an increase of $1.4 million in ticket income (these size comparisons are the same if we use coefficients from estimations with orthogonalized variables; for absolute effects, a one-standard-deviation increase in status is associated with a 6%, or $1.7 million, increase in ticket income).

We also used Model 4 to test our mediation prediction formalized in H2. To capture actual product quality, we use the number of wins during the regular season in the current season. The correlations confirm that the number of wins during the current season is positively and significantly associated with ticket income ($p < .001$) as well as with team status and team reputation ($p < .001$). To study the extent of mediation of the effects of status and reputation on revenues through actual on-court performance, we follow MacKinnon, Lockwood, Hoffman,

West, and Sheets (2002) and use a Sobel (1982) test. The results show that the effects of both reputation and status on revenue are significantly ($p < .05$) mediated by the number of wins.[11] However, whereas only 16% of the total of effect of status is mediated, 41% of the total effect of reputation is mediated. As an alternative way of presenting the same result, the ratio of the indirect, i.e., mediated, effect to the direct effect for reputation is .97 (the direct effect is almost the same as the indirect effect) but is only .19 for status (the direct effect being almost five times stronger than the indirect effect). Using the win/loss percentage in the current season instead of the number of wins to measure on-court performance yields very similar results: 21% of the total effect of status on revenues is mediated by this variable, whereas 49% of the total effect of reputation is mediated by the same variable. These differences in the extent of mediation of the effects of status and reputation by actual current product quality support H2.

Table 5 presents the results for the models predicting teams' likelihood to prefer more pure high-reputation than pure high-status players, or vice versa, in their recruitment. The effects in the multinomial logit estimations are interpreted by comparing the preference for reputation and the preference for status to the baseline case of equal preference for the two intangible assets. Model 6 shows that product quality relative to aspirations has a negative effect ($p < .05$) on the preference for reputation over status. As product quality relative to aspirations increases (decreases), the team is less (more) likely to prefer reputation over status in their new player recruitment, supporting H3a. Moreover, revenues relative to aspirations has a negative effect ($p < .05$) on the preference for status over reputation, supporting H3b. As revenues relative to aspirations increases (decreases), the team is less (more) likely to prefer status over reputation.[12]

[11] As is standard, each mediation and the accompanying statistics are tested through three estimations: (a) revenues regressed on the specification in Model 4, (b) the number of wins, i.e., current product quality, regressed on the specification in Model 4, and (c) revenues regressed on the specification in Model 4, expanded by the number of wins.

[12] While our arguments and the mechanisms we propose in deriving H3a/b do not lead to different predictions for performance above/below the aspiration level but rather a consistent linear relationship, we nevertheless tried a spline specification in testing H3a/b. For each "performance

Table 6 presents the results for player salary models. Model 7 is the baseline model containing only the control variables. As expected, both player status and player reputation have positive and significant ($p < .001$) effects on a player's salary. Model 8 adds the interaction between player status and player reputation. The interaction variable has a negative and significant coefficient ($p < .001$), suggesting that the positive effect of reputation on salary is significantly smaller for high-status players, providing support for H4. The coefficient suggests that for a high-status player (or for a one-standard-deviation increase in status) the effect of reputation on salary is reduced by 60%. To compare their effect sizes to some of the significant control variables, the standardized effects of status and reputation on salary (which are 9% or $.36 million and 14% or $.56 million, respectively) are larger than that of NBA tenure and are as large as the effects of team tenure and team past total revenue.[13]

Figure 1 graphs the effect of reputation on a player's salary, using the coefficients from Model 8. High-status and non-high-status players are those players whose value is one standard deviation above and one below the mean, respectively. All other variables with significant coefficients are at their mean value. The figure shows that reputation has a stronger effect on salary for non-high-status players than for high-status ones. An increase of reputation from one standard deviation below to one standard deviation above the mean produces a 55% salary increase for non-high-status players and a 13% salary increase for high-status ones (equivalent to $.49 and $.16 million USD, respectively).

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relative to aspiration level" variable, the spline specification requires splitting it such that the "above" variable is zero whenever "performance relative to aspiration level" is zero or below zero and is equal to the actual value whenever it is positive; and the "below" variable is zero whenever the "performance relative to aspiration level" is zero or above zero and is equal to the actual value (multiplied by -1 for the variable to remain positive) whenever it is negative. The results we obtain by substituting these spline variables for each of the "relative to aspiration level" variables are significant and consistent with our main results. Both of the "revenues relative to aspiration level" split variables have significant and negative effects on status preference but not on reputation preference. Both of the "product quality relative to aspiration" split variables have negative effects on reputation preference (with one being significant and the other short of marginal significance) but not on status preference.

[13] If we use non-orthogonalized status and reputation variables in estimating Model 8, we get similarly strong statistical support for the effects of status, reputation, and the interaction (all $p < .001$). Likewise, both the magnitude of the moderation effect and the comparison of effect sizes with the three control variables are equally strong, i.e., the reputation effect becomes reduced by more than 60% for high-status players, and the standardized effect of reputation (which is 22% or $.88 million) is equal to or larger than those of the three control variables mentioned, as is the effect of a switch from a non-high-status to high-status player.

Insert Figure 1 about here

Robustness checks

We assessed the robustness of our results in a number of ways. Starting with H1a/b, as alternative ways to measure product quality (team performance), we used (a) an indicator dependent variable for whether the team advanced to the playoffs (estimated with a logit, using the same specification in Model 2), (b) the team's ranking in its division at the end of the regular season (reverse coded, predicted using an ordered logit, using the same specification in Model 2), or (c) the team's number of wins at the end of the regular season (predicted using a panel negative binomial regression with team fixed effects, using the same specification in Model 2). With any of these alternative dependent variables, the results are consistent with those we report. Team reputation has a significant positive effect on team performance ($p < .05$), whereas team status has no significant effect. If we use the non-log-transformed ticket income (instead of the log-transformation) to measure revenues in Model 4, our results remain unchanged: team status has a significant positive effect ($p < .05$), whereas team reputation has no significant effect.

In predicting preference for high-reputation/high-status players in Models 5 and 6, the results we report remain the same if we do not consider players who are both high-reputation and high-status or those who are neither high-reputation nor high-status in calculating the baseline, "0," outcome. If we remove either or both of these sets of players from the sample as we construct the dependent variable for the multinomial logit estimation, the results we report remain the same: product quality relative to aspirations has a negative effect ($p < .05$) on the preference for reputation over status, whereas revenues relative to aspirations have no significant effect. Revenues relative to aspirations have a negative effect ($p < .05$) on the preference for

status over reputation, whereas product quality relative to aspirations has no significant effect.

In the salary models, Models 7 and 8, we added a variable that captures the salary cap for each season. This procedure results in strong multicollinearity, leading many year indicators to be dropped. In this model, the salary cap has a negative effect on player salary. However, the coefficient of our hypothesized interaction effect remains negative and significant ($p < .001$). Removing year indicators and re-estimating the model with the salary cap yields a consistent and significant ($p < .001$) result for our hypothesized interaction effect, although the salary cap now has the expected positive coefficient, albeit not significant. Because the year indicators capture additional season-specific factors, and because adding salary cap with the year indicators results in severe multicollinearity, we report results only for models with year indicators.

The 1999 Collective Bargaining Agreement (CBA) introduced provisions for maximum individual player salaries. Although there are exceptions to these provisions, we nevertheless assessed whether such provisions change our results by adding a variable that measures what the CBA sets as *maximum salary* (with three bands based on the player's NBA experience) to Model 8. As with the salary cap, the addition of *maximum salary* results in high collinearity and the dropping of many year indicators. When we remove the year indicators, *maximum salary* has a positive but not significant effect on annual salary. However, in either specification, H4 continues to receive significant support ($p < .001$).[14] We also performed similar robustness checks for possible minimum salary effects, and H4 again received significant support.

It may be argued that our reputation measure focuses narrowly on individual player performance and insufficiently on his overall contribution to team performance. Assuming that teams utilize players who make a positive contribution to the team more often, which would be

[14] To further test for the possible effects of maximum salary provisions, we re-estimated Model 8 on samples consisting of observations for player-years for salaries that are below a certain upper (ranging from $14 million to $20 million) limit, resulting in the reduction of our sample by up to 2.8%. As with our other checks, we also found support for H4 ($p < .01$) in these estimations.

captured by past minutes played, we constructed a new measure for reputation using both the average PER during the previous three seasons (with an annual decay) and past minutes played. This measure was constructed by using the scores from a principal component factor analysis of the two variables and correlates .88 with either variable. Using this measure in Model 8 as a measure of player reputation, and removing past minutes played, as it is now part of this variable, yields the same results. Player reputation and player status have significant positive effects ($p < .001$) on salary and their interaction has a significant negative effect ($p < .001$).

Arguably, a player's salary might depend not on the absolute level of his reputation but rather on his position-specific reputation relative to the other players in the league. Using the three positions of guard, center, and forward, we generated yearly, i.e., season-varying, average measures for each position and adjusted the focal player's reputation by subtracting the relevant position-specific average from the player's own reputation. This position-adjusted reputation variable is highly correlated with our original variable, and the pattern of results is exactly the same: reputation ($p < .001$) and status ($p < .01$) have positive effects on salary, whereas their interaction ($p < .001$) has a negative effect. Alternatively, added on its own to Model 8, the season-varying average position-specific reputation has no significant effect on salary, and our original reputation ($p < .001$) and status ($p < .05$) variables retain their positive effects, whereas the hypothesized negative interaction effect also remain highly significant ($p < .001$).

Because we use fixed-effects panel regressions with robust clustered-errors in estimating Model 8 (player salary) and Model 4 (team revenues), we also checked using an Arellano-Bond estimation whether the addition of a one-period lagged dependent variable to the predictors yields consistent results. In both Model 8 (testing H4) and Model 4 (testing H1b), the results are consistent with those we report. The interaction between reputation and status in Model 8 has a

negative and significant coefficient ($p < .05$). Status has a positive and significant effect in Model 4 ($p < .001$), whereas reputation has no significant effect.

Finally, it may cause concern that the correlations between *team payroll* and *team total past revenue* and between *first year in team* and *team tenure* (in Models 7-8) and the correlation between *proportion of first year players in team* and *average team tenure* (in Models 1-4) are relatively high. For each of the three pairs, we orthogonalized the two variables, removing common variance between them. Using the resulting variables did not change our results, which continue to provide significant ($p < .05$) support for our hypothesized effects.

DISCUSSION

In this paper, we explore how two intangible assets, reputation and status, affect different organizational outcomes, how organizations' performance on these different outcomes determines the acquisition of resources from providers possessing these assets, and how these assets affect the price paid to obtain resources from a provider. In particular, we argued that because reputation and status are intangible assets that produce benefits to the organization that hires the resource providers who possess them, resources from high-reputation providers have a greater effect on the quality of an organization's final products than resources from high-status providers, and resources from high-status providers have a greater effect on an organization's revenues than resources from high-reputation providers. Given the tighter link between reputation and product quality, we also argued that the effect of reputation on revenues will be mediated by the actual quality of the organization's final products more than the effect of status on revenues. Because the two intangible assets have different effects on organizational outcomes and to the extent that organizations have different goals they want to achieve, we also argued that organizations with low quality performance relative to their aspiration levels are likely to recruit

more high-reputation providers than high-status ones, whereas organizations with low revenue performance relative to their aspiration levels are likely to recruit more high-status resource providers than high-reputation ones. Finally, we argued that organizations use both reputation and status to evaluate the quality of resources obtained from a resource provider and that organizations consider the levels of these intangible assets interdependently when determining the price to pay for a resource.

We see several important contributions of this study. First, we extend the research on the relationship between reputation and status. Rather than focusing on whether these intangible assets are used independently (Washington & Zajac, 2005) or sequentially (Jensen & Roy, 2008) in determining the value of an exchange partner, we have studied the interdependent role they play in determining the price paid to resource providers. Our results suggest that firms are aware of the different roles that these intangible assets play in determining their performance on two types of outcomes. Reputation allows firms to increase their product quality, whereas status allows them to increase their revenues. For these reasons, there is an interdependence between their effects: as status increases, the link between pay and reputation is weaker.

Second, previous research has considered that firms associate with different types of actors because these different types can help organizations to achieve their goals by providing different intangible assets (Pollock et al., 2010). We explicitly consider that the same type of resource provider might possess different intangible assets at different levels and that the decision to hire them is based upon the firms' need for one asset or the other. Firms may not want or need to consider alternative types of actors to provide different benefits, instead focusing on one type of resource provider, as long as that type can provide different intangible assets.

Third, we confirm and substantiate the active role that organizations play in changing

their intangible assets base to remedy difficult situations. Chen and his colleagues (2008) have shown that firms hire prestigious executives as a dressing up of the company before IPO to remedy a scarcity of pre-existing prestige. Our results confirm not only that firms hire resource providers when their performance on some outcomes is low relative to their aspiration level but also that they act selectively to remedy the most pressing outcome-related issue they face.

Fourth, our results also extend and clarify our knowledge on the role of certification on the performance of organizations. In a paper on CEO compensation, Wade and his colleagues (2006) found that CEO certification generates abnormal short-term returns in the stock market but does not have any effect on firms' profitability. Although certification is initially valued by shareholders as indicating the quality of the new CEO, it does not really produce any difference in a firm's ability to generate higher profits. Our results extend these findings by showing that status is valued by relevant audiences – i.e., fans – who generate higher revenues for the organization. However, we find that status has little bearing on the quality of the firm's products. By explicitly considering both status and reputation, we show that it is primarily reputation that allows the firm to increase the quality of its products, whereas status generates greater revenues, which are mediated much less by the actual quality of the product, as H2 predicts. Therefore, firms should focus on the type of objective they wish to achieve and hire accordingly. It is possible that if firms wish to increase the quality of their products, and to the extent that a CEO is expected to engage in activities to affect it, firms might hire high-reputation CEOs, regardless of their certification. Wade and his colleagues (2006) also show that compensation is higher for certified CEOs than non-certified ones when performance is high but is lower when performance is low. Although this finding might well be caused by the burden of celebrity, our results might suggest, alternatively, that it is possible that reputation could be the main driver of compensation

when status is low or when certification is absent. Insofar as a firm's quality is determined by CEO reputation, low compensation might be the product of poor CEO abilities.

Fifth, this paper contributes to our understanding of myopic search (Levinthal & March, 1993). Research has shown that problemistic search is plagued by temporal myopia, whereby firms tend to focus on the short run (Greve, 2008), spatial myopia, whereby firms tend to focus on effects near the problem (Miller, Meng, & Calantone, 2006), and failure myopia, whereby firms focus more on successes than failures (Danneels, 2008). We provide an additional test of spatial myopia by showing that firms with multiple goals focus on one outcome at a time. When seeking a solution to a performance problem, firms are more likely to acquire resources that address this problem but not resources that might improve their performance on the other goals.

Finally, this paper contributes to the economic literature on "superstars," which argues (see, for example, Adler, 1985) that income is distributed disproportionally to some individuals even when their level of talent is the same as that of others. One reason for such a distribution is that consumption requires knowledge by the consumers, who need to acquire it through interactions with other consumers. We extend this argument by showing that even when there is explicit and shared knowledge about the talents of individuals, such as in our context, where performance is clearly available, certain individuals with the same talent may still have a higher income. Our results suggest that this is due to the role of certification, whereby organizations are willing to pay more for high-status individuals because of the revenue benefits they produce.

We acknowledge that the sample we have selected for this study has some idiosyncratic features that might make it difficult to reproduce our results exactly in other settings. As a consequence, we are cautious about claiming empirical generality for the results we report. First, not many industries have, as in the NBA, both detailed statistics available for each player and

team, resulting in observable indicators for the quality of resources, and perceptual evaluations of the quality of players. If, on the one hand, this might be seen as limiting the generalizability of our findings, on the other hand, it allows us to clearly distinguish between reputation and status and to provide a clean test of our arguments. We predict that the status-related mechanisms emphasized in this paper will be even more relevant in contexts where the quality of resources obtained is not as observable. Second, not every industry has the same level of contractual complications as the NBA. While collective bargaining in the NBA could be considered to be similar to collective bargaining in other industries, the presence of a soft salary cap, of minimum and maximum salary provisions, and the many exceptions to the cap and the provisions may make the salary paid to players less flexible than in other industries. Although we have taken many steps to control for such constraints, it may be difficult to generalize the results to industries with no such regulations. Third, this industry, like any other sport, may be rather unusual in the ability that star employees have to attract attention. The certification of players seems particularly relevant in this industry, where audiences want to see high-status players on TV and on the court, thereby generating higher revenues. Although there are similarities with CEOs, prominent executives, venture capitalists, and security analysts, the results of this paper are bound by those industries where uncertainty in the quality of the resources employed may generate high pay for a small set of individuals. Fourth, one of the underlying assumptions of the paper is that there is homogeneity in how high-reputation players produce their quality. Ideally, the effort or shirking of players should also be considered when studying the effects of reputation on substantive benefits. Fifth, we used ticket revenues as a proxy for firm revenue. Although we could not obtain such data, other streams of revenues, such as merchandise revenues, should be included in the measure. Finally, we did not consider complementarities when determining a

player's value for the team. Future research should explore how the extent to which a player's skill set complements those of others on the team might affect his salary.

In conclusion, our study illustrates the importance of separating the benefits received through high-status and high-reputation resource providers. Doing so also allows us to predict and observe how the effects of one intangible asset may depend on another when organizations pay their resource providers. Our study thus extends our understanding of the benefits that organizations have in obtaining resources from high-reputation and high-status resource providers and how reputation and status determine the organizational decisions of hiring and pay.

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TABLE 1: DESCRIPTIVE STATISTICS AND CORRELATIONS FOR TEAM-LEVEL MODELS·

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Product quality	2.13	1.33																		
2. Revenues	17.08	0.38	.31																	
3. Revenues relative to aspirations	1.76	2.56	.02	-.48																
4. Product quality relative to aspirations	0.05	1.18	.32	.01	.08															
5. Team reputation	8.68	0.78	.28	.17	.06	.01														
6. Team status	0.10	0.07	.37	.36	.04	.08	.52													
7. Avg. historical performance	14.30	1.38	.24	.21	.02	-.04	.46	.45												
8. Team past playoffs	0.58	0.49	.47	.29	.03	.39	.38	.47	.32											
9. Team past champion	0.04	0.19	.33	.21	.01	.35	.03	.08	.01	.17										
10. Team age	3.45	0.54	.02	.23	-.19	-.05	.10	.07	.03	-.06	.07									
11. Past total revenues	60.30	32.12	.13	.69	-.64	-.06	.09	.15	.12	.13	.14	.31								
12. Proportion of first-year players on team	0.47	0.14	-.30	-15	-.16	-.20	-.20	-.24	-.07	-.28	-.13	.02	.01							
13. Average team tenure	0.22	0.44	.36	.27	.06	.07	.27	.42	.21	.39	.17	.01	.12	-.75						
14. Average NBA tenure	1.57	0.29	.42	.39	-.12	.16	.30	.54	.32	.48	.16	.01	.19	-.25	.43					
15. Players injured	2.39	1.73	-.03	-.04	-.03	.10	-.23	-.09	-.16	-.03	.01	-.01	-.16	.19	-.18	.01				
16. All new players	3.21	1.88	-.07	.08	-.26	-.01	-.17	-.05	-.05	-.08	-.05	.09	.12	.58	-.41	.08	.26			
17. Stadium size	19108.97	1899.06	.02	.30	-.21	-.01	-.06	.09	.01	-.01	-.03	.04	.22	.12	-.12	.13	-.04	.14		
18. Population	1515.46	1998.07	.14	.29	-.01	.01	-.05	.06	-.06	-.01	.10	.25	.25	-.17	.15	.12	-.02	-.06	.07	
19. Per capita income	31.64	6.14	-.15	.38	-.60	-.07	-.14	-.14	-.16	-.25	-.06	.37	.55	.16	-.13	-.06	.01	.22	.19	.20

· n = 270. Correlations greater than |.10| are significant at $p < .05$. This table includes all the variables used in all team-level models (Models 1-6). The observations in the estimations vary between 274 and 310, depending on the model. The summary statistics and the correlations are not substantively different from the above in any of the estimation samples. Separate summary statistics and correlation tables for each model are available upon request.

TABLE 2: DESCRIPTIVE STATISTICS AND CORRELATIONS FOR PLAYER-LEVEL MODELS·

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Player salary	14.74	1.06																	
2. Player reputation	8.79	2.52	.54																
3. Player status	0.18	0.38	.41	.62															
4. Player historical performance	14.63	3.92	.44	.66	.50														
5. First year in team	0.35	0.48	-.33	-.25	-.17	-.12													
6. Team tenure	0.85	0.74	.38	.35	.28	.21	-.84												
7. NBA tenure	2.15	0.35	-.03	-.07	.03	.26	.12	-.07											
8. Past minutes played	0.44	0.97	.45	.55	.29	.30	-.23	.26	-.08										
9. Free agent	0.29	0.45	-.42	-.23	-.15	-.17	.51	-.46	.07	-.22									
10. Team age	3.41	0.59	.10	.03	.04	-.01	.01	-.01	.01	.01	.01								
11. Team past champion	0.05	0.21	-.03	.01	.01	.01	-.04	.05	.05	.01	.01	.09							
12. Team past playoffs	0.65	0.48	.03	.13	.12	.12	-.10	.11	.12	.09	.02	-.05	.16						
13. Team cumulative championships	1.88	3.64	.03	.01	.01	.01	.01	.01	-.03	.02	-.01	.43	.23	-.01					
14. Team performance at position	8.72	1.35	.24	.55	.32	.37	-.14	.19	-.01	.30	-.09	.05	.02	.21	.01				
15. Team payroll	17.50	0.45	.39	.01	.01	.01	.03	-.02	.07	-.04	.04	.19	.06	.12	.07	.03			
16. Team total past revenue	66.43	34.25	.34	.02	.03	.01	.05	-.02	.06	.04	.04	.32	.15	.14	.24	.02	.77		
17. Population	15.55	20.78	.02	-.03	.01	-.04	-.03	.02	.03	-.02	.01	.29	.10	.01	.14	-.06	.15	.30	
18. Per capita income	3.24	0.64	.27	-.05	-.04	-.09	.09	-.09	-.04	-.06	.04	.35	-.07	-.24	.22	-.08	.61	.56	.23

· n = 2075. Correlations greater than |.06| are significant at $p < .01$

TABLE 3: ORDERED LOGIT MODELS ESTIMATING PRODUCT QUALITY (SEASON PERFORMANCE)·

Variables	Model 1	Model 2
Team status		.35
		(.20)
Team reputation		.34*
		(.14)
Team past playoffs	1.29***	1.10**
	(.33)	(.35)
Team past champion	2.01*	2.19*
	(.89)	(.96)
Team age	-1.11	-1.19
	(1.58)	(1.56)
Team total past revenue	-.02	-.02
	(.01)	(.01)
Average historical performance	.15	.01
	(.13)	(.14)
Proportion of first-year players on team	-2.73	-2.85
	(1.95)	(2.09)
Average team tenure	.08	-.15
	(.65)	(.70)
Average NBA tenure	1.88*	1.80**
	(.80)	(.83)
Players injured	.05	.09
	(.10)	(.10)
Log-pseudolikelihood	-357.18	-353.41
Pseudo R-squared	.19	.20

TABLE 4: FIXED-EFFECTS REGRESSIONS ESTIMATING REVENUES (TICKET INCOME)•

Variables	Model 3	Model 4
Team status		.06**
		(.02)
Team reputation		.01
		(.01)
Team past playoffs	.09**	.07*
	(.03)	(.03)
Team past champion	.09	.11
	(.06)	(.06)
Team age	-.32	-.37
	(.22)	(.20)
Team total past revenue	.005*	.004*
	(.002)	(.001)
Average historical performance	.02	.01
	(.01)	(.01)
Proportion of first-year players on team	-.06	-.08
	(.12)	(.12)
Average team tenure	.02	-.03
	(.05)	(.05)
Average NBA tenure	.10	.06
	(.06)	(.06)
Stadium size	.07***	.06***
	(.02)	(.02)
Population	.01	.01
	(.01)	(.01)
Per capita income	-.01	-.01
	(.01)	(.01)
Constant	15.94***	16.47***
	(1.14)	(1.08)
R-squared (within)	.75	.77

· n = 313. Clustered robust standard errors, adjusted for non-independence across same-team observations, in parentheses. Unreported season and team indicator variables are included in all models.
Two-tailed tests. * $p < .05$ ** $p < .01$ *** $p < .001$

• n = 274. Clustered robust standard errors, adjusted for non-independence across same-team observations, in parentheses. Unreported season indicator variables are included in all models. Team-level fixed-effects are incorporated into the estimations.
Two-tailed tests. * $p < .05$ ** $p < .01$ *** $p < .001$

All nested models in both sets of estimations provide a significant improvement in fit ($p < .001$).

TABLE 5: MULTINOMIAL LOGIT MODELS ESTIMATING PREFERENCE FOR HIGH-REPUTATION OR HIGH-STATUS PLAYERS·

Variables	Model 5	Model 6
Outcome = -1 (reputation preference)		
Revenues relative to aspirations		-1.34
		(1.95)
Product quality relative to aspirations		-.52*
		(.24)
Team reputation	.61	.49
	(.36)	(.36)
Team status	-.31	-.24
	(.33)	(.30)
Team age	2.58	2.00
	(5.09)	(4.82)
Total past revenue	.04	.05
	(.04)	(.04)
All new players	.25	.26*
	(.13)	(.11)
Average historical performance	-.31	-.39
	(.20)	(.22)
Constant	-13.29	-11.08
	(20.63)	(19.97)
Outcome = 1 (status preference)		
Revenues relative to aspirations		-20.72*
		(10.08)
Product quality relative to aspirations		1.38
		(.72)
Team reputation	.23	.19
	(.62)	(.95)
Team status	4.87*	13.47*
	(1.96)	(6.26)
Team age	-23.72**	-64.13**
	(8.34)	(20.99)
Total past revenue	.23**	.69*
	(.08)	(.32)
All new players	1.06*	2.77*
	(.49)	(1.39)
Average historical performance	-.95	-2.95
	(.68)	(1.91)
Constant	73.50*	196.87**
	(29.15)	(62.64)
Log-pseudolikelihood	-72.26	-64.32

· n = 297. Clustered robust errors, adjusted for non-independence across same-team observations, in parentheses. Unreported season and team indicator variables are included in all models. Two-tailed tests. * $p < .05$ ** $p < .01$ *** $p < .001$
There is a significant improvement in fit from Model 5 to Model 6 ($p < .01$).

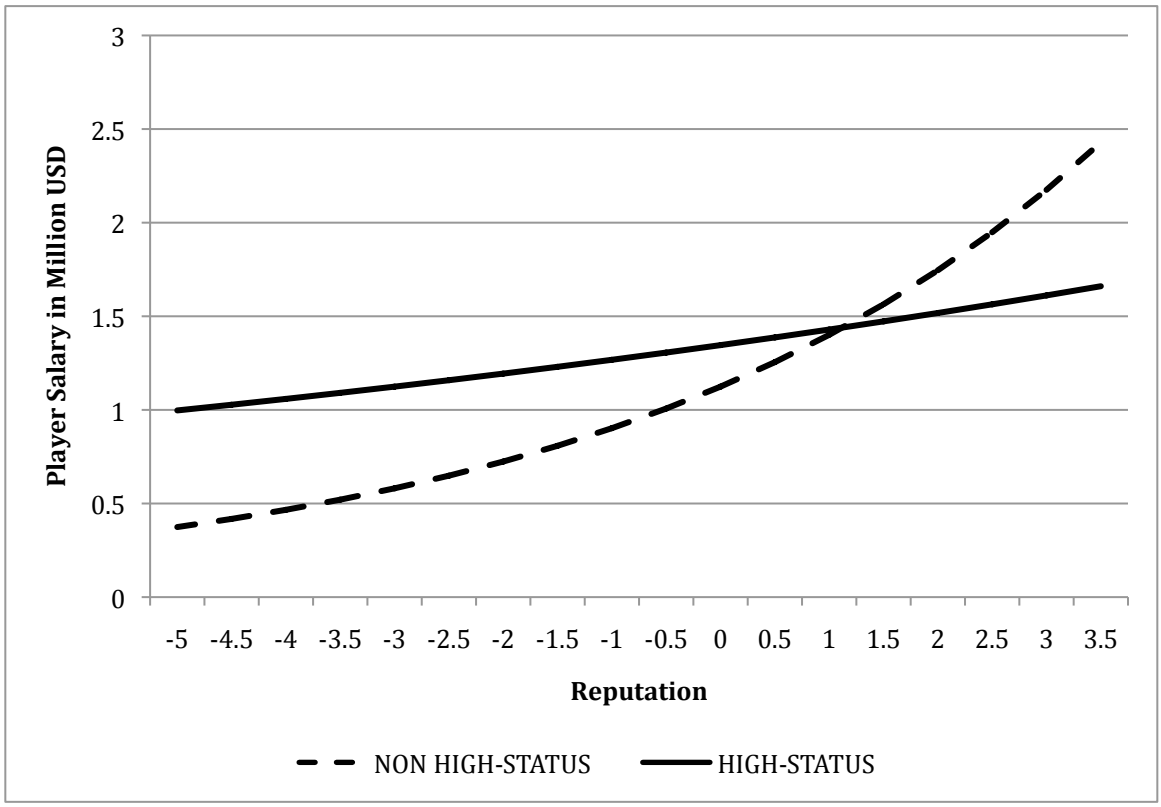
The baseline outcome (Outcome = 0) is an equal number of new hires who are pure high-reputation (high-reputation but not high-status) and pure high-status (high-status but not high-reputation). Outcome = -1 is the hiring of more new pure high-reputation than new pure-high status players, i.e., reputation preference. Outcome = 1 is the hiring of more new pure high-status than new pure high-reputation players, i.e., status preference.

TABLE 6: FIXED-EFFECTS REGRESSIONS ESTIMATING PLAYER SALARY·

Variables	Model 7	Model 8
Player reputation	.14***	.14***
	(.04)	(.04)
Player status	.12***	.09**
	(.03)	(.03)
Player reputation * Player status		-.08***
		(.02)
Player historical performance	.03*	.03*
	(.01)	(.01)
First year in team	.09	.12
	(.09)	(.09)
Team tenure	.12*	.13**
	(.05)	(.05)
NBA tenure	1.27***	1.34***
	(.34)	(.33)
Past minutes played	.06*	.06*
	(.03)	(.03)
Free agent	-.34***	-.33***
	(.04)	(.04)
Team age	.04	.06
	(.22)	(.22)
Team past champion	-.11	-.10
	(.07)	(.07)
Team past playoffs	-.12***	-.12***
	(.04)	(.04)
Team cumulative championships	.03	.03
	(.05)	(.05)
Team performance at position	-.03*	-.03*
	(.01)	(.01)
Team payroll	.23*	.23*
	(.09)	(.09)
Team past total revenue	.01	.01
	(.01)	(.01)
Population	-.03	-.03
	(.02)	(.02)
Per capita income	-.01	.01
	(.16)	(.16)
λ	-.68*	-.73*
	(.32)	(.32)
Constant	7.28***	7.03***
	(2.11)	(2.10)
R-squared (within)	0.299	0.308

· n = 2075. Clustered robust errors, adjusted for non-independence across same-player observations, in parentheses. Unreported season and team indicator variables are included in all models. Player-level fixed effects are incorporated into the estimations.
There is a significant improvement in fit from Model 7 to Model 8 ($p < .01$).
Two-tailed tests. * $p < .05$ ** $p < .01$ *** $p < .001$

FIGURE 1: THE EFFECT OF REPUTATION ON SALARY FOR DIFFERENT STATUS LEVELS



APPENDIX 1: CALCULATING THE PLAYER EFFICIENCY RATING (PER)

First, uPER is calculated as follows:

uPER = (1/MP) * [3P + (2/3) * AST + (2 - factor * (team_AST / team_FG)) * FG
+ (FT *0.5 * (1 + (1- (team_AST / team_FG)) + (2/3) * (team_AST / team_FG)))
- VOP * TOV - VOP * DRB% * (FGA - FG) - VOP * 0.44 * (0.44 + (0.56 * DRB%)) * (FTA - FT) + VOP * (1 - DRB%) * (TRB - ORB) + VOP * DRB% * ORB + VOP * STL + VOP * DRB% * BLK - PF * ((lg_FT / lg_PF) - 0.44 * (lg_FTA / lg_PF) * VOP)]

Where:

Factor = (2 / 3) - (0.5 * (lg_AST / lg_FG)) / (2 * (lg_FG / lg_FT))
VOP = lg_PTS / (lg_FGA - lg_ORB + lg_TOV + 0.44 * lg_FTA)
DRB% = (lg_TRB - lg_ORB) / lg_TRB

Once *uPER* is calculated, it is adjusted for team pace and normalized to the league to become:

PER = [uPER * (lg_pace/tmPace)] * (15/lg_uPER)

Where *tmPace* is an estimate of the number of possessions per 48 minutes by a team, calculated as follows:

tmPace = 48 * (Tm Poss + Opp Poss) / (2 * (Tm MP /5), which sets the league average (of PER) to 15 for all seasons.

The abbreviations in the formulae above stand for the following:

MP – Minutes played
AST – Assists
FG – Field goals
FT – Free throws
FTA – Free throw attempts
VOP – Value of possession
TOV – Turnovers
DRB – Defensive rebounds
ORB – Offensive rebounds
TRB – Total rebounds
BLK – Blocks
PF – Personal fouls
PTS – Points
STL – Steals
TOV – Turnovers
Tm Poss – Team possession
Tm MP – Team total minutes played
Opp Poss – Opponent possession
team_AST – Team total assists
team_FG – Team total field goals
lg_FT – League total free throws
lg_FTA – League total free throw attempts
lg_PF – League total personal fouls
lg_AST – League total assists
lg_FG – League total field goals
lg_FGA – League total field goal attempts
lg_PTS – League total points
lg_TRB – League total rebounds
lg_ORB – League total offensive rebounds
lg_TOV – League total turnovers
lg_uPER – League average uPER

Gokhan Ertug (gokhanertug@smu.edu.sg) is an assistant professor of strategic management at the Lee Kong Chian School of Business at Singapore Management University. He received his Ph.D. from INSEAD. He is interested in studying social networks, status, reputation, and trust.

Fabrizio Castellucci (fabrizio.castellucci@unibocconi.it) is an assistant professor of organization theory at the Department of Management and Technology of Bocconi University and professor of leadership at SDA Bocconi School of Management. He received his Ph.D. from the Graduate School of Business of Stanford University. His research focuses on status, reputation, social networks, and organizational learning.