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# Entrepreneurship and the taste for discrimination

**Christopher J. Coyne · Justin P. Isaacs ·
Jeremy T. Schwartz**

**Abstract** This paper analyzes the connection between discrimination and entrepreneurship. We contend that the entrepreneur is the central mechanism through which inefficiencies associated with discrimination are competed away. In addition to illuminating the mechanism through which existing discrimination tends to be eliminated, we also consider the more difficult case of consumer discrimination. The standard assumption is that consumer discrimination will not be competed away through market forces. In contrast, we find that entrepreneurs can correct the inefficiencies associated with this form of discrimination by influencing the costs and benefits associated with consumer discrimination. We empirically analyze the integration of black players in Major League Baseball to illustrate our theoretical arguments regarding entrepreneurship and consumer discrimination.

**Keywords** Entrepreneurship · Discrimination · Integration · Major league baseball · Symbolic value

**JEL Classifications** J71 · L22 · L26 · O31

C. J. Coyne (✉)
Department of Economics, West Virginia University,
Morgantown, WV 26506-6025, USA
e-mail: chris.coyne@mail.wvu.edu

J. P. Isaacs · J. T. Schwartz
Department of Economics, Hampden-Sydney College,
Hampden-Sydney, VA 23943, USA

J. P. Isaacs
e-mail: jisaacs@hsc.edu

J. T. Schwartz
e-mail: jschwartz@hsc.edu

## 1 Introduction

To what extent will market forces, left to their own devices, correct for discrimination? This is a central question in the large literature exploring the economics of discrimination.[1] Starting with Gary Becker's (1957) classic work on this topic, economists have theoretically and empirically explored the factors contributing to the existence of discrimination as well as the conditions under which various forms of discrimination persist.

Discrimination occurs when some majority group treats a minority group in an inferior manner even though the minority group has identical productive abilities. In Becker's model someone possesses a taste for discrimination if he acts "*as if* he were willing to forfeit income in order to avoid certain transactions" (1957: 16, italics original).[2] Starting with the model of perfect competition, Becker posits that this taste for discrimination manifests itself in three distinct forms—employer, coworker and consumer discrimination. Given Becker's model and assumptions employer and coworker discrimination will be competed away. However, even under perfectly competitive conditions consumer discrimination can persist over time and may not be corrected by market forces.

Within this context, economists typically conclude that the existence of discrimination must result from consumer discrimination (see, for example, Nardinelli and Simon 1990). This is evident in the large literature focusing specifically on consumer discrimination. For example, Kain (1968) discusses how consumer discrimination is a driving factor behind the failure of inner city blacks to pursue suburban-based jobs. Kahn and Sherer (1988) utilize the salaries of professional basketball players to analyze the differences in earnings based on race and attribute the difference to consumer discrimination. Nardinelli and Simon (1990) rely on the value of sports cards for black and white baseball players to explore the magnitude of consumer discrimination. Ihlanfeldt and Young (1994) rely on wage data from fast food restaurants in Atlanta to explore difference in earnings between black and white employees while Neumark (1996) focuses on gender patterns in the hiring practices of restaurants in the Philadelphia area. Both of these studies attribute wage differentials in the restaurant industry to consumer discrimination. More recently, Holzer and Ihlanfeldt (1998) utilize data from a survey of employers in the United States to investigate the magnitude of consumer discrimination.

This paper contributes to the existing literature on the economics of discrimination by analyzing the connection between the existence of discrimination

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[1]For a survey of the discrimination literature, see Cain (1986).

[2]It should be noted that in addition to Becker's taste-based theory of discrimination, there is also a literature on the statistical theory of discrimination (see Phelps 1972; Arrow 1973). The statistical theory of discrimination focuses on the information asymmetries facing firms. Because firms have limited information, they tend to intuit the expected productivity of job applicants based on observable characteristics. Our focus in this paper is on the taste-based theory of discrimination.

and entrepreneurship. Our central thesis is that the entrepreneur is the central mechanism through which discrimination is competed away. Our contribution is three-fold.

First, we identify the mechanism through which employer and coworker discrimination is eroded. The standard assumption of perfect competition—free entry and exit, perfect information, a large number of firms—fails to provide insight into the mechanism and process through which existing discrimination is competed away. A consideration of the entrepreneur fills this existing gap. Our contention is that the correction of the errors associated with discrimination should be seen as an ongoing process of discovery rather than a mechanical and automatic outcome of perfect competition. Viewed through the lens of real-world markets, where the assumptions of perfect competition rarely hold, it becomes clear why costly discrimination can occur and also how those errors can potentially be corrected over time.

Our second, and related, contribution deals with the more difficult case of consumer discrimination, and the standard assumption that this form of discrimination will not be competed away through market forces given the assumptions of perfect competition. In contrast, by moving outside the strictures of perfect competition and shifting focus to the market process, we find that entrepreneurs can, in some instances, correct the inefficiencies associated with this form of discrimination by influencing the costs and benefits associated with consumer discrimination. If entrepreneurs can demonstrate to consumers the benefits of interacting with members of a group currently discriminated against (i.e., lower the price of consumers interacting with members of that group), consumer's demand for discrimination against members of that group will decrease. The role of the entrepreneur in overcoming consumer discrimination has yet to be explored in detail and our analysis remedies this oversight.

Finally, we emphasize the importance of a broader understanding of what exactly production entails. For many goods and services, production involves not only making a physical good or services, but also entails a symbolic element. Consumers may value symbolic aspects of the production including where inputs are produced (i.e., physical location), how it is produced (e.g., environmental and ethical implications), and by whom it is produced (e.g., the race, sex, nationality, etc. of the people involved as inputs). Our analysis provides insight into this broader view of production and illuminates how entrepreneurs can influence the symbolic aspects of the production process.

In order to empirically analyze the relationship between entrepreneurship and consumer discrimination, we utilize data regarding the integration of black players in Major League Baseball (MLB). As we will discuss, the exclusion of black players from MLB can be seen as a classical case of consumer discrimination (Bradbury 2007: 129–130). MLB owners, acting as entrepreneurs in their pursuit of profits and pennants, were the catalysts of change regarding consumer discrimination in this regard. Owners attempted to convince consumers of the superior product generated through integration in terms of moving their team into pennant contention. When owners were successful, they revealed the true costs of discrimination to consumers. Consumers, who valued their team

contending for the pennant, adjusted their behavior accordingly. This insight can be generalized beyond MLB.

Our analysis is part of a growing literature that utilizes sports as a natural experiment for exploring the economics of discrimination. Relying on data from MLB, Cymrot (1985) indicates that increased competition in the form of free agency leads to reduction in the earnings gap between white and non-white players. Using data from the National Basketball Association (NAB) in the late 1980s, Bodvarsson and Brastow (1999) find evidence of employer discrimination—i.e. of entrepreneurs resisting the integration of black players in a sport where the percentage of black athletes is particularly high. They argue that employer discrimination was eradication as monopsony power was eroded. Szymanski (2000) finds that in English professional soccer, clubs fielding an above-average percentage of black players systematically outperform clubs with a below-average proportion of black players. Finally, Pedace (2008) and Frick (2007) find the opposite of discrimination, namely a preferential labor market treatment of foreigners in English and German professional football. Other things equal, players from South America earn significantly higher wages than comparable players from either of the two countries. This, in turn, is due to the fact that teams with a higher percentage of South American players on their rosters attract larger crowds (Wilson and Ying 2003) and that replica shirts with the names of South American players sell much better than those with the names of players from other parts of the world (Kalter 1999).

We proceed as follows. Section 2 briefly discusses Becker's model and explores the connection between entrepreneurship and the three forms of discrimination identified by Becker. We emphasize the entrepreneur as the mechanism through which the inefficiencies associated with discrimination are identified and corrected and discuss the process through which this occurs. Section 3 considers the integration of black players in MLB as a case of consumer discrimination and develops our empirical model. Section 4 presents a discussion of our data, estimation strategy, and results. Section 5 concludes with the implications of our analysis.

## 2 Discrimination and the entrepreneur

### 2.1 Becker's model of discrimination

Becker (1957), starting with the perfectly competitive model, identified three distinct forms of discrimination. Employer discrimination occurs when employers are willing to forgo a portion of their profits in order not to have to employee a certain group, while coworker discrimination occurs when employees are willing to forgo a portion of their wages in order not to work with members of a certain group. Consumer discrimination exists when consumers are willing to pay a higher price not to purchase goods and service from members of a certain group.

Within Becker's model, employer and coworker discrimination will be eroded as long as labor markets are competitive and there are constant returns to scale.[3] Employer discrimination is competed away because discriminating employers would ultimately be driven out of business due to the fact that a non-discriminating employer can increase productivity and minimize costs, ceteris paribus. Along similar lines, one would expect that markets would naturally erode coworker discrimination through a process of segregation. Assuming workers of different races are perfect substitutes, in equilibrium firms will be perfectly segregated by race and no one will have to work with members of a group she dislikes. In such a situation there will be no wage difference across races or across firms, ceteris paribus.

In contrast to employer and coworker discrimination, consumer discrimination *can* persist in Becker's model, even under competitive conditions. This outcome results from the fact that firms that satisfy consumers' tastes for discrimination will be rewarded for satiating that demand. Consumers that demand discrimination as part of the bundle of goods offered by firms will reward those firms accordingly and the inefficiencies of consumer discrimination will fail to be mitigated by competitive markets. Further, there is no way for consumers to arbitrage the discrimination of other consumers. As such, consumer discrimination may persist in perfectly competitive markets.

2.2 Discrimination—what role for entrepreneurship?

Outside the strictures of perfectly competitive markets, all three forms of discrimination identified by Becker may exist at any point in time. Unlike perfectly competitive markets, actual markets are characterized by imperfect competition, imperfect information, and uncertainty. As such, inefficiencies will not only exist at a point in time, but may persist over time (Leeson et al. 2006). Stated differently, there is no reason to assume that there is an automatic movement toward the equilibrium dictated by the perfectly competitive model. Given this, the central issue becomes the mechanism through which existing inefficiencies are best recognized and corrected. The entrepreneur is the central means through which economic adjustments emerge.

To date, the connection between entrepreneurship and discrimination has been neglected by economists. This is mainly due to the fact that the model of perfect competition has no room for the entrepreneur and the associated discovery process. As such, models of discrimination based on perfect competition overlook the important role of the entrepreneur. Neglecting the importance of the entrepreneurial process limits our ability to understand why discrimination exists and the process through which the associated errors may be eliminated.

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[3]Becker is careful to show that the erosion of discrimination depends not only on the taste for discrimination but also on firms production functions (1957: 43–45). There is also a literature exploring the existence and persistence of discrimination under various industry structures. See for instance Doeringer and Piore (1971) and Black (1995).

Entrepreneurs can be broadly understood as the catalysts of economic change and evolution. Economists have emphasized different aspects of entrepreneurial activity. For example, Kirzner (1973) emphasizes that entrepreneurship entails a fundamental alertness to profit opportunities that have yet to be exploited. Schumpeter (1934) emphasizes the entrepreneur as an innovator. Specifically, he defines entrepreneurship as the "carrying out of new combinations" as applied to five specific situations: (1) Introducing a new good or a new quality of an existing good, (2) Introducing a new production method, (3) Opening a new market, (4) Obtaining a new source of raw materials, and (5) Establishing a new organization of an industry (1934: 66). Schumpeter (1942) later coined the now famous term "creative destruction" to describe the broader process of entrepreneurial innovation.

Entrepreneurship entails alertness to profit opportunities that others have yet to exploit. These profit opportunities can result from reallocating existing resources (i.e., arbitrage) or through innovation or "carrying out new combinations" of inputs. Entrepreneurship entails betting on a conjecture of what is expected to happen in the future. Entrepreneurial bets that are successful result in a profit, while those that are based on inaccurate expectations result in a loss. As this process unfolds inefficiencies are corrected and new, previously unknown or unavailable, information is revealed. This is not to say that entrepreneurs are always correct in their ex ante assessments of profit opportunities. Like all economic action, entrepreneurial action is often based on inaccurate predictions of future conditions resulting in error.

It is within this context that we explore the connection between entrepreneurship and discrimination. The existence of discrimination can be seen as an error and unexploited profit opportunity. Entrepreneurial alertness to existing profit opportunities through arbitrage or innovation drives the process of competing away inefficiencies associated with discrimination. For example, once entrepreneurs become aware of the inefficiencies associated with employer and coworker discrimination, they will act to profit from those opportunities. These inefficiencies represent profit opportunities due to the potential for increased productivity and the associated profits. The process of market segmentation between discriminating and non-discriminating firms is not instantaneous, but rather occurs over time as entrepreneurs become alert to opportunities for profit. Further, given imperfect information and uncertainty, the adjustment process is not instantaneous and never reaches a point where all inefficiencies are eradicated. For example, the speed of market segmentation will depend on numerous factors including the size and technological nature of the industry in question as well as the relative sizes of the majority and minority groups (Holzer and Ihlanfeldt 1998: 836–837).

The case of consumer discrimination provides a unique challenge because, given the assumptions of perfect competition, there is reason to believe that it may not be competed away. Within Becker's model, consumer discrimination exists when consumer utility is reduced due to interactions with members of a certain group. The result is that the marginal value product of members of the group being discriminated against is reduced because of the consumer's

preference not to interact with them. When this occurs, there is no clear way for consumers to arbitrage the prejudices of other consumers. In such a situation, consumers pay higher prices and the wages of the members of the group being discriminated against are forced downward because of their lower marginal value product. This downward pressure on wages occurs despite the fact that these individuals are just as productive as the members of other groups.

In contrast to the standard assumption that consumer discrimination cannot be self-correcting, moving outside the confines of perfect competition and considering the entrepreneurial process provides a different perspective. If we assume that preferences are stable (Stigler and Becker 1977), the demand for consumer discrimination is driven by income and relative prices. It is our contention that entrepreneurs can influence the demand for consumer discrimination by influencing the associated costs and benefits. More specifically, if entrepreneurs can convince consumers of the benefits of interacting with members of a previously discriminated against group, the demand for consumer discrimination against that group will fall. To state this same point in a slightly different manner, if entrepreneurs can raise the price of consumer discrimination then consumers will demand less of it.

A variety of factors can influence the ability of entrepreneurs to overcome consumer discrimination. For example, the percentage of the discriminated group in the local population, the religious affiliation of the population and income distribution, among other factors, may all play a role in influencing the alertness of entrepreneurs. However, in general overcoming consumer discrimination requires that entrepreneurs effectively shift the costs and benefits of consumers discriminating against a certain group.[4]

The benefit to entrepreneurs of attempting to influence the relative costs and benefits associated with consumer discrimination is that they profit directly by employing members of the discriminated group. Because members of the group being discriminated are being paid less, relative to their productive capabilities, entrepreneurs who can change the price of engaging in consumer discrimination will reap a profit. In other words, they will be able to take advantage of the differential between the wage being paid to members of the discriminated group and their true productivity. Over time, this differential will be competed away, but entrepreneurs who are first movers will earn a profit.

Unlike situations where entrepreneurs erode employer discrimination, in the case of consumer discrimination the entrepreneur bears all of the risk. If he attempts to change consumer preferences, he has to believe that the quality of the product matters, and is measurable by, consumers.[5] Under this assumption, the entrepreneur has to be confident that by employing members of the discriminated group, he can raise the observable quality of the good relative to

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[4]We would like to thank an anonymous referee for suggesting this addition.

[5]We use 'quality' as a general term to define any non-price variable that may appear in a consumer's utility function.

the current quality offered in the market. In the absence of observable changes in quality, relative to other products being produced, consumers would only observe the unpopular input and not the associated benefits of employing that input. This is because the technical production process does not change, only the person (i.e., the input) used in the production of the good changes. As such, changes in quality must be readily observable by consumers.

To illustrate this point, assume the entrepreneur faces a consumer who buys units of a good in order to maximize the following indirect utility function:

$$U = \theta q - P \qquad (1)$$

Where $q$ indicates the quality of the product and $P$ is the market price at which the variety is supplied. The parameter, $\theta$, represents the consumer's marginal willingness to pay for quality and is uniformly distributed in the interval [a,b], with a = b − 1 and b > 1.[6] In the case of consumer discrimination, any increase in quality that results from the unpopular input raises the relative price by $P_d$, where $d$ is the taste for discrimination.

Given this, the entrepreneur faces a choice between offering a "higher" quality good ($q_H$) produced by an "unpopular" input (i.e., the input being discriminated against), or producing the current, "lower" quality good ($q_L$) produced by the "popular" input. Assuming that the entrepreneur cannot price discriminate between consumer groups, then $\theta_i = P_d/(q_H - q_L)$, and represents the index of consumers that are indifferent between high quality and low quality goods. The resulting market demand for high quality goods is $c_H = b - \theta_i$ and the demand for the status quo is $c_L = \theta_i - a$.[7] Under this scenario, the market is split between consumers who discriminate and those that do not. As $\theta_i$ gets smaller, the demand for the high quality good is greater, despite the higher perceived price. This change in $\theta_i$ can occur if entrepreneurs can change the quality in such a substantial and observable way that it overcomes the higher price.

The problem for the entrepreneur is that there is no guarantee, ex ante, that using the "unpopular" input will increase relative quality enough to overcome the higher price. However, if we modify $\theta_i$ slightly so that the denominator is $(q_H - q_0)$, where $q_0$ is the range of all qualities of product offered by competitors, then the entrepreneur need only have some idea where in the range of $q_0$ his product falls to know whether to change inputs. In other words, if a firm's current quality approximates the "low" quality end of the distribution, then a change in quality will not move them outside of the status quo range of quality.

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[6]See Srinagesh and Bradburd (1989) who demonstrate the appropriate reference for the location of quality difference depends on the consumer groups. See also Mussa and Rosen (1978) and Ecchia and Lambertini (1997) for the role of utility theory and quality differences among products.
[7]Such a result may help to explain why cities with multiple baseball teams only had one team integrate during the early years. Under a duopoly scenario, such an outcome ensures full market coverage (Mussa and Rosen 1978; Ecchia and Lambertini 1997), and a slower integration process.

Further, if we assume that the new input would yield the same marginal for all entrepreneurs then the current quality for any given owner has to be close enough to the "high" quality end that the change in inputs will yield a quality outside of the status quo range. This is different than the standard arguments for product innovation that suggest that either the best will offer a new product first in order to foreclose the market, or the worst will offer a new product first as a last effort at survival (Goff et al. 2002; Tremblay and Tremblay 1996). Given this, we would expect to see those owners who produce close to the highest quality product, but not the highest quality product, to incorporate the "unpopular" inputs into the production process. This is because these owners can potentially compete with the highest quality producers by incorporating the new input.

Entrepreneurial activity as it applies to consumer discrimination entails both alertness and innovation. It entails alertness to the existence of consumer discrimination but also innovation in the form of convincing consumers of the benefits of interacting with group members who were previously discriminated against. As Schumpeter (1934: 66) noted, this innovation can take place through changes in the design, quality or characteristics of existing products. The integration of black players in MLB illustrates the dynamics of this process and provides insight into how entrepreneurs can exploit inefficiencies associated with consumer discrimination.

## 3 Baseball segregation as a case of consumer discrimination

Our central postulate is that the ability of the entrepreneur to overcome consumer discrimination requires specific inputs (costs) and measurable quality (benefits). MLB provides us with the perfect laboratory for investigating our hypothesis. Unlike standard models of quality differentiation based on absolute differences where consumers purchase fixed units at specific times, baseball allows for market information on relative quality to be easily measured over time. Further, professional baseball requires very specific inputs, gives each firm a geographic monopoly—or at worst a part of a geographic duopoly—production is homogeneous, and the league was segregated until 1947. Thus, analyzing the integration of black players into MLB is a straightforward means of understanding how entrepreneurs can correct inefficiencies associated with consumer discrimination. As Bradbury (2007: 129) notes, integration is a classic example of innovation and entrepreneurship because it "took advantage of an untapped talent pool that was ignored out of racial prejudice."

The struggle to achieve racial integration has a long history and integration in MLB was only one small aspect of that larger process. The well-known civil rights laws and court cases which occurred during the 1950s–1970s are typically the main focus of studies of racial integration. However as Goff et al. (2002: 16) point out, "other changes in…custom also motivated the process of racial integration across time and place." We contribute to our understanding

of these "other changes" in customs by focusing on the process through which integration actually occurred in the context of MLB. It is our contention that some MLB entrepreneurs had superior foresight regarding the trends and customs associated with racial integration. These first movers profited from exploiting the previously untapped pool of players.

Branch Rickey is one well-known entrepreneur who serves to illuminate the superior insight regarding the benefits of racial integration. Prior to integration, Rickey was known for having made numerous other innovations throughout his career. For example, Rickey was the first general manager to buy minor league teams to create a "farm system" that would keep young talent in his organization. He was also the first general manager to train batters with a pitching machine, and the first to build a complex in Florida where all members of the organization could train.[8] The farm system afforded Rickey the opportunity to initially sign Jackie Robinson from the Negro League to a minor league contract in 1945. Less than 2 years later, Rickey purchased Robinson's minor league contract and signed him to play for the Brooklyn Dodgers as the first black player in MLB. What differentiated Rickey from other general managers was his willingness to continually innovate, his desire to sign and develop talent over the course of several years, and his familiarity with alternative talent pools such as the Negro League. In general, owners and general managers must win games with constrained resources—financial, player talent, facilities, etc. In order to do this they must find ways to innovate. The central input into winning is player talent so an owner or general manager that can continually find innovative ways to sign and develop talent will tend to be more successful. The many innovations of Branch Rickey serve to illustrate this logic.

In order to test for the existence of entrepreneurial innovation in overcoming consumer discrimination in baseball, we begin by analyzing the entrepreneur's objective to maximize revenues through an increase in attendance and gate receipts. Following our theory in Section 2, attendance should be based on the two components of the consumer's utility—quality and a taste for discrimination. As such, we define the entrepreneur's objective function:

$$A_{i,t} = \alpha_0 + \alpha_1 CP_{i,t} + \alpha_2 BLACK_{i,t} + \varepsilon_\alpha \qquad (2)$$

where $A_{i,t}$ is total attendance for the regular season, $CP_{i,t}$, our relative quality measure, measures the number of games back at the end of the season takes on a value of 1 if a team were ten games or fewer behind the pennant winner and 0 if a team were more than ten games back from the pennant winner—i.e., whether the team was contending for the pennant. Since we assume consumers were not simply concerned with increases in absolute wins, but rather in relative competitiveness, we would expect this variable to be positive. In order to measure consumers' taste for discrimination, $BLACK_{i,t}$ is a count variable

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[8]Olson and Schwab (2002) analyze the impact of the farm team system on the performance of its early adopters.

measuring the number of black players on a team's roster.[9] Consumers with a taste for discrimination will choose not to attend if the good (i.e., baseball game) is being produced by black players. Therefore, we would expect this variable to be negative.[10]

As mentioned previously, the entrepreneur bears all of the risk from changing inputs, and therefore there were a number of hurdles that may have prevented owners from integrating. The process of integration relies on an entrepreneurial owner recognizing the opportunity for profit by increasing the team's chances of winning the pennant, and hence attendance, by hiring a black player. The risk for the owner is that he alienates consumers who have a preference against employing black players.

For example, Scully (1974) calculates that 2,000 fewer people attended a game where a black pitcher was announced as the starter prior to the game. Fort and Maxcy (2001) evaluate this underlying tension in consumer preferences by considering attendance figures from 1946 to 1948. Consistent with Hanssen (1998), they find that integration had a mixed effect on attendance. The Indians, the first AL team to integrate, experienced an increase in attendance of 1.1 million during 1948 when they won the World Series. The total AL attendance for 1948 was 1.7 million greater than that in 1947. The Dodgers experienced attendance increases in 1947 upon hiring Jackie Robinson and going to the World Series, but saw a decrease in attendance in 1948 when they did not win the pennant. Thus, an owner who chooses to integrate must believe that the expected benefit (chance of competing for the World Series) exceeds the expected cost (dissatisfied consumers).

Goff et al. (2002) address the issue of innovation in racial integration, arguing that there were profit opportunities offered by integration. Using a panel data framework, they show that the number of black players employed by a team is negatively affected by games back in the previous year. They assert that this empirical result is consistent with the best teams integrating first. Amending the Goff et al. hypothesis, our argument is that the teams that integrate first will not be the best, and certainly not the worst, but rather the second-best who are searching for a way to beat the best. Therefore, a team that is in contention the previous season, but does not win the pennant, has a greater incentive to incur the expected cost of integrating by attempting to become relatively more competitive. Similarly, a team that has very little chance of improving to the point of pennant contention has little incentive to incur the expected cost of integrating.

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[9]Unlike our theoretical model where, discrimination was seen as a continuous interval between a and b, empirically we recognize that a team either integrates or it does not integrate, hence we use a non-continuous measure following Besanko et al. (1990).

[10]We have not included price in Eq. 2 since average ticket prices were stable over the period of integration. See www.rodneyfort.com for details. Further, ticket prices were set for any given year so that prices could not be changed during the season to reflect changes in relative quality as it was revealed.

In light of this, we hypothesize that owners who were in contention, but did not win the pennant, in the previous year are more likely to integrate as compared to teams that were first and worst in the previous year. Given this logic, we specify the following equation:

$$\text{BLACK}_{i,t} = g\left(\text{CP}_{i,t-1}, \text{MOV}_{i,t}, \text{AL}_{i,t}\right) \tag{3}$$

where BLACK is the number of black players employed by team i in year t. Equation 3 includes two control variables. The first, MOV measures whether or not a team moved cities during the sample period. This controls for changes in ownership and geographic market—where consumer discrimination could be different. Following Coyne et al. (2007), who contend that integration occurred more rapidly in the NL because the variation in performance was greater than that in the AL, the AL dummy variable controls for the difference in competitiveness over the sample period. Since the expected benefit from integrating was perceived to be greater in the NL, teams who were more likely to compete for the league pennant would be willing to integrate, ceteris paribus.

Offsetting this cost to integration was the potential that the addition of black players would contribute to additional wins. Along these lines, Gwartney and Haworth (1974), focus on the productive implications of hiring a black baseball player. Using a measure for cumulative black player years to capture the impact of either employing larger number of black players or adopting integration earlier, they show that each additional black player year added 3.75 wins per year for 1950 to 1955. Hanssen (1998) studies the impact of black players in MLB with a sample from 1950 to 1984, generally confirming the findings of both Scully (1974) and Gwartney and Haworth (1974). Specifically, Hanssen (1998) argues that for every black player on a team, annual attendance fell by approximately 9,900 fans; however, he also finds that for every game back a team loses 8,900 fans.

Thus, consumers appear to have been conflicted in the following sense: they had a taste for discrimination against black players, but they also had a taste for being competitive and winning. In other words, entrepreneurs should have integrated when the additional wins brought about through hiring a black player noticeably increased the team's competitiveness relative to other teams. It is not wins specifically that mattered to consumers, rather it was the ability to be competitive, something easily observed by fans. If the entrepreneurial owner believed that the addition of a black player could increase the likelihood of moving into pennant contention, then we would expect him to do so.

Following Gwartney and Haworth (1974) and Hanssen (1998), we estimate the relative quality improvement from integration. Unlike models that show that black players were responsible for additional wins in the early years of integration, or reduced games back, we demonstrate that it was their effect on competitiveness that was instrumental in an entrepreneur's decision to innovate through integration. To do so, we specify the following equation:

$$\text{CP}_{i,t} = h\left(\text{BLACK}_{i,t}\right) \tag{4}$$

Notice that in the context of our model, Eq. 4 is purely instrumental for the entrepreneur's assessment of consumers' taste for winning.[11] Entrepreneurs had to weigh the expected loss in attendance from employing black players versus the increase in attendance associated with additional wins from employing those same players. In other words, entrepreneurs assessed whether the additional wins would enhance the team's relative performance and attract fans.

In sum, the literature on MLB integration tends to treat consumers' taste for discrimination and the increased productivity of integration as mutually exclusive. However, this was not the case. Specifically, while most of the existing research recognizes that there were costs and benefits to integration, past empirical treatments have taken integration as given. In contrast, we explore and demonstrate the interrelation between consumer discrimination and increased productivity as well as the trade-off facing entrepreneurs in this regard.

## 4 Data, estimation, and results

### 4.1 Data

We gathered data from three different sources: Bardolph (1959), Reichler (1974), and Rodney Fort's website (http://www.rodneyfort.com). Bardolph (1959) provides a listing of black players in MLB as of the 1959 season; however, we constrained the data to the period from 1947 to 1956, the first full decade of integration, to control for the diminishing marginal return on additional black players resulting from the homogenization of black players through the farm system. Prior to the demise of the Negro Leagues in 1947, black and white players developed in different styles of play and therefore could be considered different inputs (regardless of the difference in color). After the Negro League folded, black players were trained in the same farm system as the white players (Fort and Maxcy 2001). Next, we located each of these players in Reichler (1974) and recorded their team each year. We also used this resource to gather additional team information to include in our empirical model. Finally, we collected attendance information from the spreadsheets available on Rodney Fort's website.

The resulting data contained a balanced panel consisting of 16 cross-sectional observations over a 10-year period. Given the nature of Major League baseball during this period—the 16 teams were broken into two

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[11]Productivity variables such as slugging average and earned run average may also help to predict whether a team is in pennant contention. Similar to Goff et al. (2002), we find that the number of black players positively affects slugging average; we further find that adding black players improves (lowers) earned run average even when only non-pitchers are added. Thus, since such productivity measures appear to be captured in the black variable, we have not included them here so as to avoid multicollinearity.

eight-team leagues, in which teams from the same league played each other during the regular season, but never played teams from the other league—our data contains the entire population of the cross-sectional observations for this time period. Finally, three of the teams in our data moved cities during the time period. We account for this change through the use of a structural dummy variable.

## 4.2 Estimation

The unique circumstances of our empirical model require further explanation. The interrelation of the statistical variables in the entrepreneur's decision process suggests the need for an instrumental variables estimation process. The entrepreneur who wishes to maximize attendance must balance pennant contention (desired by consumers) with the integration of black players (initially not desired by consumers). Since this is an ongoing process, attendance during a season depends on whether the team is performing relatively well, as measured by CP, and with the number of black players, BLACK. Note, however, that the entrepreneur may add a black player, or additional black players, at any time during the season, much like current-day MLB teams attempt to improve their pennant chances at the trading deadline. Note further that CP in Eq. 4 is predicted by the number of black players. We employ a two-step approach that attempts to capture this interrelation and to minimize the econometric issues arising from related independent variables. Specifically, we run the appropriate regression models for Eqs. 3 and 4 and use the corresponding predicted values as instruments for the attendance Eq. 2.

Since BLACK is a count variable, the linear regression model may not yield consistent estimates.[12] The case of integration in MLB from 1947 to 1956 presents a further challenge since three of the 16 teams did not integrate altogether while very few teams integrated in 1947–1949. Since all teams had counts of zero in 1946 and this persisted for the most part in the early years of integration, we have a data set with 101 out of 160 observations with a count of zero. Thus, the existence of so many zeroes represents a different count process than the standard model of positive counts. The standard negative binomial regression model does not satisfactorily address cases where the dependent variable takes the value of zero in so many instances. To accommodate our

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[12]There are a few candidates for regression type for Eq. 3, including the Poisson and the negative binomial. While the Poisson regression is commonly-used, it has the limiting restriction of the expected value of the mean equaling that of the variance. Cameron and Trivedi (1986) argue that the Poisson regression model may yield results that overestimate statistical significance when data are overdispersed and this limiting assumption does not hold. In cases where this limiting restriction is too limiting, the negative binomial regression model relaxes this restriction. Moreover, as Long (1996) points out, the negative binomial regression model addresses the issue of underprediction of zeros in the Poisson regression model.

**Table 1** Estimation of Eq. 3—number of black players employed zero-inflated negative binomial regression dependent variable: BLACK

| Independent variable | Coefficient ($z$-stat) |
|---|---|
| $CP_{i,t-1}$ | 0.3999 (1.77) |
| $MOV_{i,t}$ | 0.4568 (2.06) |
| $AL_{i,t}$ | −0.7690(−3.97) |
| C | 0.9337 (6.85) |

Log likelihood $= -176.412$

empirical model and these data, we employ a zero-inflated negative binomial regression (see Long 1996).

Equation 4 predicts current pennant contention, CP, a dummy variable, based on the number of black players hired. The linear regression model is again inappropriate here, so we use a fixed effects logistic regression model. The fixed effects model is more appropriate, theoretically, since we are dealing with the population (not a sample) and individual teams have stable but very different player budgets based in large part on market size (Halcoussis 2005). Once we perform the zero-inflated negative binomial regression for Eq. 3 and the logistic regression for Eq. 4, we can develop predicted values for BLACK and CP to use in our estimation of ATTEND in Eq. 2.

## 5 Results

Table 1 presents the results for Eq. 3.

Note that all independent variable are significant with the expected sign. The interpretation for the regression coefficients are as follows. Being a team in contention in the previous year increases the expected number of black players by 49% $[=100 \times (e^{0.3999} - 1)]$, ceteris paribus. Being a team that moved in the sample period increases the expected number of black players by 57%, ceteris paribus. Being a team in the AL decreases the expected number of black players by 54%, ceteris paribus.

Does integration make a team more competitive? To answer this, we employ a logistic model with CP as the dependent variable and BLACK as the independent variable. The results are provided in Table 2.

**Table 2** Estimation of Eq. 4—estimate of the relative quality improvement from integration logit regression dependent variable: CP

| Independent variable | Fixed-effects coefficient ($z$-stat) |
|---|---|
| $BLACK_{i,t}$ | 0.3346 (1.68) |

Fixed-effects log likelihood $= -34.873$

**Table 3** IV estimation of Eq. 2—total attendance for the regular season Instrumental variables linear regression dependent variable: $A_{i,t}$

| Independent variable | Fixed-effects coefficient ($z$-stat) |
| --- | --- |
| $CP_{i,t}$ | 2,297,904 (3.28) |
| $BLACK_{i,t}$ | −169,279 (−3.10) |
| C | 1,008,257 (16.69) |

The instrumented variables are in italics. $F$-stat = 6.25

Based on these results, black players appear to increase the probability that a team is in contention during the current season. Specifically, with the addition of each black player, the odds of being in contention increase by 40%.[13]

Finally, we have argued that owners may have been reluctant to integrate due to a taste for discrimination and that such a taste would be revealed in the attendance numbers. We use the predicted values from the regressions for Eqs. 3 and 4 as the independent variables in the estimation of Eq. 2. Table 3 shows the results of the instrumental variables linear regression model.

We see that black players have a negative and significant effect on a team's attendance, but that this effect is more than offset by the positive and significant result of a team's being in contention. Specifically, the addition of each black player is predicted to reduce attendance by 169,279, ceteris paribus. However, a team's being in contention increase attendance by 2,297,904, ceteris paribus.

This panel reveals the delicate balance that an owner faced when attempting to integrate. If the team was not in contention for the pennant, attendance fell and the owner earned a lower return. Returning to the case of the Cleveland Indians discussed in Section 3, this finding provides further justification as to why that franchise was the primary integrator in the AL. Other AL owners realized that integration would not be enough to help them compete with the New York Yankees, and hence refrained from employing black players.

## 6 Conclusion

Our analysis has three main implications. First, we have provided insight into the process through which errors associated with discrimination in general are corrected. The standard assumption of perfect competition fails to provide insight into the process through which the inefficiencies related to discrimination

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[13]Since we model CP solely as a function of BLACK—and the coefficient is marginally significant—we also estimated Eq. 4 with a random effects specification as a robustness check. The random effects coefficient is 0.3643, with a z-statistic of 2.07. Further, we ran a Hausman (1978) test ($\chi^2 = 0.10$ with 1 degree of freedom) that provides evidence that the random effects are consistent. Nevertheless, while the random effects provides statistical robustness, since we use the entire population, and Eq. 4 is purely instrumental, we have chosen to use the fixed effects results in our estimation of Eq. 2 (Greene 1997). We would like to thank an anonymous referee for making this suggestion.

are eliminated. In order to truly understand the economics of discrimination, one must understand how the associated inefficiencies are overcome. An understanding of entrepreneurship fills this existing gap. Real-world markets are characterized by imperfect information, imperfect competition and imperfect actors. The result is the constant presence, and often persistence, of errors. The entrepreneurial process *tends* to correct for these errors over time as alert actors recognize existing errors and reallocate resources.

The second implication of our analysis is that it is possible for real-world markets, under certain conditions, to overcome the inefficiencies associated with consumer discrimination. Standard studies of discrimination, grounded in the model of perfect competition, typically conclude that markets will not correct for consumer discrimination. By shifting focus from the perfectly competitive model to the entrepreneurial process, we have illuminated how the entrepreneur may correct for consumer discrimination. In real-world markets, consumer discrimination will tend to be competed away when the quality of the good or service in question is readily measurable by consumers. If the entrepreneur can increase the relative quality of the good or service by employing the "unpopular" (i.e., discriminated against) input, and this increase is apparent to consumers, they will increase the cost of consumer discrimination and the demand for such behavior will fall. In the absence of clear and measurable changes in quality, consumers would only observe the unpopular input and not the associated benefits of employing that input.

A third implication of our analysis is the importance of the symbolic element of production. In many cases consumers value the symbolic aspects of production—location, methods of production and the nature of inputs. Consumers often have preferences regarding these symbolic aspects, but entrepreneurs can also influence the costs and benefits associated with the values that consumers place on the various aspects of production. As our analysis of MLB illustrates, owners were able to increase their relative contention by illustrating to consumers the benefits of accepting black players as inputs in the production of a winning team.

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