Guardiola, Klopp or Mourinho? Evidence on the Value of Managerial Abilities for Brand Performance from the English Premier League Using an Extended Two-Sided Matching Model of the Market for Talent

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Abstract

We study the market for talent, focusing on the role of managerial abilities and their alignment with organizational capabilities in determining success with data from the English Premier League on manager-club matches. Employing a revealed preference semi-parametric two-sided matching maximum score estimator framework (MMSE), we address econometric challenges related to self-selection endogeneity and competitive equilibrium in talent markets. We further extend the framework to allow the estimation of manager-specific attributes, providing richer interpretations and directly linking match value to brand performance that conventional MMSE cannot. We leverage a Large Language Model to quantify managerial abilities using extensive publicly available textual data, avoiding limitations of proxies or subjective measures. Results reveal that interpersonal skills yield diminishing returns with squad size, while tactical skills yield increasing marginal returns with player quality. Surprisingly, managerial misconduct impacts lower-tier clubs more severely than higher-prestige clubs. This framework offers broad applicability to marketing research on matching markets.

Keywords: *Two-sided Matching Models, Maximum Score Estimator, Market for Talent.*
Track: *Methods, Modelling & Marketing Analytics*

1 Introduction

Managerial abilities are critical to brand performance and organizational outcomes (Goldfarb and Yang, 2009; Kaplan et al., 2012). Aligning managerial abilities with organizational capabilities is especially vital in competitive environments (Terviö, 2008; Pan, 2017). To advance understanding in this area, this study seeks to address two key research questions: (1) What is the value of managerial abilities in driving brand performance? (2) How does the alignment between managerial abilities and organizational characteristics influence performance?

However, research in matching managerial abilities with organizational needs faces a complex challenge with two critical econometric challenges persist. First, there may be endogeneity due to self-selection. Second, an organization's selection results from an equilibrium process within the competitive market for talents, where firms and managers mutually select one another based on preferences and availability. The nature of the talent market implies that the likelihood of a manager and a club forming a pair depends on who chooses whom within the rest of the market. This creates complex interdependencies (Fox, 2018). To the best of our knowledge, the econometric implications of these complexities have not been adequately addressed in the existing literature.

This study addresses these challenges using the Matching Maximum Score Estimator (MMSE) framework (Fox, 2010, 2018), which accounts for mutual preferences, competition, and limited availability of desired managers. The conventional MMSE models assume equilibrium, where matches satisfy a pairwise stable condition: no participant benefits from switching to an alternative match. Inequalities are constructed to compare observed matches with counterfactual scenarios. The objective function, therefore, seeks to maximize the number of correctly predicted inequalities.

While conventional MMSE models effectively analyze dyadic interactions, they do not estimate agent-specific characteristics, as such terms are canceled out under the pairwise stable condition (detailed in Section (3)). This limitation may lead to incomplete value functions and potentially misleading managerial implications, especially when coefficients on agent-specific characteristics and interactions have opposite signs (Akkus et al., 2016; Khwaja et al., 2024). Furthermore, the conventional MMSE's match value does not connect to outcomes, despite their importance to shareholders. Missing this link reduces the practical value of managerial insights.

Methodologically, we further develop the MMSE framework to estimate agent-specific effects and provide clear interpretations of the value function (Khwaja et al., 2024). This involves constructing new inequalities using data on dismissals and brand performance, integrating these within the MMSE framework (Petrin, 2002). The revised model delivers richer insights, including diminishing marginal returns, rather than uniform recommendations from conventional MMSE models.

Studies often rely on proxies to measure managerial abilities, conflating managers' skills with firms' resources (Demerjian et al., 2012; Sunder et al., 2017). Moreover, proxies may lack uni-

versal applicability, necessitating more direct measures (Yadav et al., 2007). To overcome this, we use a Large Language Model (LLM) to quantify managerial abilities with publicly available data, including news articles, interviews, and biographies. This approach provides consistent, direct assessments of abstract traits. Cross-validation ensures robust findings, offering a reliable alternative to traditional methods.

The context for our study is the English Premier League (EPL), one of the most competitive and lucrative football leagues worldwide. It has cumulative data from multiple decades, a clear manager-per-club structure, and well-recognized performance metrics. Our results show that managerial abilities and manager-club fit significantly influence success. Interpersonal skills exhibit diminishing returns with larger squads, while tactical skills deliver increasing returns with higher-quality players. Low-tier clubs are more vulnerable to managerial misconduct than elite clubs.

This research contributes to marketing by tackling econometric challenges and offering practical insights into the talent market. It lays a foundation for future marketing research in areas such as co-branding, celebrity endorsements, and movie casting, where aligning organizational capabilities with talent attributes is essential.

2 Data

Our analysis covers the 2004/05 to 2022/23 seasons, combining data from sources such as *Transfermarkt*, *Statbunker*, and the *Premier League official website*. Summary statistics are presented in Table 1.

Table 1: Summary Statistics of Main Variables

Variable	Mean	SD	Min	Max	Observation
Club Variables					
Total Player Market Value (£100M)	335.86	266.18	52.38	1471.32	515
Transfer Support (£100M)	41.93	68.02	-143.55	562.39	515
Squad (Normalized)	0.42	0.16	0	1	515
Top 6 Placements	5.09	7.21	0	29	515
Relegation/Non-EPL History	9.21	8.45	0	29	515
Average points at EPL	50.26	14.57	0	83.43	515
Manager Variables					
Morale Management	7.79	0.89	4	10	515
Misconduct	4.13	1.90	2	8	515
Tactical Acumen	7.50	1.30	4	10	515
Points per Match in Top League (PPM)	1.21	0.64	0	2.55	515
Experience	10.38	6.68	0	30	515
Interaction Terms					
PPM x Average points at EPL	65.39	43.63	0	177.30	515
Experience x Transfer Support	454.19	816.24	-2624.03	6748.68	515
Morale Management x Squad	3.26	1.33	0	10	515
Tactical Acumen x Total Player Market Value	2706.83	2526.11	284.05	14713.20	515
Misconduct x NTop 6 Placements	21.21	33.06	0	200	515
Misconduct x Relegation/Non-EPL History	35.08	37.17	0	182	515

The club variables include *Transfer Support*, measured as net transfer spending. *Squad* represents the normalized team size (ranging from 0 to 1). *Total Player Market Value* indicates the aggregate market value of players, serving as a proxy for squad quality. *Top 6 Placements* counts the number of seasons a club has ranked in the top six positions. *Relegation/Non-EPL History* records the frequency of a club's relegation or participation in lower leagues. Finally, *Average Points at EPL* measures the average points per season accumulated by the club, indicating long-term capability and consistent performance.

We use the LLM to quantify EPL managers' *Morale Management*, *Tactical Acumen*, and *Misconduct*. *Tactical Acumen* reflects a manager's depth of strategic understanding and adaptability. *Morale Management* measures the ability to foster a positive and cohesive team environment. *Misconduct* quantifies a manager's tendency toward controversies or ethical lapses. Using unstructured textual data, the LLM is trained to rate managers on a 0-to-10 scale, providing transparent explanations supported by evidence. Cross-validation with different LLMs and human evaluation confirms robustness with high correlation coefficients. Other variables include *Experience*, representing the total years a manager has served as head coach. Finally, *Points per Match in Top League* (PPM) captures the historical average points per match the manager achieves in top-tier leagues.

3 Model

We adopt the two-sided MMSE framework pioneered by Fox (2010, 2018), who established the identification and consistency of the maximum score estimator (Manski, 1975, 1985) for feasibly estimating two-sided matching models without requiring computationally prohibitive integrals.

For any manager-club matching in a two-sided market (season) $s = 1, \ldots, S$, there are clubs ($c = 1, \ldots, N_c$) and managers ($m = 1, \ldots, N_m$) who strategically choose to match to maximize their payoffs. In this process, both parties account for competition for, and limited availability of, desirable counterparts (Amaldoss and Rapoport, 2005). The value of a manager-club match is given by $V_s(c,m)$, with c's payoff being $V_s(c,m) - u_{s,cm}$ and m's payoff $u_{s,cm}$. The term $u_{s,cm}$ represents the unobserved (to the researcher) transfer from c to m. Generally, we can regard the transfer as the *market price* of the manager. In this model, we allow clubs to offer a higher price to attract more desirable managers. For ease of exposition, we suppress subscript s henceforth.

3.1 Pairwise Stability Condition and Conventional MMSE

Equilibrium relies on the concept of pairwise stability, which suggests that participants in a stable alliance find that their combined profits, even after factoring in any transfer payments, exceed the profits they might earn with different partners (Roth and Sotomayor, 1992; Mindruta et al.,

2016). If this condition were not met, participants would have already switched to more profitable partnerships. Applying the revealed preference (RP) equilibrium concept in the EPL context, for any two observed matched pairs (c,m) and (c',m'), by individual rationality (IR) for club c:

$$V(c,m) - u_{cm} \geq V(c,m') - \tilde{u}_{cm'}, \tag{1}$$

where $\tilde{u}_{cm'}$ is the compensating transfer from firm c to m' when m' swaps from c' to c. Further, in equilibrium, $\tilde{u}_{cm'}$ should equal $u_{c'm'}$ to make the manager m' indifferent between the two matches. By symmetry, the same applies for c':

$$V(c',m') - u_{c'm'} \geq V(c',m) - \tilde{u}_{c'm} \tag{2}$$

Adding (1) and (2) gives the pairwise stability condition (PSC):

$$V(c,m) + V(c',m') \geq V(c,m') + V(c',m) \tag{3}$$

The value of observed matches is at least as much as that of hypothetical matches. The MMSE framework considers all potential manager-club partnerships and preferences, capturing competition for desirable partners and, therefore, addressing self-selection and market equilibrium.

For illustration purposes only, we assume the match value function is structured as follows, based on the characteristics of the club (X) and the manager (Z):

$$\begin{aligned} V(c,m;\beta) = \bar{V}(c,m;\beta) + \varepsilon_{cm} = \beta_1 X_{c,1} + \beta_2 Z_{m,1} + \beta_3 X_{c,1} Z_{m,1} \\ + \beta_4 X_{c,2} + \beta_5 Z_{m,2} + \beta_6 X_{c,2} Z_{m,2} + \varepsilon_{cm} \end{aligned} \tag{4}$$

In Equation (4), the match value function is specified as the sum of a deterministic component $\bar{V}(c,m;\beta)$ and a stochastic component ε_{cm}. The model does not make any parametric distribution assumption for ε_{cm}, making the analysis semi-parametric (Fox, 2018).

Substituting the parametric specification in Equation (4) into Inequality (3) gives:

$$\begin{aligned} &\beta_3(X_{c,1}Z_{m,1} + X_{c',1}Z_{m',1}) + \beta_6(X_{c,2}Z_{m,2} + X_{c',2}Z_{m',2}) + \varepsilon_{cm} + \varepsilon_{c'm'} \\ &\geq \beta_3(X_{c,1}Z_{m',1} + X_{c',1}Z_{m,1}) + \beta_6(X_{c,2}Z_{m',2} + X_{c',2}Z_{m',2}) + \varepsilon_{cm'} + \varepsilon_{c'm} \end{aligned} \tag{5}$$

The manager-specific terms (e.g., $Z_{m,1}$) are eliminated, and only interaction terms (e.g., $X_{c,1}Z_{m,1}$) are preserved. Therefore, the coefficients of the manager-specific characteristics (e.g., β_2) cannot typically be estimated in the conventional MMSE framework.

The conventional MMSE seeks to rationalize the observed matches by maximizing the following objective function with respect to β:

$$Q_1(\beta) = \sum_{S} \sum_{(c,m),(c',m')} 1\{\bar{V}(c,m) + \bar{V}(c',m') \geq \bar{V}(c,m') + \bar{V}(c',m)\} \tag{6}$$

Here, $1\{\cdot\}$ represents the indicator function, which equals one when the condition inside the bracket is satisfied and zero otherwise. The function $Q_1(\beta)$ checks how many inequalities are satisfied given particular β. The conventional MMSE framework only considers stable manager-club matches, but our context includes dismissals and brand performance. We extend the framework to address these factors and estimate agent-specific effects

3.2 Extension I: Option to Sack the Managers

Clubs can sack their managers when the benefits outweigh the drawbacks, while retaining managers reflects the opposite belief. For any matched pairs (c,m) where the manager is retained and (c',m') where m' is sacked and replaced with m'' as a successor, the following should hold:

$$V(c',m'') - u_{c'm'} - u_{c'm''} \geq V(c',m') - u_{c'm'} \tag{7}$$

Note that the severance payment should equal the manager's total gain (transfer) in the original match to make the manager *indifferent*. From (7) and $u_{c'm''} \geq 0$, we can derive the following extended pairwise stability condition (EPSC) for the case of managers being sacked:

$$V(c',m'') \geq V(c',m') \tag{8}$$

Intuitively, this means that when the club decides to sack the manager, the value of having the new manager m'' surpasses the value of the previous manager m'. Substituting (4) into EPSC (8) yields:

$$\begin{aligned} &\beta_2 Z_{m'',1} + \beta_3 X_{c',1} Z_{m'',1} + \beta_5 Z_{m'',2} + \beta_6 X_{c',2} Z_{m'',2} + \varepsilon_{c'm''} \\ &\geq \beta_2 Z_{m',1} + \beta_3 X_{c',1} Z_{m',1} + \beta_5 Z_{m',2} + \beta_6 X_{c',2} Z_{m',2} + \varepsilon_{c'm'} \end{aligned} \tag{9}$$

The inequality in (9) preserves the manager-specific characteristics (e.g., $Z_{m'',1}$). Therefore, the coefficients of the manager-specific characteristics (e.g., β_2) can be estimated in the extended MMSE framework.

For those (c,m) who do not sack the manager, we have the *reverse* condition:

$$V(c,m) - u_{cm} \geq V(c,m'') - u_{cm''} - u_{cm} \tag{10}$$

Since m'' is later recruited by club c' with a transfer $u_{c'm''}$. This market price sets an upper bound on how much transfer m'' could command. Thus, we have the following condition:

$$u_{c'm''} \geq u_{c^*m''} \tag{11}$$

where c^* represents any club in the market, including c. Combining (7), (10) and (11) gives the following the extended pairwise stability condition (EPSC) for the case of retention:

$$V(c,m) + V(c',m'') \geq V(c',m') + V(c,m'') \tag{12}$$

Intuitively, this condition implies that the value of the observed is higher than the counterfactual scenario where club c hires m'' while c' retains manager m'. Substituting (4) into EPSC (12) yields:

$$\begin{aligned} &\beta_2 Z_{m,1} + \beta_3 (X_{c,1} Z_{m,1} + X_{c',1} Z_{m'',1}) + \beta_5 Z_{m,2} + \beta_6 (X_{c,2} Z_{m,2} + X_{c',2} Z_{m'',2}) + \varepsilon_{cm} + \varepsilon_{c'm''} \\ &\geq \beta_2 Z_{m',1} + \beta_3 (X_{c',1} Z_{m',1} + X_{c,1} Z_{m'',1}) + \beta_5 Z_{m',2} + \beta_6 (X_{c',2} Z_{m',2} + X_{c,2} Z_{m'',2}) + \varepsilon_{c'm'} + \varepsilon_{cm''} \end{aligned} \tag{13}$$

The above inequality (13) also preserves the manager-specific characteristics (e.g., $Z_{m,1}$). MMSE rationalizes the observed decisions of sacking or retaining a manager by including $Q_2(\beta)$ as a supplement to the conventional inequalities $Q_1(\beta)$:

$$\begin{aligned} Q_2(\beta) = \sum_S \sum_{(c,m),(c',m'),m''} &1\{c' \text{ sacks } m'\} * 1\{\bar{V}(c',m'') \geq \bar{V}(c',m')\} \\ &+ 1\{c \text{ retains } m\} * 1\{\bar{V}(c,m) + \bar{V}(c',m'') \geq \bar{V}(c',m') + \bar{V}(c,m'')\} \end{aligned} \tag{14}$$

3.3 Extension II: Brand Performance

We further relate the value of matches to their brand performance (e.g., ranking in the EPL). The value of higher-ranked teams should be greater than that of lower-ranked ones. For every season, we exhaustively compare all randomly selected pairs based on their relative rankings. The MMSE rationalizes the observed brand performance by including $Q_3(\beta)$:

$$Q_3(\beta) = \sum_S \sum_{(c,m),(c',m')} 1\{(c,m) \text{ ranks higher than } (c',m')\} * 1\{\bar{V}(c,m) \geq \bar{V}(c',m')\} \tag{15}$$

The inequality in (15) retains the manager-specific characteristics and complements the other inequalities in the MMSE procedure, helping to rationalize the observed performance. In doing so, it provides a meaningful interpretation of the valuation function that much of the previous literature does not capture.

3.4 Estimation

Our estimation process follows Fox (2010), which established identification, and Fox (2018), which demonstrated consistency within the MMSE framework. We estimate the coefficients β using the MSE based on all inequalities represented by the functions $Q_1(\beta)$, $Q_2(\beta)$, and $Q_3(\beta)$. The extended MMSE maximizes the following combined objective function to estimate parameters that rationalize the data:

$$\max_{\beta} \frac{1}{N}(Q_1(\beta) + Q_2(\beta) + Q_3(\beta)) \tag{16}$$

where N represents the total number of inequalities (Fox and Santiago, 2014). We optimize this objective function using the differential evolution algorithm (Storn and Price, 1997). We construct 95% confidence intervals through a subsampling procedure following Akkus et al. (2016). This approach accounts for the known slow convergence rate of the MMSE, which converges at a rate of $\sqrt[3]{N}$ (Politis and Romano, 1994; Delgado et al., 2001).

3.5 Results

Using the variables described in Section 2, we now specify the parametric form of the match value (production) function to be estimated as:

$$\begin{aligned} V(c,m;\beta) = {} & \beta_1 \text{Points per Match in Top League} \times \text{Average Points at EPL} \\ & + \beta_2 \text{Morale Management} \times \text{Squad} + \beta_3 \text{Morale Management} \\ & + \beta_4 \text{Tactical Acumen} \times \text{Total Player Market Value} + \beta_5 \text{Tactical Acumen} \\ & + \beta_6 \text{Misconduct} \times \text{Top 6 Placements} \\ & + \beta_7 \text{Misconduct} \times \text{Relegation/Non-EPL History} \\ & + \beta_8 \text{Misconduct} \\ & + \beta_9 \text{Experience} \times \text{Transfer Support} + \beta_{10} \text{Experience} + \varepsilon_{cm} \end{aligned} \tag{17}$$

Here, we employ a production function framework, viewing manager involvement as the essential input in the manager-club match (Fox, 2010, 2018). The results are presented in Table (2). Column (1) displays the full extended model, column (2) reports the conventional MMSE model, and column (3) provides results from the ordered logit model, where the EPL ranking is regressed on the variables without addressing endogeneity concerns. The 95% confidence intervals are shown in square brackets below each coefficient.

Table 2: Result of Two-sided Matching Model

	(1) Extended MMSE	(2) Conventional MMSE	(3) Ordered Logit
PPM x Average Points at EPL	1.00 Superconsistent	1.00 Superconsistent	1.02** (0.325)
Morale Management x Squad	-85.95*** [-95.58, -30.44]	-2.81* [-31.22, 4.48]	-34.00*** (6.95)
Morale Management	88.40*** [20.96, 96.38]		83.17*** (12.75)
Tactical Acumen x Total Player Market Value	38.29*** [16.38, 56.08]	2.64*** [1.37, 27.90]	0.06*** (0.01)
Tactical Acumen	-47.69* [-81.20, 12.02]		9.08 (9.18)
Misconduct x Top 6 Placements	1.09 [-2.62, 3.16]	0.14 [-0.21, 1.53]	-0.58 (0.48)
Misconduct x Relegation/Non-EPL History	-1.22*** [-2.68, -0.19]	-0.05 [-0.79, 0.03]	-1.28*** (0.33)
Misconduct	8.58 [-18.87, 40.41]		31.31*** (6.27)
Experience x Transfer Support	-0.05 [-4.42, 6.05]	0.25 [-0.33, 4.44]	-0.05*** (0.01)
Experience	-5.26 [-14.02, 6.67]		-1.56 (1.60)
Total Inequalities	17,338	6,594	
Satisfied Inequalities	12,619	4,853	
Inequality Prediction Accuracy	72.78%	73.60%	
Prediction Accuracy	80.39%		79.09%

Note: 95% confidence intervals in square brackets for MMSE. Standard errors in parentheses for Ordered Logit. Values with *** represent significance at 1%, ** at 5%, * at 10%.

We normalize the coefficient of the interaction term *Points per Match in Top League (PPM)* $\times$ *Average Points at EPL* to +1. The coefficients of all other variables are interpreted with respect to the coefficient of *PPM* $\times$ *Average Points at EPL*.

The first-order derivative indicates that *Morale Management* has a stronger impact in smaller squads, where closer connections are easier to maintain, but its effectiveness diminishes in larger squads due to increased complexity and coordination challenges. Our finding aligns with broader

management literature, which highlights the reduced influence of interpersonal skills in larger organizations as complexity grows (Lawrence and Poliquin, 2023). Notably, the interaction term and the manager-specific term for *Morale Management* exhibit opposite signs. Relying solely on the conventional MMSE framework, which incorporates only interaction terms, could lead to the misleading implication that higher *Morale Management* reduces the match value. This highlights the importance of our extension incorporating manager-specific terms.

The marginal effect of *Tactical Acumen* becomes positive when *Total Player Market Value* exceeds £124 million, reflecting increasing marginal returns for tactical expertise in clubs with high-quality squads. This result supports the synergy between managerial talent and financial resources (Pan, 2017) and underscores the need to align managerial expertise with organizational capabilities for optimal outcomes (Wade et al., 2008).

While prior studies suggest larger organizations are more vulnerable to misconduct due to heightened media scrutiny and stakeholder expectations (Greve et al., 2010; Thanassoulis, 2023), our findings reveal a counterintuitive result: high-prestige EPL clubs are resilient to managerial misconduct. In contrast, smaller clubs with a history of relegation are significantly harmed, as misconduct undermines cohesion and discipline, highlighting their weaker organizational resilience.

Compared to the conventional MMSE model (Model (2)), our Extended MMSE model aligns with the interaction term signs but overcomes key limitations, such as the inability to estimate manager-specific attributes and capture diminishing or increasing marginal effects. For instance, while the conventional model suggests uniform benefits from tactical acumen, our findings reveal that these skills are most effective in clubs with substantial player market value. Additionally, our model now links the estimated match value function to performance, providing meaningful managerial implications. The ordered logit model (Model (3)), which ranks manager-club matches, fails to address endogeneity, mutual preferences, and competition for top managers. This leads to unrealistic results, such as the positive effects of misconduct and the negative effects of managerial experience. These shortcomings highlight the importance of our Extended MMSE model in addressing endogeneity and capturing the competitive equilibrium of the matching process.

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