Does Experience Matter? Salary Dispersion, Coaching, and Team Performance: the MLS case

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DOES EXPERIENCE MATTER? SALARY DISPERSION, COACHING AND TEAM PERFORMANCE

Using Major League Soccer as a unique dataset, this study examines the direct and indirect role of coaches' experience in determining team performance. Inspired by labour market studies, we applied traditional indicators of team salary structure and, unlike previous studies, empirically test the hypothesis that coach experience affects the way in which team salary distribution influences performance. Our results suggest that coaches with experience as professional soccer players improve team performance directly but worsen the negative effect of a skewed salary distribution. Moreover, experience as a player is more important than coaching experience.

JEL Classification: D3, J3, M5

"*Part of coaching is around getting into the minds of players and then making sure they play the right way*."

Brendon Bolton, senior coach of the Carlton Football Club, AFL.

I. INTRODUCTION

Studies of the role and influence of managers in business and managers or coaches in sports are common (Britton 2013; Hawkins 2011; Weinberg and Gould 2007). Similarly common are studies of the impact of salary distribution on production within a firm or sports team (Breunig et al. 2014; Coates, Frick, and Jewell 2016; Simmons and Berri 2011; Katayama and Nuch 2011). This study is one of a very few that combine the influence of the coach and the influence of salary distribution into a single model (Berri and Jewell 2004) and the first to consider the possibility that coaches alter the manner in which salary distribution affects production.

The literature on managerial and coach effectiveness addresses two related questions. The first is simply inquiry into what it is that coaches and managers do; the second is whether there is evidence that whatever they do matters for production by the firm or their team. Alchian and Demsetz (1972) suggest that a manager's task is to oversee the workers to assure that they are not shirking and to motivate them to full effort. Included in this oversight and motivational role is the decision about how to best utilize the workers. Clement and McCormick (1989) consider the success of college basketball coaches with respect to allocation of playing time of their players. Porter and Scully (1982) assess the efficiency of managers of Major League Baseball teams.

Literature on coaching puts emphasis on coaches' teaching and motivating athletes (Hardy, Hall, and Hardy 2005) which requires the ability to communicate on a day-to-day basis in a clear, honest and direct manner. Weinberg and Gould (2007) emphasized that to achieve success, coaches build interpersonal relationships with team members and work through these relationships to provide direction, goals and structure to their teams. The main implication of this latter literature

is that coaches and athletes have much closer relationships than do the manager and employees in a company.

Nonetheless, interpersonal relationships nowadays are considered a source of an organization's growth (Ni 2006). Generally, it refers to qualifications (or education) and experience such as tenure in the position or organization, or even in the industry (Becker 1962). One of the arguments about why experience, defined broadly, could influence the ability to establish interpersonal relationships, relates to the trust and capability for better understanding of human behavior and the accumulation of the skills necessary to perform the tasks and manage people in a team, which in turn correlates with background (Mackey 2008). Barker and Mueller (2002) concluded that in the case of CEOs, the managerial experience allows them to perceive and intuitively interpret any situation better than if their understanding was based solely on knowledge from education and to connect them to organizational performance. While empirical evidence indicates that there is a close connection between human capital and the ability to form relationships, some authors (Lahiri et al., 2012; van Marrewijk and Timmers, 2003; Molloy et al., 2011) claim that human capital influences performance only indirectly – through those relationships. Based on this, we utilize coaches' personal experience as a coach and as a player as a proxy for the ability to form these relationships and to connect them to organizational performance.

The sports economics literature has focused on a coach's prior coaching and playing experience as potential determinants of team performance (Smith and Smoll 2011; Frick and Simmons 2008; Goodall, Kahn, and Oswald 2011; L. M. Kahn 1993; Bridgewater, Kahn, and Goodall 2011). In fact, Blackett, Evans, and Piggott (2017) report that at the start of the 2013-14 season, 90 out of 92 head coaches in professional football in England and Wales had previously been professional players. Rynne and Mallett (2014) stated that former players are immediately

able to understand the sport, the club culture, the fans – and most importantly, how to win. Goodall, Kahn, and Oswald (2011) concluded that coaches' playing experience in the NBA and their brilliance as a player are important factors for team success. On the other hand, del Corral et al. (2015), studying Spanish basketball, observed coach experience to be insignificant. Playing experience does give players an opportunity to learn about coaching from their own coaches and experience in being a member of a team. Potrac, Jones, and Cushion (2007) showed that a professional playing background could improve coaching skills with respect to both sport-specific knowledge, such as technical and tactical aspects, and the degree of 'organizational socialization'. The latter notion relates to the psychological context: better understanding of players' behavior regarding different aspects of the job may help to achieve better performance indirectly. In particular, we hypothesize that playing experience could help coaches better understand the players' attitudes and behavior in relation to salary distribution within the team and enable coaches to mitigate the harmful influence of unequal or unfair salary distribution on team performance.

The relationship between a team's salary distribution (as measured by the Gini coefficient, coefficient of variation or the Herfindahl-Hirschman Index) and team performance, has been an active area of research on professional team sports. A number of researchers have examined whether the salary structure of a team has an effect on its on-field success (Breunig et al., 2014; Debrock et al., 2004; Simmons and Berri, 2011; Coates, Frick, and Jewell, 2016). There are two competing hypotheses in the literature regarding the influence of a team's salary distribution on its performance: that wider dispersion raises performance and that wider dispersion harms performance. The empirical studies undertaken by Breunig et al. (2014),Debrock, Hendricks, and Koenker (2004) and Simmons and Berri (2011), found that increasing expected wage inequality, as measured by the Gini coefficient, increased team performance. Avrutin and Sommers (2007) used baseball data from 2001-2005 to determine the effect of the Gini coefficient and team payroll

on annual team win percentage and concluded that increased wage disparity does not result in decreased team performance. The same results were obtained by Berri and Jewell (2004) and by Katayama and Nuch (2011) for the NBA. However, Breunig et al. (2014) found, for MLB, that greater salary inequality may lead to lower productivity, especially if cooperation between players (or workers) is an important feature of the production function (Levine, 1991); Kahn, 2000). Moreover, Coates, Frick, and Jewell (2016) explored data from MLS clubs and found that the more equal the salary structure, the higher is the sporting performance. Therefore, there is no consensus on the effect of salary variation on performance. One possible explanation for the lack of consensus is that the role of coaching is almost completely neglected in these studies.

To fill this gap in the literature, we hypothesize that professional playing experience in the past equips a coach with the skills or knowledge to moderate possible harmful effects of high salary differentiation or to take advantage of the benefits of low salary distribution regarding team performance. Our hypothesis is based on the idea that an experienced coach is better able to address issues of team 'chemistry' than a coach with less background.

This study contributes to the body of knowledge on coaching effectiveness and salary dispersion in teams, particularly in the context of professional sport and MLS. Kahn (2000) suggested sports labor markets as a fruitful area for labor-market research. Therefore, to the extent that the coach experience as a player is comparable to business manager experience as an employee, the conclusions here may be adapted outside the sports context.

The next section is a literature review focusing on the theoretical and empirical background forming the basis for our hypothesis. Section 3 presents the empirical methodology and the data. In section 4, the results of the study are described. Section 5 shows robustness checks and section 6 concludes.

II. COACHES' DIRECT AND INDIRECT IMPACT ON TEAM PERFORMANCE

A. Impact of Salary Distribution on Team Performance

Originally, concern about the effect of wage distribution on performance first appeared in economic theory (Lazear 1991; Levine 1991; Ramaswamy and Rowthorn 1991) and was then applied by scholars to labor and sport economics. Beaumont and Harris (2003) used data on manufacturing in five United Kingdom industrial sectors, finding a positive but weak relationship between the internal wage structure and the firm's labor productivity. However, Jirjahn and Kraft (2007) show that wage dispersion exerts a substantially higher positive impact on productivity, supporting the conclusions of Lallemand, Plasman, and Rycx (2004) for Belgian firms and Heyman (2005) for Swedish corporations.

The salary distribution among players and its impact on performance is an active and large area of research in professional team sports. For example, Richards and Guell (1998) found that the variance of the team's salary distribution is negatively correlated with winning percentage for MLB, while controlling for lagged winning percentage and total payroll. Bloom (1999, Depken (2000), Debrock, Hendricks, and Koenker (2004) and Jewell and Molina (2004) all found a negative impact of dispersion in MLB. Investigating different sports leagues in North America and using the Gini coefficient as indicator of salary inequality and the team's winning percentage as the output, Frick, Prinz, and Winkelmann (2003) observed that the higher the degree of pay inequality, the higher the performance in basketball and hockey but the lower the winning percentage in football and baseball. Possible explanations for these findings are differences in the necessary degree of cooperation among players or the relative importance of a single player for team success. Marchand, Smeeding, and Torrey (2006), who examined data from the 2000-01 season to the 2003-04 season, concluded that there is a positive link between salary dispersion and performance, which could be related to a star effect: the smaller teams in basketball and hockey

might lead to a larger impact of an individual star player. However, Berri and Jewell (2004) and Katayama and Nuch (2011) did not find any effect of salary inequality on the winning percentage in the NHL or the NBA. Interestingly, Bloom (1999) indicates that salary dispersion not only reduces group performance but also decreases the individual performance of baseball players. Earlier support for the negative impact of the team's salary dispersion on team success can be found in studies by Sommers (1998) and Kahane et al. (2012) for NHL, as well as in the study by Jewell and Molina (2004) for MLB.Therefore, there is no consensus among scholars about the impact of salary inequality on team results.

Franck and Nüesch (2011) argued that these different results could be due to unaddressed nonlinearity in the relationship. For example, the impact of widening dispersion in salaries may be beneficial when there is little difference in salaries across players but increasing the dispersion could be harmful when the dispersion is already large. They estimated and found support for a quadratic relationship between salary inequality and team performance, using German football data. Coates, Frick, and Jewell (2016) followed the lead of Franck and Nüesch (2011) but used data from MLS. The model supported the quadratic relationship, but the average marginal effect of increased dispersion was negative. In other words, evaluated at the average, clubs were on the downhill side of the quadratic function.

An unaddressed issue in the literature is the role of the coach. Specifically, none of the existing research has assessed the role of the coach in affecting the relationship between salary dispersion and team performance. For example, Berri and Jewell (2004) include coaching experience and lifetime winning percentage as explanatory variables but do not explore their interaction with the measures of salary dispersion, and thus the influence of dispersion is independent of the coaches' experience. Next, we review the literature on the effect of coaching on team performance.

B. Coaches' Experience

Coaches' experience is a topic of wide interest. Of course, coaches' experience comes in at least two types: experience as a coach and experience as a player. Additional coach characteristics may also matter for team performance. For example, where the coach gained his experience might be important: coaching or playing in lower divisions or in an American college, for instance, may not be as valuable as coaching or playing in a top European league. Indeed, nowadays it is common for former players to hold top coaching positions. Given this fact, it is important to understand whether the tendency to hire former players as coaches improves team performance compared with hiring individuals without a background as players. However, despite the increasing number of players becoming coaches, understanding of the benefits of coaches who were players remains weak.

Several studies investigate athletic skills such as perception, knowledge and decision-making, (e g., Hodge and Lonsdale (2011), Rynne and Mallett (2014) and Grundel et al. (2013) that may underpin performance. For example, the ability to read patterns of the game quickly is a necessary trait of highly-skilled athletes (Hodge and Lonsdale 2011), but could also be a valuable skill for coaches. Supporting this, Feltz et al. (1999) and later Hepler and Feltz (2012) reported that coaches with a past as players have greater confidence in themselves than coaches without playing experience. Werthner and Trudel (2006) point out that experience as a high-level player is a valuable source of knowledge and Rodgers et al. (2007) suggest that this experience seems to be associated with the use of techniques identified as good practice in high-performance training. This is a view shared by Mielke (2007), who considers experience as a player to be a precondition for coaches to understand the stress and emotions of the competition. Saury and Durand (1998) claimed that experienced coaches have been shown to employ standardized routines and plans to help their athletes.

However, Naidenova et al. (2015) found an insignificant role of previous coaching experience on team performance for five top European football leagues. At the same time, Gilbert et al. (2006) reported that the combination of experience as a player and coaching education tends to increase the efficacy of the coach. An important distinction in understanding skilled performers' decision-making processes relates to intuitive, (i.e., automatic) versus deliberative, (i.e., explicit information-processing) decisions. Highly skilled athletes use both intuitive and deliberative processes: in high game tempo situations, they are able to make fast, intuitive and accurate decisions, but when given the opportunity they are also able to deliberate and propose other options (Hogarth 2001). Although there is some disagreement about the value of deliberation in decision-making (see Grundel et al., 2013), it appears that highly skilled athletes are superior at both intuitive and deliberative decision-making.

At the same time, there is the emergence of a group of coaches who, using their skills in teaching, have been successful despite having very little or no experience as football players in the top divisions. This is true of José Mourinho, the manager of Manchester United, who played fewer than 100 football games in the Portuguese second division (Carter and Bloom 2009). On the other hand, these coaches may have more extensive and varied experience in all aspects of coaching work, as well as more opportunities to obtain different qualifications needed in coaching, including psychological aspects of their relationships with players. The success of these coaches raises questions about the importance of experience as a professional athlete for coaching success.

Nash and Collins (2006) underlined the multifaceted role of coaches. Orlowski et al. (2016) surveyed coaches in elite sports in Germany, who reported 65 different formal qualifications, such as licenses, certificates and university degrees, which they classified into 11 separate types. An important facet in the role of the coach is the ability to communicate effectively, creating 'chemistry' between coach and athletes (Carter and Bloom 2009). Yet del Corral, Maroto, and

Gallardo (2015) find that foreign coaches were more efficient than native coaches among 17 Spanish basketball clubs in the 2008-2009 season, suggesting that different native languages is not an insurmountable barrier to effective communication in the sporting context. Coaches are also responsible for the optimal physical, mental and emotional preparation of the players throughout the season (Nash and Collins 2006). The coaches with the most wins in NBA history, Don Nelson (1,335) and Lenny Wilkens (1,332), were both hired without coaching experience, though they had an extensive professional playing background. At the same time, NBA Hall-of-Famer Magic Johnson spent just 16 games coaching the Los Angeles Lakers.

The literature suggests that coaching requires a variety of skills, some of which can be acquired without extensive high-level playing experience. Indeed, university-level training in sport sciences may contribute to coaching success; it is, at least, positively correlated with compensation in German elite sports coaches (Orlowski, Wicker, and Breuer 2016). Consequently, it is important to look at coaching skill and ability from multiple perspectives and regard it as arising from multiple sources.

C. The Relationship between Salary Distribution, Coaches' Playing Experience and Team Performance

Following the literature, we assume that there are possible differences in the success of teams with coaches who have experience as players in professional football or experience as a head coach and those who do not. These may be related to decision-making and strategizing, creating 'chemistry' in a team, or understanding the players' minds and behavior. Based on the above arguments, the first hypothesis to be tested is:

H1: *Coaches' playing experience directly influences team performance.*

The first test for this hypothesis concerns the statistical significance of the number of years the coach played in the first division of professional football. Of course, the hypothesis is one-sided

as we believe that more experience leads to better team performance. This effect may be nonlinear, for example, with a declining marginal impact of experience, or may be influenced by the position the coach played. If any or all these coaches' experience variables are statistically significant, it will support the hypothesis.

Studies of the nexus between coaching experience and team performance have generally treated coaching experience as separable from other factors affecting performance. We hypothesize that coaches could influence performance both directly, as a separable factor, and indirectly through mitigating or accentuating the influence of other determinants of team performance. To the best of our knowledge, there are no studies focusing on these indirect effects. This study fills the gap.

One possible indirect effect of coaching experience is to alter the influence of salary dispersion. As described above, the literature on the impact of salary dispersion is inconclusive, with greater dispersion linked to both higher and lower performance. It is possible that the impact of dispersion is mitigated by the experience of the coach, either as a player or as a coach. It may be that an experienced coach is better able to manage the issues arising from a larger inequality in the salary dispersion. Alternatively, perhaps a coach who played professionally is better equipped to address such problems. Of course, it is also possible that more experienced coaches, whether that experience is as a coach or as a player, are less able to connect with the players, possibly because they are considerably older than the players they manage, which may not be the case for coaches with less experience. Therefore, the second hypothesis is:

H2: *The former professional background of a coach alters the impact of salary dispersion on team performance*.

This hypothesis is tested by investigating the interaction between the salary dispersion and salary dispersion squared variables and the number of years of playing or coaching experience.

Rejection of the null hypothesis that the coefficients of these interaction terms are all zero represents support for our suggestion that experience has an indirect effect on team performance, working through altering the impact of salary dispersion.

III. METHODOLOGY AND DATA

A. Methodology

The analysis models a team's production of points per game as a function of the team wage bill, the distribution of wages among the players, indicators of player quality that might not be captured by salary and the head coach's experience. The baseline model is that of Coates et al. (2016) with the addition of the coach experience variables. Equation (1) represents the model.

$$ln(points\ per\ game)_{it} = \alpha_0 + \alpha_1 Dist_{it} + \alpha_2 Dist^2{}_{it} + \alpha_3 RelWage_{it} + \alpha_4 RelWage^2{}_{it} +$$
$$+\alpha_5 Coach_{it} + \alpha_6 X_{it} + \varepsilon_{it}, \qquad (1)$$

where *points per game (ln)* is the dependent variable, α_0 is the intercept term, ε_{it} are the errors and α_i are the coefficients associated with each covariate. The error term, $\varepsilon_{it} = \mu_i + \omega_t + \nu_{it}$, includes estimated team and year effects and a completely random component. $Dist_{it}$, $RelWage_{it}$, $Coach_{it}$ and X_{it} reflect salary dispersion, team ability, coach ability, player quality and other influences, as described in detail below.

The dependent variable is *the natural logarithm of* $points\ per\ game$. Several different indicators of team performance are possible, such as the seasonal winning percentage (Yamamura 2015), points and total wins. In our analysis, points per game is a better choice than points or wins because the number of games in a season is not constant across seasons. The natural logarithm accounts for the fact that the number of points per game has a maximum value of three, as a team earns three points for a win, one point for a draw and zero points for a loss.

Dist and $Dist^2$ represent variables capturing nonlinear effects of wage dispersion. Following Franck and Nüesch (2011), our expectation is that $\alpha_1 > 0$ and $\alpha_2 < 0$: starting from a low dispersion, raising dispersion raises performance, but after some level of salary inequality is attained further increases in dispersion harm team success. We follow the literature on the relationships between sporting performances and wage dispersion in using both the Gini index (*Gini*) and the coefficient of variation (*Coefficient of variation*) as measures of salary concentration. See, for example, Sommers (1998) for NHL, Franck and Nüesch (2011) for the first German soccer league, Coates, Frick and Jewell (2016) for MLS, Yamamura (2015) for the Japanese football league and Caruso, Di Domizio and Rossignoli (2017) for the Italian Serie A.

Several control variables are included in the model based on the literature (del Corral, Maroto, and Gallardo (2015), Coates, Frick, and Jewell (2016)). Firstly, we control for team quality by introducing the team wage bill relative to the average wage bill that season (*RelWage*) as suggested in the studies on football productivity. $RelWage^2$ is the square of that ratio. Following Coates et al. (2016), we expect that teams with higher than average wage bills will produce more points per game than teams with lower than average wage bills. Secondly, we control for different team characteristics using a vector *X* which includes the number of players who have competed on some country's national team (*National*) and explains the quality characteristics of the player. Caruso, Di Domizio, and Rossignoli (2017) implemented the same approach. Players with international experience are presumably better than players without such experience and clubs in their first year of existence are expected to be weaker than older clubs. We also take into account differences caused by lack of experience in the MLS by including dummy variables indicating the first year of team existence (*Expansion*). Coates, Frick, and Jewell (2016) found that teams in their first season have lower productivity than more experienced teams.

To investigate the direct effect of coach characteristics in line with Dawson and Dobson (2002) we introduce *Coach* as a vector of coach attributes focusing on the experience of a coach as a professional player (*Years of playing experience*). The vector also includes a dummy for a coach in his first year with this team (*Coaches without experience with the current team*), a dummy for the first year of head coaching any top tier professional, team, a dummy for whether the coach is not American (*Foreign coach*), the number of teams managed before the current team (*Number of teams previously coached*), for those who have coached other teams, and a dummy indicating whether he was or was not a defender (*Defender*), for those coaches who were players.

We include two additional variables related to coaching, though these are not about the specific coach but rather about the team's experience with coaches. Frequent turnover of coaches suggests problems at the club level as much as, or more than, problems with the coaches. We control for the number of coaches who have managed the team over its history (*Coach turnover*). Similarly, we account for the possible effect on a team of a coach change during the season by including the dummy variable for such cases (*Dismissed coach during the season*).

For capturing the moderating effect of background as a professional player and testing hypothesis H2, the complete regression model includes among the variables interactions between coach characteristics and the salary distribution variables in equation (2). Hypothesis H2 is supported in this model if either or both of δ_1 and δ_2 are different from zero.

$$ln(points\ per\ game)_{it} = \alpha_0 + \alpha_1 Dist_{it} + \alpha_2 Dist^2{}_{it} + \alpha_3 RelWage_{it} + \alpha_4 RelWage^2{}_{it} + \alpha_5 X_{it} + \alpha_6 Coach_{it} + \delta_1 Dist_{it} Coach_{it} + \delta_2 Dist^2{}_{it} Coach_{it} + \varepsilon_{it} \quad (2)$$

Our intuition is that the effect of the coach having more experience is to make the impact of salary inequality smaller, that is, less harmful to performance. The logic is that experienced coaches are better able to navigate or manage the clubhouse issues that arise from wide salary

dispersion. Of course, an alternative intuition is that greater coach experience, either as a coach or a player, implies a larger age gap between the coach and his players, which results in communication problems or difficult interpersonal relationships. Under this logic, greater coach experience may imply an exacerbation of the issues regarding salary dispersion. A more direct test, in this case, is to use the age of the coach directly as an explanatory variable. We do this as a robustness check.

If the null hypothesis is rejected, implying that one or both of δ_1 and δ_2 are non-zero, the natural question to ask is how the coach interaction affects the influence of salary dispersion on performance. To assess this, we compute marginal effects. To be precise, the marginal effect of wage dispersion is the first derivative of the regression equation with respect to the wage distribution variable.

$$\frac{\mathrm{dln}(points\ per\ game)_{it}}{dDist_{it}} = \alpha_1 + 2\alpha_2 Dist_{it} + \delta_1 Coach_{it} + 2\delta_2 Dist_{it} Coach_{it} = (\alpha_1 + 2\alpha_2 Dist_{it}) + Coach_{it}(\delta_1 + 2\delta_2 Dist_{it}) \quad (3)$$

If δ_1 and δ_2 are both zero, or more generally if $(\delta_1 + 2\delta_2 Dist_{it}) = 0$, then the coach characteristic has no impact on the marginal effect of salary distribution on team performance. Of course, $(\delta_1 + 2\delta_2 Dist_{it}) > 0$ means that coach experience increases the marginal influence of salary distribution, that is, makes it more positive or less negative. In the alternative case, where $(\delta_1 + 2\delta_2 Dist_{it}) < 0$, the harmful influence of salary dispersion is made worse by having a more experienced coach, or the beneficial impact is reduced. Note that this mitigation effect depends on the value of $Dist_{it}$, so that if δ_1 and δ_2 are of opposite signs, the marginal effect of salary dispersion may be increased for some clubs, unaffected for some clubs and decreased for others.

To obtain a better understanding of the relationship between coach experience, salary dispersion and team performance, we calculate both the average marginal effects and the effects at different points in the distribution of the coach and salary dispersion variables.

B. Data

The data used in the study include 217 observations for the 2005-2017 seasons for all MLS teams. Only nine teams exist throughout the whole period, as there has been substantial expansion of the league since 2005. Data for the expansion teams cover the entire period of their existence. The expansion teams are: New York Red Bulls (2006), Toronto FC (2007), San Jose Earthquakes (2008), Seattle Sounders FC (2009), Philadelphia Union (2010), Portland Timbers (2011), Vancouver Whitecaps FC (2011), Montreal Impact (2012), New York City FC (2015), Orlando City SC (2015), Atlanta United FC (2017) and Minnesota United FC (2017). In addition, there was originally a club in San Jose, California, from 1996 through 2005, which moved to Houston before the 2006 season. We treat Houston both as an expansion team and not as an expansion team, as a sensitivity check.

Table 1 shows the number of teams in each season, the mean of the natural logarithm of points per game, Gini and CV and the median of the relative wage. None of the variables has a trend, though each is, perhaps unsurprisingly, serially correlated. There is a spike in the (mean) Gini, CV and (median) relative wage (downward) in 2007, the year that David Beckham signed with LA Galaxy as a Designated Player. The mean Gini coefficient and mean CV drifted down towards pre-Designated Player levels until about 2012 when they began to rise. Pay dispersion has risen as clubs have increased the use of Designated Players. A Kruskal-Wallis test rejects the null hypothesis that the distributions of the Gini coefficient, CV and relative wage are the same in every year.

TABLE 1

Mean values of team performance and salary structure' indicators by years

Year	Number of obs	Points(ln)	GINI	CV	Relative wage*
2005	10	0.213	0.497	1.189	0.932
2006	12	0.294	0.490	1.095	0.941
2007	13	0.288	0.547	1.484	0.796
2008	14	0.298	0.556	1.538	0.828
2009	15	0.276	0.490	1.361	0.840
2010	16	0.287	0.447	1.133	0.665
2011	18	0.255	0.427	1.087	0.752
2012	19	0.287	0.470	1.233	0.752
2013	19	0.275	0.460	1.225	0.795
2014	19	0.280	0.515	1.456	0.718
2015	20	0.318	0.538	1.534	0.710
2016	20	0.280	0.547	1.466	0.733
2017	22	0.303	0.546	1.433	0.796

Notes: *For the relative wage the table reports the median values, as mean values equal 1.000 for all years

Table 2 shows the mean values of the logarithm of points per game, Gini coefficients and CVs and the median relative wage by club. The leading users of Designated Players, individuals whose salaries may exceed the league salary cap, are those clubs that have the highest level of salary concentration, with a Gini coefficient of more than 0.7. These clubs are LA Galaxy, New York City FC, New York Red Bulls and Orlando City SC.[1]

TABLE 2

Mean values of team performance and salary structure' indicators by teams

Team name	Points(ln)	GINI	CV	Relative wage
ATL	0.482	0.567	1.448	0.869
CHI	0.272	0.538	1.576	1.057
CHV	0.060	0.417	0.957	0.738
CLB	0.337	0.429	0.937	0.713
COL	0.237	0.458	1.033	0.749
DAL	0.380	0.449	1.112	0.772
DC	0.228	0.457	1.024	0.783
HOU	0.330	0.406	0.813	0.757
KC	0.347	0.467	1.071	0.785
LA	0.373	0.735	2.626	2.175

[1] It should be noted that New York City FC and Orlando City SC joined the MLS very recently. Therefore, their effect on salary distribution coefficients is small compared with LA Galaxy and New York Red Bulls.

MNUFC	0.058	0.346	0.657	0.612
MTL	0.201	0.501	1.404	0.767
NE	0.299	0.476	1.197	0.762
NYCFC	0.356	0.775	2.405	2.337
NYRB	0.352	0.641	2.012	1.701
ORL	0.195	0.726	3.207	1.324
PHI	0.183	0.416	0.900	0.707
POR	0.320	0.476	1.179	0.825
RSL	0.274	0.423	0.901	0.744
SEA	0.476	0.607	1.902	1.196
SJ	0.231	0.416	0.896	0.700
TOR	0.138	0.593	1.736	1.546
VAN	0.253	0.501	1.316	0.833

Table 3 presents the descriptive statistics for the team performance and salary structure variables. The figures in parentheses are the values when the four clubs with extreme dispersions of salary structure are omitted from the sample. The table indicates that there is little difference in the logarithm of points per game without these clubs but that the salary dispersion is smaller, on average. Moreover, 6.5% of observations represent teams in their first year in MLS. On average, 11 players on a roster were once members of national teams playing in international competitions, while the teams were managed, on average, by 2.5 coaches during their history in MLS.

TABLE 3

Descriptive statistics of the sample

Variable	Mean	Median	SD	Min	Max
Points (ln)	0.283 (0.273)	0.344 (0.322)	0.240 (0.242)	-0.755 (-0.755)	0.708 (0.708)
Gini	0.503 (0.470)	0.478 (0.456)	0.138 (0.112)	0.055 (0.055)	0.838 (0.806)
CV	1.336 (1.154)	1.030 (0.998)	0.719 (0.536)	0.156 (0.156)	3.786 (2.987)
Relative Wage	1.000 (0.845)	0.786 (0.752)	0.586 (0.346)	0.456 (0.456)	3.601(2.767)
National	11.018 (10.753)	11 (10)	3.190 (3.073)	4 (4)	20 (20)
Expansion	0.065	0	0.246	0	1
Coach turnover	2.507 (2.506)	2 (2)	1.678 (1.671)	0 (0)	7 (7)

Notes: N = 217 (N=186)

The key variables in our analysis are coach characteristics, particularly experience, as summarized in Table 4. In total, information about 65 coaches from 26 countries is included in the data set. The country distribution is as follows: 46% come from European countries, 35% of coaches are from North America (US and Canada), 17% represent Latin and Central America and 2% are from Macau. Interestingly, among the European countries, the largest share belongs to Scotland and England (30%), representing 15% of the total sample. As was emphasized by Dawson and Dobson (2002), there is a popular perception that Scottish nationals are 'better' managers than others. Among coaches with professional soccer experience as players, we use the traditional division of positions or roles and observe 23 defenders (35%), 19 midfielders (29%), 11 forwards (17%) and one goalkeeper (1.5%), which is in line with previous studies. As an emerging but fast-growing football market, MLS attracts both soccer players and coaches from different countries. Hence, 48% of the head coaches had played on non-US teams and 63% had represented national teams. Dawson and Dobson (2002) argued that managers who played at the highest level should have a greater appreciation of the game and should find it easier to inspire and motivate players. Our hypothesis is that this experience is particularly important for managing a team, and defenders make more successful coaches. Table 4 provides further details on the data and shows the mean values for each independent variable, reflecting coaches' personal characteristics relating to experience.

TABLE 4

Descriptive Statistics of Coaches' Personal Experience Characteristics

Coaches' experience characteristics	Mean	SD	Min	Max	Mean*	SD*
Foreign (1=Non-American)	0.590	0.493	0	1	0.601	0.491
Age	46.410	7.938	34	67	44.860	6.973
Former top division player	0.820	0.384	0	1	-	-
Defender	0.378	0.486	0	1	0.461	0.500
Number of years playing	11.387	7.157	0	23	13.882	5.261
Coaches with 0-1 years of playing experience	0.180	0.385	0	1	-	-
Coaches with 2-4 years of playing experience	0.065	0.246	0	1	0.079	.270

Coaches with 5-8 years of playing experience	0.088	0.283	0	1	0.107	0.310
Coaches with 9-15 years of playing experience	0.350	0.478	0	1	0.427	0.496
Coaches with more than 15 years of playing experience	0.318	0.467	0	1	0.388	0.489
Number of years coaching	6.852	6.655	0	30	5.338	5.492
Number of teams managed before the current team	1.723	2.384	0	12	1.882	2.523
First-year coach	0.111	0.314	0	1	0.134	0.343
Coaches without experience with the current team	0.479	0.501	0	1	0.556	0.498
Dismissed coaches during the season	0.097	0.296	0	1	0.096	0.295

Notes: N = 217 team-years. * These columns report mean and standard deviation when excluding coaches without playing experience. (N=178 team-years).

The information in Table 4 reveals that the average age of MLS coaches is 46 years. Both the proportion of team-years when a club had a foreign coach (59%) and the proportion of team-years when the coach was a former professional player (82%) are high. In the full sample, coaches have on average 11 years of playing experience, and among those who had any first-division professional playing experience the mean is 14 years. In addition, in 80% of the team-year observations, the coaches with playing experience spent more than nine years as a player, while only 8% spent four years or less as professional soccer players. On average, coaches have seven years of coaching experience and had managed fewer than two teams before the current appointment. The numbers are smaller for those coaches who had been professional soccer players. Moreover, 11% of the coaches (24 coaches) were considered first-year coaches (without any previous head coach experience), while 48% were coaches who were in the first year with the current team. We also observed that in about 10% of the team-years, the coach changed during the season.

Table 5 shows the difference between salary dispersion metrics and sporting results, comparing teams with coaches in their first year with the current team with teams whose coach is in at least the second year with the team. Tests for the difference between means show that salary

dispersion is not significantly different between teams in these different circumstances. This evidence is important because it suggests that coaches do not take positions with teams based on the salary dispersion in that team. In other words, there is not a problem of selection bias associated with salary dispersion. The relative wage is significantly different between coaches in their first year with the team and coaches with a longer tenure, with a larger mean for the latter coaches.

TABLE 5

Descriptive statistics for teams with tenured and green coaches

	Mean	**Median**	**SD**	**Min**	**Max**	**25%**	**75%**	**t-stat**
			Points(ln)					
Teams with first-year coach (green)	0.292	0.322	0.221	-0.755	0.708	0.191	0.435	-0.473
Teams with experienced coaches (tenured)	0.276	0.344	0.257	-0.580	0.678	0.122	0.451	
			Gini-coefficient					
Teams with first-year coach	0.489	0.453	0.131	0.295	0.806	0.406	0.530	1.389
Teams with experienced coaches	0.515	0.483	0.145	0.055	0.838	0.412	0.602	
			CV					
Teams with first-year coach	1.279	1.007	0.676	0.534	3.519	0.826	1.522	1.124
Teams with experienced coaches	1.388	1.089	0.755	0.156	3.786	0.873	1.737	
			Relative Wage					
Teams with first-year coach	0.909	0.738	0.477	0.530	2.767	0.666	0.866	2.207**
Teams with experienced coaches	1.083	0.845	0.662	0.456	3.601	0.699	1.221	

Notes: ** $p<0.05$.

IV. RESULTS

The models were estimated with both years of playing experience and years of previous coaching experience, and their squares, together and separately but the coaching experience variables were rarely significant, either individually or jointly, while the playing experience variables generally are, particularly jointly.. This suggests that a coach who is a former player contributes more to the success of a team than does a coach with no playing experience. From here on we drop discussion

of experience as a coach. The results from models with years of coaching experience are available upon request.

Table 6 reports the results when the measure of dispersion in salaries is the Gini coefficient and Table 7 gives the results when the CV measures salary distribution.

TABLE 6

Results of Model Estimations with the Gini Coefficient

Variables	**(1)**	**(2)**	**(3)**
Gini coefficient	-0.632	-0.487	0.059
	(0.709)	(0.837)	(2.761)
Gini coefficient squared	-0.785	-0.547	-0.818
	(0.918)	(0.988)	(2.459)
Relative wage	0.925**	0.677*	0.661*
	(0.328)	(0.331)	(0.339)
Relative wage squared	-0.148**	-0.095	-0.091
	(0.059)	(0.059)	(0.062)
Number of players with international experience	0.028	0.036	0.035
	(0.033)	(0.029)	(0.028)
Number of players with international experience squared	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Expansion	-0.237**	-0.279***	-0.279***
	(0.074)	(0.078)	(0.079)
Number of years playing		0.008***	0.018
		(0.003)	(0.040)
Gini coefficient * Number of years playing			-0.016
			(0.144)
Gini coefficient squared * Number of years playing			-0.010
			(0.120)
Coach in first year with the current team		0.038	0.047
		(0.034)	(0.033)
Foreign coach		-0.079	-0.076
		(0.053)	(0.048)
Defender		-0.075	-0.066
		(0.046)	(0.040)
Coach turnover		-0.016	-0.011
		(0.025)	(0.026)
Number of teams previously coached		-0.002	-0.001
		(0.007)	(0.007)
Dismissed coach during the season		-0.082	-0.081
		(0.065)	(0.069)
Constant	-0.187	-0.160	-0.346
	(0.370)	(0.316)	(0.819)
R-squared	0.172	0.242	0.249

Notes: Number of observations = 217, number of id=23. Dependent variable is *lnPoint*. Robust standard errors in parentheses. Models include year and team dummies. The constant terms reflect the excluded team (Seattle Sounders FC) and the excluded year (2005). [a]Coefficient multiplied by 10. *** p<0.01, ** p<0.05, * p<0.1.

The results of model (1) in the first column replicate those of Coates, Frick and Jewell (2016), though with four additional years of data. The Gini coefficient and its square are not individually different from zero, though one rejects the null hypothesis that both are zero at the 5% level. Additionally, the level of relative wage and its square are individually and jointly significant, demonstrating the nonlinear effect. It is also not surprising that the marginal benefit of additional player compensation declines as the relative wage rises. In contrast to previous papers, it is found that having more players with international experience does not improve team performance. Finally, teams in their first year of existence perform more poorly, all other things being equal, than do teams that have been around for longer. The latter results are robust across the specifications.

The second and third columns address the hypotheses described above. The second column adds the professional playing experience and the third adds interaction effects between the Gini coefficient and this coaching characteristic. Both models include control variables reflecting team and coach heterogeneity. Firstly, it should be noted that the coefficient estimates for these variables in the base model (1) are similar in models (2) and (3). Secondly, regarding hypothesis H1, the number of years of playing experience is positive and statistically significant at better than the 5% level in model (2). Additionally, the coach characteristics variables are jointly significant, further indicating support for the role of coach experience and for hypothesis H1. Note also that the Gini and Gini-squared factors are not individually statistically significant, just as in the first column, but they are jointly significant (p-value = 0.090). Furthermore, in comparison with model (1), we can see that inclusion of coach experience influences the impact of salary distribution: the Gini coefficient is less than 25% as large in column 1 as in column 2, and the coefficient of Gini squared is more than 40% bigger in absolute value in column 1 than in column 2.

In contrast to the results obtained by del Corral, Maroto and Gallardo (2015), who concluded that playing experience does not influence team performance, our results are consistent with studies such as that of Goodall, Kahn and Oswald (2011), who found a positive and statistically significant effect of the coach's experience as a player.

From the third column, we can see that neither the experience variables nor the interactions with the Gini coefficient and its square are individually statistically significant, suggesting rejection of hypothesis H2. However, the joint hypothesis that all the Gini and Gini-squared terms have zero coefficients for model (3) can be rejected (p-value = 0.041). This result is consistent with the hypothesis that coaches with playing experience affect the way that salary inequality influences team success, even if that salary inequality has no apparent independent impact. Below, we report the marginal effects for playing experience and salary distribution.

Turning to Table 7, where the measure of inequality is the coefficient of variation, column (1) reproduces the results given by Coates, Frick and Jewell (2016). The first point to note is that the measure of inequality is now individually statistically significant and negative at the 5% level. This suggests that greater salary concentration reduces team performance. Results for other control variables are similar to those of the corresponding model in Table 6. In the second and third columns, the factor representing years of playing experience is positive and statistically significant, meaning that more experienced coaches directly improve team results. Therefore, we again have evidence in support of hypothesis H1. Despite individually insignificant coefficients for CV squared in the first two models, CV and CV squared are jointly significant in both models (p-values of 0.02 in each case). We also observe the difference in the CV regression coefficient with the inclusion of coach characteristics, as was evident in the Gini equations. Finally, in model (3), neither the CV nor CV-squared terms are individually statistically significant, but they are jointly so (p-value = 0.038). The CV interaction with the number of years as a player is jointly statistically

significant and all the terms involving the CV are jointly significant (p-value = 0.005). These results support hypothesis H2 that experience influences the way in which salary distribution affects team performance.

TABLE 7

Results of Model Estimations with the Coefficient of Variation

Variables	**(1)**	**(2)**	**(3)**
Coefficient of variation	-0.426**	-0.303	0.006
	(0.168)	(0.204)	(0.288)
Coefficient of variation squared	0.053	0.029	-0.034
	(0.046)	(0.055)	(0.063)
Relative wage	0.855***	0.686***	0.595**
	(0.231)	(0.228)	(0.255)
Relative wage squared	-0.152**	-0.108**	-0.091
	(0.049)	(0.049)	(0.054)
Number of players with international experience	0.032	0.038	0.037
	(0.032)	(0.029)	(0.025)
Number of players with international experience squared	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Expansion	-0.247**	-0.278***	-0.290***
	(0.079)	(0.080)	(0.076)
Number of years playing		0.007***	0.028**
		(0.002)	(0.011)
Coefficient of variation * Number of years playing			-0.025*
			(0.014)
Coefficient of variation squared * Number of years playing			0.005
			(0.004)
Coach in first year with the current team		0.050	0.058
		(0.034)	(0.034)
Foreign coach		-0.066	-0.075
		(0.052)	(0.045)
Defender		-0.070	-0.058
		(0.049)	(0.038)
Coach turnover		-0.013	-0.008
		(0.024)	(0.025)
Number of teams previously coached		-0.001	-0.000
		(0.007)	(0.007)
Dismissed coach during the season		-0.072	-0.078
		(0.067)	(0.070)
Constant	-0.200	-0.231	-0.414
	(0.282)	(0.251)	(0.251)
R-squared	0.202	0.264	0.279

Notes: Number of observations = 217, number of id = 23. Robust standard errors in parentheses. Models include year and team dummies. The constant terms reflect the excluded team (Seattle Sounders FC) and the excluded year (2005). *** p<0.01, ** p<0.05, * p<0.1.

Turning to the control variables, we can infer the following. Despite individual insignificance, particular coaching characteristics are jointly significant. Firstly, the results indicate that being a coach in the first season improves team performance relative to those who have managed the team for more than two seasons. However, Gilbert et al. (2006) report that it is the combination of experience as a player and coaching education that tends to increase the efficacy of the coach. Unfortunately, we have no information on coaching education to enable us to include this variable in the model. Secondly, being a foreign coach has a negative impact on team results. The coach (or manager) communicates with the media prior to and after the match, picks the squad, determines the line-up and decides the strategy, is responsible for interventions such as substitutions, actively supervises training sessions and sometimes is even responsible for transfer-market policies and scouting. According to the statistics, at least two foreign coaches are replaced by Americans each season (Levy, 2013). It has often been suggested that American coaches thrive in MLS because they have a better understanding of the systems of American sports and the structure of the league, with foreign coaches struggling to acclimate to the way the US develops players to matriculate to the professional ranks. As a large share of coaches are from Europe, this cultural difference could explain the negative sign. Moreover, Maderer et al. (2014) obtained similar results after investigating 98 clubs in the five largest European football leagues. Scholars have observed that the intercultural experience of a coach has a negative impact on team performance. However, Wulf and Hungenberg (2006) found that greater cultural diversity contributes significantly to sporting success, while del Corral, Maroto and Gallardo (2015) observed a positive effect of being a foreign coach in the Spanish basketball league. Interestingly, the result indicates that the more teams a coach has managed before taking the current job, the worse the performance of his current team. This evidence is consistent with that of Tervio (2009) showing how mediocre talent is repeatedly hired while highly talented individuals may not be able

to get a job. Moreover, coaches who have held many jobs may find it difficult to establish close relationships between themselves and the players, and these weak interpersonal relationships may be detrimental to team success. The same effect holds for coach turnover: clubs that have had more coaches in their history, at a given season, perform worse than those with less managerial flux. Finally, as we hypothesized, the dismissal of a coach during the season leads to lower sporting performance, although the coefficient is not statistically significant.

Taken as a whole, the evidence above is supportive of the important role of coaches' playing experience as a determinant of team performance, both directly and indirectly. Moreover, these results are consistent with the hypothesis that the distribution of the salary bill across players on the team affects team performance differently for teams with a wide salary distribution than for those with concentrated salaries. Of course, the evidence above does not indicate the strength of the effects. In what follows, the marginal effects of the salary distribution and the coach experience are reported.

TABLE 8

Results of Average Marginal Effects (Elasticity Coefficients) Estimation

Dependent variable	**Gini-coefficient**			**Coefficient of Variation**		
Models	(1)	(2)	(3)	(5)	(6)	(7)
Gini coefficient	-0.806**	-0.542*	-0.563**			
Coefficient of variation				-0.340**	-0.269**	-0.262**
Relative wage	0.560**	0.423**	0.418**	0.460**	0.395***	0.351***
Number of players with international experience	0.087	0.040	0.046	0.070	0.035	0.040
Expansion	-0.014**	-0.018***	-0.018***	-0.016**	-0.018***	-0.019***
Number of years playing		0.090**	0.087***		0.084**	0.088***
Coach in first year with the current team		0.018	0.022		0.024	0.028*
Foreign coach		-0.047	-0.046*		-0.039	-0.044*
Defender		-0.028*	0.025*		-0.027	-0.022
Coach turnover		-0.039	-0.026		0.034	0.020
Number of teams		-0.004	-0.002		-0.001	-0.001

previously coached					
Dismissed coach during the season	-0.008	-0.008		-0.007	-0.008

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table 8 indicates average marginal effects. For example, worsening of the salary distribution significantly reduces team performance and increasing the Gini coefficient by 10% reduces team points by between 5.4% and 8.1%. Increasing the coefficient of variation by 10% reduces team points by 2.7% to 3.4%. Interestingly, the marginal effect of having playing experience is also individually statistically significant in all models: increasing it by 10% raises team points by about 1%.

We also investigated the distribution of marginal effects. The results for playing experience are shown in Table 9. The marginal effects are computed for each year of playing experience but are only reported every three years in the table. The results show that the marginal effects do not change much year by year, but between little experience and a great deal of experience the differences can be quite large. For example, the marginal effect of playing experience roughly doubles from the first year to the 23rd year.

TABLE 9

Results of Marginal Effects (Elasticity Coefficients) At Point's Estimation for the Models 3 and 6

Number of playing years' experience	Gini	CV
1	-0.429*	-0.155
3	-0.457*	-0.173*
6	-0.498*	-0.199**
9	-0.539*	-0.225**
12	-0.581**	-0.252**
15	-0.622**	-0.278**
18	-0.633**	-0.304**
21	-0.705*	-0.331**
23	-0.732*	-0.348**

Notes: ** p<0.05, * p<0.1.

Our prior expectation was that greater experience would weaken the harmful impact of a wide wage diversity on team success; we expected greater experience to cause the marginal effect

to become less harmful, i.e., to become closer to zero. However, the results show that each year of the coach's playing experience increases the negative effect of salary distribution. A possible explanation for this result, as described above, is that as coaches' age, the age difference between them and their players grows. This greater difference in age might make coaches less able to relate to their players and may accentuate the harmful effects of wide salary dispersion. To assess this possibility, we have conducted robustness tests using age in place of playing experience.

V. ROBUSTNESS CHECK

We conducted several robustness checks, the results of which are available upon request. For the primary robustness check we used the coach's age instead of playing experience, hypothesizing that years as a player is a proxy for age. The results are presented in Table 10 and are not much different from the previous ones. In fact, the results are a little weaker in the case of age than in the case of years of playing experience. Note that age is not individually significant in either the Gini or the CV equation, though years of playing experience was significant in both in Tables 6 and 7. The joint hypothesis test, which assumes that when the Gini and its square both interact with age each has a zero coefficient, cannot be rejected. However, the similar interaction of years of playing experience with Gini and Gini squared rejected the null hypothesis. The implication is that our findings with respect to playing experience are not because playing experience is a proxy for the age of the coach.

As a further robustness check, we looked for differences between coaches from five top European leagues and other leagues. The results are consistent with those given above. Furthermore, we obtained the same results whether Houston was counted as an expansion team in 2006 (its first year after moving from San Jose) or treated as a continuous franchise.

Finally, we included the dummy variable indicating a new head coach, i.e., one without any previous experience as a head coach, in combination with the dummy indicating the first year with

this team. The results indicate that experienced coaches in their first year with a new team positively influence team results, but an inexperienced coach in his first top-division coaching assignment has no effect on team performance. However, more importantly, the results for salary distribution and years of playing experience are unchanged.

TABLE 10
Results of the Robustness check

Salary distribution metric	Gini-coefficient		CV	
Variables	(1)	(2)	(3)	(4)
Gini coefficient	-0.366	2.282		
	(0.828)	(5.853)		
Gini coefficient squared	-0.864	-2.196		
	(0.964)	(5.094)		
Coefficient of variation			-0.334	0.477
			(0.202)	(0.686)
Coefficient of variation squared			0.033	-0.143
			(0.051)	(0.211)
Relative wage	0.752**	0.718**	0.716**	0.718***
	(0.346)	(0.333)	(0.258)	(0.239)
Relative wage squared	-0.113*	-0.101	-0.120**	-0.113**
	(0.062)	(0.062)	(0.055)	(0.050)
Number of players with international experience	0.029	0.036	0.033	0.039
	(0.032)	(0.031)	(0.031)	(0.030)
Number of players with international experience squared	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Expansion	-0.256***	-0.252**	-0.263***	-0.260**
	(0.091)	(0.095)	(0.090)	(0.094)
Coach age	0.003	0.026	0.001	0.017
	(0.003)	(0.038)	(0.003)	(0.011)
Gini coefficient * Playing experience		-0.061		
		(0.133)		
Gini coefficient squared* Playing experience		0.032		
		(0.111)		
Coefficient of variation * Coach age				-0.017
				(0.014)
Coefficient of variation squared * Coach age				0.004
				(0.004)
Coach in the first year with the current team	0.078*	0.080*	0.079*	0.081*
	(0.045)	(0.046)	(0.044)	(0.045)
Foreign coach	-0.036	-0.046	-0.021	-0.028
	(0.055)	(0.054)	(0.054)	(0.052)
Defender	-0.035	-0.053*	-0.037	-0.057
	(0.034)	(0.030)	(0.039)	(0.037)
Coach turnover	-0.011	-0.013	-0.012	-0.016
	(0.031)	(0.033)	(0.029)	(0.030)
Number of teams previously coached	-0.004	-0.005	-0.002	-0.003
	(0.007)	(0.007)	(0.007)	(0.007)
Dismissed coach during the season	-0.087	-0.083	-0.075	-0.067
	(0.066)	(0.066)	(0.067)	(0.068)
Constant	-0.291	-1.316	-0.229	-0.993*
	(0.394)	(1.621)	(0.267)	(0.520)

R-squared	0.212	0.220	0.234	0.243

Notes: Number of observations = 217, number of id = 23. Dependent variable is *lnPOINT*. Robust standard errors in parentheses. Models include year and team dummies. The constant terms reflect the excluded team (Seattle Sounders FC), the excluded year (2005) and the excluded coach age category (0-1 years). [a]Coefficient multiplied by 10. *** p<0.01, ** p<0.05, * p<0.1.

VI. DISCUSSION

Investigating the impact of executives' experience on company performance is an important topic in empirical research. However, intra-firm data over time are scarce, and therefore the real effect of top leaders' background is difficult to evaluate. Data on sports offer a unique opportunity to study this phenomenon because within-team data are available. Despite the number of studies in the literature on the impact of leader (or coach) personal characteristics, particularly experience, on firm (or team) performance, research on the topic remains vibrant. Another popular research stream investigates the relationship between wage disparity and results produced by the team. Both streams have an important place in the research on organizational behavior. In the case of coach characteristics, scholars mostly agree about their significant direct role in producing team outcomes. Studies on pay inequality have contradictory findings and the results depend on the inequality measure and functional form used. One of the explanations for the contradictory findings may be the underestimation of the coaches' role when modeling the linkage between wage disparity, individual efforts and team performance. However, relatively little is known in the empirical literature about how the introduction of the role of the coach (or supervisor) alters results in the research on the influence of wage inequality on team performance.

This paper has aimed to fill this gap by investigating the moderating effect of the coach on the relationship between wage differentiation and team performance. The analysis uses professional soccer teams from Major League Soccer covering the seasons between 2005 and 2017. We have tested the model allowing for a nonlinear effect of wage distribution as well as interaction

terms of salary inequality and coach experience as a player and as a coach on team performance, measured by the natural logarithm of points per game. Two widely used measures of salary variation have been used: the Gini coefficient and the coefficient of variation. According to Levine (1991), greater wage disparity motivates jealousy and mistrust amongst workers in a firm (team) and reduces overall performance. Our intuition suggested that more experienced coaches can decrease the negative impact of salary inequality because they are better at relating to the players and at creating team 'chemistry'. We have found weak evidence that coaching experience as a player individually significantly influences team performance and that it does so jointly with salary inequality. Specifically, we have concluded that for coaches with experience as a player there is a statistically significant impact on the harmful effect of wage dispersion on team results, especially for the coefficient of variation. Contrary to our intuition, however, this effect worsens the negative effect on performance of greater salary inequality. The results of joint hypothesis tests of significance indicate that including the playing experience variable in the relationship between salary dispersion and performance gives a better understanding of the relationship. Our results are in line with those of several papers in the literature (Coates, Frick, and Jewell 2016; Jewell and Molina 2004; Kahane 2012) that suggest that pay dispersion causes perceptions of inequity and relative deprivation that are detrimental to cooperation. Our results contradict those that find pay dispersion can motivate employees to work harder (Breunig et al. 2014; Simmons and Berri 2011).

Computing marginal effects of salary dispersion at different levels of coach playing or coaching experience provides interesting insights into the relationship between salary dispersion and team production. Firstly, the effect of experience is generally to worsen the harmful effect of increasing salary dispersion. This is true whether the experience in question is time spent as a player or as a coach. Secondly, number of years as a player has a much larger range of influence than number of years as a coach: the elasticity roughly doubles from the first to the 23rd year of playing

experience (the maximum in our data) while it only increases from 12% to 17% for the same increase in years as a coach. Thirdly, regardless of the years of experience, performance is inelastic with respect to salary dispersion.

Overall, the paper contributes to the human capital and labor economics literature by advancing our knowledge about the leaders' impact on performance, which highlighted the managerial implications for club owners and league. Firstly, the literature on salary dispersion has rarely included measures of coaching quality. Our conclusion indicates that executives' experience (or human capital in broader terms) should not be ignored in studies of the influence of salary dispersion on sports or company performance. Secondly, to the best of our knowledge, this is the first paper to analyze the indirect impact of coach experience through its impact on the role of wage dispersion in determining team results. Thirdly, the empirical evidence suggests that coaches' experience as players is more relevant for team production than their experience as coaches. This result also carries over to the impact of experience on the marginal effect of the salary distribution. The conclusions have practical implications for the clubs' investors and managers as well as soccer league organization. This may also have implications for business management.

The study has several limitations, giving us avenues for future research. The first limitation is the dataset, because we explored only one league. Comparing the results with those from other leagues is necessary to understand the generality of the issue. An additional limitation is that we investigated only coach experience, as a coach and as a professional player, whereas other coach personal characteristics may also influence team success. Finally, pay dispersion may be a weak proxy for dispersion of player abilities, in which case our results suggest that coaches with greater experience are poorer at managing teams with wide differences in ability than those with less experience. In future work, we will address these limitations.

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