Youth Development as a Means for Outperformance in the English Premier League

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Abstract:

There is a strong historical correlation between the financial standing of a Premier League club, from the revenue of the club to the wages paid to players, and their performance in the League. The purpose of this paper is to evaluate the extent to which an emphasis on youth development contributes to a club's ability to outperform their expected finish, as determined specifically by wages paid to players. By building a logistic and linear regression model of several indicators of a youth development emphasis, such as the minutes dedicated to youth players to the average age of transfers, against the difference between a club's league finish and wage rank, we conclude that emphasizing certain facets of youth development do significantly correlate with a club's outperformance of wage rank. Finally, we attempt to hypothesize qualitative reasons for the significance of those facets of youth development, and reconcile the results of the regressions with real-life observations of team and player performance.

Outline

I. Introduction

"My team and I love helping young players. It's like planting a tree, watering it and watching it grow. All the fruit that it bears comes from the land and environment that you put in place. There's nothing quite like winning with the team you joined at 13 or 14 and have given your heart and soul to. You then move on to play for the first team with a feeling of identity that offers the team an added extra." – Mauricio Pochettino, Manager of Tottenham Hotspur

The purpose of this paper is to examine whether an emphasis on youth and homegrown player development in Premier League clubs is significantly correlated with the historical outperformance of clubs to their expected finish, as determined by the wages paid to players. In this paper, we will construct a linear and logistic regression model of the level of over- or under-performance of Premier League clubs against numerous indicators of the level of emphasis on youth development in Premier League clubs, such as the average age of the squad, minutes allocated to homegrown players, or quality of youth facilities and coaching. We will then evaluate different facets of youth development on their impact on the outperformance of a club, based on the significance of their coefficients in the regression models.

The motivation for this topic is the success of Mauricio Pochettino's Tottenham Hotspur in the past 3 years of the Premier League. Since he joined Tottenham in 2014, Pochettino has implemented a philosophy of youth development at the club, handing numerous players from the Tottenham academies and youth teams their first team debuts, and turning many of them into fixtures on their respective international teams and some into the best players at their positions in the Premier League. This includes players such as Dele Alli and Eric Dier, who joined the club at young ages (under 21), as well as homegrown players such as Harry Kane and Danny Rose, who came through the Spurs academy. And in effect, despite having the lowest total

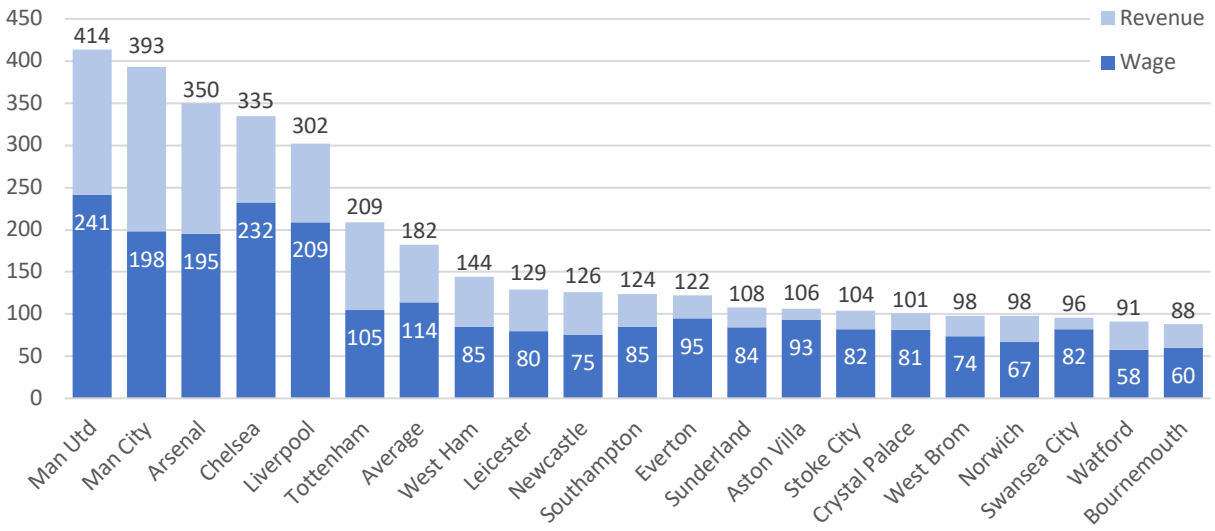
wage bill and revenues of the "Top 6" Premier League clubs, Pochettino led what was the youngest squad in the Premier League to a 3rd and 2nd place finish over the past two seasons.

Addressing this exact philosophy, both Pochettino and John McDermott, the Head of Youth Development of Tottenham Hotspur, have stated that youth and homegrown players have a "passion and commitment" to the club that is unteachable, and becomes extremely valuable to the club further in the player's development. And in this regard, the question of whether there is a connection between outperformance and youth development may also be interpreted as whether there truly is an additional "value" presented to Premier League clubs by their homegrown and developed youth players.

a. Wage and Performance

Historically, one of the strongest predictors (or determinants) of performance in the Premier League is the financial standing of club, including the revenue of the club and the wages paid to players.

Figure 1: Premier League Clubs' Revenues and Wages, 2015-16 (£m)



Source: Deloitte 2017 Review of Football Finance

The disparity of wealth in the English Premier League is wider than most other sports leagues, with a difference of almost 400% between the highest earning club, Manchester United, and the lowest, Bournemouth FC. In comparison, this difference is more than twice as large as difference between the highest and lowest revenues of teams in the NFL in the same year, the Dallas Cowboys and the Oakland Raiders. Furthermore, whereas in the NFL, there are numerous measures in place with the purpose of enforcing competitive parity in the league, including revenue sharing, reverse order drafts, and salary caps, such measures largely do not exist in the English Premier League. Rather, there are many measures in place in the Premier League that have the opposite effect; for instance, prize money is awarded based on performance, the top 4 clubs in the league participate in the Champions League (which is a tremendous revenue source itself), and broadcast revenue partially distributed based on viewership and performance. All of these measures seem to have the effect of expanding the disparity of wealth in the league and concentrating wealth in the few clubs that are able to succeed on a consistent basis.

One empirical example of this connection between wealth and performance is what pundits refer to as the "Top 6" of the English Premier League, which includes Manchester United, Manchester City, Chelsea, Arsenal, Liverpool, and Tottenham Hotspur. These clubs have been labeled as such because of the substantial gap between their revenue and wages and those of next highest club, from £209m in revenue for Tottenham Hotspur to £144m in revenue for West Ham United. However, the "Top 6" clubs may just as well have earned their title based on performance, as the clubs have claimed at least 5 out of the top 6 spots in the league every year since 2009-10 (when Manchester City joined the "Top 6" after a financial takeover), and in

about half those seasons, have claimed all 6 spots. Furthermore, since the turn of the millennium and until Leicester City won the league in the 2015-16 season, no Premier League team outside of top 3 in wages paid to players had ever won the league title.

A simple linear, ordinary least squares regression on the points gained in the league against the wages of teams paid to players strongly affirms this connection between wages and performance. Data for points gained are taken from Premier League tables from the 2003-04 season to the most recent 2016-17 season, while wage data are collected from annual reports published by Companies House, the UK registrar of companies.

Figure 2: Linear OLS Model Estimate of League Points against Wage

Variable	Estimate	Std. Error	t-value	Pr(>|t|)
constant	35.946	(1.300)***	27.64	<2e-16
wage	0.220	(0.015)***	15.26	<2e-16
R^2	0.4593			
# Observations	278			

*** signifies significant to 0.1%
Dependent Variable: league points scored
Results from 2003-04 to 2016-17

Evidently, with a positive coefficient significant to 0.1%, wage is a strong indicator of performance in the Premier League. Similarly, both the Pearson's correlation coefficient between wage and points and the Spearman's rank correlation coefficient between wage rank and league table position return strong results – for the 2016-17 season for example, the correlation coefficients were 0.859 and 0.787 respectively, signaling extremely strong positive correlation. Interestingly, the 2015-16 season in which Leicester City won the league with the 15th highest wage is the only exception to this correlation, with Pearson's and Spearman's

correlation coefficients of 0.428 and 0.541, respectively – however, this season is best regarded as an outlier due to the exceptional (and unrepeated) nature of the Leicester campaign.

That being said, as the R^2 of 0.4593 shows, there are certainly other factors beyond wage spend that contribute to a club's performance on the pitch and in the league. This variance is exemplified by instances of extreme outperformance by clubs in a season, such as the 2015-16 Leicester City campaign, or the 9th place finish of Bournemouth in 2016-17 with the League's lowest player wage bill. Moreover, it is evidenced in instances of consistent outperformance of a club across several seasons – for example, teams such as Tottenham Hotspur and Southampton have managed to outperform their wage ranking consistently over many years. And it is in these consistent outperforming clubs that youth development emerges as a new possible variable for the outperformance of player wage rankings.

b. Youth Development in the Premier League

Since 2014, with the arrival of manager Mauricio Pochettino, Tottenham have outperformed their wage rank of 6th by an average of 3 places, which many pundits attribute to Pochettino's incorporation of youth and homegrown players into the first team squad. Similarly, Southampton is known for a highly productive youth academy, having produced exceptional premiership talent in the past, such as Alan Shearer and Gareth Bale – and like Tottenham, Southampton have outperformed their expected rank by an average of 5 places since rejoining the Premier League in 2012. The common element of youth development in the cases of these two teams provides motivation for the examination of youth development as a means of achieving consistent outperformance in the Premier League.

In a sense, the connection between wage and performance is grounded in economic fundamentals. From a labor economics perspective, the wages of a player represents that player's marginal product of labor, which intuitively, is the player's talent or contribution on the pitch. The more talented players who are able to add more to the success of the club will demand higher wages; therefore, clubs that are able to afford higher wages for players will inevitably attract and accumulate players with greater amounts of talent, and will thereafter perform the better in the league.

This economic interpretation of players' wages, however, leaves room for youth development as a means to achieve greater than expected return. Youth and homegrown players typically demand lower wages than players in the "prime" years of their career (typically 27 to 30 years old), because of the notion that their talent is not yet fully developed or guaranteed. Therefore, clubs that are able to successfully develop youth players to perform at high levels, whilst paying those players youth-level wages, will achieve a greater marginal product of labor on the wages paid to players, and will in effect, outperform in the league. Pochettino himself addresses this notion by suggesting that young homegrown players "play for the first team with a feeling of identity that offers the team an added extra", which seems to highlight the exact concept of achieving a higher return on player wages for young players.

In this regard, youth development is often seen as a contrary philosophy to that employed by the wealthiest clubs. As previously mentioned, youth players earn less than fully-developed players because of the uncertainty of their future marginal product of labor (i.e. their future talent). Therefore, the intuition holds that clubs without the resources to transfer established talent will opt instead to develop young players in attempt to pay youth-level

wages for higher levels of talent, whereas wealthier clubs would opt to pay higher wages for established, lower risk players. Furthermore, a club that promote players from youth academies or buys young players on the market before they reach their peak value will effectively save transfer cost compared to transferring older players performing at their peak levels, but also incurs a risk on the uncertainty of the young player's development and future value to the club or on the market. Many examples of success in this philosophy and its economic returns exist – such as Gareth Bale, who was purchased by Tottenham from Southampton in 2007 for £5m, and sold in 2013 for £71m – while many examples of this gamble not paying off exist as well.

This generalized notion of youth development exemplifies the core tenant of the hypothesis of this paper, which is that youth development provides a statistically significant means of achieving a level of performance that exceeds the expected level determined by wages. That said, it is worth noting that it does not necessarily align with how youth development manifests in reality in England and the Premier League, as wealthy clubs do certainly invest heavily in youth development, and lower-table clubs often acquire older players as well. In fact, it is often argued that the system of youth development itself, as dictated by the Elite Player Performance Plan (EPPP) of 2015, heavily favors wealthy clubs.

The Elite Player Performance Plan (EPPP) was established by the English Football Association in 2015 to introduce a structure of youth development in the Premier League. Among other more detailed institutional changes to player coaching and education, the EPPP most notably introduced a system of academy categorization, in which each club youth academy is independently audited and assigned a category status of 1 to 4, which determines their participation in the established system of youth leagues titled the Professional

Development League. Category 1 academies, which includes academies of most Premier League clubs, participate in the Premier League 2 and the U18 Premier League, for U23 and U18 academy teams respectively. The specific criticism that is often level against the EPPP is that its rules of fixed fee transfers – which states that a youth player can be bought for a fixed fee based on the length of their time at the academy, replacing the previous independent tribunal for compensation – and youth player scouting – which states that any category 1 academy can go to any other training ground and watch a player – both favor elite clubs, and allow elite club academies to poach and hoard the best youth talent. In fact, several youth academies of lower league clubs have closed since 2015, citing the EPPP as the reason for closure.

II. Analysis

In order to test whether an emphasis on youth development is significantly correlated with the outperformance of a club's wage rank, we will construct a logistic and a linear regression model of outperformance of clubs on various indicators of a Premier League club's "emphasis" on youth development. We will begin by identifying a set of important facets of youth development to inform the selection of independent variables of the model, and will then draw conclusions on the importance of each facet of youth development and the interactions between them, based on the results of the regression.

a. Hypothesis

The labor economics interpretation of player wages and talent as the player's marginal product of labor leaves room for youth development as a means of achieving a higher marginal product of labor on lower levels of wage. This provides a strong case for the hypothesis that youth development does contribute significantly to a Premier League club's outperformance of

the rank of their wages against other clubs. Empirically, this hypothesis seems to be consistent with the cases of consistent outperformance of clubs previously discussed as well – namely, Tottenham since 2014 and Southampton since 2012 – because the shared attribute of both clubs which pundits identify as the keys to their consistent outperformance was their emphasis on youth development.

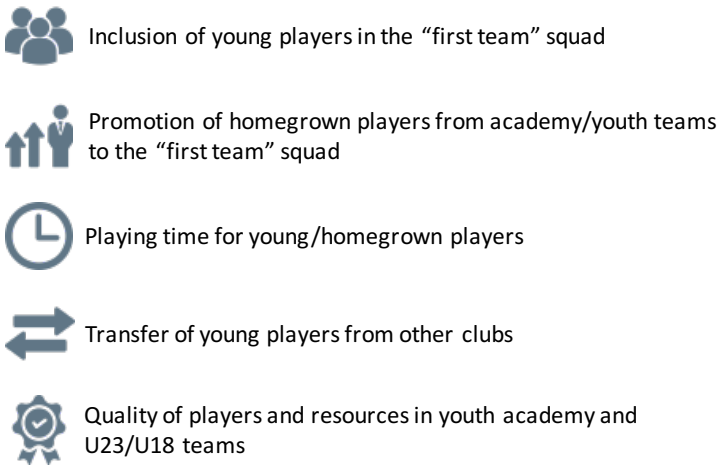
b. Methodology

This paper will construct two regression models, each of which will have a different measure of outperformance as the dependent variable, and various indicators of a club's "emphasis" on youth development as the independent variables. The first model will be a logistic regression with a binary variable indicating outperformance as the dependent variable, intended to measure the contribution of youth development on the frequency of occurrences of outperformance in the Premier League. The second regression will be a linear ordinary least squares regression model with the difference between the ranks of the club's wage and league standing as the dependent variable. This second model will measure the impact of youth development on the level of over- or under-performance in the Premier League, rather than simply their frequency, and will hopefully add additional insight on top of that provided by the logistic regression.

Variables selected as indicators of the level of "emphasis" a Premier League clubs places on youth development should capture the most important qualities of a youth development philosophy. While youth development is manifested in different ways across different Premier League clubs, we will point to several important tenants of youth development shared across clubs at all levels of the Premier League, and which will be used as the basis for the selection of

independent variables for the regression models. These different facets of youth development are listed below in Figure 3.

Figure 3: Core Facets of Youth Development



The first important tenant of youth development is the "inclusion of young players in the 'first team' squad". The 'first team' squad is determined after the closing of the summer transfer window at the start of every Premier League season, at which point every club must publish a list of 25 players who qualify as members of the 'first team' squad. The inclusion of young players in this squad is a sign of the willingness of the club to involve and rely on young players as part of the tactics and performance of the team in the league, and is therefore an important quality of a youth development philosophy. Secondly, the "promotion of homegrown players from academy/youth teams to the 'first team' squad" represents the willingness of a club to rely on its academy to produce talent for the first team, rather than exclusively acquiring talent from outside clubs. Thirdly, "playing time for young and homegrown players" is important to the development of young players, as experience on the pitch is regarded as one of the most important means of learning and growth for young players. This quality also represents the club's willingness to take risks on playing young players, who are potentially

more error prone or not fully developed. Fourthly, the "transfer of young players from other clubs" is intended to encapsulate the level of youth emphasis in the transfer policy of clubs. The transfer of young players can be viewed as a commitment to develop and gain on the investment paid to those players, and therefore is reflective of a club's emphasis on youth development. Finally, the "quality of players and resources in the youth academy and U18/U23 teams" represents the quality of the youth development system implemented by the club. Higher quality academies and youth players may be indicative of a club's willingness to rely on their academy for first team talent – as is the case with Southampton's renowned academy.

Given these core facets of youth development, there were eight variables chosen to represent an "emphasis" on youth development, which collectively should represent all five of the core facets. These variables and their definitions are provided below:

- avg_age: the average age of squad members who recorded at least 1000 minutes of playing time over the course of the season. This is a simple variable used to indicate the level of youth involvement in the squad, based on the number of young players training and playing with senior team members. There were two reasons that 1000 minutes was chosen as a baseline for the number of minutes a player must be involved to be included in this measurement: firstly, 1000 minutes is an approximate lower limit for players who feature regularly in the starting 11 or as a substitute, and secondly, to avoid dilution of this metric by the inclusion of young players in the senior squad to meet the minimum 8 homegrown players, which is required and performed of all clubs.

- u23_min: the number of senior team minutes in the League (not including domestic cup or European competition) played by players 23 years old or younger on the first team throughout the duration of a season.
- hg_min: the number of senior team minutes in the League played by homegrown players, or players who previously played for the youth academy of their current team, throughout the duration of a season.
- avg_trans: the average age of the incoming transfers (including loans and free transfers) from outside clubs to the squad.
- avg_prev_trans: the average age of transfers from the previous season, including loans and free transfers. The purpose of this metric is to account for the time it often takes, especially for young players, to become integrated in the squad and contribute to the team performance.
- u18_perf: the number of points scored by the U18 team in the U18 Premier League. This variable only includes clubs with a category 1 academy, as designated by the EPPP, and data for this variable only extends back to 2015, when the EPPP was founded.
- u23_perf: the number of points scored by the U23 team in the Premier League 2.
- academy_cat: the category status of the youth academy, as determined by the independent audit by the EPPP. This audit purportedly captures many hidden qualities of the youth academy, such as coaching, facilities, and other resources provided to youth players; and therefore, the purpose of this variable is to capture those qualities.

These eight variables provide coverage for all five core facets of youth development, as illustrated in Figure 4, below.

Figure 4: Coverage of Youth Development Facets

	Inclusion of Youth in Squad	Promotion from Academy	Playing Time for Young / Homegrown Players	Transfer of Young Players	Quality of Academy Players and Resources
Average Age	✓				
Homegrown Player Minutes	✓	✓	✓		
Young (U23) Player Minutes	✓		✓		
Average Transfer Age				✓	
Avg. Transfer Age (Previous Season)				✓	
Points in U23 League					✓
Points in U18 League					✓
EPPP Academy Category Status					✓

c. Data

Wage data for the dependent variables of both regressions are collected from Companies House, the UK registrar of companies, which publishes wage information for all Premier League clubs on an annual basis. These figures are aggregated annually in a report by Deloitte. Data for the youth development variables are aggregated from several public soccer databases. The first is FootballSquads, which is an archive of the published Premier League squads, as well as player information such as birthdates and previous clubs. The second is WhoScored, which contains player involvement statistics, including the number of minutes played during a season. The third is Transfermarkt, which contains a database of Premier League transfers. Data will be used from the previous four seasons, from 2013 to present, which provides a total of 80 data points, with 20 clubs per season.

III. Regression Results

The results of both the logistic regression model and the linear regression model show highly significant correlations between the indicators of an emphasis on youth development, and the frequency and level of outperformance in the Premier League. Between both regressions, with the exceptions of the average age of transfers in the current season (avg_trans) and the league points scored by the U23 youth team (U23_perf), the two regressions are consistent in significance and sign of the regression coefficients, and therefore, provides strong verification of the effects of the variables. In the linear regression, the R-squared value of 0.7628 indicates that the youth development variables capture a fairly comprehensive amount of the variance of outperformance. The results of the regressions are tabulated below in Figures 5 and 6.

Figure 5: Logistic Regression Model

Variable	Estimate	Std. Error	t-value	Pr(>|t|)
constant	16.81	(3.111)***	5.403	0.0010
avg_age	-0.319	(0.094)**	-3.411	0.0113
u23_min	-5.347e-05	(2.793e-05)*	-1.915	0.0971
hg_min	-1.893e-04	(5.741e-05)**	-3.298	0.0132
avg_trans	-3.855e-02	(8.591e-02)	-0.449	0.6672
avg_prev_trans	-0.202	(5.864e-02)**	-3.453	0.1065
U18_perf	1.910e-03	(5.558e-03)	0.344	0.7411
U23_perf	-3.360e-02	(8.319e-03)***	-4.039	0.00494
academy_cat	-	-	-	-
# Observations	80			

*, **, *** signifies significant to 10%, 5%, 1%
Dependent Variable: outperformed
Results from 2003-04 to 2016-17

Figure 5: Linear Regression Model

Variable	Estimate	Std. Error	t-value	Pr(>|t|)
constant	126.6	(29.81)***	4.246	0.0038
avg_age	-1.554	(0.090)	-1.733	0.1267
u23_min	-0.065e-04	(2.675e-04)**	-3.388	0.0116
hg_min	-3.252e-04	(5.499e-04)*	-0.591	0.5729
avg_trans	-1.880	(0.823)*	-2.284	0.0563
avg_prev_trans	-1.182	(0.562)*	-2.104	0.0734
U18_perf	1.923e-02	(5.324e-02)	0.361	0.7287
U23_perf	-9.505e-02	(7.969e-02)	-1.193	0.2719
academy_cat	-	-	-	-
R^2	0.7628			
# Observations	80			
F-statistic	3.216*			

*, **, *** signifies significant to 10%, 5%, 1%
Dependent Variable: rank_diff
Results from 2003-04 to 2016-17

Notably, the coefficients of all significant independent variables in both regressions is negative, indicating a negative correlation between all variables and the level of outperformance. For certain variables, including the average age of the squad (avg_age) and the average age of transfers in the current and previous seasons (avg_trans and avg_prev_trans), this negative coefficient is consistent with the hypothesis that an emphasis on youth development – indicated in these specific variables by younger squads and younger incoming transfers – is significantly correlated with outperformance in the Premier League.

However, in regards to the independent variables which serve as indicators of playing time dedicated to youth players (u23_min and hg_min), the negative correlation coefficient goes against the expectations of the hypothesis, which would be that dedicating greater amounts of playing time to youth players would increase outperformance. Rather, the results of the regression indicate the effect that increasing playing time for youth players is significantly correlated with underperformance of Premier League sides. Possible explanations for this

negative correlation could include youth players being more error prone than older and more experienced players, and therefore greater minutes for youth players would negatively impact the performance of the team. It is also a possible bias that youth players are disproportionately given playing time for Premier League sides that have no better alternative to those players (i.e. teams that are initially more likely to underperform), and therefore, that reverse causality induces the negative coefficient on the independent variables.

That being said, coupling the suggested effects of the negative correlation coefficients of average squad age and youth player minutes, one possible conclusion that can be derived from these effects is that the best role of a youth player for a Premier League team seeking to outperform wage rankings is a substitute player, or non-core squad member. This position would minimize the negative effect of youth player minutes, while simultaneously inducing the positive effect of a lower average squad age. Having youth players in this non-core role may reduce the negative effect of error proneness on the pitch, due to minimized playing time and tactics being built around more established and experienced players, while deriving the benefit of their inclusion in the squad, possibly by providing competition and motivation for core squad members.

In regards to the variables of the performance of U18 and U23 teams in their respective youth leagues, the regression models returned ambiguous or insignificant results for both variables. The points scored by the U23 team (u23_perf) was determined to be significant and negative against outperformance in the logistic regression model; however, this result was not repeated in the linear regression model. The ambiguity of results for these variables can possibly be interpreted as a misalignment between the motivations of performing well in the

youth league and developing talent for the first team, the former of which is modeled by these variables, and not the latter. For example, if a player in the youth academy is strongly prospected for the first team and is on bad form in the youth leagues, the motive of performing well in the youth league may suggest not fielding the player, whereas the motive of developing talent for the first team would suggest doing so. While a potentially interesting conclusion from these variables, this misalignment between the motive modeled by these variables and the motive intended to be captured may also be viewed as a limitation of the model, and may suggest that different variables are necessary in order to capture the effect of the "quality of players and resource in the youth academy" facet of youth development. To a similar effect, the variable of academy category status given by the EPPP independent audit (academy_cat) was omitted, due to lack of significant variance within data points. Between 80 and 90 percent of Premier League teams in the seasons included in these models had an academy category status of 1, and therefore, there were not enough informative data points for this variable to meaningfully include in the regressions.

IV. Conclusion

The results of the logistic and linear regression models affirm a connection between an emphasis on youth development and outperformance in the Premier League, although not as straightforwardly as hypothesized. Different facets of youth development have differently significant and directional effects on the tendency of a Premier League club to outperform. An emphasis on youth development is positively correlated with outperformance specifically in regards to the core facets of "inclusion of youth players in the first team squad" and the "transfer of youth players". This result is consistent with the labor economic interpretation of

player wages and marginal product of labor; namely, that successfully developing youth talent allows a team to achieve higher marginal product of labor on wages paid to players, as youth players demand lower wages than experienced players later in their career. Contrarily, the effect of the other facets of youth development are either ambiguous (in the case of "promotion of homegrown players" and "quality of youth academy") or negatively correlated (in the case of "playing time for youth and homegrown players") with outperformance. The former, we identified as being due to the misalignment of motives between developing talent for the first team (which ultimately impacts outperformance) and performing in youth leagues, and the latter can be reconciled with the effect of the "average age of squad" facet to formulate the conclusion that the best role for a youth player for a Premier League side is as a substitute, or non-core squad member.

The methodology used in this paper to construct the logistic and linear regression models presents several limitations. Firstly, the representation of the dependent variable – outperformance of a club to their player wage rank – using binary and linear variables, likely does not capture the full nuance of how outperformance occurs in the Premier League. Rather, it seems that the true "level" of outperformance of a Premier League club is exponential and step-wise, because outperformance by one or two ranks may be attributable to the variability of the competition, whereas outperformance by three or four ranks is substantially more significant. The "level" of outperformance of a club is also highly dependent on the wages of clubs around it, which is not captured in the binary and linear variables. In the Top 6, for instance, outperformance is more impressive due to the large gaps in wages between clubs, whereas in the bottom half, most clubs have wages between £80m and £100m, and

outperformance by several spots is less significant. Therefore, a dependent variable that is exponential and accounts for player wage levels (as opposed to solely player wage ranks) would likely normalize for the inherent variability of the Premier League competition, and would better identify cases of significant outperformance, as intended by the models of this paper.

Secondly, the variables selected as indicators for an "emphasis" on youth development are limited, and in some cases, do not adequately the core facets of youth development identified. Most notably, variables representing the "quality of players and resources in the youth academy", including the performance of U23 and U18 teams in their respective youth leagues and the category status of academy designated by the EPPP, were poor indicators of that facet of youth development. This was either due to a misalignment of the motives they represent and the motives they were intended to represent (in the case of the U23 and U18 performance variables), or due to limitations to the variable itself (in the case of EPPP academy categorization and insufficient spread across data points). Therefore, variables intended to represent this facet of youth development should be replaced in order to avoid these limitations, and to better evaluate the effect of 'quality of players and resources in the youth academy' on the outperformance of clubs.

Finally, the structure of the model and the selected variables assumed that youth development is applied homogeneously across all levels of the Premier League. However, as we determined, how different philosophies of youth development are implemented across different Premier League clubs at different levels of wealth is incredibly nuanced – and the eight variables chosen for the models of this paper, while a substantial start, are not sufficient to construct a full picture of youth development in the Premier League. Therefore, additional

variables can be developed to more comprehensively represent the different levels to which Premier League clubs “emphasize” youth development.

In order to fully validate the conclusions of this paper, resolving these limitations should be a first step. Beyond that, the models constructed for this paper only touch on the effect of youth development on the outperformance of Premier League clubs. Further identifying the nature of this effect has strong potential implications for our understanding of the methods to achieve success in the Premier League, and can be applied to youth development in other soccer leagues in Europe, around the world, and to the international stage of soccer as well.

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