

# WAGE DETERMINATION IN PROFESSIONAL FOOTBALL

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# INTRODUCTION

- Player wages vary widely, even among players with similar performance
- Performance matters, but does not fully explain wage differences
- Structural factors in football may shape wage outcomes

**Research Question:** What factors explain wage differences among professional football players, and to what extent do club affiliation and playing position matter once individual performance attributes are taken into account?

# LITERATURE REVIEW

Football clubs do not operate as standard profit-maximizing firms, but rather face incentives related to sporting success, reputation, and financial sustainability.

Empirical analysis: wages in professional football reflect not only individual productivity, but also organisational and market-related factors: Popularity and visibility of the player, club affiliation and playing position



# DATA DESCRIPTION

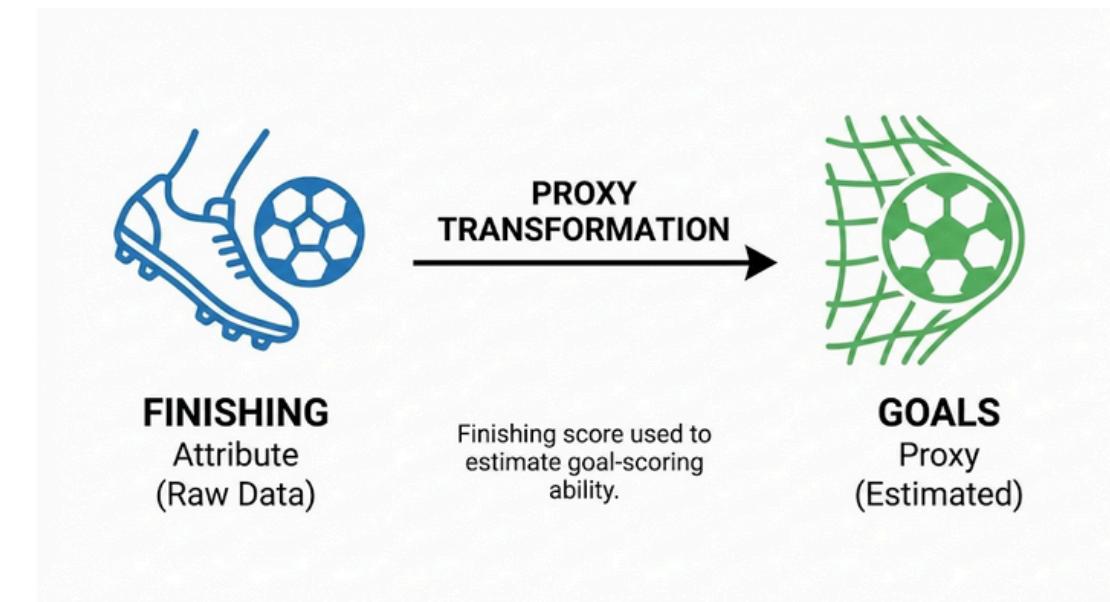
- Player-level data from the FIFA video game series, obtained from FIFA 15 to FIFA 21.

It includes over **18,000 player observations** and more than **100 variables** capturing individual performance characteristics (such as overall rating and detailed skill indicators) as well as positional information, club affiliation, and personal characteristics, players' clubs, playing positions, age, nationality, etc.

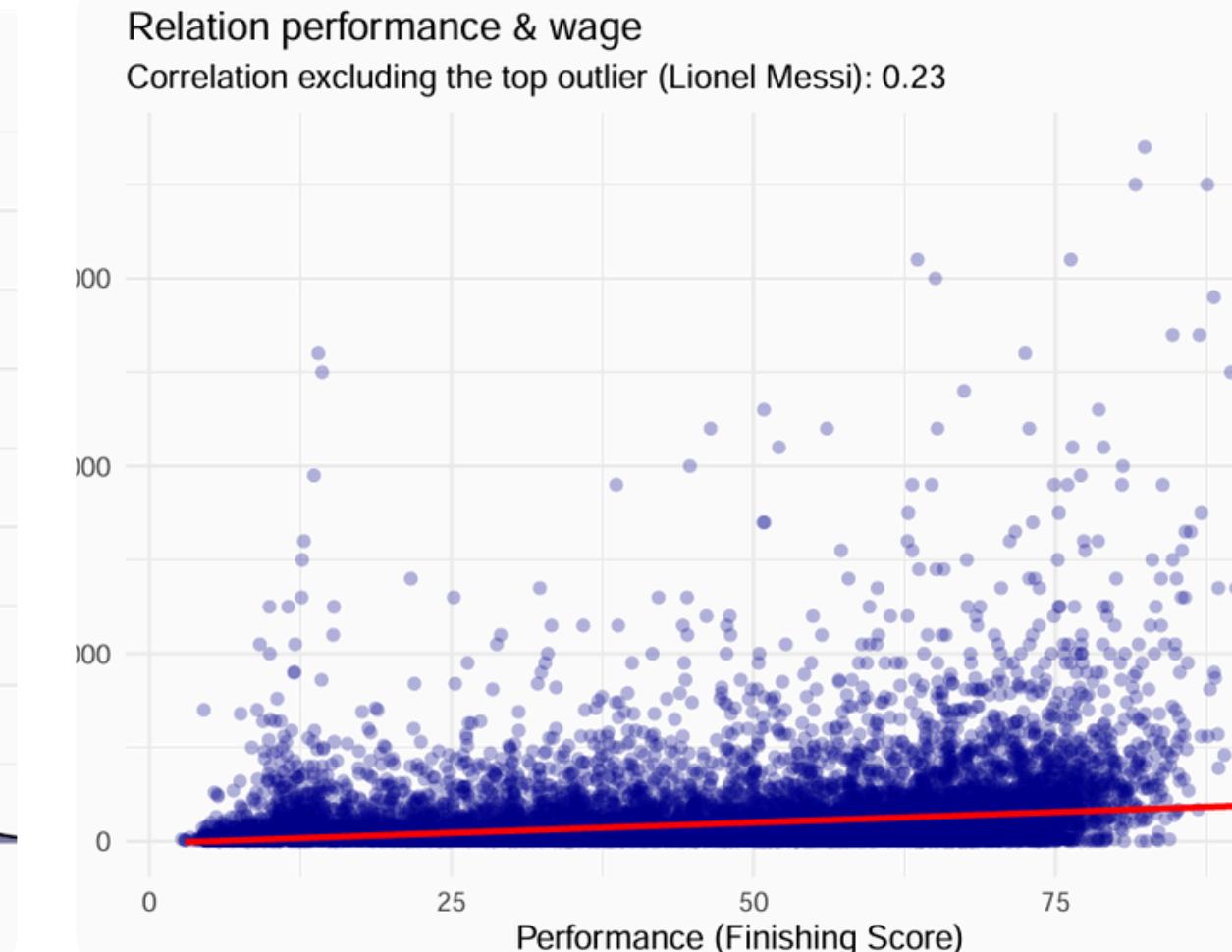
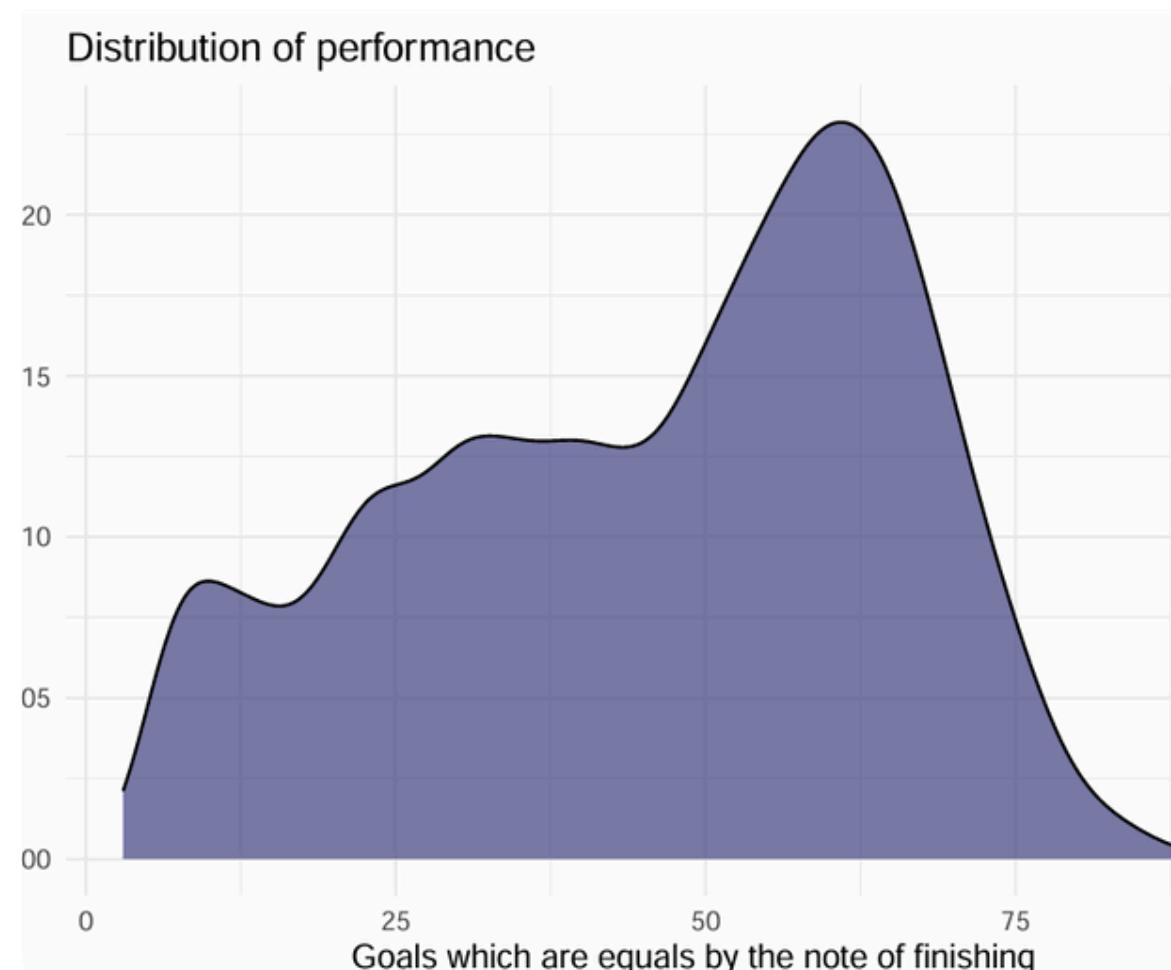
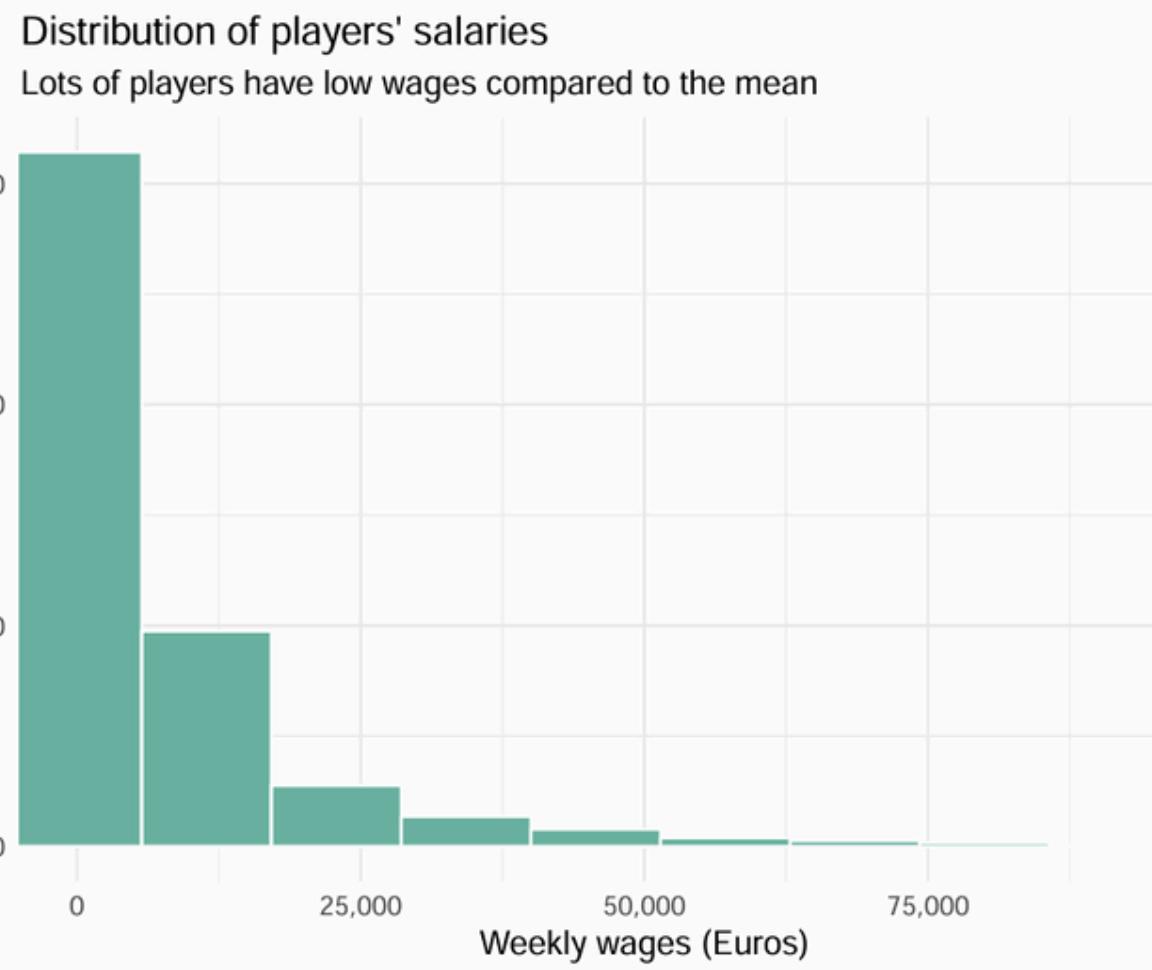
Table 1: Variable descriptions	
Variable	Description
wage_eur	Weekly wage of the player in euros (estimated by FIFA)
overall_rating	Overall performance rating assigned by FIFA
finishing	Finishing skill, used as a proxy for goal-scoring ability
base_stats	Aggregate performance indicator based on FIFA attributes
club	Club to which the player belongs
position	Primary playing position of the player
age	Age of the player in years
height_cm	Height of the player in centimeters
weight_kg	Weight of the player in kilograms
preferred_foot	Preferred foot of the player
potential	Potential rating assigned by FIFA, reflecting expected future ability

# DATA CLEANING

To transform the FIFA21 database attributes into an analyzable economic dataset, we standardized currency and physical units and engineered a '**Goals**' proxy using the '**Finishing**' score to compensate for missing match statistics. Our initial exploration revealed a highly skewed wage distribution, necessitating the exclusion of extreme outlier **Lionel Messi** to properly observe the underlying trends.



# DESCRIPTIVE STATISTICS AND EXPLORATORY ANALYSIS



**Big wage inequality: concentration of players in the lower ranges.**  
**High salaries are not representative of the average player**

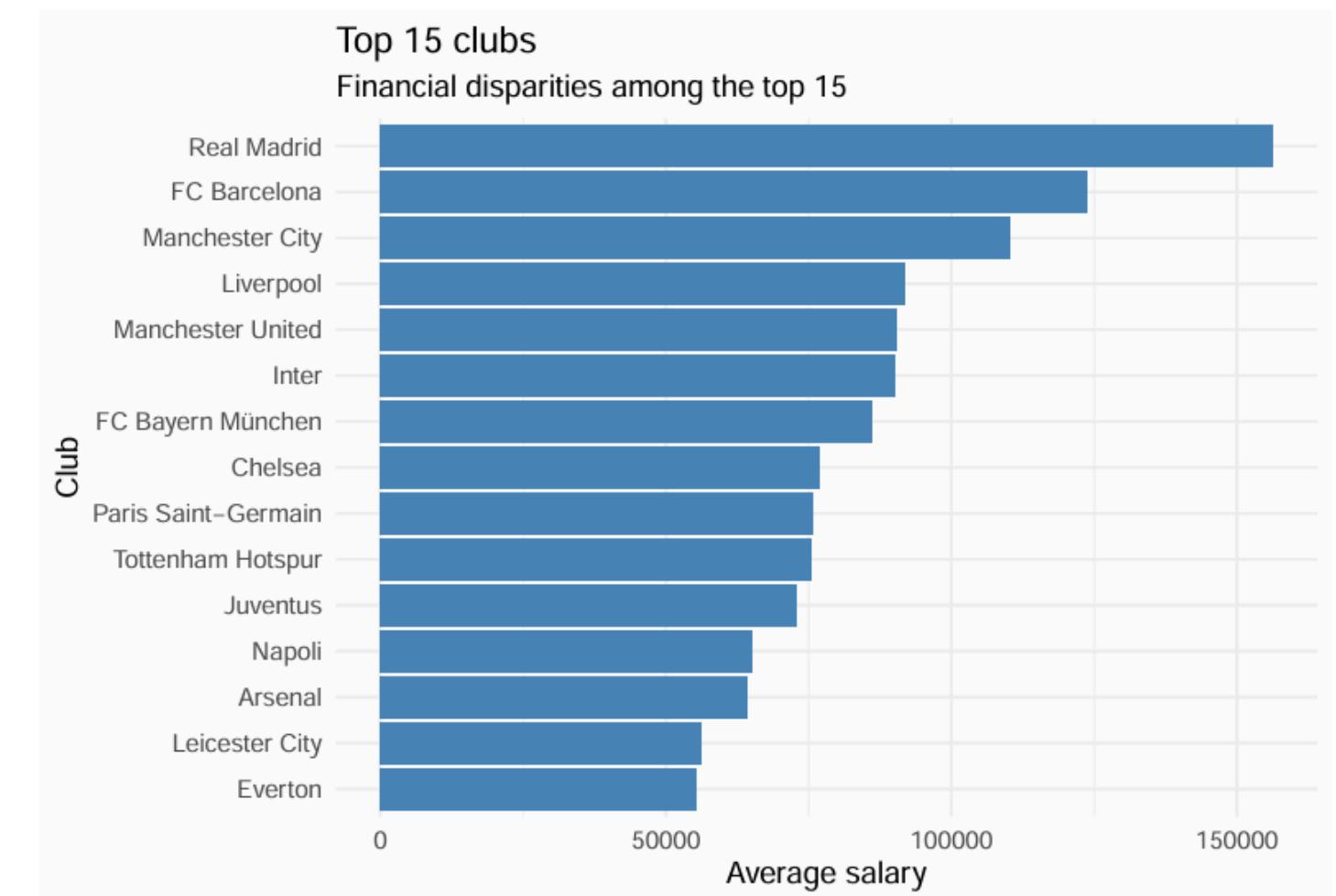
**Majority of players exhibit moderate finishing ability.**  
→ less dispersion in performance than in wages  
Large wage differences may not be fully explained by differences in individual performance alone

**The large dispersion of wages at similar performance levels indicates that performance alone does not fully explain wage differences.**  
**“Superstar Effect”**

# WAGE DIFFERENCES ACROSS CLUBS

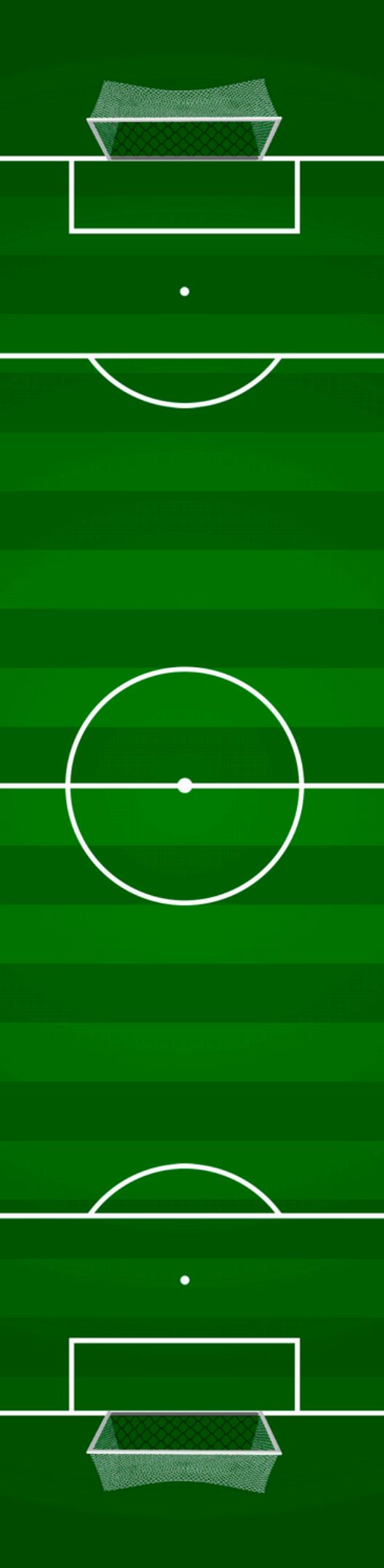
Table 2: Top 10 clubs by average wage

Club	Average Weekly Wage (€)	Average Performance
Real Madrid	156233.33	60.10
FC Barcelona	123727.27	57.79
Manchester City	110272.73	53.09
Liverpool	91772.73	55.24
Manchester United	90484.85	54.67
Inter	90192.31	55.31
FC Bayern München	86043.48	59.13
Chelsea	76787.88	52.97
Paris Saint-Germain	75885.00	54.87
Tottenham Hotspur	75606.06	52.85



**Club affiliation plays an important role in wage determination**

**WAGES DEPENDS ON PERFORMANCE BUT ALSO THE JERSEY YOU WEAR**



# METHODOLOGY

Linear regression models using ordinary least squares

## Model 1 (Performance)

$$\log(wage_i) = \alpha + \beta X_i + \varepsilon_i$$

## Model 2 (Performance + Position)

$$\log(wage_i) = \alpha + \beta X_i + \delta Position_i + \varepsilon_i$$

## Model 3 (Performance + Position + Club)

$$\log(wage_i) = \alpha + \beta X_i + \delta Position_i + \theta Club_i + \varepsilon_i$$





# MODEL VARIABLES



## Dependent Variable: Wages (Estimated FIFA21)

$\log(\text{wage})$  - estimated FIFA21 wages

### Control Variables

Age, height , weight, potential

### Performance Variables

overall rating, Finishing

### Playing Positions

### Club (Fixed Effects)

Table 3: Distribution of players by position group

Comparison is made within the same club

Position group	Number of players	Percentage (%)
Defender	6309	33.66
Forward	3206	17.11
Goalkeeper	2041	10.89
Midfielder	7186	38.34

Isolates the effect of performance and position on wages

Midfielders and defenders dominate the sample

# RESULTS

Table 4: Baseline OLS Results: Performance and Wages

Variable	Coefficient	Std. Error	t-value	p-value
(Intercept)	-4.6101	0.2204	-20.92	0.0000
overall_rating	0.1516	0.0022	69.05	0.0000
finishing	0.0054	0.0004	15.10	0.0000
Age	-0.0166	0.0026	-6.45	0.0000
height_cm	0.0178	0.0014	12.45	0.0000
weight_kg	-0.0088	0.0014	-6.35	0.0000
potential	0.0053	0.0022	2.36	0.0181

Clear wage differences across positions:

- Forwards earn more
- Goalkeepers earn less
- Midfielders earn more than defenders

Overall rating strongly and positively associated with wages

Finishing has a positive and statistically significant effect

Age shows a negative effect on wages

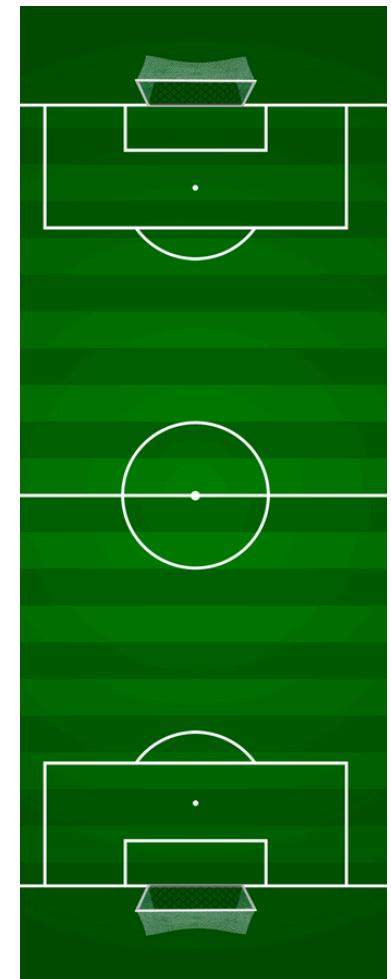
Table 5: Regression Results: Performance and Playing Position

Variable	Coefficient	Std. Error	t-value	p-value
(Intercept)	-4.6934	0.2265	-20.72	0.0000
overall_rating	0.1534	0.0023	68.00	0.0000
finishing	0.0024	0.0007	3.31	0.0009
Age	-0.0156	0.0026	-6.06	0.0000
height_cm	0.0180	0.0014	12.46	0.0000
weight_kg	-0.0088	0.0014	-6.30	0.0000
potential	0.0056	0.0022	2.52	0.0118
position_groupForward	0.0967	0.0286	3.38	0.0007
position_groupGoalkeeper	-0.1520	0.0268	-5.67	0.0000
position_groupMidfielder	0.0395	0.0203	1.95	0.0517

# RESULTS

# MODEL 3

Variable	Coefficient	Std. Error	Significance
Overall rating	0.1370	0.0011	***
Finishing (performance)	0.0017	0.0003	***
Age	-0.0177	0.0013	***
Height (cm)	0.0015	0.0007	**
Weight (kg)	0.0004	0.0007	
Potential	-0.0363	0.0012	***
Forward (ref: Defender)	0.1184	0.0133	***
Midfielder (ref: Defender)	0.0604	0.0094	***
Goalkeeper (ref: Defender)	-0.1553	0.0124	***



Observations: 18,742

R<sup>2</sup>: 0.637

Model include club fixed effects.

- Within-club comparisons of players
- Position effects remain significant

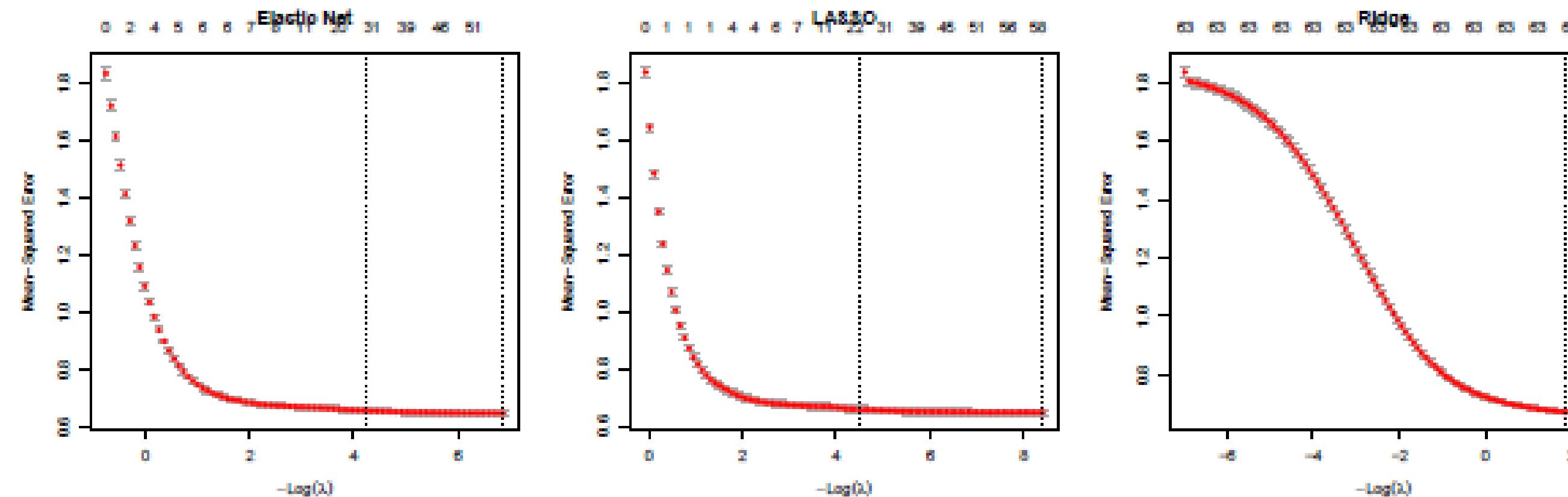
- Effect of individual ability decreases
- Club wage structure plays a key role

# ROBUSTNESS CHECK: ELASTIC NET REGULARIZATION

OLS models are economically consistent but sensitive to multicollinearity of FIFA performance variables.

Elastic Net (LASSO + Ridge, cross-validation) is better suited for highly correlated variables.

Salaries mainly depend on overall indicators (overall rating, potential, reactions, composure) rather than isolated skills.



# ROBUSTNESS CHECK: ELASTIC NET REGULARIZATION

Variable	Coefficient
Intercept	-4.8290
Age	-0.0116
Height (cm)	0.0171
Weight (kg)	-0.0008
Overall Rating	0.1276
Potential	0.0093
Finishing	0.0000
Heading Accuracy	0.0027
Dribbling	0.0025
Curve	0.0008
Reactions	0.0063
Balance	0.0026
Shot Power	0.0061
Jumping	0.0027
Stamina	-0.0041
Strength	-0.0041
Aggression	0.0016
Vision	0.0005
Penalties	0.0009
Composure	0.0517
Sliding Tackle	0.0012
GK Reflexes	0.0007

Table 1: Player Attributes after regularization

Position	Coefficient
Central Attacking Midfielder (CAM)	-0.0519
Central Defensive Midfielder (CDM)	-0.0760
Central Midfielder (CM)	0.0021
Left Back (LB)	-0.0020
Left Midfielder (LM)	-0.0022
Left Winger (LW)	-0.0610
Right Wing Back (RWB)	-0.0583
Striker (ST)	0.0366

Table 2: Positional Coefficients after regularization

- Age has a negative effect on salaries
- offensive positions remain better paid.
- Elastic Net reduces over-interpretation of certain technical skills present in OLS.
- Regularization confirms and strengthens key OLS results while improving the stability and interpretability of the model.

# *Discussion and limitations*

- the analysis relies on a linear modeling framework, which captures average marginal effects but may not fully reflect potential nonlinearities in wage determination
- based on fifa estimates rather than observed contractual salaries
- potential endogeneity cannot be fully ruled out
- cross-sectional data from a single season



## **CONCLUSION**

Globally our models are saying that:

- A one-point increase in overall rating is associated with approximately 15% higher weekly wages. Also goal-scoring ability is positive and highly significant.
- Relative to defenders (the reference category), forwards earn approximately 9–10% higher wages, conditional on performance. Inversely, goalkeepers experience a substantial wage discount of roughly 15% at the same performance level. Playing position matters for wage determination, although its contribution remains secondary relative to overall performance.
- Clubs differ significantly in wage levels, but performance remains decisive within clubs.

Wage differences reflect a combination of individual productivity, position valuation, and club-specific factors.