



Department of Business and Management

Master Thesis in Financial Reporting and Performance Measurement

**The Effect of Salary Dispersion on Team Outcome:
Evidence from the Italian Serie A**

Supervisor:

Prof. Saverio Bozzolan

Co-Supervisor:

Prof. Elisa Raoli

Candidate:

Giuseppe Leonardi

Matr. N. 713351

Academic year: 2019 – 2020

Alla mia famiglia, i miei amici, i miei compagni di università e a tutti quelli che hanno incrociato la loro vita con la mia lasciandomi qualcosa di buono. Grazie per essere stati miei complici, ognuno a suo modo, in questo percorso intenso ed entusiasmante. Grazie per aver reso questo percorso pieno di ricordi, il vostro sostegno è stato fondamentale.

The Effect of Salary Dispersion on Team Outcome: Evidence from the Italian Serie A

<i>Introduction</i>	5
<i>Part I</i>	
<i>Salary Dispersion: Determinants and Theories</i>	7
<hr/>	
1.1. Italian Football Clubs' Cost and Revenue Structure	8
1.1.1. Italian Football Clubs' Revenue Structure	10
1.1.2. Italian Football Clubs' Cost Structure	18
1.2. The Role of Salary	23
1.2.1. Tournament Theory	26
1.2.2. Cohesion Theory	31
1.3. The Determinants of Italian Serie A Players' Salary	34
1.3.1. Labor Market Dynamics	35
1.3.2. Italian "Decreto Crescita"	38
1.3.3. Players' Performance and the Resource Based View	40
<i>Part II</i>	
<i>Salary Dispersion and Efficiency: Evidence from Serie A</i>	43
<hr/>	
2.1. Evidence from Past Research	44
2.2. The Econometric Model	46
2.2.1. The dataset	47
2.2.2. Gini, Shannon and Simpson Index	48
2.2.3. The variables	56
2.3. Results	60
<i>Conclusion</i>	63

<i>References</i>	65
<i>Summary</i>	68
<i>Appendix</i>	83

Introduction

Among those who design and administer compensation systems, pay distributions have been an important issue for a long time, yet a relatively scarce literature exists on this topic. Even though there seems to be agreement that the wage structure influences the individual and organizational performance of complex organizations, there is little agreement over how to achieve an equitable and utility maximizing compensation. The long-standing debate in the compensation literature revolves around two major schools of thought; on the one hand, the Tournament Theory, first introduced in 1981 by economists Lazear and Rosen, proposes a hierarchical wage structure in order to encourage workers; on the other hand, the Cohesion theory, conceived by the American economist David K. Levine in 1989, encourages a compressed wage structure, introducing equity as a driver of increased effort. Complicit the easy availability of data, the relationship between pay dispersion and performance has been studied in several professional sports leagues. However, it is to be noticed that the findings stemming from the analysis of different leagues have led to opposite results in some cases. Therefore, a general endorsement of Cohesion or Tournament theory is utopic as the context and the status quo results to be of extreme relevance.

The following document seeks to provide a comprehensive analytical study of the effect of salary dispersion on team outcome in the Italian Serie A context. De facto, this paper explores whether a salary structure may be more efficient and should be applied in order to maximize the efficiency and minimize the costs. Accordingly, the hypothesis tested is that, depending on the characteristics of the context examined, (e.g. the aristocracy of the clubs, or the percentage of foreigners in the roster) a particular salary structure may achieve more efficient outcomes in terms of sport results. The paper is framed in two parts: the first, based on a theoretical analysis of the data and literature available, introduces the context in which the analysis is performed by reporting the Italian football clubs' cost and revenue structure, the two major salary theories and the determinants of the Serie A players' salaries;¹ the second and final part of the analysis is empirical and consists of a panel data regression on a five-year timeframe from season 2014/2015 to season 2018/2019.¹ More specifically, Part II of the study is arranged according to the following logic: in order to capture potential suggestions on the measures to be used in the model, a propaedeutic analysis of the most relevant past literature is performed; Following the insights from previous studies, a complete dataset containing information

¹ All data and information related to Part I and Part II which has been used to describe the context and create a detailed dataset has been collected only through reliable sources such as the football clubs themselves, the Lega Serie A and certified databases.

on the Serie A clubs is built. Using the dataset, the empirical model consisting of three concentration/diversity measures – namely the Gini, Shannon and Simpson indexes – and nine other explanatory variables is developed and regressed. The explanatory variables used in the model have the scope to understand if other management practices should be applied together with a defined wage structure. Finally, in the last section of Part II, the findings of the model are reported and discussed in detail. Concerning the major results of the analysis, it has been found that only the Gini index is significantly associated with sport performance. In particular, it appears that sport performance improves as salary dispersion decreases, finding support for the Cohesion Theory.

Part I

Salary Dispersion: Determinants and Theories

The impact of salary dispersion on team outcome is a highly discussed one. On the one hand, wage differentials provide incentives for higher employee effort. On the other hand, pay inequality may reduce team cohesiveness and increase feelings of relative deprivation and social envy, leading to lower personal performance and consequently harming the overall result achieved by the team. This social construct is supported by the fact that individuals who happen to work together to achieve a common objective tend to verify the adequacy of their salary by confronting with others.² The amount of money to be received does not represent a sufficient metric for the individual who desires to assess the goodness of his salary; to know the distribution of the colleagues' salaries is fundamental.³ Nevertheless, the theory of social comparison – which does not apply only to salaries – requires transparency and complete information, two elements that more than occasionally are missing or non-completely transparent when two individuals interact.

Part I focuses on the determinants and theories of salary dispersion. The aim is to draw a clear picture of the cornerstones of professional football players' retribution. First, the revenue and cost structures of Italian professional football clubs will be analyzed in order to understand the economic relationship between players and clubs. Then, the theoretical foundations of retribution and two major school of thought will outline the possible salary policies to be adopted. Finally, the relevant elements that determine players' retribution will be assessed. Among the determinants of a player's salary are the age, experience, physical endowments and tactical preparation but as it will be dealt in the next sections, other factors can have an incidence; In the last ten years, globalization and technological innovations have generated a systematic inflation in players' prices and salaries. The growth in football clubs' revenues deriving from broadcasting rights and merchandising sale has broadened the field of action of players, who are not anymore only pro athletes but also testimonials. Nowadays more than ever, the best players such as Cristiano Ronaldo and Messi have become extremely profitable brands that have dramatically affected the financial performance of the teams for which they are playing. As a consequence, the salaries of these players have grown exponentially and have generated a real clue for what concerns intra-team salary dispersion.

² L. Festinger, *A theory of social comparison processes*, Human Relations, Vol. 7, Pg 117-140, 1954.

³ E. Franck, S. Nüesch, *The effect of wage dispersion on team outcome and the way team outcome is produced*, Applied Economics, 43:23, Pg. 3037-3049, 2011.

1.1. Italian Football Clubs' Cost and Revenue Structure

Football is a fundamental asset within the Italian scenario, at sport, economic and social level.⁴ In 2019 the socio-economic impact of football reached the record value of over three billion euros. In the same year, the Italian professional football sector has achieved an aggregate turnover of over 4,7 billion euros, accounting for the 12% of the global GDP of professional football leagues.⁵ Moreover, the Italian Serie A is the greatest fiscal contributor among all Italian professional sports leagues, with an annual outlay of 1,2 billion euros. However, this does not represent the azimuth of Italian professional football; As of season 2018-2019, the economic weight of football is still growing and the impact of the value of production on the Italian Gross Domestic Product (from now on GDP) has risen slightly from 0,17% in 2013 to 0,19% in 2018.⁶

Behind the enormous success of football, both on the sport and the economic level, lies the simplicity and versatility of this game which has the ability to aggregate people from all over the world and create a true sense of community.⁷ Especially in the last years, football has experienced a considerable exploit thanks to the growing popularity in China and North America. This in turn has led to increased revenues especially in merchandising and broadcasting rights for European football clubs. In Italy, clubs' revenues have grown by more than 700 million euros in the last five years.

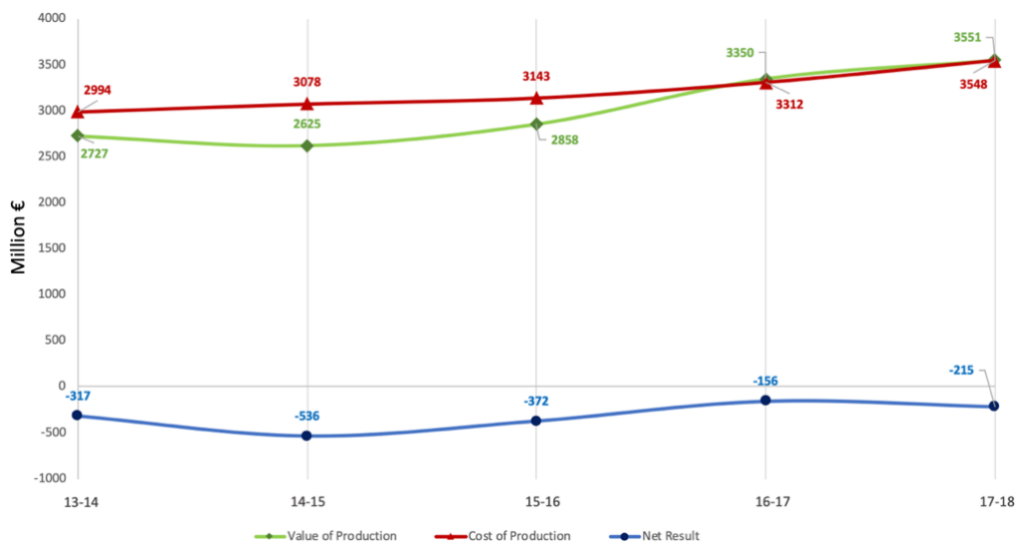


Figure 1.1 – Value, cost of production and Net Result of Italian professional football clubs 2013-2018s

⁴ G. Gravina, FIGC President, 2019 opening speech for the *PWC Report Calcio 2019*

⁵ Redazione. *Il calcio italiano genera 4,7 mld: vale il 12% al mondo*. Calcio & Finanza. 2019

⁶ Data retrieved from ISTAT and PWC Report Calcio 2019.

⁷ E. Letta, AREL President, 2019 opening speech for the *PWC Report Calcio 2019*

⁸ Figure 1.1 retrieved from PWC Report Calcio 2019.

Figure 1.1 reports the trends in value and cost of production of Italian professional football clubs and draws the variation of the net result in the period 2013-2018. The value of production is the sum of the revenues of clubs from their most relevant activities such as the sale of gate receipts, profit on disposal of players, broadcasting rights and sponsorships. The cost of production is the result of the operating costs plus any amortization and depreciation. Finally, the net result is the difference between the value and cost of production adjusted for interests and taxes. Since 2013, the value of production of Italian professional football has grown at a compound annual growth rate of 5,7%, reaching for the first time in 2018, revenues for more than €3,5 billion.⁹ To be noticed that season 2016-2017 has represented a turning point for the Italian system with a 17,2% year-over-year growth rate thanks to the growth of broadcasting rights' income. Despite the steady growth in the value of production, the net result in the period 2013-2018 has been swinging due to the increase in the cost of production. It is significant to highlight that season 2014-2015 exhibits the lowest net result in the last ten years.¹⁰ This negative record can be attributed to the simultaneous increase in the cost of production – which reversed the precedent trend of spending review – and decrease in the value of production, leading to a negative net result of over € 500 million.

	13-14	Var %	14-15	Var %	15-16	Var %	16-17	Var %	17-18	Var %
Gate Receipts	€ 221m	0,20%	€ 262m	18,40%	€ 270m	3,30%	€ 278m	2,90%	€ 341m	22,40%
Sponsorships and Commercial Activities	€ 374m	-3,00%	€ 409m	9,30%	€ 466m	13,80%	€ 525m	12,80%	€ 575m	9,50%
Broadcasting Rights income	€ 1.016m	-2,00%	€ 1.091m	7,40%	€ 1.153m	5,70%	€ 1.260m	9,30%	€ 1.252m	-0,60%
Other Revenues	€ 588m	13,90%	€ 482m	-17,90%	€ 532m	10,20%	€ 537m	1,10%	€ 606m	12,80%
Profit on disposal of players	€ 528m	-1,50%	€ 381m	-27,90%	€ 437m	14,80%	€ 749m	71,40%	€ 777m	3,60%
Value of Production	€ 2.727m	1,20%	€ 2.625m	-3,70%	€ 2.858m	8,90%	€ 3.350m	17,20%	€ 3.551m	6,00%
Services and third party assets	(€ 545m)	-1,50%	(€ 549m)	0,80%	(€ 602m)	9,60%	(€ 655m)	8,80%	(€ 649m)	-1,00%
Labour Costs	(€ 1.456m)	0,10%	(€ 1.528m)	4,90%	(€ 1.633m)	6,90%	(€ 1.693m)	3,70%	(€ 1.792m)	5,90%
Other Costs	(€ 356m)	0,50%	(€ 372m)	4,40%	(€ 293m)	-21,20%	(€ 268m)	-8,50%	(€ 330m)	23,00%
Cost of Production	(€ 2.357m)	-0,20%	(€ 2.449m)	3,90%	(€ 2.528m)	3,20%	(€ 2.616m)	3,50%	(€ 2.771m)	5,90%
Ebitda	€ 370m	11,20%	€ 176m	-52,30%	€ 330m	87,10%	€ 734m	122,42%	€ 780m	6,20%
Amortization and Devaluation	(€ 637m)	4,60%	(€ 630m)	-1,10%	(€ 615m)	-2,30%	(€ 696m)	13,00%	(€ 777m)	11,70%
Ebit	(€ 267m)	3,30%	(€ 453m)	-70,00%	(€ 285m)	37,10%	€ 39m	113,68%	€ 3m	-92,00%
Interests	(€ 16m)	14,60%	(€ 78m)	387,50%	(€ 66m)	-14,80%	(€ 95m)	43,90%	(€ 110m)	15,10%
Ebt	(€ 283m)	2,40%	(€ 531m)	-87,80%	(€ 351m)	33,80%	(€ 56m)	83,90%	(€ 107m)	-88,70%
Taxes	(€ 34m)	62,60%	(€ 5m)	-85,80%	(€ 20m)	300,00%	(€ 99m)	395,00%	(€ 108m)	8,80%
Net Result	(€ 317m)	-1,90%	(€ 536m)	-69,10%	(€ 372m)	30,60%	(€ 156m)	58,10%	(€ 215m)	-37,80%

Figure 1.2 – IFRS consolidated accounts of Italian Professional Clubs 2013-2018¹¹

Figure 1.2, which reports the consolidated accounts of Italian professional football clubs, is fundamental to understand how the changes in the value and cost of production impact the net result in the period 2013-2018. As it can be noticed from the table, amortization and devaluation have a considerable weight on the overall result and represent an average 21% share of the yearly costs of

⁹ Data retrieved from PWC Report Calcio 2019.

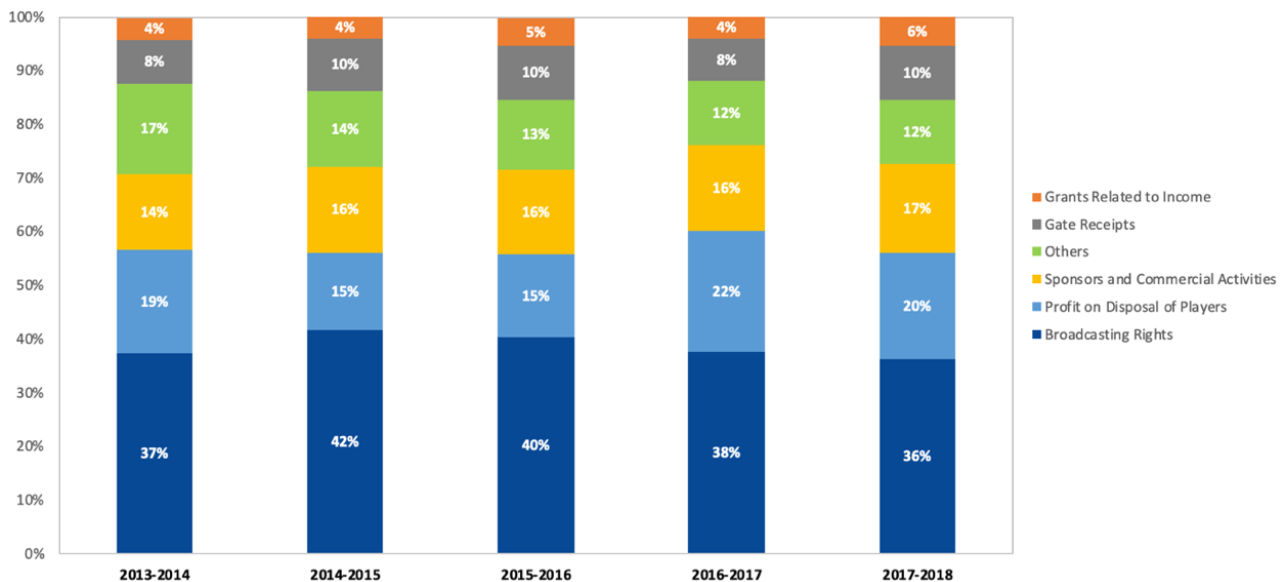
¹⁰ Data retrieved from PWC Report Calcio 2016.

¹¹ Figure 1.2 retrieved from PWC Report Calcio 2019.

production. Furthermore, it is characteristic to notice the incidence of the profit on disposal of players on the net result. Especially during season 2014-2015, this element of the value of production has reduced drastically, affecting the net result and registering the worst result in the last ten years for Italian professional football clubs. It is ought to the record to mention that the harsh decrease in the profit from disposal of players may be partly attributed to the fraudulent bankruptcy of Parma Calcio 1913 which has caused the players of the Serie A team to have their contracts voided and providing other teams with the opportunity to sign these players for free. Finally, *Figure 1.2* highlights how the net result of Italian professional football is negative, year after year. This is a consequence of the high costs incurred by football clubs and the gargantuan investments that are needed in order to be competitive.

1.1.1. Italian Football Clubs' Revenue Structure

Figure 1.2 provides interesting insights on the evolution of the consolidated accounts of professional football in Italy but is not enough comprehensive to discover and understand the determinants of these results. It is hence useful to breakdown the revenue and cost structures of Italian professional football clubs in order to understand which are the characteristics of this industry and compare it with other European professional football leagues.



*Figure 1.3 – Breakdown of the revenues of Italian professional football clubs 2013-2018*¹²

¹² *Figure 1.3* Retrieved from PWC Report Calcio 2019.

Figure 1.3 represents the breakdown of the revenues of Italian professional football clubs in percentage terms. It provides a clear picture of the elements that mostly affect the stream of revenues of professional football clubs in Italy. Under the label *Others* are accounted the proceeds that are not associated with the sport results or the commercial activities carried forward by clubs. Part of this category are non-operating income, insurance claims and the proceeds from the sale of away games' tickets. The grants related to income are supplementary revenues paid by public entities and associations. These revenues are accounted in the income statement of professional football clubs as grants from Lega Nazionale Professionisti and grants from FIFA/UEFA for players summoned to the National team.

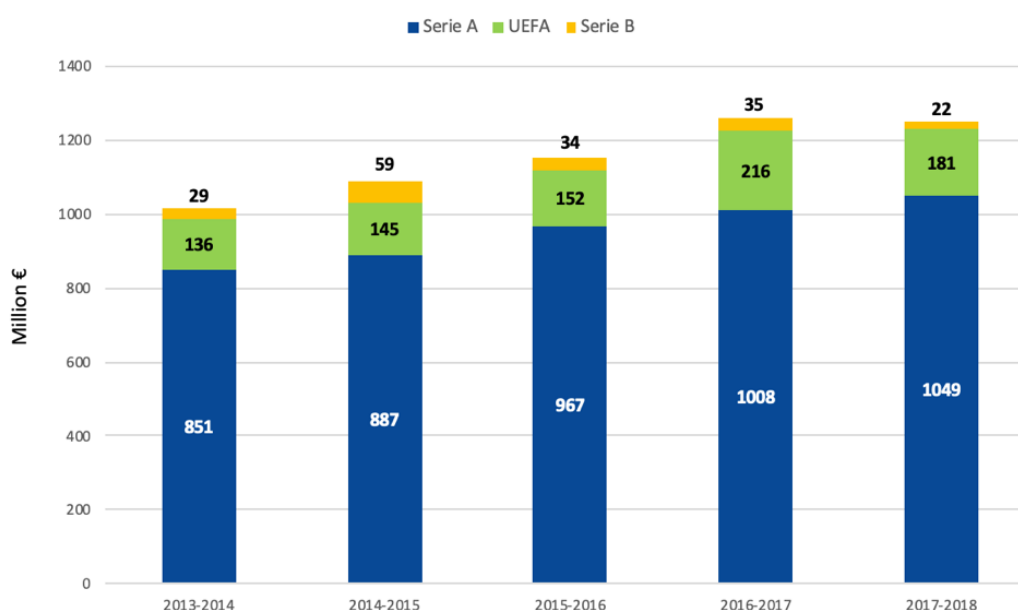


Figure 1.4 – Distribution of broadcasting rights income 2013-2018¹³

Broadcasting rights are by far the most relevant source of income for Italian clubs, accounting for more than one third of the value of production during the period 2013-2018. Figure 1.4 reports the distribution of the broadcasting rights income earned by Italian professional football clubs in the period 2013-2018. Only a very small fraction of the broadcasting rights income is entitled to the cadet Italian championship, while a conspicuous extra income is perceived by the teams that have access to the Champions League and the Europa League. These UEFA competitions are conceived as a stage-gate tournament, having *lieu* every season and comprising 32 clubs for the Champions League and 48 clubs for the Europa League. Given the formula that regulates these tournaments, the proceeds from the broadcasting rights are partitioned among the clubs according to their market pool – a quota

¹³ Figure 1.4 retrieved from PWC Report Calcio 2019.

based on the proportional value of the television market -, the results achieved, the UEFA ten-year performance ranking and a fixed amount equally distributed among all the participants. As it can be noticed from *Figure 1.4*, the revenues in season 2016-2017 have increased by more than 40%. This result can be attributed to two factors; Firstly, to the results achieved by Juventus FC, having reached the Champions League final. Secondly, to the deal signed by the UEFA and the European Club Association in 2015 that has led to a 25% increase of the total jackpot to be distributed among the participants.¹⁴ This fact becomes of extreme relevance if the proceeds from season 2014-2015 are compared to the ones of season 2016-2017. Notwithstanding the exemplar results achieved by the Italian clubs in season 2014-2015 - with Juventus FC playing in the Champions League final and SS Napoli and ACF Fiorentina being two of the four Europa League semifinalists - the revenues have de facto slightly increased in the following season even though all teams had exited the European competitions by the round of sixteen. Concerning the biggest slice of the broadcasting rights income, consisting in the proceeds from the airing of the Serie A, the distribution followed the following criteria imposed by the *Legge Melandri*¹⁵ until season 2017-2018:

- 40 % equally redistributed among all twenty clubs;
- 25 % of the revenues conferred on the basis of the number of supporters during home matches;
- 15 % based on the results achieved in the last five seasons;
- 5 % of the total income according to the last year's positioning;
- 5 % partitioned according to the population of the municipality in which the club plays.

The *Legge Melandri* has been modified in 2018 by the “*Pacchetto Sport*”¹⁶ signed by the Italian Minister of Sport Luca Lotti. The new redistribution of the broadcasting rights income has brought these edits:

- the share of proceeds that are equally partitioned by the twenty clubs increases from 40% to 50%;
- The 5% share for the population of the municipality is not anymore in place;
- The revenues conferred on the basis of the supporters is reduced from 25% to 20%.

The aim of this measure is to reduce the gap between the small and large clubs and create a more competitive environment.¹⁷

¹⁴ Redazione. *Champions e Europa League: una pioggia di euro in arrivo sui club*. La Repubblica. 2015.

¹⁵ Legislative Decree n° 9/2008.

¹⁶ Law n° 205/2017.

¹⁷ Redazione. *Diritti tv, la riforma Lotti: 50% in parti uguali, il resto tra risultati e spettatori allo stadio*. Calcio & Finanza. 2017.

The second most relevant source of income for Italian professional football clubs is represented by the profits on disposal of players. Professional football clubs, as part of a labor-centric industry, rely on the players' registration rights. These rights are based on contracts signed by the player and the club that are intended to protect and ensure the going concern principle of the club and guarantee the remuneration of the players' performance. The club requires a contractual agreement to protect and guarantee the going concern principle of the company as the sudden deprivation of a player imposes a damage that must be economically compensated. Hence, a club willing to acquire the performances of a player which is being held under contract, must reach an agreement with the counterparty in order to void the contract in place. However, a club can register a player for free when his contract expires, and the player is refuses to extend the contract with his membership club. In such case, when accounted on the financial statements of the new club, the book value of the player will be zero. Given the economic value of players' registration rights, all the transactions for the acquisition and sale of players are regularly transposed on the financial accounts of both the acquiror and vendor. Moreover, the acquiring club has to write a new contract with the player. This new contract, depending on its length, will set the amortization schedule in order to expense the initial cost of the transaction. A profit on disposal of players' rights is accounted whenever the sum received for the sale of the player is higher than the residual book value of the player. The residual book value is the difference between the sum paid to acquire the player plus any bonus and the amortization and write-down provision.

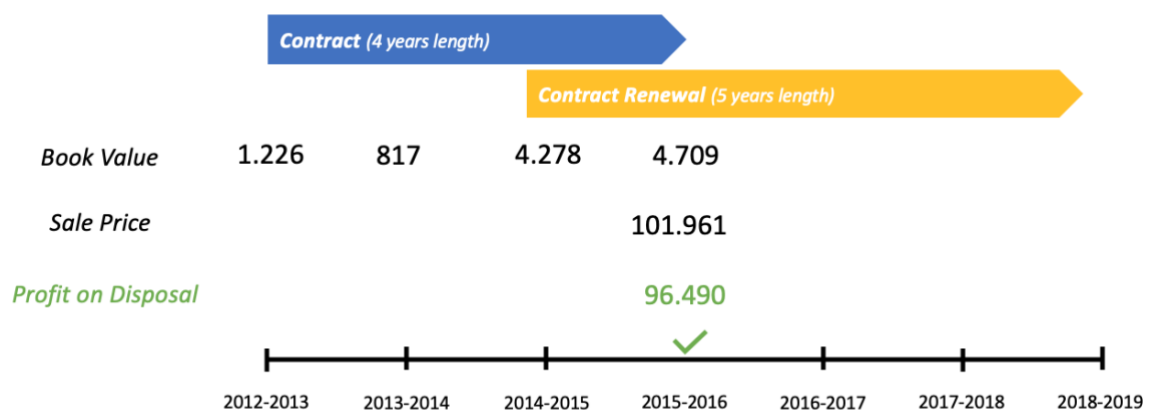


Figure 1.5 – Juventus profit on disposal on the sale of Paul Pogba to Manchester United FC¹⁸

¹⁸ Data retrieved from Juventus FC financial statements, fiscal years 2012/13 to 2015/16.

Figure 1.5 illustrates the case of the profit on disposal made by Juventus FC on the sale of Paul Pogba. The player moved at nearly no cost from Manchester United FC to Juventus during the summer transfer window of 2012.¹⁹ Pogba formalized his transfer by signing a four-year contract that was then renewed in 2015. The book value of the player accounts for the provision for the agent, the premiums for the performance, the training prize and the amortization. The year-after-year increase in the book value of the player is due to the bonuses granted by Juventus to the player and the contractual fees for the renewal of the contract in 2015. As a matter of fact, it is common to see that when new contracts are arranged, players and agents require a fee as a reward for the loyalty and commitment to the club. As it is highlighted by *Figure 1.5*, Juventus FC sold Paul Pogba in 2016 for nearly 102 million euros, making a profit on disposal of 96,5 million euros.

Sponsors and commercial activities are another important stream of revenues for clubs as they represent the monetization of the value of the brand. The brand of a club is influenced by the history of the club, the trophies lifted and the popularity of the players that are part of the team. In the last four years, the revenues from this segment have experienced a year over year growth above 10%. The rationale of this growth can be found in the heavy investments carried forward by some Italian football clubs who have diversified the ancillary activities that were exploiting the clubs' brand. Hence, the traditional commercial activities such as sponsorships, advertisement and merchandising have been integrated by other initiatives such as guided tours of club museum and stadium, restaurants and even hotel facilities.²⁰ Behind this diversification lies the will to transform the traditional supporter in a profitable client, exploiting his passion in order to extract more value from the customer. The objective is to convey a new identity to all the supporters in Italy, Europe and the rest of the world, with new products that may be more "lifestyle".²¹ The new identity that brings football clubs more into the life of the supporters has also affected the traditional lines of business of the clubs that are now willing to pay more for influent players which may have an effect on the value of the brand. The acquisition of Cristiano Ronaldo by Juventus FC back in the 2018 summer transfer window is a clear example of this strategy. The arrival of the Portuguese superstar in Turin has led to an 81% increase in merchandising in the first semester of season 2018-2019 with respect to the same period of the previous fiscal year.²² Another strategy put in place by Italian clubs like AS Roma and Juventus FC is the restyling of the logo in order to increase the sale of merchandising. The first Italian club to adopt this strategy was AS Roma in 2013, having abandoned the traditional monogram ASR

¹⁹ The English team received a training prize of 265.000€

²⁰ Redazione. *Juve, presentato ufficialmente il J Hotel: l'albergo dei bianconeri*. Sky Sport. 2019.

²¹ Quote from Andrea Agnelli, President of Juventus FC. Retrieved from the interview by Antonio De Paola and published on Tuttosport on the 5th of July 2017.

²² Redazione. *Juventus, merchandising in crescita (+81%) con CR7*. Calcio & Finanza. 2019.

for the more appealing ROMA. In the wake of the roman club, Juventus FC has chosen to reshape the traditional logo to create a new, modern and lifestyle one. The lifestyle revolution of football clubs' commercial activities has yet not reached its azimuth, with International clubs like Barcelona and Paris Saint-Germain being world leaders in this field. As a matter of fact, the next frontier of merchandising has just been set in 2019 by the French club which, thanks to the partnership agreement with Jordan – the exclusive, high-end brand by Nike – has been able to reach the incredible result of over one million jerseys sold in 2019.²³ Finally, sponsorship agreements are the financial contributions that football clubs receive in exchange for promotion and public exposure. Just like the commercial activities, their value is extremely influenced by the value of the club's brand, by its popularity and resonance. These patronage agreements are not exclusive but are binding and generally have a three to five years length. Football clubs generally have more than a single sponsor, all representing different industries and sectors. The generosity of the sponsor depends on the visibility achieved and the activities arranged in the sponsorship deal.



Figure 1.6 – Sponsors on clubs' official kit.²⁴

Figure 1.6 illustrates the various sponsors that may figure on an official kit. The *technical sponsor* is the provider of the kit and is entitled to sell the merchandising of the club in its stores. Together with the club, the *technical sponsor* creates the design of the jersey and the merchandising and, depending on the terms of the deal, they share the revenues from the sale plus a fixed sum every year. The *jersey sponsor* is the most common and visible sponsor, while the *sleeve sponsor* and the *short sponsor* are not frequently used by Italian football clubs. For what concerns the *back sponsor*, it is mostly used by German Bundesliga teams. Only few Serie A teams like SSC Napoli exhibit a *back sponsor*, while in 2019 nineteen Serie B clubs has arranged such an agreement.²⁵ Finally, these agreements are

²³ Redazione. *Psg, boom merchandising: un milione di maglie vendute*. Calcio & Finanza. 2019.

²⁴ PWC Report Calcio 2018.

²⁵ PWC Report Calcio 2019.

mainly underwritten with national companies; In 2019, out of nearly 4000 patronage agreements, only 5% of them was arranged with a foreign company.

Coming to gate receipts, it is shocking to notice from *Figure 1.3* that ticket sales represent only a small fraction of the value of production. This result is even more worrying when it is benchmarked to the trends of the other top four European championships. To this extent, *Figure 1.7* reports the aggregate attendance and occupancy of stadiums of the clubs of the top five European leagues during the period 2010-2018. As is possible to notice from *Figure 1.7*, Italy is the second-worst country for number of gate receipts sold and counts the most unsold tickets among the top five football leagues. The Serie A, which is the top Italian league, presents the worst results in terms of average occupancy of stadiums with its 55%. This result is alarming, especially when compared to England's Premier League 91% rate. The rationale for this hideous result lies in the low quality-price ratio. In brief, the gate receipts are perceived as too expensive given the inadequacy of the structures.

Country	Total Attendance	Unsold Tickets	Average % Filling
<i>England</i>	136.562.167	12.756.665	91%
<i>Germany</i>	122.957.905	12.513.664	91%
<i>Spain</i>	107.108.326	42.931.962	71%
<i>France</i>	72.876.715	36.993.158	66%
<i>Italy</i>	79.793.279	66.494.607	55%

*Figure 1.7 – Attendance and occupancy of stadiums of European top 5 championships 2010-2018*²⁶

De facto, Italy is the sixth country by average cost of gate receipt among all the European football leagues with its €25,80 average yield per game, way less expensive than England's Premier League (€47,7 per ticket), Spain's La Liga (€39,60 per ticket), German Bundesliga (€31,70 per ticket), Swiss Super League (€34,20 per ticket) and French League 1 (€26,90 per ticket).²⁷ England Premier League's clubs are able to keep the price of the gate receipts very high and still fill their seats thanks to the popularity of the championship - which is considered the most important league worldwide – and the modernity of their structures. The English Premier League is the European championship where the most clubs own the structure in which play. Fifteen out of twenty English clubs have their stadium included in their balance sheet as an asset and heavily invest in their development and modernization. That is why a ticket for a Chelsea FC match can cost up to €86,70 on average.²⁸ In

²⁶ *Figure 1.7* retrieved from PWC Report Calcio 2019.

²⁷ Financial Sustainability and Research Division. *The European Club Footballing Landscape*. UEFA. 2019.

²⁸ Redazione. *Quanto costa andare allo stadio in Europa: in Inghilterra prezzi doppi rispetto all'Italia*. Calcio & Finanza. 2019.

Germany - exception made for Bayern München that reports a €72,30 average yield per match attendee - the cost of gate receipts is linked to tradition: stadium attendance is considered a folkloristic attraction. Hence, the price of gate receipts varies considerably, with a small amount of tickets – the best spots - sold for high prices and the most part of gate receipts sold at a low price in order to keep it affordable for most of the supporters. This particular strategy explains why German Bundesliga is able to keep the pace of Premier League with a 91% average seat filling. In Spain, out of twenty clubs, sixteen have their stadium included in the balance sheet. Nevertheless, the results in the Spanish La Liga are strongly biased by Barcelona and Real Madrid which respectively generate 5,8 and 5,9 times more revenues than the average league club. Thanks to the capacious stadiums and the extreme popularity, these two clubs are able to earn an estimated revenue per match that amounts to nearly five million euros. The two teams are respectively on the fifth and sixth position among the top 30 clubs by average yield per match attendee, with an average price per gate receipt of €80,00 for Real Madrid and €74,60 for Barcelona. Hence, the rationale behind the lower average yield per match attendee – with respect to the Premier League - lies in the gap of popularity between the Barcelona and Real Madrid and the other clubs of the Spanish La Liga. Nevertheless, in the last years, some clubs like Club Atlético de Madrid have reported strong increases in revenues due to their investments in new, modern stadiums. The situation in France is the one that is most similar to Italian Serie A among the top five European championships. The analysis is strongly biased by Paris Saint-Germain which is the top club by average yield per match attendee, with an average receipt of €86,90 per match and recording revenues 7,6 times higher than the League 1 average. The Qatari-owned club does not own the stadium Parc des Princes, but has it partially included in its balance sheet for the leasehold improvements. The only club to totally own its stadium in France is Olympique Lyonnais and indeed, the club records an average yield per match attendee of €40,70 and a revenue per match 3,7 times higher than the League 1 average. In Italy, five clubs – Juventus, Atalanta, Udinese, Sassuolo and Frosinone – have their stadium as an asset in the balance sheet. Nevertheless, Juventus is the only top Italian club to have its own facility. In Italy, the average age of stadiums is 60 years and in the last ten years, only 2 facilities have been built and three have been renovated.²⁹ Many important clubs just like Inter and Milan are sharing the stadium that is owned by the municipality. This happens to represent an important threat to the possibility to customize the facility and to develop other activities around the stadium. Since the opening of the Juventus Stadium in 2011 Juventus has lifted eight Serie A trophies in a row, with only eight home-games lost on aggregate. Moreover, the customization of the facility, together with the creation of a museum and a medical center, the Italian club has increased its average yield per match attendee to €60,20, becoming the ninth European club

²⁹ Financial Sustainability and Research Division. *The European Club Footballing Landscape*. UEFA. 2019.

in this special category. It is hence straightforward to understand that stadiums are a very remunerative activity and are worth the investment as they drive to better results and increased revenues. It is however ought to the records to mention that the lag of some Italian top clubs with respect to other European ones is also influenced by the bureaucracy. As Roma has presented the first project for a new stadium in 2014 and nowadays, after nearly six years, the construction hasn't started yet.

1.1.2. Italian Football Clubs' Cost Structure

The assessment of the cost structure of Italian professional football clubs is propaedeutic for the study of the effect of intra-team salary dispersion on the efficiency of Serie A teams. *Figure 1.8* outlines the characteristic cost structure of Italian professional football clubs. As a labor-intensive industry, salaries account for half of the weight of the cost structure of Italian professional football clubs.

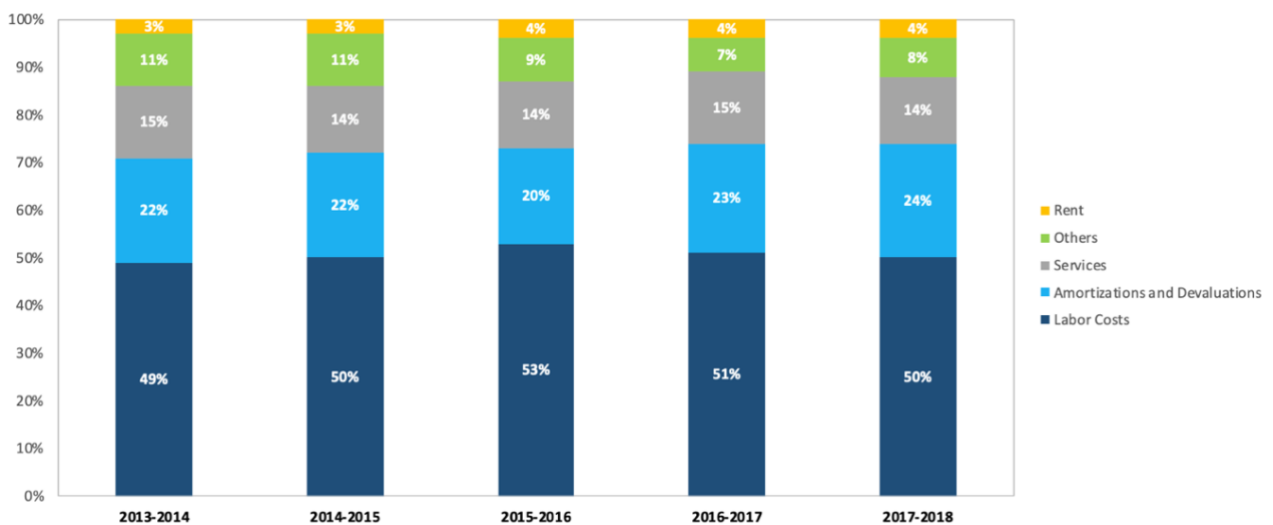


Figure 1.8 - Breakdown of the costs of Italian professional football clubs 2013-2018³⁰

The cost structure of Italian professional football clubs is in large part composed by labor costs, amortization and devaluations. As a matter of fact, the other components of the cost structure account for less than a third of the total and will not be discussed in dept in this analysis as they are not sufficiently relevant for the proposed analysis. Nevertheless, a small clarification is needed:

- the label “Rent” in *Figure 1.8* encapsulates all the lease payments due for the use of third-party structures as stadiums or training facilities;

³⁰ *Figure 1.8* retrieved from PWC Report Calcio 2019.

- “Services” account for all the costs incurred by professional football clubs in the execution of the business such as travel arrangements and transportation costs, maintenances, insurance costs, consulting, legal and cleaning fees and advertisement;
- “Others” refer to operating losses like loss on disposals and credit losses.

De facto, this section will concentrate on the costs which are associated with labor and the amortization and devaluation of the most relevant assets of professional football clubs: the registration rights on players’ performance.

As *Figure 1.8* shows, labor costs account for half of the cost structure of Italian professional football clubs. However, as the analysis that will be carried forward in *Part II* focuses on the players, a distinction³¹ has to be made between the labor costs associated to professionals’ salaries and the labor costs that are correlated to other non-licensed actors such as non-professional players, observers, advisors, temporary workers and regular workers.³²

	2013-2014		2014-2015		2015-2016		2016-2017		2017-2018	
Labor Cost	1456	100%	1528	100%	1633	100%	1693	100%	1792	100%
<i>Professional Figures</i>	1322	91%	1376	90%	1486	91%	1543	91%	1583	88%
<i>Non-licensed employees</i>	134	9%	152	10%	147	9%	150	9%	209	12%
Costs associated to professionals	1859	100%	1898	100%	1980	100%	2108	100%	2224	100%
<i>Professionals' salaries</i>	1322	71%	1376	72%	1486	75%	1543	73%	1583	71%
<i>Amortization of Registration Rights</i>	538	29%	522	28%	494	25%	565	27%	641	29%

*Figure 1.9 – Italian football clubs Labor Costs 2013-2018*³³

Figure 1.9 is intended to isolate the labor costs associated to professional (or licensed) figures from the ones correlated to non-licensed employees. As it is possible to notice, professionals account for 90% of the labor costs, even though they represent on average the 20% of the total number of employees. The rationale behind this fact resides in the importance of licensed employees on the financial results of the club: the successes and failures achieved or suffered on the field strongly affect the revenues from sponsors, commercial activities, gate receipts and broadcasting rights especially in the long run. That, in turn affects the costs and investments that a club can afford. This happens to be especially true for European top divisions where the participation to international tournaments organized by FIFA has a stronger delta on the finances of the clubs and their future successes. *Figure 10* suggests that salaries are undoubtedly correlated to long-term results and sustainable competitive

³¹ The classification depends on law n. 91/1981 which introduced the concept of professionalism in football.

³² CDA Juventus, *Relazione Finanziaria annuale al 30 giugno 2019*, Juventus.com. 2019

³³ *Figure 1.9* elaborated from data retrieved from *PWC Report Calcio 2019*.

advantage. Nevertheless, the salary ranking cannot be the sole variable, especially in very competitive context like English Premier League, where many clubs have the opportunity to fight for the title every year. Hence, overspending competitors doesn't appear to be a valid, unique solution to uncertainty and causes inefficiencies as competition increases. Moreover, *Figure 1.10* doesn't take into account that not all clubs start each season with the objective to win the league. As a matter of fact, clubs' objectives may vary according to their finances and size, with some top clubs thriving for titles and others battling not to be relegated. Plus, it is sometimes the case of clubs that have to rearrange their objectives during the season as they unexpectedly perform better or worse than planned. Hence, the achievement of a sustainable competitive advantage - here intended as the realization of the proposed objectives - must be based on labor cost optimization and team-work management.

	England	Germany	Spain	Italy	France
2007-2008	2	1	2	1	1
2008-2009	2	2	1	1	3
2009-2010	1	1	1	1	2
2010-2011	3	1	1	1	4
2011-2012	1	7	1	3	7
2012-2013	2	4	2	1	1
2013-2014	2	1	3	1	1
2014-2015	1	1	1	1	1
2015-2016	15	1	1	1	1
2016-2017	3	1	1	1	3
<i>Average</i>	3,2	2	1,4	1,2	2,4

Figure 1.10 – Domestic salary ranking of the winners of the European top divisions³⁴

According to *Figure 1.8*, amortizations and devaluations are the second heaviest entry of the cost structure of Italian professional football clubs, accounting for 22% of the total costs on average. The 80% of the amortizations and devaluations suffered by Italian professional football clubs are caused by the players registration rights which, as it has been previously pointed out, represent the book value of the licensed players. Italian professional football clubs have two options for the accounting of players' registration rights. They may apply the Italian practice defined by art. 2426 of

³⁴ Data retrieved from PWC Report Calcio 2019.

the Italian Civil Code or the International Accounting Standards.³⁵ However, the clubs that are quoted on the Italian stock exchange are forced to file registration rights according to IFRS 38 as the fruition of their financial statements must be smooth for both national and international investors.³⁶ De facto, in the last years, not only listed clubs like Roma, Juventus and Lazio have applied the international accounting standards, but also many other Italian clubs like Napoli and Milan have started to use this accounting principles as they are preferred by international stakeholders. IFRS 38 regulates the accounting of intangible assets and is articulated in three phases: the initial recognition, the evaluation and the subsequent adjustments to the value of the asset. The initial recognition phase defines which intangible assets are regulated by the accounting standard. IFRS 38 states that licenses, trademarks and similar rights are accounted among the intangible assets if they present the following general requirements:

- Identifiability;
- Control;
- Future economic benefits;
- Cost determinability.

Whenever an activity incorporates both tangible and intangible elements, the entity applies a subjective judgement for the evaluation of the most significant element.³⁷ The next step is the measurement of the value to be registered. IFRS 38 distinguishes among:

- *Purchased fixed assets*, recorded at the acquisition cost plus any direct attributable cost;
- *Self-generated fixed assets*, whose value is composed by the sum of the development costs incurred.³⁸

The third and last stage consists in the subsequent adjustment to the value of the intangible assets. IFRS 38 establishes two methods for the subsequent adjustment:

- the *cost method*, stating that an intangible asset must be recorded at cost less cumulative amortization and depreciation;
- the *value recalculation method*, suggesting that an intangible asset should be booked at fair value less accumulated amortization and depreciation.

In order for the application of the subsequent adjustments' criterion to be relevant, there must exist an active market to determine the fair value of the intangible asset and the adjustments must be carried

³⁵ The International Financial Reporting Standards (IFRS) are issued by the International Accounting Standards Board (IASB), an international standard-setting body. The aim of the IAS/IFRS is to increase transparency and trust in financial reporting, and foster global trade and investment.

³⁶ G. Gravina, *Il bilancio d'esercizio e l'analisi delle performance delle società di calcio professionistiche*, FrancoAngeli Editore, 2011.

³⁷ Concerning football, the performance is more important than the physical actor that executes it.

³⁸ Selling, general and administrative costs; inefficiencies and operating costs prior to operating efficiency; training costs are not included in the development costs.

out with sufficient regularity across all the assets in the specific category. Concerning the amortization of the intangible fixed assets, IFRS 38 states that the company must assess if the useful life of the intangible asset is limited or unlimited in time. If from the analysis of the different factors, does not emerge a predictable limit to the generation of cash flows for the company, the asset is not amortized but rather has to be subject to a yearly *impairment test* based on IFRS 36. Differently, if the useful life of the intangible asset is limited, the expected duration of its disposal must be assessed. In this specific case, the asset is amortized on the basis of its useful life, with the possibility to choose among different amortization schedules. According to the definition provided by IFRS 38, players' registration rights are intangible fixed assets as they satisfy all the requirements above mentioned. Moreover, due to the contractual nature of this specific intangible asset, the value of its use is limited in time and as there exists a continuous market for these intangibles, their relative cost must be regularly evaluated in each financial year in relation to the residual possibility of utilization. The amortization of the registration rights starts in the fiscal year in which the players' future performances are acquired by the club and is carried forward according to the prudence principle, consisting in the amortization of the cost of the right on a straight-line basis for the entire duration of the contract that binds the player to the club. *Figure 1.11* reports the amortization schedule of Stephan Lichtsteiner, former SS Lazio and Juventus FC player. The costs for the acquisition of the player's registration rights have been fully amortized within seven fiscal years. The player was acquired from SS Lazio on July the 1st, 2011 by Juventus FC for nearly ten million euros. Having Lichtsteiner signed a four-year contract, the amortization of the intangible fixed asset consisted in equal installments amounting to 2.483.000€ each. Hence, according to the original amortization schedule, Juventus FC should have amortized in full the registration right by the end of season 2014-2015.

'000 Euros	01/07/11	30/06/12	30/06/13	30/06/14	30/06/15	30/06/16	30/06/17	30/06/18
<i>Historical Cost</i>	-	9.932 €	9.932 €	9.932 €	9.932 €	9.932 €	9.932 €	9.932 €
<i>Variation</i>	9.932 €	-	-	-	-	-	-	-
<i>Residual years of contract</i>	4 years	3 years	2 years	1 year	2 years	1 year	1 year	0 years
<i>Amortization</i>	-	2.483 €	2.483 €	2.483 €	828 €	828 €	414 €	414 €
<i>Prov. for amortization, depreciation and write-downs</i>	-	2.483 €	4.966 €	7.449 €	8.277 €	9.104 €	9.518 €	9.932 €
<i>Net</i>	-	7.449 €	4.966 €	2.483 €	1.655 €	828 €	414 €	0 €

*Figure 1.11 – Amortization of the registration rights of Stephan Lichtsteiner*³⁹

Nevertheless, due to the importance of the player for the team, during season 2014-2015, Juventus FC has negotiated with Lichtsteiner the renewal of the contract one year prior to expiration.

³⁹ Data retrieved from Juventus FC financial statements;

The new contract, signed in January 2015,⁴⁰ had a three-year length and, at the time of the sign, the residual book value of the player of the financial accounts of Juventus FC amounted to nearly 2,5 million euros. Hence, as the cost method defined by IFRS 38 suggests, the net value of the player at 30/06/2014 must be amortized in equal installments of the duration of the contract. The amortization installments relative to the second contract amount exactly to one third of the net value as the useful life of the new contract is three years. Following the same logic, in February 2017 the Swiss player has prolonged his contract with a two-year deal ending on the June 30th, 2018.⁴¹ *Figure 1.11* provides a clear example of how changes in the useful life of an intangible asset influences the amortization schedule of the cost of the asset.

1.2. The Role of Salary

The remuneration system has traditionally assumed the role of the medium of exchange between workers (for their performance) and firms (for the effort received). In the Neoclassical economic theory, salary represents the price of labor, determined by the market and equal to the marginal product (ideally, when competition is perfect). Labor, differently from the other factors of production, is characterized by the indivisibility from the individual worker and hence, is non-vulnerable to sale – contrary to land and capital. Hence, the supply of labor is constrained by the availability of workers. Theoretically, as unemployment decreases, the supply of labor becomes steeper (at least in the short run) as time is needed for other workers to enter the market. Nevertheless, more frequently than not the labor market is influenced by economic rigidities and imperfections, making the salary determination process thorny and complicated with respect to perfect competition and full employment. In fact, the contractual power in the labor market is rarely equally distributed and, frequently, government intervention is necessary. Hence, salaries constitute a fundamental regulator of the interaction between individuals and organizations. This relationship can be interpreted under three different perspectives:

- An economic exchange relationship, based on the most simple and elementary exchange between labor and salary;
- A psychological exchange relationship, through which expectations are set and regulated with a particular emphasis on the rights and duties to be respected;

⁴⁰ Datasport, *Juventus, ufficiale il rinnovo di Lichtsteiner*, Il Sole 24 Ore, January 13th, 2015.

⁴¹ Redazione, *Ufficiale: Lichtsteiner rinnova con la Juventus fino al 2018*, Corriere dello Sport, February 2nd, 2017.

- A membership relation, whose parties are the members of the firm - the labor lenders - and the individuals who fulfill the aim of the firm, namely the set of individuals that operate and manage the firm.

Whichever is the interpretation of the relationship between individuals and firms, it undoubtedly comprises the relationship of exchange regulated by the remuneration system. This separation between ownership and control over the results of the firm create several issues related to conflict of interest which happens to be a leading cause for agency problems. Due to the risks that arise from this exchange relationship, all three perspectives cyclically require extensive contracting and agency costs' management. Agency costs represent a conflict of interest inherent in any relationship where one party – the workers - is expected to act in another's – the firm – best interests. In the management of agency problems, salaries and compensation packages represent a frequently used tool to mitigate possible frictions and motivate workers to push harder and increase their effort. Nevertheless, it might be easier said than done; It might result to be costly and useless to simply increase salaries. The key to success may reside in the use of bonuses and efficiency rewards, but too much bonuses will make workers feel too much pressured, while if reward policies are too low it will show a scarce interest on the side of the firm to achieve results. In professional sports bonuses are an extremely powerful tools used by firms to encourage athletes to perform at their best and to put more effort in their performances. These bonuses can be set at reach of individual results, such as amount of goals for a striker in football or dribbles and shoots for a basketball player, or for team results – victory of a trophy, qualification for a tournament, etc. -.

The fundamental role of salary and the efficient equilibrium of basic and result-driven remuneration is studied by the *Efficiency Wage theory*. The efficient wage hypothesis, firstly introduced by Alfred Marshall in 1890, suggests that compensation is de facto set by the employer, whose interest could be to keep salaries higher than the equilibrium level, regardless the level of unemployment, in order to incentivize individuals and achieve higher levels of efficiency and, in turn, higher profits.⁴² According to the *Efficiency Wage theory*, salaries do not only represent a compensation mechanism (allocative function) but also act as an incentive tool to achieve better results. The psychological attitude of humans with respect to the salary contractual agreement is further explained by the *Implicit Contract theory*;⁴³ As salaries are determined through a stage-gate contractual agreement for the exchange of effort and remuneration between the worker and the firm, the behavioral attitude of the parties stands as a fundamental factor together with the law of demand

⁴² A. Marshall, *Principles of Economics*, Ch VI.III.10, Macmillan, London, 1890.

⁴³ M. Baily, *Wages and employment under uncertain demand*, *Review of Economic Studies*, 1974.

and supply. Even though the *Implicit Contract theory* mostly elaborates on the specific conditions of an economy under recession, it provides insights on the behavioral sphere that are applicable in any general context: if workers are risk adverse, they will naturally be more open to accept lower salaries in exchange for stability, while if they are risk prone, the supply of labor will be steeper as they will be asking higher salaries, accepting the risk of being unemployed. According to the *Implicit Contract theory*, workers exhibit a risk prone attitude when their abilities are unique or difficult to be replaced. Hence, diversification is a driver of increased remuneration as firms may be willing to pay more for individuals who are difficult to be substituted. The influence of skill diversification on retribution is further developed in the *insider-outsider theory*.⁴⁴ This theory, first introduced in 1984 by Assar Lindbeck and Dennis Snower, highlights how in some specific contexts where the supply side is scarce, the transaction costs that are incurred to hire outsiders are higher than the ones associated to insiders' training. Thereupon, insiders tend to achieve a greater bargaining power and obtain salaries above the equilibrium level. The *insider-outsider theory* appears to be a good fit for professional sports, where the best pro athletes are a small fraction of the population and turnover results to be extremely costly for firms. As a matter of fact, the compensation of the labor factor is of extreme relevance in professional sports as salaries stand as one of the heaviest elements of the cost structure of sport firms. In the past, numerous studies on American professional sports⁴⁵ have highlighted that in such labor-intensive contexts, one of the competitive advantages resides in the ability to select, motivate and retain the best talents. To this end, the remuneration system plays a fundamental role in the success of professional sport firms.

Another important behavioral theory that introduces aspects on social confrontation is *equity theory*.⁴⁶ Equity theory proposes that individuals make judgements about the fairness of their pay on the basis of assessments of their perceived outcomes/inputs ratio relative to the ratio of some salient comparison other. The foundations of this theory lie in the judgment made by individuals on their pay. Individuals often judge the “goodness” of their pay in relative rather than absolute terms, just as employers evaluate the reasonableness of their pay level in relation to what others are paying.⁴⁷

⁴⁴A. Lindbeck, D. Snower, *Involuntary unemployment as an insider-outsider dilemma*, Institute of International Economic Studies, Stockholm, 1984.

A. Lindbeck, D. Snower, *The insider-outsider theory of employment and unemployment*, MIT press, Cambridge, MA, 1988.

A. Lindbeck, D. Snower. *Insiders versus Outsiders*, Journal of Economic Perspectives, 2001.

⁴⁵ M. Bloom, *The Performance Effects of Pay Dispersion on Individuals and Organizations*, Academy of Management Journal, 42(1), 25–40, 2007.

⁴⁶ J. S. Adams, *Inequality in social exchange*, Advanced Experimental Psychology, Pg. 335-343, 1965.

⁴⁷ B. Gerhart, S. L. Rynes, *Compensation: Theory, Evidence, and Strategic Implications*, Pg. 135-138, Sage Publications, 2003.

However, social confrontation does not apply only to workers, but also to companies. As a matter of fact, pay basis decisions involve comparisons among people doing exactly the same kind of work in the same organization, whereas pay level decisions involve comparisons across organizations, and pay structure decisions involve comparisons across jobs. Nevertheless, *equity theory* suggests that pay basis decisions – such as merit increases or bonuses – are more likely than other pay decisions to evoke equity comparisons. This hypothesis is based on the fact that pay basis decisions (e.g. merit-increase decisions) are often explicitly personal, while decisions about pay level or pay structure generally involve decisions about large groups of people. For these reasons, equity theory advocates that pay basis decisions are a way more considerable source of employee monitoring and reactivity.

In the wake of *equity theory* in social psychology and *social exchange theory* in sociology, two contrasting school of thought have delineated on the pay structure, studying the phenomenon of social confrontation, but also analyzing the effects of this social behavior on the efficiency of the labor force. The two theories are the *Tournament theory*, which proposes a relatively dispersed pay structure in order to attract talented employees and motivate high individual performance as a consequence of the substantial rewards on offer; and the *Cohesion theory*, stating that firms can increase productivity by narrowing wage dispersion among workers with the aim to improve the cohesiveness of the group.

1.2.1. Tournament Theory

Tournament theory, first introduced by economists Edward Lazear and Sherwin Rosen in 1981, is a personnel economics theory which has frequently been applied to the practice of law and professional sports.⁴⁸ In some cases it has also been adapted to contexts like the book industry, where a writer which is marginally better than one another, writes marginally better book; even though the distance between the two books is small, the better writer will sell way more copies as readers devote a small fraction of their time to reading. The paper from which the *Tournament theory* originates examines performance related pay and stresses the importance of compensation schemes as a motivational tool for individuals.

The theory developed by Lazear and Rosen analyses compensation schemes which pay according to an individual's ordinal rank in an organization rather than his output level. The

⁴⁸ E. Lazear, S. Rosen, *Rank-Order Tournaments as Optimum Labor Contracts*, Journal of Political Economy, Pg. 841-846, 1981.

hypothesis supported by *Tournament theory* argues that a relatively dispersed pay structure will attract talented employees and motivate high individual performance as a consequence of the substantial rewards on offer. The application of this theory originates in, and revolves around the explanation of large differentials in prize structures - such as disproportionately high chief executive officer (CEO) or talented players' salaries -. De facto, the ratio of CEO-to-worker pay in large public companies listed on the NYSE has risen steadily from 40:1 in 1982 to 278:1 in 2018.⁴⁹ The result is even more shocking when it comes to Italian professional football. In 1982, Juventus bought from Saint-Etienne Michel Platini. At the time, Platini was considered the World's most talented player. There have been two major interrelated consequences to the transfer of the French player to Juventus. Firstly, the signing of a record-breaking contract, granting to the player a salary of 560.000€ per year.⁵⁰ Secondly, the rise of the highest to lowest paid spread to 316:1. Even though this gap was already high in 1982, it has grown since then. As of today, Cristiano Ronaldo is the highest paid Serie A player, earning €31 million per year and the ratio is now 1135:1.

As it has been pointed out in the previous section, incentive payment schemes have a crucial role in the motivation and retention of the best talents. Nevertheless, a wide variety of schemes are used in practice. Tournament theory highlights the downsides of the most common ones (such as piece rate or input-wage schemes) and proposes a possible solution. Piece rate is a scheme that rewards workers on the output they produce rather than the time they input. While simple piece rates and input-wage schemes are based on output, the rank-order payment proposed by *Tournament theory* rewards workers for their rank rather than their performance. Conceptually, firms are paying high salaries to managers to encourage individuals to invest in their career development and boost their lifetime productivity. Hence, the objective of the firm applying the rank-order incentive scheme is to acquire talented employees and maximize efficiency.

The use of *Tournament theory* provides an efficient compensation of labor when it is difficult or expensive to quantify labor. According to the authors, if inexpensive and reliable monitors of effort are available, then the best compensation scheme is a periodic wage based on input. However, when monitoring is difficult, so that workers can alter their input with less than perfect detection, rank-order compensation provides an excellent alternative.⁵¹ It is effective as it incentivizes hard work and puts milestones to be reached in front of workers, in order for them to climb to the top of the pyramid.

⁴⁹ J. Colombo, *Why Has The U.S. CEO-To-Worker Pay Ratio Increased So Much?*, Forbes, Aug. 31st, 2019

⁵⁰ Redazione, *Paperone Ibrahimovic, guadagna 22 volte più di Platini*, Libero, Jan. 3rd, 2009.

⁵¹ E. Lazear, S. Rosen, *Rank-Order Tournaments as Optimum Labor Contracts*, Journal of Political Economy, Pg. 841-846, 1981.

Two important assumptions stand as the cornerstones of *Tournament theory*:

- the labor market is a reiterated life-long contest in which each single individual who enters the labor market becomes a player;
- the worker's output produced is considered as the lifetime quantity that the individual will provide.

These two assumptions are not clear enough; First, in the tournament game, each player knows the rules of the game and expects to be facing at least one opponent at some point in time. However, the player cannot be *ex ante* aware of the identity of his opponent, precluding any possible collusion. Second, the output produced from the individual is a function in two variables, namely skill – which may be controlled by the worker at an early stage in life by investing to develop and acquire new skills – and chance – an independent variable which depends upon the natural predisposition of the individual and the opportunities on the market -. Each player has the ability to control the skill variable but is powerless against the chance variable.

In its easiest form, the tournament involves two players and two prizes, one for the winner and one for the loser.⁵² The bigger the spread between the two prizes, the stronger will be the incentive for the two players to aspire to the victory. Thus, as the only variable that individuals can control is the skill variable, players will tend to invest more in their education as the spread increases. As it has been pointed out above, it's also in the firm's interest to increase the spread of prizes as this will result in better skilled workers, higher output produced and increased effort. Nevertheless, the firm is prone to increase the spread up to a certain level. The rationale of this limit is that as the workers invest more, the superior costs incurred will offset the gain in efficiency. Therefore, the prize setters, namely the firms, will set an optimal prize spread, high enough for inducing investment in skills, but low enough for the investment not to be too expensive for the firm to repay. The prize may be in the form of extra cash or a promotion. A promotion is not a synonym of increased paycheck – even though usually the two are associated – but confers the possibility to the player to access to higher stages of the tournament, which may of course have higher stakes. This game concept introduced by Lazear and Rosen explains why presidents are paid tremendously more than vice presidents. All of a sudden, a vice president can be promoted and become president of the company, thereby having his pay tripled or even more, even though his productivity has not tripled. This happens to be extremely common in the business world and it is considered to be absurd according to piece rate schemes.

⁵² Lazear and Rosen refer to the prize awarded to the loser as a *Consolation Prize*.

Tournament theory, and in general the hierarchical pay hypothesis, have been frequently applied to the study of efficient management in the most popular professional sports. However, a distinction has to be made among the professional team sports, like football, baseball and American football and nonteam sports, such as tennis, golf and motor racing. According to the application of *Tournament theory*, in individual sports, the promoter of an individual event needs to attract individual athletes through price and/or appearance money. The prize money may be spread widely to ensure that a good field is attracted, or the promoter may use appearance money to ensure the presence of star players.⁵³ On the other hand, in team sports, the intra-team wage structure is considered by *Tournament theory* as an incentive system that attracts talents and stimulates individual effort. In order to keep highly talented star players, it is often inevitable to introduce significant wage differentials.⁵⁴ Moreover, wage dispersion allows creating a meritocracy in which rewards are expected to increase with work performance.⁵⁵ A slightly modified version of the Tournament theory can be applied to professional football too. The basic principles of the tournament model designed by economists Lazear and Rosen can be a good fit for both professional players and football clubs.

De facto, the assessment of the economic value of a football player is not influenced by a single game, but rather the performance trajectory of his career, his age and his potential future performance. Moreover, it is a generally accepted concept that from a very young age, players train in order to maximize their future performance and reach their full potential. Naturally, luck or natural predisposition have a role in the output function of a player. As the career of a professional football player is short with respect to the one of a manager, a teacher or a plumber, the negative or positive events – such as a serious, unexpected injury or scoring the last minute goal in a World Cup final – have a greater delta on the overall production of output of the individual. Nevertheless, players can control their skill variable by adopting a positive and resolute mentality and by training while they are in a young age. As a matter of fact, the potential of a player is not only due to his natural genetic physical endowment but also by the mentality adopted. Football fans have assisted to a disproportionate number of very well-endowed players who have failed to express their potential as they hadn't the appropriate mentality. The right approach leads a professional player to cure every aspect of his life in order to extend their career and maximize their performances. Cristiano Ronaldo, one of the best players worldwide in the last ten years and one of the greatest players of all times, is the clearest example of how mentality can affect performance. Since the age of fifteen, the Portuguese

⁵³ R. Sandy, P.J. Sloane, M.S. Rosentraub, *The Economics of Sport: An International Perspective*, Macmillan, 2004.

⁵⁴ P. Milgrom, J. Roberts, *Economics, Organization & Management*, Prentice-Hall, 1992.

⁵⁵ E. Franck, S. Nüesch, *The effect of wage dispersion on team outcome and the way team outcome is produced*, *Applied Economics*, Pg. 3037-3049, 2011.

player had a single objective in his mind, to become the best player in the world.⁵⁶ This objective, this mentality, has led Cristiano Ronaldo to train harder and to express his full potential.

As the study that is being carried forward concentrates on the Italian Serie A, the following application of the Tournament model will concentrate on the Italian first division. According to the model designed by Lazear and Rosen in 1981, the Serie A is a single game, where each season represents a reiteration of the tournament. The players of the game are the football clubs and are represented in the game by the players who act in their behalf. Football clubs usually set objectives on a short to mid-term range. However, mid-term objectives are now isolated as they would violate the reiterative nature of the game set by the Tournament model. Hence, football clubs, at the beginning of the season choose among three main end-of-year objectives:

- Win the title;
- Achieve a spot for a European competition (either Champions League or Europa League);
- Avoid Relegation.

In order to achieve the objective set, clubs invest during the transfer windows to buy the performance of the football players that they believe will help the team achieve the goal.

According to the Piece rate model, the costs – acquisition price and salary - incurred by the football club should be representative of the output to be produced by the player. Hence, players with the same relevant statistics should be paid the same salary. In brief, a striker who scores 20 goals and provides 10 assists should be paid double the salary of a striker who produces half of the output; however, this is not the case. To bring a real-world case, at the end of season 2017-2018, two players were on top of the scorer ranking with 29 goals each.⁵⁷ The two players, *Ciro Immobile* and *Mauro Icardi* were players of *SS Lazio* and *FC Inter* respectively, and both teams ended the season with 72 points on aggregate. The two players also shared very similar minutage and disciplinary sanctions, with the only difference that the *SS Lazio* player assisted his teammates eight times, while *Icardi* only one. The two players were similar even in reputation, role in the team and age, with *Immobile* being only three years older. Hence, according to the Piece Rate incentive scheme, the two players should be approximately equal in value, rank and salary. Nevertheless, *Icardi*'s net salary, amounting to 4,5 million euros, was higher than the one perceived by *Immobile*, earning a net salary of 2,2 million euros. Consequently, if *Immobile* were to follow the piece rate theory, he could ask for a conspicuous salary increase as a reward for his excellent performance and increased effort. However, in

⁵⁶ Cristiano Ronaldo, *Madrid: My Story*, The Players' Tribune, 2017.

⁵⁷ Data retrieved from Transfermarkt.com

professional football, those decisions are strongly influenced by the salary policy adopted by the football club. As a matter of fact, Inter FC and SS Lazio are teams that adopt antipodal salary policies; While Inter FC is willing to retain its best players by using salary as a reward and motivational tool, SS Lazio's president Claudio Lotito prefers to keep salaries around an average to foster team cohesiveness and adopt a harder line with players who ask for salary increases. The different management practices adopted by the two teams are further highlighted by the fact that in the following season Immobile's salary has not changed while Icardi has received a net salary increase of nearly half a million euro.

1.2.2. Cohesion Theory

On the opposite side with respect to the *Tournament theory* stands the *Cohesion theory*. First introduced by economist David I. Levine in 1989, Cohesion theory states that firms can increase productivity by narrowing wage dispersion among workers since this policy improves the cohesiveness of the group.⁵⁸ Here cohesiveness has to do with:

- the within-group harmony,
- the force that keeps the members from leaving the group,
- the capacity of the group to maintain integrity,
- the extent to which the members reinforce each other's expectations regarding the value of maintaining the identity of the group.⁵⁹

Hence, *Cohesion theory* and, in general, the compressed pay distribution model, affirms that team performance and pay dispersion are inversely related: the higher the dispersion among the salaries, the less the members of the team will be keen to cooperate. This position is strengthened by economists Kohn⁶⁰ and Pfeffer⁶¹, affirming that the hierarchical salary structure introduces inequity and injustice in the organization, leading to a consequential lack of satisfaction and low team productivity. One of the main pitfalls of the hierarchical pay model suggested by *Tournament theory* is the overcompensation of the top tier members of the team which results in the allocation of a large portion of the salary resources of the organization on few top-tier individuals perceiving very high

⁵⁸ D. I. Levine, *Cohesiveness, Productivity and Wage Dispersion*, Journal of Economic Behavior and Organization, Vol. 15, Pg. 237-255, 1989.

⁵⁹ R. M. Stogdill, *Group productivity, drive, and cohesiveness*, Organizational Behavior & Human Performance, 8(1), Pg. 26-43, 1972.

⁶⁰ A. Kohn, Punished by rewards: *The trouble with gold stars, incentive plans, A's, praise, and other bribes*, Houghton, Mifflin and Company, 1993.

⁶¹ J. Pfeffer, *Competitive Advantage through People Unleashing the Power of the Workforce*, Harvard Business School Press, 1994.

salaries. According to the *Matthew effect*,⁶² the overcompensation issue worsens when there is an increase in the salary resources; as a matter of fact, the new resources available to the company will most likely be distributed pro rata, eventually demotivating whoever is not on the top tier. This condition in which salaries are not equally distributed, can lead to *Winner-Takes-All competitions*, fostering individual productivity but seriously harming the team performance and result. Moreover, as reiteration of the competition is introduced, positive streaks have a negative effect on individual productivity too, as the losers lack of self-esteem and winners lose interest.⁶³

On the other hand, a compressed salary structure, such as the one proposed by the *Cohesion theory*, has the advantage to introduce a sense of equity, fostering cooperation and, consequently, the enhancement of team performance. De facto, salary equity is essential to increase team productivity, stimulating cohesion and encouraging the overall result rather than the individual achievement. These conclusions are drawn by Levine from the construction of a production model based on two possible tasks which may vary according to their interdependence. The model reaches the following conclusions:

- A strong salary disparity among good and bad workers causes a break in team cohesion and, more in general, a collapse in production;
- The greater the complementarity of tasks, the stronger will be the marginal effects of each single job;

Hence, the cohesion hypothesis foresees that a great salary disparity leads to a lack of trust and social envy between workers, impairing the company's performance. Moreover, the intra-team wage disparity can lead to other related issues: members who are extremely dissatisfied with their remuneration may adopt hostile behaviors and disruptive adverse alliances in an attempt to counterbalance the salary gap. The tools available to the "insurgents" are various and comprehend the possibility to hamper the communication and collaboration or to exclude the more efficient elements and hinder the consensus among the co-operators.⁶⁴ As a consequence, the team productivity would decrease, hampering the decision making process' creativity and quality.

In the previous section it has been pointed out that, according to Tournament theory, individuals are incentivized by high pay dispersion to increase their effort: they will work harder to

⁶² In sociology, the *Matthew effect* refers to a condition in which "*the rich get richer and the poor get poorer*". The effect is named after verse 25:29 of the Gospel of Matthew which reads: << *For whoever has will be given and will be in abundance; but whoever has not will also be taken away what he has*>>.

⁶³ R. H. Frank, P.J. Cook, *The Winner-Take-All Society*, The Journal of Economic Literature, Vol. 34, No. 1, 1996.

⁶⁴ K. M. Eisenhardt, L. J. Burgeois, *Politics of Strategic Decision Making in High-Velocity Environments: Toward a Midrange Theory*, The Academy of Management Journal, Vol. 31, No. 4, 1988.

achieve higher retributive stages. Nevertheless, the tournament theory's detractors highlight how this approach doesn't take into consideration the complementarity of some kinds of task and result, which are extremely interdependent and subject to the cooperation among workers. In this case, the hierarchical distribution of salaries loses most of its benefits and can even harm the company's productivity. The rationale is that individuals will concentrate only on their performance at the expense of the teamwork, given that the single performance will be the driver of increased retribution. Furthermore, this mechanism will eventually trigger a fierce competition among workers, causing detrimental activities to occur. In fact, not only an individual can increase his chances to win a contest by putting more effort in his job, but will also be tempted to, and probably will end up trying to shrink and blur the results achieved by his opponent by the means of sabotage and non-cooperation.⁶⁵ Economist Edward Lazear stated in 1989 that a possible solution to fade this detrimental activity is to reduce the spread among the prizes, a solution which may seem in conflict from what he previously theorized in the Tournament theory.⁶⁶ The American economist proposes to distinguish the more aggressive workers, or *Hawks*, from the less aggressive ones, or *Doves*. Clearly, any company will obviously prefer to hire only Doves, but it is very difficult to assess the personality of an individual before she is hired. Hence, given the fact that it is not possible to make an a priori distinction, the ideal solution is to introduce a more equitable salary structure, just in case the organization is composed of a considerable number of Hawks. Thereupon, Lazear can be seen as an advocate of both school of thought as he expressed argumentations on the side of both the Cohesion and Tournament theory thought his academic career.

Finally, *Cohesion theory* has been rarely juxtaposed to professional football, even though most of its aspects, such as the complementarity of tasks and the importance of team cooperation are endemic to this specific sport. As a matter of fact, the roles among the players in the field are strongly connected and a single error or sabotage by a player can have a catastrophic resonance on the overall team performance. Moreover, as the composition of professional football teams becomes more internationally homogeneous, the management of the group cohesiveness becomes complex and more subject to social comparison. Consequently, some football clubs adopt compressed wage structures in order to foster team cohesiveness and team collaboration.

⁶⁵ E. P. Lazear, *Personnel Economics*, MIT Press Books, The MIT Press, Vol. 1, 1995.

⁶⁶ E. P. Lazear, *Pay Inequality and Industrial Politics*, Journal of Political Economy, Vol. 97, Pg. 561-580, 1989.

	<i>Hierarchical</i>	<i>Compressed</i>
Levels	Many	Fewer
Differentials	Large	Small
Criteria	Person or Job	Person or Job
Supports	Close Fit	Loose Fit
Work Organization	Individual Performance	Teams
Fairness	Fairness	Fairness
Behavioral	Opportunities for promotion	Co-Operation

Figure 1.12 – Hierarchical versus Compressed Wage Structures⁶⁷

Hence, according to *Cohesion theory*, depending on some relevant factors such as the skills, performances and experience of the players of the team, the managers of the club will opt for a compressed or a hierarchical wage structure and invest in order to preserve the equilibrium. To this extent, *Figure 1.12* reports a general framework designed by Milkovic and Newman, which briefly summarizes the different applications of the two wage structures. This framework can be applied to professional football clubs too; Being the levels the role inside the team (e.g. star, determinant player, regular player, frequent substitute, etc.); the differentials, the differences in the salary perceived; the supports and the work organization, the reliance on teamwork rather than individual effort – even though in football there will always be a mix close to a 50-50 balance on the long run -; and the behavioral attitude, the “aim of the contest” which individuals will aspire to, to achieve a salary increase.

1.3. The Determinants of Italian Serie A Players’ Salary

While the first two sections of Part I were dedicated to the financial structure of Italian professional football clubs and the different schools of thought that determine salary policies, this last section focuses on the determinants of Italian Serie A players’ salary. Three major arguments will be assessed: the labor market dynamics of professional football, the tax incentives provided by Art. 5 of the Italian Legislative Decree n. 34/2019 - commonly known under the name of “Decreto Crescita” – and the performance of players.

The Italian Serie A is one of the top five European football championships and the eight largest professional sport leagues worldwide - after the NFL, the Major League Baseball, the Premier

⁶⁷ G. T. Milkovic, J. M. Newman, *Compensation*, McGraw-Hill, Boston, 1999.

League, the NBA, the La Liga, the NHL and the Bundesliga –.⁶⁸ The top Italian championship is currently earning revenues in excess of two billion Euro each year and employing more than 700 professional players every season.⁶⁹ The gargantuan flow of money that revolves around this industry creates high pressure on the achievement of sport and economic results. Moreover, due to the high incidence of unpredictable factors such as injuries, end-of-season results are not always predictable, increasing the pressure on the final outcome. As a consequence of the labor-intensity, the pressure on results and the high uncertainty, the human capital⁷⁰ – namely the players – has a strong influence on the financial performance of the club and, hence, requires a conspicuous remuneration.

Yet, even though the characteristics of the Italian Serie A provide a rationale for the conspicuous salaries that are observed, it does not explain the great variance of players' salary, with a ratio of highest to lowest paid equal to 1135:1. The comparison of players' salaries seems to be extremely fascinating for football fans too; In some cases, the apparent absence of a rationale for this variance – especially when players have similar characteristics - creates taboos. The objective of the section on the “Decreto Crescita” is to highlight how regulation and tax incentives favor the growth of the championship by attracting more talented players. Finally, the argument will include the players characteristics by listing and analyzing what physical – past, potential performance and field position - and non-physical – such as resonance and leadership - characteristics determine the salary of a player.

1.3.1. Labor Market Dynamics

Demand and supply govern the relationship between the quantity that consumers are willing to buy and the quantity of a commodity that is available for sale. It postulates that, holding all else equal, in a competitive market, the unit price for a particular good, or other traded item such as labor or liquid financial assets, will vary until it settles at a point where the quantity demanded will equal the quantity supplied, resulting in an economic equilibrium for price and quantity transacted. Nevertheless, there may exist some factors that shift or influence the demand and others that affect the supply for a particular asset. The demand curve relates price and asked quantity. The curve defines how a change in price affects the quantity demanded of a specific good. However, the demand curve

⁶⁸ S. Kutz, *NFL took in \$13 billion in revenue last season - see how it stacks up against other pro sports leagues*, Marketwatch.com, 2019.

⁶⁹ N. Donna, *PWC Report Calcio 2019*, PWC, 2020.

⁷⁰ F. Montanari, G. Silvestri, *Le Determinanti Della Retribuzione tra Risultati e Caratteristiche Individuali: Il Caso del Campionato di Calcio di Serie A*. *Rivista Di Diritto Ed Economia Dello Sport*, III(I), 92–106, 2007.

may be affected by multiple other factors. These are the main factors that alter the demand for a good:⁷¹

- *Change in consumers' preferences*: If a good is more pleasant for consumers, keeping the price constant, more of it will be bought.
- *Change in information*: If consumers realize the sudden need for a certain good, demand will increase.
- *Change in wealth*: If consumers have a greater income, they can afford more of the good.
- *Change in expectations*: If consumers believe that the good is undervalued and that the price will increase in the future, they will buy the good in advance.
- *Change in price of other related goods*: If the quantity bought of a substitute or complementary good changes, it will also affect the quantity of related goods that are being bought at a lower price.

A distinction has to be made between changes that influence the demand, moving the equilibrium along the curve and changes that shift the demand curve. On the one hand, the factors listed above shift the demand curve according to the negative or positive effect that they have on consumers' preferences. As an example, an increase in incomes will cause the relative price of goods to decrease, making individuals richer and able to afford more of the good if the price is kept fixed. On the other hand, an exogenous increase in prices will move the equilibrium along the curve and decrease the quantity demanded of the good - while a decrease in the price will increase the quantity demanded -. Depending on how steep the demand curve is, the changes in the price of the asset will generate more consistent adjustments in the quantity required by consumers.

Analogously to the demand curve, the supply is the quantity of a specific good that sellers are willing to market for a certain price. Hence, the supply curve defines the relationship between the price and the quantity that is made available by vendors. Differently from the demand curve, the supply curve is increasing because as the price goes up, sellers are incentivized to market more of the good. Just as the demand curve, the supply is affected by these factors - other than the price -:⁷²

- *Change in technology*: Technological innovations may affect the production process of the good, affecting the price.
- *Change in the price of raw materials*: if the production costs change, they will affect the quantity and price.

⁷¹ M. Valente, *Domanda e Offerta*. Università dell'Aquila, 3-11, 2009.

⁷² M. Valente, *Domanda e Offerta*. Università dell'Aquila, 12-20, 2009.

- *Change in the competition level:* All else being equal, a greater competition will cause a change in the relationship between price and total quantity offered.
- *Change in expectations:* If producers believe that in the future the price will change, they will adapt their strategies in accordance with their beliefs.
- *Government intervention:* Any change in taxes, subsidies or laws that will influence the costs will affect the price of the good.

As it has been pointed out in the previous sections, professional football players' performances are secured by football clubs through the use of registration rights. Hence, football clubs that are willing to acquire the performances of a player must negotiate a deal with his membership club. This negotiation follows the laws of demand and supply and are influenced by the factors listed above. It is however noticeable that the market for football players does not depend only on the quantity available and the price, but it also depends on the quality too. Quality is here intended as the potential abilities of the player who may be endowed with more or less potentiality. The quality variable is positively related to price and inversely related to quantity; in brief, the more qualitative a player, the rarer and the more expensive will be. Moreover, as registration rights have expiration dates which vary according to the length of the contract signed with the player, clubs may have the opportunity to acquire players for free by just offering an inflated salary to the player. Another important characteristic is that professional football clubs cannot access the market at will, but have the possibility to officially operate only during market windows.⁷³ Professional football clubs have two market windows in which to operate, a long summer session – from May to September - and a small winter session in January. The start and close date are strongly dependent from the championship in question. In Italy, the summer market window starts on July the 1st and ends September the 2nd, while the winter session lasts from the 2nd to the 31st of January. Notwithstanding the time limitations, the market sessions are busy as changes in expectations are extremely frequent. If a player shows off in a particular season, his price will skyrocket, and a pool of clubs will undoubtedly show their interest for the player. This peculiar market reactivity is fostered by two aspects: First, the reliance of football clubs on profit on disposal of players' registration rights which is influenced by the *change in expectations*. As a player shows a great potential, expectations change for both the demand and supply side, resulting in a price increase. Since the advent of the Financial Fair Play, all players have a price tag and can be sacrificed for excess cash. Second, the high uncertainty that stems from the impossibility to foresee injuries causes sudden, urgent needs for clubs who are forced to access the

⁷³ The term *officially* is specified because clubs can actually negotiate even when the market is closed, but the exchange can take place only during market windows.

market. The greater and the more unexpected the need, the higher clubs will be prone to disburse large sums. Another factor which influences the demand is the *change in price of other related goods*; Football clubs are exceptionally aware of the deals that are closed in the market and the acquisition price of a player will set the standard for players with similar potentiality. This is especially true for top players, who set the standard for the entire market. A *change in wealth* has a strong influence on the demand for professional football. Since 2008, the aggregate revenues collected by top-division clubs have increased at average growth rate of 6,6% per year.⁷⁴ Nevertheless, the top five European championships have experienced a more than proportional growth, increasing their share of the cake from 69% to 74%. Given the dependence of the market on the relative needs of clubs and the opportunities on the market, the level of competition certainly influences the price and quantity offered; If similar players are offered on the market by different clubs, more choice will be available to interested parties and the opposite will be true as well.

Last but not least, local *government intervention* has a determinant influence on the market power of professional football clubs. It suffices to say that since 1990, Barcelona and Real Madrid, two of the most emblazoned teams worldwide are considered by the Spanish Government as non-profit firms and can de facto access to specific tax incentives.⁷⁵ Lately, the Italian Government has moved in the same direction, by approving the “Decreto Crescita” which will be dealt in the next section.

1.3.2. Italian “Decreto Crescita”

Government intervention plays a fundamental role in the market dynamics of every industry. In the case of Art. 5 of the Italian Legislative Decree n. 34/2019 government intervention has dramatically affected the attractiveness of the Italian Serie A Tim for international football players. The “Decreto Crescita”, brings some changes to the already existing Art. 16 of the Italian Legislative Decree n. 147/2015, establishing a favorable tax regime in order to attract foreign human capital. It also includes an ad hoc regime for professional football players who are incentivized to transfer their residence in Italy.

The requirements needed to access to the fiscal incentives are the following: ⁷⁶

⁷⁴ UEFA Financial Sustainability and Research Division, *The European Club Footballing Landscape*, UEFA, 2018.

⁷⁵ M. Cruccu, *Real e Barcellona? Pagano meno tasse di un'impresa di pulizie. E la UE indaga*, Corriere della Sera, August, 7th 2013.

⁷⁶ Art. 5 Decreto-legge 30 aprile 2019, n. 34

- The individual must have resided in a foreign country in the past two fiscal years before moving to Italy;
- It is compulsory to stay in Italy for at least two fiscal years after having moved the residence to Italy;
- The working activity must prevalently have place in the Italian territory.

With the access to the fiscal regime, which has a five-year duration, the salaries produced by professional athletes contribute by half their value (50%) to the definition of their taxable income. Moreover, professional athletes have the possibility to extend the length of the fiscal incentive for other five years if they are loaded with at least one minor child and/or have acquired a residential real estate in Italy. The adhesion to the fiscal regime is optional and implies the deposit of a lump-sum tax, intended for the growth of youth teams, that equals the 0,5% of the amount levied, which represents the 50% of the total income subject to taxation. This favorable tax regime has been applied by professional football players who have moved to Italy since July 2019, as they were required to comply with Italian tax law only from fiscal year 2020 (as they had lived in Italy from less than six months) -. The real advantages of this norm are translated in the possibility to attract and retain foreign top-level football athletes by Italian Serie A clubs, creating a virtuous trend that has the potential to foster the interest in this championship and the growth of merchandising sale, gate receipts and sponsorships. As a matter of fact, this policy has already made its effects of the Italian championship by attracting players of the calibre of Ibrahimovic and Eriksen and young promises such as De Ligt.⁷⁷ Nevertheless, this fiscal regime may also be applied by football managers. Antonio Conte, one of the best football managers worldwide and former coach of Juventus and Chelsea⁷⁸ has been appointed in the summer market window of 2019 as manager of FC Internazionale. Thanks to his two-year experience in Premier League, he is currently entitled to the favorable fiscal regime. His net salary at Internazionale FC amounts to ten million euros and only 50% of his income is taxable using the fiscal relief. As it is possible to notice from *Figure 1.13*, Antonio Conte, appointed in July 2019 as FC Internazionale manager, has reached an agreement for a net salary amounting to ten million euros. The Italian manager is expected, thanks to the “Decreto Crescita” – also named “Legge Conte”⁷⁹ from the Italian press -, to experience a tax relief that will halve his taxable income from nearly 18 million euros to only 6,5 million euros.

⁷⁷ M. Pino, *Il Decreto Crescita nel calcio: i nuovi incentivi per gli sportivi in Italia*. Calcio & Finanza, 2019

⁷⁸ Transfermarkt Data (2020).

⁷⁹ S. Cola, *Calciomercato, dopo la “legge Bosman” arriva la “legge Conte”?*, Fox Sports, 2019.

	Former Taxation	%	Tax Relief Regime	%
<i>Gross Salary</i>	18.009.710 €	100%	13.087.116 €	100%
<i>Net Salary</i>	10.000.000 €	56%	10.000.000 €	76%
<i>Social Contribution</i>	44.672 €	0,25%	32.462 €	0,25%
<i>Taxable Income</i>	17.965.038 €	100%	6.527.327 €	50%
<i>Taxes (IRPEF)</i>	7.712.666 €	43%	2.802.281 €	43%
<i>Regional Tax</i>	252.372 €	3%	252.372 €	3%
<i>Contract Length</i>	3 years		3 years	
<i>Total Cost</i>	54.029.131 €		39.261.346,82 €	
Δ	-		14.767.784,24 €	

Figure 1.13 – The effects of the “Decreto Crescita” on Antonio Conte’s salary at FC Internazionale ⁸⁰

Moreover, the advantage will have an even greater impact on FC Inter as the total cost of the salary for the three years of contract will decrease by nearly 15 million euros. Hence, this tax regime represents an advantage not only for foreign players, but for Italian football clubs too: as the taxable income of foreign players decreases, so it will happen to the weight of foreign players’ salary on the company’s financial statement. Furthermore, as more international football superstars land in the Serie A championship, Italian football clubs will grow the value of their brands, achieving easier access to profitable sponsors and greater revenues from broadcasting rights, merchandising and ticket sales.

1.3.3. Players’ Performance and the Resource Based View

The aim of this section is to point out the impact of the workforce - here represented by the athletes - for the success of the company. In professional football, the human resources are fundamental in the achievement of a competitive advantage for the company with respect to its competitors, not only in their home country but also internationally.⁸¹ As it has been pointed out in the previous sections, the human resources represent a relevant share of the cost structure of a professional football club, and the strategic management of these resources has become fundamental for the success of clubs, both at the financial and sport level. In the last years, the theoretical perspective of the Resource Based View has acquired a growing importance, becoming one of the most supported theories in the field of strategic management. The Resource Based View emphasizes the importance of the organization’s internal variables with respect to external ones, in contrast with

⁸⁰ Data from AIC gross-net salary 2019.

⁸¹ M. Peteraf, *The cornerstones of Competitive Advantage*, Strategic Management Journal, vol.14, 179-191, 1993.

the traditional approach of industrial organization.⁸² According to this managerial framework, every single company is unique and constituted by a particular set of resources. Therefore, the differences in performance may be attributed to the firms' endowment of key resources.⁸³ In particular, the intangible resources of a company (e.g. players' registration rights or the brand) are the most critical as they are rare, complex and difficult to imitate. Hence, the intangible resources play a major role in the achievement of a competitive advantage for a firm.⁸⁴ Among the intangible resources, players' registration rights have progressively acquired a relevant role in the financial accounts of professional football clubs; these rights represent the right to the performance of players which embody the set of knowledge, capabilities and routines that are brought in by each single individual that plays for the company.⁸⁵ Pfeffer, notorious representative of the universalist current, underlines how companies which aim to succeed in the global market have the duty to recruit and craft an adequate human capital in order to achieve a competitive edge with respect to competitors.⁸⁶ Hence, the centrality of individuals on the achievement of the competitive advantage leads to a greater emphasis on the systems and practices that deal with human resource management. Theoretically, it is deemed that the human resource strategic management has an impact on the performance through three interrelated processes:

- Starting from the critical resources of the company, it crafts the competences to be developed and spread;
- It motivates and incentivizes workers through the career path and the compensation system;
- It provides to motivated and ambitious workers the ability to develop and grow their competences.

Commonly, it is believed that it is possible to isolate a determined set of best practices, which are influenced by the characteristics of the industry, for the management of human resources that could grant the achievement of excellent results for a company. As a consequence, Pfeffer suggests a compensation system which is contingent to the performance.⁸⁷ Thus, according to his vision, the compensation system represents one of the most crucial instruments used to attract, retain and

⁸² M. Porter, *Competitive Advantage*, Free Press, New York, 1980.

⁸³ J. Barney, *Firm Resources and sustained competitive advantage*, *Journal of Management*, vol. 5, p. 171-180, 1984

⁸⁴ J. Black, K. Boal, *Strategic Resources: Traits, configurations and paths to sustainable competitive advantage*, *Strategic Management Journal*, vol. 15, 131-148, 1984.

⁸⁵ P. Cappelli, *The new deal at work: Managing the market driven workforce*, Harvard Business School Press, Cambridge, 1999. G. Becker, *Human Capital*, University of Chicago Press, Chicago, 1983.

⁸⁶ J. Pfeffer, *The Human Equation. Building Profit by Putting People First*, Harvard Business School Press, Cambridge, 1998.

⁸⁷ J. Pfeffer, *The Human Equation. Building Profit by Putting People First*, Harvard Business School Press, Cambridge, 1998.

motivate those individuals who exhibit the appropriate characteristics needed to reach the objectives of the company. The key issue then, is the measurement of performance and, as pointed out by salary theories, the incentive system that maximizes utility. Professional football clubs measure performance according to the relevant statistics of players such as age, role, scored goals, assists, saved penalties and others. These factors sum up to a final economical evaluation of the player which, however, is more often than not inflated by market dynamics. Depending on the budget available and the objectives to be reached, clubs will choose a salary policy which may opt for a hierarchical distribution, with influent players and younger promises or to choose in favor of a more compressed wage structure. In Part II, the aim will be to assess the determinants of football clubs' performance and whether a particular salary structure is to be preferred.

Part II

Salary Dispersion and Efficiency: Evidence from Serie A

In Part I the two school of thought on salary structure have been pointed out in order to lay the theoretical foundations of Part II, which will assess the empirical evidence from Italian Serie A. As above mentioned, the performance and related success in team sports depend on several elements; the most important is undoubtedly the availability of talent. This assumption, first introduced by Economists El-Hodiri and Quirk in 1971, has been tested by a wide range of papers that have investigated the talent-performance relationship for several professional team sports, both theoretically and empirically.⁸⁸ Mostly, the effect of salary entropy on team performance has been investigated in the most famous American sports leagues like the National Football League (NFL), the Major League Baseball (MLB) and National Basketball Association (NBA). The rationale behind the study of salary inequality in professional sports is attributable to the availability of data both on the financial and performance level.

In Part II the focus will be on the development of a model whose aim is to assess whether intra-team wage dispersion has an effect on performance. The empirical analysis will be developed using data from the professional football clubs which have taken part to the last five seasons of Italian Serie A. Before developing the econometric model, Part II introduces the relevant results which have been achieved by past research; This specific section fulfills two major objectives: First, it provides useful suggestions on the variables to be used in the model; Second, it will serve as a benchmark for the Results section. After having reported the evidences from past research, the focus will shift on the development of the model. The first step will be to illustrate the sources from which the data has been drawn and how the dataset has been built. Then, given the fact that multiple indexes are available for the measurement of salary dispersion, Part II will introduce the three measures of inequality – namely, Gini, Shannon and Simpson Index - which are used in the model. As a matter of fact, one of the key objectives of Part II is to understand which is the best measure of salary dispersion and its effect on the overall team performance. Moreover, Part II will check for relevant insights in the distribution of indexes with respect to the quartiles of teams' population; The partition of clubs in four groups will be based on the real wages level. The following stage is to list the dependent variables which are exploited by the model in order to reach a significant result. Finally, Part II will report the results which stem from the panel data regression of the econometric model.

⁸⁸ M. El-Hodiri, J. Quirk, *An Economic Model of a Professional Sports League*, Journal of Political Economy, Vol. 79, issue 6, Pg. 1302-1319, 1971.

2.1. Evidence from Past Research

The aim of this section is to provide guidance on the most relevant results which have been accomplished in the past in the study of the payroll-performance relationship. These results will act as the pillars on which the empirical model will be built in order to understand if there is continuity in results. It is however ought to the records to mention that the empirical investigations on the Italian football landscape are quantitatively poor. As a matter of fact, the effects of salary dispersion have been mostly investigated in the major American professional sports leagues. Even though the evidence from empirical researches on other sports' leagues are undoubtedly uncorrelated to the ones stemming from Italian Serie A, they surely provide insights on the variables which may be used to develop the econometric model.

Traditionally, one of the most explored professional sports leagues has been the Major League Baseball (MLB); which is the second richest league worldwide, with a yearly revenue amounting to over 9,5 billion dollars. In this environment, the empirical investigations covering the period 1985-2000 have outlined a negative relationship between team performance and salary dispersion; Hence providing relevant support for the validation of Cohesion theory in professional baseball. To be considered that the studies on the MLB have achieved relevant results by measuring the salary entropy using the Gini coefficient and the performance of the team using the won-lost percentage.⁸⁹

Different results arise from the studies exploring the payroll-performance relationship in the National Basket Association (NBA). The most relevant result is achieved by Simmons and Berri (2011), who again, using the Gini index as a measure of salary dispersion have discovered a positive relationship between dispersion of salaries and player productivity, validating the Tournament theory for the NBA. In their performance model, Berri and Simmons use relative salaries as a proxy for team quality. Relative salaries are computed by dividing each single payroll by the league average in order to center the metric at a mean around 1. However, most of the studies undertaken on the National

⁸⁹ M. Bloom, *The performance effects of pay dispersion on individuals and organizations*, Academy of Management Journal, 42(1), Pg. 25-40, 1999.

F. Wiseman, S. Chatterjee, *Team payroll and team performance in Major League Baseball: 1985-2002*, Economics Bulletin, 1(2), Pg. 1-10, 2003.

T. Jewell, D. J. Molina, *Productive Efficiency and Salary Distribution: The case of US Major League Baseball*, Scottish Journal of Political Economy, 51(1), Pg. 127-142, 2004.

Basketball Association, just as the ones on the National Hockey League (NHL), have led to inconclusive results.⁹⁰

Oppositely, statistically significant result stem from the analysis of the National Football League (NFL), which is the richest professional sports league worldwide. According to economists Mondello and Maxcy, the relationship between pay dispersion and team performance is negative. Their empirical investigation, based on 254 observations in the period 2000-2007, includes the participation to other competitions (other than the NFL) as a factor that influences the dependent variable; The participation to other competitions is expressed by using a dummy variable. The analysis highlights a positive relationship between total revenues and dispersion; hence, NFL top managers typically face a dilemma in the choice between sport result and revenue goals.⁹¹

Narrowing the focus to professional soccer, studies on the Bundesliga - the first German soccer league - from season 1995/96 to 2006/07 have discovered a U-shaped relationship between salary dispersion and team performance; teams having either a high or low level of dispersion are more successful than teams with a medium level of wage inequality.⁹² Support for the Cohesion theory is proven by empirical models on the Major League Soccer (MLS) - the North American soccer association – in the period 2005-2013. It is interesting to notice that here too, the relative wage level is used as a control variable in the assessment of the effects of salary dispersion on team performance. From the estimation by Coates et al. (2016), it emerges a negative correlation between wage entropy and performance, while non-linearity (which resulted from the studies on the Bundesliga) is excluded. Concerning the Italian football context, tradition appears to be a relevant driver of success. Hence, the Italian Serie A appears to be characterized by a self-reinforcing mechanism, where the most successful teams have a competitive edge.⁹³ Moreover, Simmons and Forrest (2014) highlights that in the period 1987-1999 the Italian landscape is characterized by a positive relation between team performance and relative wages; nevertheless, as relative salaries increase, performance improves but at a decreasing rate.

⁹⁰ D. Berri, T. Jewell, *Wage inequality and firm performance: Professional basketball's natural experiment*, Atlantic Economic Journal, 32(2), Pg. 130-139, 2004.

H. Katayama, H. Nuch, *A game-level analysis of salary dispersion and team performance in the National Basketball Association*, Journal of Applied Economics, 43(10), Pg. 1193-1207, 2009.

⁹¹ M. Mondello, J. Maxcy, *The impact of salary dispersion and performance bonuses in NFL organizations*, Management Decisions, 47(1), Pg. 110-123, 2009.

⁹² E. Franck, S. Nüesch, *The Effect of wage dispersion on team outcome and the way team outcome is produced*, Journal of Applied Economics, 43(23), Pg.3037-3049, 2011.

⁹³ C. Amenta, P. Di Betta, *A Die-Hard Aristocracy: Competitive Balance in Italian Soccer 1929-2009*, Rivista di Diritto ed Economia dello Sport, 4(2), 2010.

However, the most complete study on the Italian Serie A is carried forward by Caruso et al. (2016). The empirical analysis is based on 180 observations on 32 teams in an eight-season time frame. Using the percentage of points achieved as the dependent variable, the study assesses the statistical significance of three measures of salary entropy, namely the Gini, Shannon and Simpson indexes. Among the other explanatory variables used in the model are the average age of the roster, the foreigners' percentage and the population of the city that hosts the home matches. According to the results achieved by Caruso et al. (2016), the Simpson index appears to be the only statistically significant index, presenting a negative relation between salary dispersion and sport performance.⁹⁴

2.2. The Econometric Model

After having outlined the evidence from past research, it is now time to develop the econometric model. In the next subsections, the dataset, the indexes and the variables that will be used for the development and assessment of the empirical analysis. The estimation strategy, whose outcome will be dealt in the “Results” section, consists of a baseline model introducing all the covariates and alternatively the control variables associated to wage dispersion. The aim is to solve the following equation:

$$\log(\text{points}_{\%}) = \alpha + \beta_1 \log(X_{i,t}) + \beta_2 \log(\text{Relative Wages}_{i,t}) + \beta_3 \log(\text{Aristocracy}_{i,t}) + \beta_4 \log(\text{Age}_{i,t}) + \beta_5 [\log(\text{Age})]^2 + \beta_6 \log(\text{Population}) + \beta_7 \log(\text{Defensive Efficiency}) + \beta_8 \log(\text{Offensive Efficiency}) + \beta_9 \log(\text{Foreigners}_{\%}) + \beta_{10}(\text{euro}_{cup}) + \mu_{i,t} + \varepsilon_{i,t};$$

by performing both Random Effect (RE) and Fixed Effect (FE) models with standard errors, adjusted for clusters in teams and controlling for potential heteroskedasticity across teams. The FE model, just as the RE model takes its name from the constraints applied to the parameters; while the parameters of the Fixed Effect model are fixed or non-random quantities, the Random Effects – also called Variance Components model – assumes that the data are drawn from a hierarchy of different populations, whose differences stem from the hierarchy itself. Hence, the RE model is preferred when the data is affected by unobserved heterogeneity which is constant over time and uncorrelated with independent variables.⁹⁵ To be noticed that all the variables in the equation are expressed in logarithms, so that each coefficient resulting from the models measures the elasticity of the dependent

⁹⁴ R. Caruso, C. Bellavite Pellegrini, M. Di Domizio, *Does diversity in the payroll affect soccer teams' performance? Evidence from the Italian Serie A*, Munich Personal RePEc Archive, 2016.

⁹⁵ J.C. Gardiner, Z. Luo, L.A. Roman, *Fixed Effects, Random Effects and GEE: What are the differences?*, *Statistics in Medicine*, 28(2), 221-239, 2009.

variable with respect to the control variables. In order to signal which model should be preferred, the Hausman specification test will be performed; its scope is to test the statistical consistency of an estimator when compared to an alternative, less efficient estimator which is known to be significant. Hence, the hypothesis will be to test whether the estimator of the Random Effects model should be preferred to the one of the Fixed Effects model.

2.2.1. The dataset

In order to empirically assess the effect of salary dispersion on team performance in Italian Serie A, a pool of data in a five-year timeframe has been collected to create a dataset. The information included comprises 100 observations, from the 27 teams who have participated to the Italian Serie A from season 2014/2015 to season 2018/2019. During the period under investigation, 14 teams have participated to all the editions of the major Italian championship. The dependent variable of the empirical model, seasonal performance, is here measured using the percentage of points achieved by each team at the end of the season; and, in accordance with past research is computed as follows:⁹⁶

$$Points\%_{i,t} = \frac{points_{i,t}}{points_t};$$

where $points_{i,t}$ are the points achieved by team i during season t and $points_t$ are the maximum points attainable by a single team at the end of the season (38 games x 3 points each = 114). Note that the amount of points taken into account are the ones actually regularly obtained by the team during the season. This is the case of Parma Football Club in season 2014/2015; the financial distress caused the club to receive a penalty of 7 points forcing the club to be relegated in the last position.

The data on the players' salaries have been drawn from *La Gazzetta dello Sport*. The Italian sport newspaper publishes since 2007 the data on players' wages at the beginning of the season. However, in order to provide a more faithful analysis, the salaries are adjusted for the effective months in which a player has been part of the team; That is, if a footballer leaves the club during the winter market window, only six or seven months of his yearly salary are considered. The same logic applies also to the new entries: only the real cost of the player during the season is accounted. The data on players' salaries has multiple uses in the model:

⁹⁶ E. Franck, S. Nüesch, *The Effect of wage dispersion on team outcome and the way team outcome is produced*, Journal of Applied Economics, 43(23), Pg.3037-3049, 2011.

- a. It is used to measure the intra-team salary dispersion;
- b. It is employed to measure the teams' relative wages level.

This decision may seem redundant at first, but this is not the case; The dispersion of salaries and the relative wages level describe two faces of the same coin. As a matter of fact, two or more clubs may share a similar relative wages level but use these resources in very different ways. The opposite too is true: several teams may apply an analogous salary policy but have different budgets.

The next section will deal with the dispersion measures which are then applied in the panel data regression. While the Gini index is typically applied to the statistical analysis of salary dispersion, the Shannon and Simpson indexes are more frequently employed in biology to measure the diversity within a group.⁹⁷ However, Caruso et al. (2016) have proven the possibility to apply these measures to the Italian Serie A; in particular, they demonstrated the statistical significance of the Simpson Index and its negative relationship with the dependent variable.

2.2.2. Gini, Shannon and Simpson Index

In order to increase the chances to find statistically significant results to the empirical analysis, salary dispersion has been measured using multiple indexes. Even though the past research has traditionally used the coefficient of variation as a possible substitute for the Gini coefficient, it is here not considered. The choice stems from the will to check for continuity in the results obtained by Caruso et al. (2016) who have studied the Serie A context in the period 2007-2015.

The Gini index, first introduced in 1912 by the homonymous Italian statistician, measures the data distribution's inequality. Mostly, it is used as a concentration index in order to measure salary or income discrimination and ranges between zero and one; if the coefficient tends towards 0, it points out a relative homogeneity in the distribution, while as it increases above 0,50, it indicates increasing inequality. The mathematical definition of the Gini coefficient is linked to the Lorenz curve and is conceived as the area in-between the 45° line of perfect equality and the Lorenz curve. However, the Gini index can be calculated independently from the Lorenz curve; The Gini index is calculated as half the mean absolute difference:

⁹⁷ D. Coates, B. Frick, T. Jewell, *Superstar salaries and soccer success: The impact of designated players in the Major League Soccer*, Journal of Sports Economics, 17(7), 2016.
E. Yamamura, *Wage disparity and team performance in the process of industry development: Evidence from Japan's Professional Football League*, Journal of Sports Economics, 16(2), 2013.

$$\text{Mean Absolute Difference} = \frac{1}{2} \left(\frac{\sum_i \sum_j |x_i - x_j|}{n(n-1)} \right);$$

(where x_i and x_j are observations, with $i \neq j$ and n is the number of observations) divided by the mean values. Hence, the complete Gini index formula is:

$$\text{Gini} = \frac{\sum_i \sum_j |x_i - x_j|}{\sum_i x_i} \times \frac{1}{2(n-1)};$$

Concerning the Shannon and Simpson indexes, supposing to have a population of N individuals of s species, with n_i being the number of individuals of species i . The Shannon and Simpson index are computed as:

$$\text{Shannon} = \frac{[-(\sum_{i=1}^s p_i \ln p_i)]}{\ln(s)};$$

$$\text{Simpson} = 1 - \sum_{i=1}^s p_i^2;$$

where p_i is the relative abundance (n_i / N) of individuals of species i . In more concrete terms, if N is the number of players in the team, and s is the different salary levels paid to players, the Shannon and Simpson indexes provide insights on the perceived diversity in terms of monetary payroll among individuals. Both the Simpson and the Shannon indexes are increasing in diversity and ranged between 0 and 1.⁹⁸

The frequencies distribution of the Gini, Shannon and Simpson indexes are illustrated in *Figure 2.1*, *Figure 2.2*, and *Figure 2.3*. On the x-axis are reported the 100 observations of diversity indexes, while on the y-axis are the indexes' values. It is important to notice that, while the Gini coefficient highlights a more equitable distribution of incomes in the period 2014-2019, the Shannon and Simpson index report a completely different outcome. The rationale is that the Gini coefficient is not extremely sensitive to the specifics of the income distribution, but rather only on how incomes vary relative to the other members of a population. Moreover, as the Simpson and Shannon indexes

⁹⁸ R. Caruso, C. Bellavite Pellegrini, M. Di Domizio, *Does diversity in the payroll affect soccer teams' performance? Evidence from the Italian Serie A*, Munich Personal RePEc Archive, 2016.

measure the distribution among different species, they may be biased by the differentiation scheme (especially when it comes to salaries). Here the species have been grouped by using as a proxy the average of the distribution of monthly salaries. Hence, each species is differentiated from the other by at least €37.500.

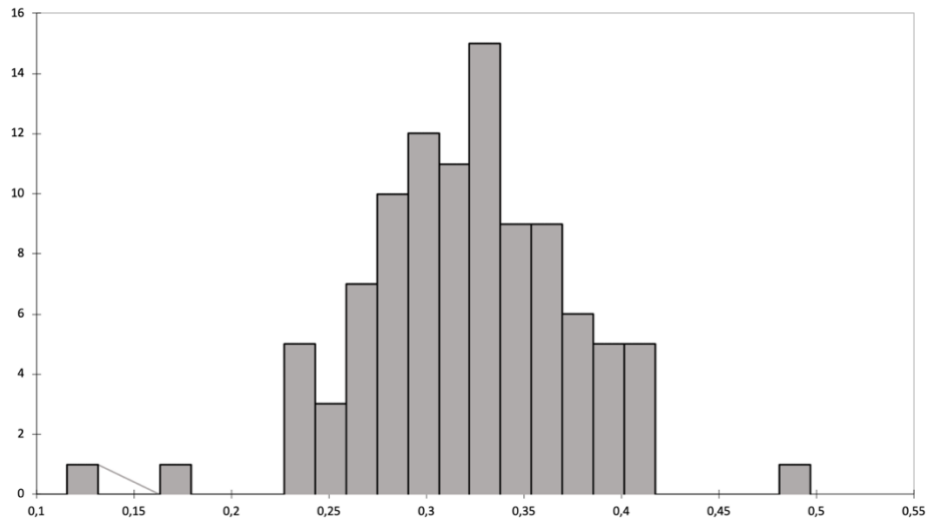


Figure 2.1 – Frequencies distribution of Gini Index

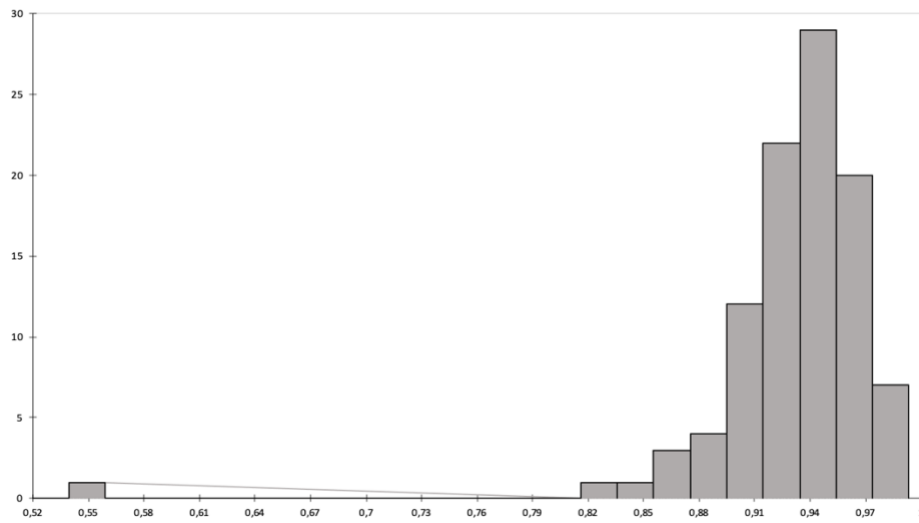


Figure 2.2 – Frequencies distribution of Shannon Index

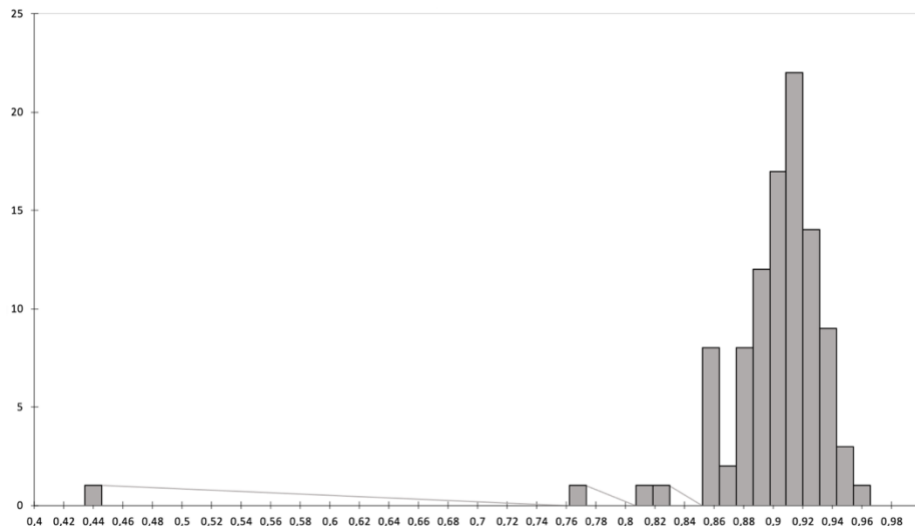


Figure 2.3 – Frequencies distribution of Simpson Index

Nevertheless, the frequencies distribution does not provide sufficient insights on the tendency of the Gini, Shannon and Simpson indexes with respect to the teams' population quartiles. In order to better understand the relationship between real wages and the concentration/diversity variables a visual analysis is developed in three steps:

- i. First, the indexes are standardized by dividing team-related concentration/diversity variables for each seasonal average;
- ii. Then, the teams are divided in quartiles based on the relative wages level; from the low quartile which includes the 5 clubs with the lowest payrolls, to the High quartile composed by the teams with the highest 5 payrolls. Naturally, the quartiles have been considered as open groups so that clubs can change quartile from year to year. For instance, Sassuolo was part of the Medium/High quartile during season 2014/2015, while from season 2015/2016 has steadily been in the Low/Medium quartile.
- iii. The last step consists in estimating the average standardized indexes for each group and season.

The results of the analysis are reported for Gini, Shannon and Simpson indexes in *Figure 2.4*, *Figure 2.5* and *Figure 2.6* respectively.

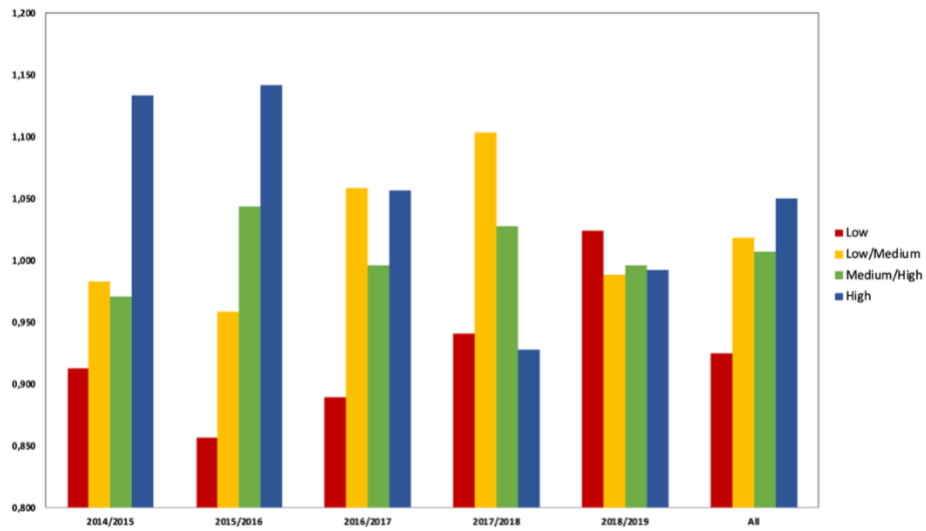


Figure 2.4 – Standardized Gini index and wages profile

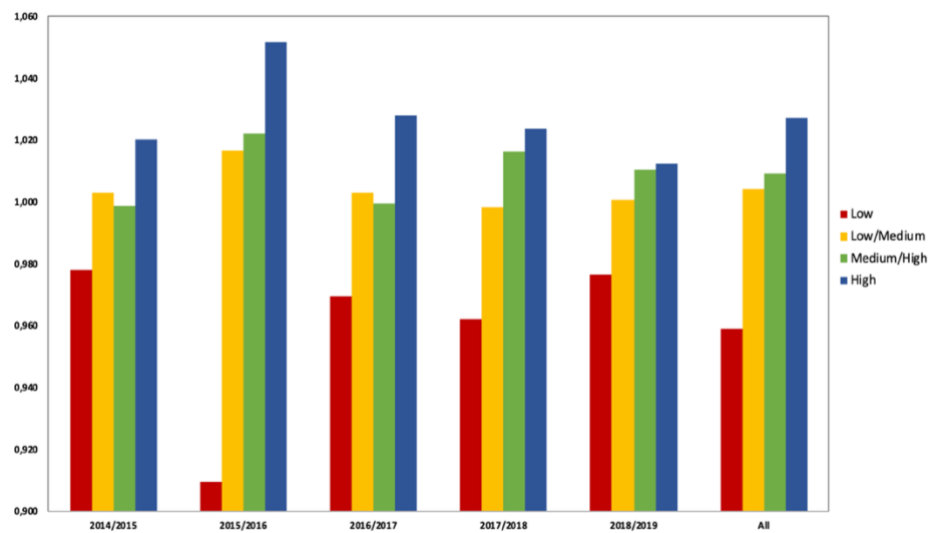


Figure 2.5 – Standardized Shannon index and wages profile

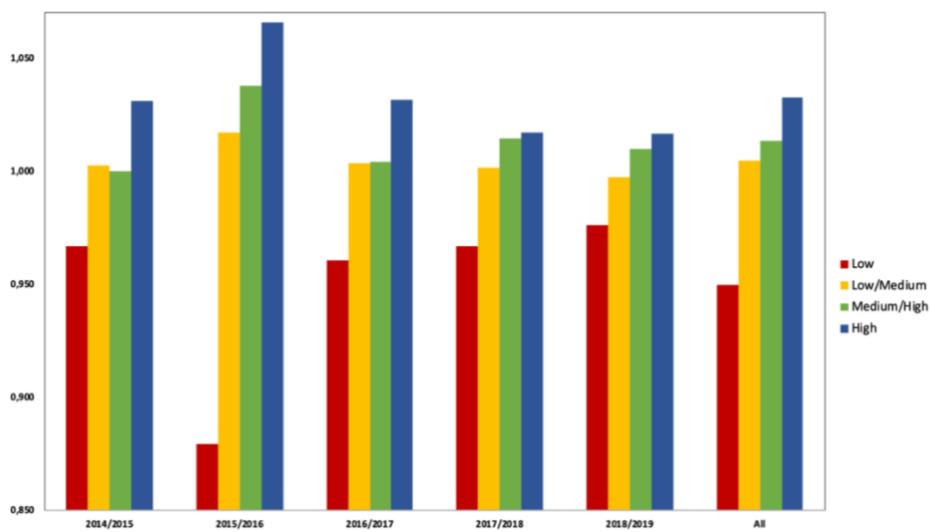


Figure 2.6 – Standardized Simpson Index and wages profile

Again, as highlighted by the frequencies distribution, the results from the analysis on the Gini index are not in line with the ones from the study of the Shannon and Simpson indexes. While the *All* columns of *Figure 2.5* and *2.6* report that the Shannon and Simpson indexes increase with wage differentials, the same cannot be stated from the Gini index; according to *Figure 2.4*, the relationship between wage quartiles and concentration/diversity is sinusoidal. Concentrating on the different seasons, *Figure 2.4* highlights a general tendency towards concentration for the High quartile, while the Medium/High clubs are always around the yearly average, the Low/Medium quartile is characterized by a strong unpredictability, with a growing trend in the first four seasons and a sudden down turn in the last year under analysis. Concerning *Figure 2.5* and *2.6*, the Shannon and Simpson indexes are able to explain a more linear relationship between wage differentials and salary dispersion; as a matter of fact, the Low quartile always stands below the yearly average, with a low peak during season 2015/2016 caused by the troublesome management of USC Palermo (the Sicilian club changed nine head coaches during the season and exchanged more than 10 players in the winter market window, an event which is extremely unusual). Another trend to be noticed is the tendency of concentration in the High quartile, decreasing the gap with the Medium/High and Low/Medium quartiles.

To be noticed however, that the measures of diversity/concentration in use have nothing to do with wage levels themselves, but rather relate only to the different salary concerns of management with respect to players' performance. In other words, the primary aim of the analysis is to understand whether a specific salary structure may be preferred in order to maximize the sport performance, rather than the economic efficiency. To this extent, *Figure 2.7* compares concentration/diversity measures of the Serie A winning teams (in this specific time-lapse s single team) to the average yearly Gini, Shannon and Simpson indexes.

Season	Team	Points_%	Gini	Gini Avg	Shannon	Shannon Avg	Simpson	Simpson Avg
2014/2015	Juventus	0,763	0,393	0,331	0,969	0,942	0,940	0,911
2015/2016	Juventus	0,798	0,302	0,301	0,953	0,910	0,919	0,872
2016/2017	Juventus	0,798	0,327	0,313	0,937	0,929	0,921	0,900
2017/2018	Juventus	0,833	0,282	0,335	0,915	0,930	0,886	0,901
2018/2019	Juventus	0,789	0,487	0,324	0,922	0,942	0,905	0,910

Figure 2.7 – Winning teams, points percentage and concentration/diversity measures. 2014-2019

In line with the past literature, there seems to be an inconclusive association between the points percentage of the winning teams and the indexes.⁹⁹ In the first three seasons under scrutiny, the indexes are all above the yearly average, suggesting that a higher level of wage inequality may be preferred. On the other hand, season 2017/2018 provides a counterargument by reporting the Gini, Shannon and Simpson indexes below the seasonal mean and hence providing support to the Cohesion theory. Finally, results stemming from the last season are mixed, with the Gini supporting the Tournament theory and the Simpson and Shannon indexes the Cohesion Theory.

Given the inconclusive results from the analysis of the winners' variables, a more sophisticated analysis should be preferred. A graphical approach to the correlation between the percentage of points and the concentration/diversity variables may be able to provide interesting insights. The scatter plots in *Figure 2.8*, *2.9* and *2.10* report on the y-axis the sport performance and on the x-axis the wage dispersion measures.

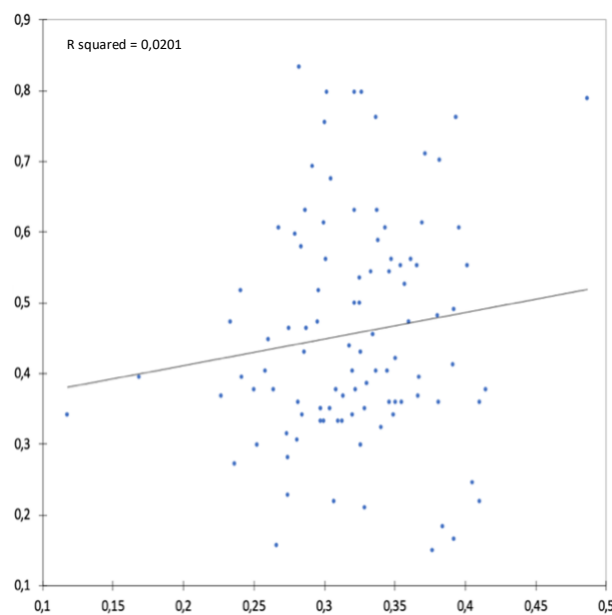


Figure 2.8 – Gini index and sport performance: 2014-2019

⁹⁹ R. Caruso, C. Bellavite Pellegrini, M. Di Domizio, *Does diversity in the payroll affect soccer teams' performance? Evidence from the Italian Serie A*, Munich Personal RePEc Archive, 2016.

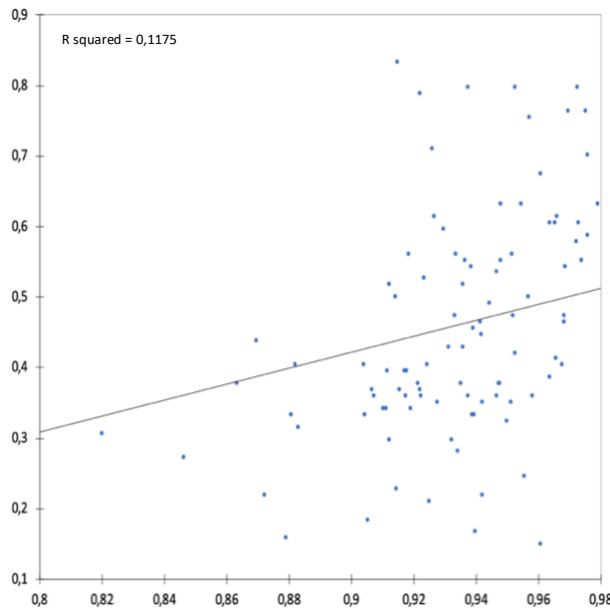


Figure 2.9 – Shannon index and sport performance: 2014-2019

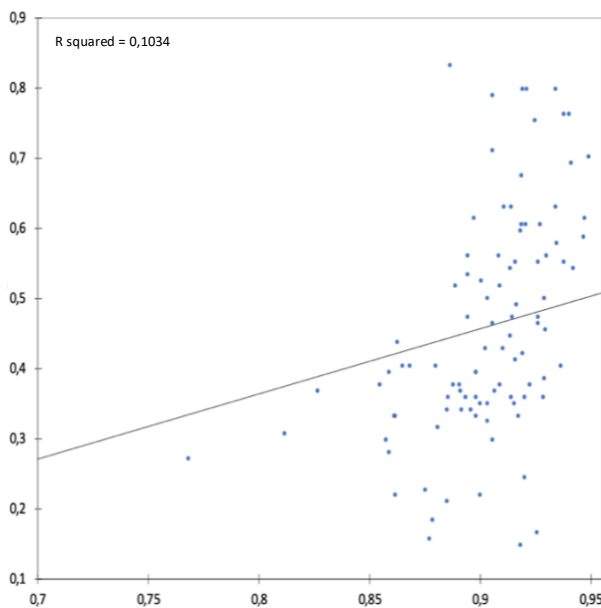


Figure 2.10 – Simpson index and sport performance 2014-2019

The scatter plots in the above-mentioned figures report a positive relationship between the percentage points and the Gini, Shannon and Simpson indexes. This result disproves the belief that the Gini index has an opposite effect with respect to the Shannon and Simpson indexes.¹⁰⁰ In the top-left corner of *Figure 2.8*, *Figure 2.9* and *Figure 2.10*, is reported the coefficient of determination, or R squared, which explains the effect of the independent variable (the concentration/diversity variables) on the dependent variable, namely the percentage points. According to *Figure 2.8*, the Gini

¹⁰⁰ Beliefs that were suggested by both the Frequencies distribution and the Standardized indexes (*Figure 2.1* to *Figure 2.6*).

coefficient is able to explain only 2% of the variability of sport performance, while the Simpson and Shannon index account for a 10% of the variability, which seems to be a promising result at a first glance.

The absence of a clear and consistent result across the different analyses performed confirms the need for an in-depth study of the multiple factors, other than the simple wage dispersion, that may affect the team performance. In the next section, the empirical model's variables will be first described and then studied. The aim is to develop a framework which is able to explain most of the variance of the dependent variable and assess whether one or more than one of the wage dispersion measures is statistically significant. To achieve this goal, the concentration/dispersion measures, together with data acquired on the Serie A clubs have been set in a panel structure, to be regressed. In the *Result* section will be reported the findings of the panel data regression.

2.2.3. The variables

The empirical model that will be regressed in *section 2.3* is composed by the three concentration/diversity measures plus eight independent variables. The regressors have been chosen accurately in order to craft a model able to significantly explain the variation of the dependent variable, namely *Points_%*. Hence, the aim of the model is to solve the following equation:

$$\log(\text{points}_{\%}) = \alpha + \beta_1 \log(X_{i,t}) + \beta_2 \log(\text{Relative Wages}_{i,t}) + \beta_3 \log(\text{Aristocracy}_{i,t}) + \beta_4 \log(\text{Age}_{i,t}) + \beta_5 [\log(\text{Age})]^2 + \beta_6 \log(\text{Population}) + \beta_7 \log(\text{Defensive Efficiency}) + \beta_8 \log(\text{Offensive Efficiency}) + \beta_9 \log(\text{Foreigners}_{\%}) + \beta_{10}(\text{euro}_{cup}) + \mu_{i,t} + \varepsilon_{i,t};$$

where α is the intercept term, $\mu_{i,t}$ and $\varepsilon_{i,t}$ are the between-entity and within-entity errors and $X_{i,t}$ indicates alternatively the Gini, Shannon or Simpson index. All the covariates, exception made for *euro_{cup}* which is a dummy variable, are logged so that each coefficient in the regression captures the elasticity of the dependent variable with respect to the explanatory variables. The covariates have been designed as follows:

- *Relative Wages*: As it has been already specified, data on the Serie A players' salaries have been taken from the Italian sport newspaper *La Gazzetta dello Sport* and have been adjusted for the effective months that a player is part of the team. That is, only the effective number of paychecks received by each player are accounted. The covariate *Relative Wages* is obtained

by dividing each payroll of team i in season t by the average salary in season t and then summing up all the relative salaries of team i .

- *Aristocracy*: together with *Population* are the only variables which are independent from the management of the club, at least in the short run. Aristocracy proxies the history of the club in the most important Italian championship. It counts the number of seasons, including the seasons under investigation, that each club has played in the Serie A. The data for the aristocracy of the club is extracted from the renowned football database *Transfermarkt*.
- *Age*: reports the average age of the team. It is computed using data taken from the Lega Serie A archives, which reports the official list of players which have been regularly part of the team.
- *Age Squared*: The fourth covariate, Age squared, is used to control for any existing non-linearity in the age structure as suggested by Caruso et al. (2016).
- *Population*: intended as the town population of the city that hosts the home games of the club. The data for each season is taken from the *Istituto Nazionale di Statistica* (ISTAT) at the 31st of December of the previous year.
- *Defensive Efficiency*: The variables Defensive and Offensive Efficiency are based of the Expected Goals Theory, which is a statistical analysis which studies the players' performance using different measures such as goals, shots, attempts, passes, field occupancy, pressing, and many others.¹⁰¹ The expected Suffered Goals (or xGA) highlight the defensive quality of a team: hence, a team with a strong defensive strategy will exhibit a low xGA . However, in order to understand whether a defensive approach should be preferred to an offensive one, the focus should be on the efficiency rather than on the quality itself. Accordingly, the *Defensive Efficiency* variable is computed by dividing the effective number of goals suffered by team i during season t by the $xGA_{i,t}$.¹⁰²
- *Offensive Efficiency*: As above stated, this variable is based on the use of the Expected Goals Theory and is calculated by dividing the number of goals scored by team i during season t by the offensive quality of the team, measured by the expected goals (xG).¹⁰¹
- *Foreigners%*: This variable is introduced as the ratio between the number of foreign players and the total number of players in the team.
- *Euro_cup*: is a dummy variable used to highlight those teams that are also involved in European competitions like the Champions League or Europa League. The choice to use a dummy variable is due to two factors; the first stems from the difficulty to assess the statistical

¹⁰¹ Mincuo, *Prestazioni vs Risultati: l'efficacia della Juve secondo la statistica*, Calcio & Finanza, March 19, 2018.

weight of the Defensive and Offensive performance of the European competitions. As a matter of fact, given the fact that these are stage-gate competitions, the value of the players' performance increases as stages are passed. The second factor concerns the will to concentrate the analysis only on the Italian championship and simply assess whether the participation to the European cups drains performance resources from the championship.

Figure 2.11 reports the descriptive statistics of the above-mentioned explanatory variables which are used in the model. The analysis from season 2014/2015 to season 2018/2019 has produced 100 observations on 27 teams; only 14 teams have been able to participate to all the editions. Focusing on the descriptive statistic of the dependent variable *Points_%* it can be noticed the average and the median are close, highlighting a distribution close to normality. The minimum result of 0,158 was achieved by Pescara during season 2016/2017 with only 18 points, establishing the second-worst result ever for a Serie A team (the record is detained by Venezia 1949/1950). During the same season, Pescara established also the record for the most home game defeats (14 out of 19 matches). The maximum amount of points is achieved by Juventus FC during season 2017/2018 with 95 points. During the same season, Juventus has set the record of the most points in the first round (53 out of 57).

	Observations	Average	Median	St. Devition	Min	Max
<i>Points_%</i>	100	0,457	0,417	0,159	0,158	0,833
<i>Relative Wages</i>	100	27,45	17,62	22,72	5,16	105,75
<i>Aristocracy</i>	100	53,85	68,50	29,54	1	87
<i>Age</i>	100	25,975	25,902	1,17	23,50	29,11
<i>Foreigners%</i>	100	0,555	0,565	0,173	0,115	0,844
<i>Rel.Defensive Perf</i>	100	1,033	1,031	0,142	0,728	1,571
<i>Rel.Offensive Perf</i>	100	1,025	1,037	0,154	0,546	1,618
<i>Population</i>	100	758858	533060	799869	47904	2873000
<i>Euro_cup</i>	100	0,310	0,000	0,465	0,000	1,000
<i>Gini</i>	100	0,321	0,322	0,054	0,117	0,487
<i>Shannon</i>	100	0,931	0,937	0,048	0,559	0,983
<i>Simpson</i>	100	0,899	0,907	0,055	0,443	0,955

Figure 2.11 – Descriptive Statistics of the Empirical Model

Shifting the focus towards the independent variables, a significant standard deviation characterizes - as expected - *Relative Wages*. As it is been pointed out in Part I, significant differences in budget exist, with the teams fighting for the championship with a high budget and the low budget

team struggling to avoid relegation. The average *Aristocracy* of the clubs amounts to 53 seasons, with 4 clubs participating for the first time to the Serie A (Benevento 2017/2018, Carpi 2015/2016, Crotone 2016/2017, Frosinone 2015/2016); The most “Aristocratic” club is Inter FC with 87 participations to the Serie A. The teams’ average *Age* in Serie A is nearly 26 years, with Cagliari 2014/2015 reporting the minimum average age of the roster in the period 2014-2019. Concerning the Nationality of the players in the Italian championship the split is nearly 50-50, with the biggest clubs showing higher number of foreigners in their roster. From the two efficiency variables, *Defensive Efficiency* and *Offensive Efficiency* it can be deduced from the mean and the median that, as expected, the efficiency of the best teams in the league is offset by the worse teams. The average Population of the city that hosts the home matches is 750.000 inhabitants, with Empoli being the least populated town to host a Serie A match. The *Euro_cup* dummy variable simply reports the “rules of the game” with only 6 clubs playing in European competitions until season 2017/2018 and 7 teams from season 2018/2019 onwards. Finally, the three concentration/diversity measures, as it has been above mentioned, the Gini coefficient reports a completely opposite result with respect to the Simpson and Shannon indexes.

Moving to *Figure 2.12*, the table reports the correlation matrix of the variables which are included in the empirical model. The matrix highlights the correlation of each single variable on the other.

	<i>Points_%</i>	<i>Relative Wages</i>	<i>Aristocracy</i>	<i>Age</i>	<i>Age^2</i>	<i>Foreigners%</i>	<i>Defensive Perf</i>	<i>Offensive Perf</i>	<i>Population</i>	<i>Gini</i>	<i>Shannon</i>	<i>Simpson</i>
<i>Points_%</i>	1	0,796	0,691	0,207	0,203	0,446	-0,242	0,468	0,558	0,135	0,345	0,323
<i>Relative Wages</i>		1	0,656	0,274	0,267	0,396	-0,248	0,338	0,583	0,239	0,317	0,349
<i>Aristocracy</i>			1	0,067	0,059	0,639	-0,144	0,290	0,583	0,141	0,387	0,399
<i>Age</i>				1	1,000	-0,097	-0,212	0,089	0,152	0,111	0,205	0,240
<i>Age^2</i>					1	-0,101	-0,211	0,088	0,143	0,107	0,193	0,230
<i>Foreigners%</i>						1	0,073	0,169	0,478	0,042	0,267	0,258
<i>Defensive Perf</i>							1	-0,024	-0,126	-0,038	-0,141	-0,113
<i>Offensive Perf</i>								1	0,234	-0,018	0,099	0,068
<i>Population</i>									1	-0,004	0,255	0,232
<i>Gini</i>										1	0,484	0,545
<i>Shannon</i>											1	0,954
<i>Simpson</i>												1

Figure 2.12 – Correlation matrix of covariates

Following the results of the correlation matrix it is possible to have a glimpse on the dependence of the dependent variable on the other covariates. According to *Figure 2.12*, the variable *Points_%* is strongly and positively correlated to *Relative Wages*; A positive correlation can be found also with the independent variables *Aristocracy*, *Population*, *Foreigners%* and *Offensive Performance*. Contrariwise, a relative independence can be noticed between *Points_%* and the concentration/diversity measures (*Gini*, *Shannon* and *Simpson*). A similar result is observable for the two covariates *Age* and *Age2*, showing a positive but low correlation. However, the Pierson correlation coefficient give a partial result on the analysis of the relationship between the dependent variable and the other variables; as a matter of fact, the correlation matrix reflects the noisiness and direction of a linear relationship, but not its slope.

2.3. Results

Before regressing the dataset, the variables have been logged in order for the coefficients to measure the elasticity of the dependent variable, namely *Points_%* with respect to the covariates. Subsequently the panel data regression has been performed using both the random effects (RE) and fixed effects (FE) models, using for the Swamy-Aurora estimator for the former model. Finally, the Hausman test has been computed to signal the model to be preferred.

Figure 2.13 reports the results of the five-season panel data regression; below each coefficient is reported in parenthesis the standard error adjusted for 27 clusters in teams. The level of statistical significance of each coefficient is signaled using asterisks (*=10%; **=5%; ***=1%). The Hausman test for each model indicates that the RE model is to be preferred to the FE estimator; hence, the *Results* section will predominantly concentrate on the Random Effects model. Moreover, the Wald test, used to assess the statistical significance of the RE models, rejects the hypothesis that the coefficients in the regressions are equal to zero. In general, the *R_squared* overall, which reports the ability of the model to explain the variability of the dependent variable, ranges between 0,715 and 0,721; Furthermore, Model 3 is able to explain 80,2% of the variability of *Points_%* “between” teams (*R_squared between*), while “within” variability is low (ranging between 0,252 and 0,263).

	1	2	3	4	5	6	7	8
	RE	FE	RE	FE	RE	FE	RE	FE
<i>Constant</i>	67,662 (44,232)	48,736 (52,214)	58,383 (46,074)	44,715 (54,052)	70,650 (44,683)	50,678 (52,424)	63,369 (44,779)	50,266 (52,759)
<i>log Gini</i>			-0,153** (0,072)	-0,060 (0,075)				
<i>log Shannon</i>					0,089 (0,260)	0,057 (0,171)		
<i>log Simpson</i>							-0,119 (0,108)	0,050 (0,159)
<i>log relative_wages</i>	0,271*** (0,068)	0,082 (0,098)	0,308*** (0,073)	0,111 (0,111)	0,265*** (0,060)	0,075 (0,112)	0,282*** (0,078)	0,072 (0,122)
<i>log aristocracy</i>	0,060* (0,038)	-0,184* (0,098)	0,062* (0,036)	-0,174* (0,097)	0,060 (0,038)	-0,181* (0,099)	0,061* (0,038)	-0,184* (0,099)
<i>log age</i>	-96,428 (62,933)	-68,111 (74,140)	-83,317 (65,560)	-62,446 (76,749)	-100,654 (63,545)	-70,882 (74,420)	-90,374 (63,712)	-70,279 (74,883)
<i>log age_squared</i>	33,933 (22,360)	24,074 (26,428)	29,286 (23,291)	22,047 (27,351)	35,424 (22,563)	25,056 (26,527)	31,800 (22,635)	24,843 (26,687)
<i>log population</i>	-0,005 (0,031)	-0,139* (0,076)	-0,022 (0,034)	-0,142* (0,075)	-0,002 (0,032)	-0,136* (0,076)	-0,009 (0,033)	-0,137* (0,076)
<i>Defensive Efficiency</i>	0,452*** (0,121)	0,421*** (0,112)	0,436*** (0,114)	0,417*** (0,109)	0,453*** (0,122)	0,422*** (0,112)	0,446*** (0,119)	0,423*** (0,112)
<i>Offensive Efficiency</i>	0,514*** (0,159)	0,478*** (0,152)	0,503*** (0,163)	0,478*** (0,155)	0,514*** (0,160)	0,477*** (0,153)	0,512*** (0,159)	0,478*** (0,154)
<i>log foreigners_%</i>	-0,075 (0,082)	-0,086 (0,101)	-0,083 (0,082)	-0,090 (0,101)	-0,077 (0,082)	-0,088 (0,100)	-0,076 (0,084)	-0,087 (0,101)
<i>euro_cup</i>	0,040 (0,027)	0,021 (0,028)	0,037 (0,028)	-0,060 (0,075)	0,040 (0,027)	0,021 (0,028)	0,038 (0,028)	0,021 (0,028)
<i>Observations</i>	100	100	100	100	100	100	100	100
<i>Cross Sections</i>	27	27	27	27	27	27	27	27
<i>Periods</i>	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5
<i>R_squared overall</i>	0,715	0,160	0,721	0,129	0,715	0,160	0,715	0,167
<i>R_squared between</i>	0,767	0,326	0,802	0,295	0,768	0,327	0,767	0,333
<i>R_squared within</i>	0,252	0,313	0,262	0,316	0,252	0,314	0,253	0,314
<i>Sigma_u</i>	0,057	0,278	0,058	0,268	0,059	0,277	0,059	0,280
<i>Sigma_e</i>	0,069	0,069	0,070	0,070	0,070	0,070	0,070	0,070
<i>Rho</i>	0,408	0,942	0,408	0,937	0,415	0,940	0,420	0,942
<i>Wald chi_squared</i>	134,57		159,15		135,97		135,38	
<i>p-value</i>	0,0000		0,0000		0,0000		0,0000	
<i>Fstat</i>		5,32		5,29		4,67		4,73
<i>p-value</i>		0,0004		0,0003		0,0007		0,0007

Figure 2.13 – Panel Data Regression. Dependent Variable: *log(Points_%)*

From the analysis of the regression's coefficients it is possible to notice that the Gini index is the only concentration/diversity measure which appears to be statistically significant (95% confidence level). The relationship with the dependent variable results to be negative, suggesting that as salary dispersion increases, sport performance decreases. Thus, the Gini index provides support for the Cohesion theory as a 1% increase in salary dispersion will cause a -0,153% decrease in the *Points_%* achieved by the team. However, the negative relationship between the Gini index and the team performance may be partially or totally offset by an increase in relative wages; As a matter of fact, a 1% increase in the *Gini index* is faded out by a 0,497% increase in *Relative Wages*. Hence,

differentiating the salary structure of a club by increasing the wage diversity may be a safe strategy only if it achieved through a budget increase. Furthermore, according to the RE models, the *Defensive Efficiency* and *Offensive Efficiency* variables too are statistically significant at the 99% confidence level. This result provides insights in two directions; First, the Expected Goals theory is a good proxy for the evaluation of the single players' performance. Second, by comparing the effect of both coefficients on the dependent variable, it is possible to notice that boosts in the Offensive Efficiency, achieved through the acquisition of more valuable strikers, may be slightly preferred to an increase in the Defensive Efficiency of the team. Finally, the only other independent variable which is statistically significant is *Aristocracy* (90% confidence level); However, the coefficient reports a strongly inelastic relationship, suggesting that the effect of this covariate on the *Points_%* is negligible.

Conclusion

Economists have long recognized the relationship between salary dispersion and sport performance when working in teams. This topic becomes of even greater interests if the implications of these issues on firms' performance is considered. In this thesis, the aim was to test whether a particular salary structure may be more efficient and should be applied in the Italian Serie A context, in order to maximize the efficiency and minimize the costs. To reach this goal, the hypothesis tested was that, depending on the characteristics of the Serie A context, a precise wage structure may achieve more efficient outcomes in terms of sport results. Accordingly, this paper has been framed in two parts.

Part I, based on a theoretical analysis of the data and literature available on Italian professional football, has described a fast-growing industry, with a compound annual growth rate of 5,7% since 2013. The economic growth of this industry is mainly attributable to the revenues stemming from the sale of the broadcasting rights, which have risen due to the growing popularity of football in Asia and North America. Notwithstanding the reach of an aggregate turnover of over 4,7 billion euros, the analysis of the Italian professional football clubs' revenue structure has highlighted an unexpressed economic potential caused by the low revenues from gate receipts. As a matter of fact, the Serie A exhibits the lowest stadium attendance rates among the top five European championships, far away from the standards set by the Bundesliga and the Premier League. This negative record is due to the inadequacy of the structures, whose average age in Italy amounts to over 60 years. Only in the last years efforts have been made by clubs to renew or rebuild their stadiums following the lead of Juventus FC. Facing the cost structure of Serie A clubs, football players account for nearly 70% of the costs incurred by clubs, characterizing this context as a fully-fledged labor-intensive industry. Part I has also pointed out that Government intervention can influence the competitiveness of the Italian championship by devising fiscal measures that can favor the acquisition of more valuable players. In this sense, Government intervention may introduce incentives for Italian clubs to invest in the construction of modern stadiums, creating a positive circle in which more structural investments lead to increased revenues, resulting in higher budgets and, in turn better sport results and excess profits to be reinvested.

Part II empirically investigates the effect of wage diversity on the performance of football teams in the Italian Serie A between the seasons 2014/2015 and 2018/2019. In line with a growing literature, the findings from this analysis have proven a negative association between salary

dispersion and sport performance. Among the three concentration/diversity measures studied – namely the Gini, Shannon and Simpson index -, the Gini index is the only measure that has resulted to be statistically significant at the 95% confidence level. In particular, it has been demonstrated that a 1% increase in the Gini diversity index (all else being equal) reduces the points percentage achieved by 0,153%. This result provides support for the Cohesion theory which states that firms can increase productivity by narrowing wage dispersion among workers since this policy improves the cohesiveness of the group. However, the Gini index is not the only variable that has proven to be significant in the model; the Random Effects model, which is able to explain 80% of the variance of the dependent variable points%, has highlighted the statistical significance of the following explanatory variables: Relative Wages, Defensive and Offensive Efficiency (99% confidence level) and the Aristocracy of the club (90% confidence level). A variety of insights stem from these results: First, an increase in the salary dispersion can be offset by a simultaneous increase in the relative wages level. According to the coefficients described in the model, a 1% increase in the Gini coefficient can be faded out by a 0,55% increase in the level of relative wages. Second, regarding the statistical significance of the Aristocracy measure, this should be seen as a self-fulfilling prophecy in that, since the nineties, seven teams - also called the “Seven Sisters” - (Juventus, Inter, Milan, Roma, Lazio, Fiorentina and Parma) have fought for the first positions of the Serie A. However, the outbreak of the financial crisis in 2008 has shocked this status quo, with SSC Napoli and Atalanta BC entering in the fight. Finally, the statistical significance of the defensive and offensive efficiency measures at the 99% confidence level has proven the goodness of the Expected Goals theory. This theory measures the real performance of teams through the use of complex statistics such as the ratio of transformed to total attempts. In the model, the Expected Goals have been used in the computation of the ratio between the effective goals scored and the expected goals. From the comparison of the coefficients of the Defensive and Offensive Performance Measures, it can be noticed that the Offensive efficiency has a slightly greater effect on the points percentage achieved by a team.

References

- Beaumont, P. B., & Harris, R. I. D. (2003). Internal Wage Structures and Organizational Performance. *British Journal of Industrial Relations*, 41(1), 53–70. doi: 10.1111/1467-8543.00261
- Montanari, F., & Silvestri, G. (2007). Le Determinanti Della Retribuzione tra Risultati e Caratteristiche Individuali: Il Caso del Campionato di Calcio di Serie A. *Rivista Di Diritto Ed Economia Dello Sport*, III(I), 92–106.
- Franck, E., & Nüesch, S. (2011). The effect of wage dispersion on team outcome and the way team outcome is produced. *Applied Economics*, 43(23), 3037–3049. doi: 10.1080/00036840903427224
- Akerlof, G. A., & Yellen, J. L. (1990). The Fair Wage-Effort Hypothesis and Unemployment. *Oxford Journals*, 105(2), 255–283. doi: 10.2307/j.ctvc4j8j.21
- Bloom, M. (1999). The Performance Effects of Pay Dispersion on Individuals and Organizations. *Academy of Management Journal*, 42(1), 25–40. doi: 10.5465/256872
- Caruso, R., Bellavite Pellegrini, C., & Di Domizio, M. (2016). Does Diversity in the Payroll Affect Soccer Teams' Performance? Evidence from the Italian Serie A. *Munich Personal RePEc Archive*, 1–30. Retrieved from <https://mpa.ub.uni-munchen.de/75644>
- Yaldo, L., & Shamir, L. (2017). Computational Estimation of Football Player Wages. *International Journal of Computer Science in Sport*, 16(1), 18–38. doi: 10.1515/ijcss-2017-0002
- Why are football players paid so much? (2019, August 7). Retrieved February 9, 2020, from <https://www.bankofengland.co.uk/knowledgebank/why-are-football-players-paid-so-much>
- Pettinger, T. (1970, January 1). Economics of Football - Players Wages. Retrieved February 9, 2020, from <https://econ.economicshelp.org/2007/09/economics-of-football-players-wages.html>
- Serie A, gli ingaggi tornano a salire: calciatori strapagati e coccolati. (2013, September 7). Retrieved February 9, 2020, from <https://www.gazzetta.it/Calciomercato/07-09-2016/serie-a-ingaggi-tornano-salire-calciatori-strapagati-coccolati-1601093632883.shtml>
- Spaziante, M. (2016, May 4). Diritti tv, ecco quanto incidono i soldi delle televisioni sui ricavi in Serie A. Retrieved February 9, 2020, from <https://www.calciofinanza.it/2016/05/03/quanto-incidono-diritti-tv-ricavi-serie-a/>
- Serie A, l'impatto dei diritti tv: ecco quanto valgono i soldi delle televisioni per i club. (2017, June 15). Retrieved February 9, 2020, from <https://www.calciofinanza.it/2017/06/14/impatto-diritti-tv-ricavi-serie-a-fatturato/>

- Donna, N. (2019). Report Calcio 2019. PWC. Retrieved from <https://www.pwc.com/it/it/publications/reportcalcio/2019/doc/reportcalcio-2019-ita.pdf>
- Pagani, L. (2012). salario in "Dizionario di Economia e Finanza". Retrieved February 11, 2020, from [http://www.treccani.it/enciclopedia/salario_\(Dizionario-di-Economia-e-Finanza\)/](http://www.treccani.it/enciclopedia/salario_(Dizionario-di-Economia-e-Finanza)/)
- Redazione. (2020, January 20). Ingaggio medio, Serie A terza tra le top leghe europee. Retrieved February 15, 2020, from <https://www.calciofinanza.it/2019/12/30/serie-a-stipendi/>
- Redazione. (2019, January 4). I diritti tv nella Serie A 2018 2019: la simulazione dei ricavi per i club. Retrieved February 17, 2020, from <https://www.calciofinanza.it/2018/12/24/ripartizione-diritti-tv-serie-a-2018-2019/>
- Bodrero, L. (2017, September 6). Blog: Calcio, ecco come funziona la spartizione dei ricavi da diritti tv? Retrieved February 17, 2020, from <https://www.infodata.ilsole24ore.com/2017/09/07/calcio-funziona-la-spartizione-dei-ricavi-diritti-tv/>
- Redazione. (2016, March 11). Diritti tv serie A distribuzione 2015-2016, simulazione Gazzetta con le nuove regole. Retrieved February 17, 2020, from <https://www.calciofinanza.it/2016/03/11/diritti-tv-serie-a-distribuzione-2015-2016/>
- Traversa, D. (2015, October 15). Diritti Tv Serie A, più equilibrio con le regole Premier League. Retrieved February 17, 2020, from <https://www.calciofinanza.it/2015/10/15/diritti-tv-serie-a-ripartizione-2014-2015-metodo-premier-league/>
- Redazione. (2016, December 5). La Serie A è l'8^a lega sportiva per stipendi medi: nel calcio più ricche solo Premier e Liga. Retrieved February 17, 2020, from <https://www.calciofinanza.it/2016/11/14/stipendi-medi-serie-a-2016-2017/>
- UEFA. (2010). *Uefa Club Licensing and Financial Fair Play Regulations*. Nyon: UEFA.
- Pino, M. (2019, June 13). Il Decreto Crescita per il calcio: come può aiutare la Serie A. Retrieved February 20, 2020, from <https://www.calciofinanza.it/2019/06/13/decreto-crescita-impatto-calcio/>
- Mattarella, S. Decreto-Legge 30 aprile 2019, n. 34, Decreto-Legge 30 aprile 2019, n. 34 (2019). Roma, Italia: Gazzetta Ufficiale della Repubblica Italiana.
- Redazione. (2019, July 22). Il Decreto Crescita nel calcio: i nuovi incentivi per gli sportivi in Italia. Retrieved February 20, 2020, from <https://www.calciofinanza.it/2019/07/22/come-funziona-decreto-crescita-calciatori/>
- Bellinazzo, M. (2019, May 31). Conte all'Inter è ufficiale, un affare da quasi 70 milioni di costo. Retrieved February 21, 2020, from <https://www.ilsole24ore.com/art/conte-all-inter-affare-quasi-70-milioni-costo-complessivo--ACMjack>

- Kutz, S. (2016, July 2). NFL took in \$13 billion in revenue last season - see how it stacks up against other pro sports leagues. Retrieved February 20, 2020, from <https://www.marketwatch.com/story/the-nfl-made-13-billion-last-season-see-how-it-stacks-up-against-other-leagues-2016-07-01>
- Peteraf, M. (1993). The Cornerstones of Competitive Advantage. *Strategic Management Journal*, vol. 14, p. 179-191.
- Porter, M. (1980). Competitive Advantage. *Free Press*, New York.
- Barney, J. (1984). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, vol. 5, p. 171-180.
- Black, J. & Boal K. (1984). Strategic Resources: Traits, configurations, and paths to sustainable competitive advantage. *Strategic Management Journal*, vol. 15, p. 131-148.
- Cappelli, P. (1999). The new deal at work: Managing the market driven workforce. *Harvard Business School Press*, Cambridge.
- Gecker, G. (1983). Human Capital. *University of Chicago Press*, Chicago.
- Oliva, A. (2015, September 23). Prezzo medio stadi, la Serie A è tra le più care al mondo. Retrieved March 13, 2020, from <https://www.calciofinanza.it/2015/09/23/quanto-costa-andare-allo-stadio-la-serie-a-e-tra-i-campionati-piu-cari-al-mondo/>
- Redazione. (2017, October 30). Diritti tv, la riforma Lotti: 50% in parti uguali, il resto tra risultati e spettatori allo stadio. Retrieved March 16, 2020, from <https://www.calciofinanza.it/2017/10/30/riforma-diritti-tv-serie-a-lotti/>

Summary

This paper provides a comprehensive analytical approach to the study of the effect of salary dispersion on team performance in the Italian Serie A context. De facto, this paper explores whether a specific salary structure may be more efficient and should be preferred. The choice of the top Italian football championship has been influenced by the easy availability of data and the popularity of this sport in Italy. Behind the enormous success of football, both on the sport and the economic level, lies the simplicity and versatility of this game which has the ability to aggregate people from all over the world and create a true sense of community. As a consequence, football is a fundamental asset within the Italian scenario, at sport, economic and social level. In 2019 the socio-economic impact of football reached the record value of over three billion euros, with an aggregate turnover of over 4,7 billion euros (12% of the global GDP of professional football leagues). Moreover, the Italian Serie A is the greatest fiscal contributor among all Italian professional sports leagues, with an annual outlay of 1,2 billion euros. In order to provide a clear and fluid argument, the paper is framed in two parts: Part I, based on a theoretical analysis of the data and literature available, describes the characteristics of the Serie A clubs' revenue and cost structure, introduces the two schools of thought of salary theory (cohesion theory and Tournament theory) and studies the determinants of the players' salaries; on the other hand, Part II consists of an empirical analysis of the relationship between salary dispersion and sport performance. The empirical model developed tests the statistical significance of three major concentration/diversity measures – namely the Gini, Shannon and Simpson Index – and nine other explanatory variables using a dataset composed of data from the clubs which have taken part to the last five editions of the Serie A (from season 2014/2015 to season 2018/2019). Concerning the major results of Part II, it has been found that only the Gini index is significantly associated with sport performance. In particular, it appears that sport performance improves as salary dispersion decreases, finding support for the Cohesion Theory. After this brief introduction, the aim of this summary is to synthesize the analysis developed in the paper.

Starting from the study of the typical cost and revenue structure of Italian professional football clubs, Part I introduces the characteristics of the Italian Serie A. To capture the general financial trends of the last seasons of Serie A a preliminary analysis of the trends in value and cost of production and the net result has been developed. The value of production is defined as the sum of the revenues of clubs from their most relevant activities such as the sale of gate receipts, profit on disposal of players, broadcasting rights and sponsorships. The cost of production is the result of the operating costs plus any amortization and depreciation. Finally, the net result is the difference between the value and cost of production adjusted for interests and taxes. The study of the three accounts has highlighted

a fast-growing industry, with a compound annual growth rate of 5,7% since 2013. In the period under analysis, the revenues of Serie A clubs have soared by more than 700 million euros, with season 2016-2017 representing the turning point for the Italian system with a 17,2% tear-over-year growth. Notwithstanding the soaring increase in revenues in the last five years, the net result, has remained approximately unchanged as the cost of production too has leavened. It is significant to highlight that season 2014-2015 exhibits the lowest net result in the last ten years. This negative record can be attributed to the simultaneous increase in the cost of production – which reversed the precedent post-financial crisis trend of spending review – and decrease in the value of production, leading to a negative net result of over € 500 million. In order to discover and understand the determinants of the evolution of the consolidated accounts of professional football in Italy, the revenue and cost structure have been broken down and assessed. The revenue structure has been split in six major accounts: *Broadcasting Rights*, *Gate Receipts*, *Sponsors and Commercial Activities*, *Profit on Disposal of Players*, *Grants Related to Income* and *Others*. Under the label *Others* are accounted the proceeds that are not associated with the sport results or the commercial activities carried forward by clubs; part of this category are non-operating income, insurance claims and the proceeds from the sale of away games' tickets. The *Grants Related to Income* are supplementary revenues paid by public entities and associations. These revenues are accounted in the income statement of professional football clubs as grants from Lega Nazionale Professionisti and grants from FIFA/UEFA for players summoned to the National team.

According to the study of the breakdown of the revenues on Italian professional football clubs (**Appendix I**), broadcasting rights are by far the most relevant source of income for Italian clubs, accounting for more than one third of the value of production during the period 2013-2018. Only a very small fraction of the broadcasting rights income is entitled to the cadet Italian championship (Serie B), while a conspicuous extra income is perceived by the teams that have access to the Champions League and the Europa League. Concerning the biggest slice of the broadcasting rights income, consisting in the proceeds from the airing of the Serie A, the distribution followed the following criteria imposed by the *Legge Melandri* until season 2017-2018:

- 40 % equally redistributed among all twenty clubs;
- 25 % of the revenues conferred on the basis of the number of supporters during home matches;
- 15 % based on the results achieved in the last five seasons;
- 5 % of the total income according to the last year's positioning;
- 5 % partitioned according to the population of the municipality in which the club plays.

The Legge Melandri has been modified in 2018 by the “*Pacchetto Sport*” signed by the Italian Minister of Sport Luca Lotti. The new redistribution of the broadcasting rights income has brought these edits:

- the share of proceeds that are equally partitioned by the twenty clubs increases from 40% to 50%;
- The 5% share for the population of the municipality is no longer in place;
- The revenues conferred on the basis of the supporters is reduced from 25% to 20%.

The aim of this measure was to reduce the gap between the small and large clubs and create a more competitive environment. The second most relevant source of income for Italian professional football clubs is represented by the profits on disposal of players. Professional football clubs, as part of a labor-centric industry, rely on the players’ registration rights. These rights are based on contracts signed by the player and the club that are intended to protect and ensure the going concern principle of the club and guarantee the remuneration of the players’ performance. A profit on disposal of players’ rights is accounted whenever the sum received for the sale of the player is higher than the residual book value of the player. The residual book value is the difference between the sum paid to acquire the player plus any bonus and the amortization and write-down provision.

Sponsors and commercial activities are another important stream of revenues for clubs as they represent the monetization of the value of the brand. The brand of a club is influenced by the history of the club, the trophies lifted and the popularity of the players that are part of the team. In the last four years, the revenues from this segment have experienced a year over year growth above 10%. The rationale of this growth can be found in the heavy investments carried forward by some Italian football clubs who have diversified the ancillary activities that were exploiting the clubs’ brand. Hence, the traditional commercial activities such as sponsorships, advertisement and merchandising have been integrated by other initiatives such as guided tours of club museum and stadium, restaurants and even hotel facilities. Behind this diversification lies the will to transform the traditional supporter in a profitable client, exploiting his passion in order to extract more value from the customer. The objective is to convey a new identity to all the supporters in Italy, Europe and the rest of the world, with new products that may be more “lifestyle”. However, the lifestyle revolution of football clubs’ commercial activities has yet not reached its azimuth, with International clubs like Barcelona and Paris Saint-Germain being world leaders in this field. As a matter of fact, the next frontier of merchandising has just been set in 2019 by the French club which, thanks to the partnership agreement with Jordan – the exclusive, high-end brand by Nike – has been able to reach the incredible result of over one million jerseys sold in 2019. Finally, sponsorship agreements are the financial contributions that football clubs receive in exchange for promotion and public exposure. Just like the commercial

activities, their value is extremely influenced by the value of the club's brand, by its popularity and resonance. These patronage agreements are not exclusive but are binding and generally have a three to five years length. Football clubs generally have more than a single sponsor, all representing different industries and sectors. The generosity of the sponsor depends on the visibility achieved and the activities arranged in the sponsorship deal.

Concerning the gate receipts, it is shocking to notice that ticket sales represent only a small fraction of the value of production. This result is even more worrying when it is benchmarked to the trends of the other top four European championships. Italy is the second worst country for number of gate receipts sold and counts the most unsold tickets among the top five European football leagues. Another negative record is set by Serie A clubs in terms of average occupancy of stadiums with its 55%. This result is alarming, especially when compared to England's Premier League 91% occupancy rate. The rationale for this hideous result lies in the low quality-price ratio. In brief, the gate receipts are perceived as too expensive given the inadequacy of the structures. De facto, Italy is the sixth country by average cost of gate receipt among all the European football leagues with its €25,80 average yield per game, way less expensive than England's Premier League (€47,7 per ticket), Spain's La Liga (€39,60 per ticket), German Bundesliga (€31,70 per ticket), Swiss Super League (€34,20 per ticket) and French League 1 (€26,90 per ticket). England Premier League's clubs are able to keep the price of the gate receipts very high and still fill their seats thanks to the popularity of the championship - which is considered the most important league worldwide - and the modernity of their structures. In Italy, five clubs - Juventus, Atalanta, Udinese, Sassuolo and Frosinone - have their stadium as an asset in the balance sheet. Nevertheless, Juventus is the only top Italian club to have its own facility. In Italy, the average age of stadiums is 60 years and in the last ten years, only 2 facilities have been built and three have been renovated. Many important clubs just like Inter and Milan are sharing the stadium that is owned by the municipality. This happens to represent an important threat to the possibility to customize the facility and to develop other activities around the stadium. Since the opening of the Juventus Stadium in 2011 Juventus has lifted eight Serie A trophies in a row, with only eight home-games lost on aggregate. Moreover, the customization of the facility, together with the creation of a museum and a medical center, the Italian club has increased its average yield per match attendee to €60,20, becoming the ninth European club in this special category. It is hence straightforward to understand that stadiums are a very remunerative activity and are worth the investment as they drive to better results and increased revenues.

The assessment of the cost structure of Italian professional football clubs is propaedeutic for the study of the effect of intra-team salary dispersion on the efficiency of Serie A teams. As a labor-intensive industry, salaries account for half of the weight of the cost structure of Italian professional

football clubs (**Appendix II**). The cost structure of Italian professional football clubs is in large part composed by labor costs, amortization and devaluations. As a matter of fact, the other components of the cost structure account for less than a third of the total and will not be discussed in depth in this analysis as they are not sufficiently relevant for the proposed analysis. Professionals (players and managers) account for 90% of the labor costs, even though they represent on average the 20% of the total number of employees. The rationale behind this fact resides in the importance of licensed employees on the financial results of the club: the successes and failures achieved or suffered on the field strongly affect the revenues from sponsors, commercial activities, gate receipts and broadcasting rights especially in the long run.

Amortizations and devaluations are the second heaviest entry of the cost structure of Italian professional football clubs, accounting for 22% of the total costs on average. The 80% of the amortizations and devaluations suffered by Italian professional football clubs are caused by the players registration rights which, as it has been previously pointed out, represent the book value of the licensed players. Italian professional football clubs have two options for the accounting of players' registration rights. They may apply the Italian practice defined by art. 2426 of the Italian Civil Code or the International Accounting Standards. However, the clubs that are quoted on the Italian stock exchange are forced to file registration rights according to IFRS 38 as the fruition of their financial statements must be smooth for both national and international investors. IFRS 38 regulates the accounting of intangible assets and is articulated in three phases: the initial recognition, the evaluation and the subsequent adjustments to the value of the asset. The initial recognition phase defines which intangible assets are regulated by the accounting standard. IFRS 38 states that licenses, trademarks and similar rights are accounted among the intangible assets if they present the following general requirements: *Identifiability*, *Control*, *Future economic benefits* and *Cost determinability*. The next step is the measurement of the value to be registered. IFRS 38 distinguishes among:

- *Purchased fixed assets*, recorded at the acquisition cost plus any direct attributable cost;
- *Self-generated fixed assets*, whose value is composed by the sum of the development costs incurred.

The third and last stage consists in the subsequent adjustment to the value of the intangible assets. IFRS 38 establishes two methods for the subsequent adjustment:

- the *cost method*, stating that an intangible asset must be recorded at cost less cumulative amortization and depreciation;
- the *value recalculation method*, suggesting that an intangible asset should be booked at fair value less accumulated amortization and depreciation.

In order for the application of the subsequent adjustments' criterion to be relevant, there must exist an active market to determine the fair value of the intangible asset and the adjustments must be carried out with sufficient regularity across all the assets in the specific category. Concerning the amortization of the intangible fixed assets, IFRS 38 states that the company must assess if the useful life of the intangible asset is limited or unlimited in time. If from the analysis of the different factors, does not emerge a predictable limit to the generation of cash flows for the company, the asset is not amortized but rather has to be subject to a yearly *impairment test* based on IFRS 36. Differently, if the useful life of the intangible asset is limited, the expected duration of its disposal must be assessed. In this specific case, the asset is amortized on the basis of its useful life, with the possibility to choose among different amortization schedules. According to the definition provided by IFRS 38, players' registration rights are intangible fixed assets as they satisfy all the requirements above mentioned. Moreover, due to the contractual nature of this specific intangible asset, the value of its use is limited in time and as there exists a continuous market for these intangibles, their relative cost must be regularly evaluated in each financial year in relation to the residual possibility of utilization. The amortization of the registration rights starts in the fiscal year in which the players' future performances are acquired by the club and is carried forward according to the prudence principle, consisting in the amortization of the cost of the right on a straight-line basis for the entire duration of the contract that binds the player to the club.

After having studied the cost and revenue structure of Italian professional football clubs, the paper focuses on the role of the salary and describes the two major school of thought of salary theory. In brief, the remuneration system has traditionally assumed the role of the medium of exchange between workers (for their performance) and firms (for the effort received). In the Neoclassical economic theory, salary represents the price of labor, determined by the market and equal to the marginal product (ideally, when competition is perfect). According to the *Efficiency Wage theory*, first introduced by economist Alfred Marshall in 1980, salaries do not only represent a compensation mechanism (allocative function) but also act as an incentive tool to achieve better results. The psychological attitude of humans with respect to the salary contractual agreement is further explained by the *Implicit Contract theory*; as salaries are determined through a stage-gate contractual agreement for the exchange of effort and remuneration between the worker and the firm, the behavioral attitude of the parties stands as a fundamental factor together with the law of demand and supply. Another important behavioral theory that introduces aspects on social confrontation is *Equity theory*. Equity theory proposes that individuals make judgements about the fairness of their pay on the basis of assessments of their perceived outcomes/inputs ratio relative to the ratio of some salient comparison other. In the wake of *Equity theory* in social psychology and *Social Exchange theory* in sociology,

two contrasting school of thought have delineated in salary theory. The two theories are the *Tournament theory*, which proposes a relatively dispersed pay structure in order to attract talented employees and motivate high individual performance as a consequence of the substantial rewards on offer; and the *Cohesion theory*, stating that firms can increase productivity by narrowing wage dispersion among workers with the aim to improve the cohesiveness of the group.

Tournament theory, first introduced by economists Edward Lazear and Sherwin Rosen in 1981, is a personnel economics theory which has frequently been applied to the practice of law and professional sports. The theory developed by Lazear and Rosen analyses compensation schemes which pay according to an individual's ordinal rank in an organization rather than his output level. The application of this theory originates in, and revolves around the explanation of large differentials in prize structures. Conceptually, firms are paying high salaries to managers to encourage individuals to invest in their career development and boost their lifetime productivity. The use of *Tournament theory* provides an efficient compensation of labor when it is difficult or expensive to quantify labor. According to the authors, if inexpensive and reliable monitors of effort are available, then the best compensation scheme is a periodic wage based on input.

On the other hand, *Cohesion theory* states that firms can increase productivity by narrowing wage dispersion among workers since this policy improves the cohesiveness of the group. More specifically, cohesion has to do with within-group harmony and integrity and the extent to which the members reinforce each other's expectations regarding the value of maintaining the identity of the group. Hence, *Cohesion theory* and, in general, the compressed pay distribution model, affirms that team performance and pay dispersion are inversely related: the higher the dispersion among the salaries, the less the members of the team will be keen to cooperate. According to the Matthew effect, the overcompensation issue – caused by pay dispersion – worsens when salary budgets increase; as a matter of fact, the new resources available to the company will most likely be distributed pro rata, eventually demotivating whoever is not on the top tier. In this sense, the compressed salary structure, proposed by the *Cohesion theory*, has the advantage to introduce a sense of equity, fostering cooperation and, consequently, the enhancement of team performance.

The last section of Part I is devoted to the study of the determinants of Italian Serie A players' salary. The major arguments assessed are the labor market dynamics of professional football, the tax incentives provided by Art. 5 of the Italian Legislative Decree n. 34/2019 and the performance of players. The Italian Serie A is one of the top five European football championships and the eight largest professional sport leagues worldwide - after the NFL, the Major League Baseball, the Premier League, the NBA, the La Liga, the NHL and the Bundesliga –. The gargantuan flow of money that revolves around the Serie A context creates high pressure on the achievement of sport and economic

results. Moreover, due to the high incidence of unpredictable factors such as injuries, end-of-season results are not always predictable, increasing the pressure on the final outcome. As a consequence of the labor-intensity, the pressure on results and the high uncertainty, the human capital – namely the players – has a strong influence on the financial performance of the club and, hence, requires a conspicuous remuneration. The laws of demand and supply for football players do not depend solely on the price and the quantity available but also from the quality; quality is here intended as the potential abilities of the player who may be endowed with more or less potentiality. The quality variable is positively related to price and inversely related to quantity. In other words, the more qualitative a player, the rarer and the more expensive will be. Another important labor market dynamic in professional football consists in the possibility for football clubs to officially operate only during market windows; the longer session takes place from May to September, while the shorter one lasts from January 2nd to January, 31st. Notwithstanding the time limitations, the market sessions are busy as changes in expectations are extremely frequent. If a player shows off in a particular season, his price will skyrocket, and a pool of clubs will undoubtedly show their interest for the player. This peculiar market reactivity is fostered by two aspects: First, the reliance of football clubs on profit on disposal of players' registration rights which is influenced by the *change in expectations*. Second, the high uncertainty that stems from the impossibility to foresee injuries causes sudden, urgent needs for clubs who are forced to access the market. The greater and the more unexpected the need, the higher clubs will be prone to disburse large sums. Another factor which influences the demand is the *change in price of other related goods*; Football clubs are exceptionally aware of the deals that are closed in the market and the acquisition price of a player will set the standard for players with similar potentiality. This is especially true for top players, who set the standard for the entire market.

Last but not least, local *government intervention* has a determinant influence on the market power of professional football clubs. It suffices to say that since 1990, Barcelona and Real Madrid, two of the most emblazoned teams worldwide are considered by the Spanish Government as non-profit firms and can de facto access to specific tax incentives. Lately, the Italian Government has moved in the same direction, by approving the “Decreto Crescita” (Art. 5 of the Italian Legislative Decree n. 34/2019), establishing a favorable tax regime in order to attract foreign human capital. It also includes an ad hoc regime for professional football players who are incentivized to transfer their residence in Italy. The requirements needed to access to the fiscal incentives are the following:

- The individual must have resided in a foreign country in the past two fiscal years before moving to Italy;
- It is compulsory to stay in Italy for at least two fiscal years after having moved the residence to Italy;

- The working activity must prevalently have place in the Italian territory.

With the access to the fiscal regime, which has a five-year duration, the salaries produced by professional athletes contribute by half their value (50%) to the definition of their taxable income. Moreover, professional athletes have the possibility to extend the length of the fiscal incentive for other five years if they are loaded with at least one minor child and/or have acquired a residential real estate in Italy. The adhesion to the fiscal regime is optional and implies the deposit of a lump-sum tax, intended for the growth of youth teams, that equals the 0,5% of the amount levied, which represents the 50% of the total income subject to taxation. This favorable tax regime has been applied by professional football players who have moved to Italy since July 2019, as they were required to comply with Italian tax law only from fiscal year 2020. The real advantages of this norm are translated in the possibility to attract and retain foreign top-level football athletes by Italian Serie A clubs, creating a virtuous trend that has the potential to foster the interest in this championship and the growth of merchandising sale, gate receipts and sponsorships.

According to the major concepts stressed in Part I, the impact of the workforce in professional football is of extreme relevance for the financial success of clubs. Hence, the human resources, representing a strategic resource in the Serie A context (which strongly affect both the revenue and cost structure of the firms) should be managed optimally in order to acquire a sustainable competitive advantage. In this sense, the Resource Based View emphasizes the importance of the organization's internal variables with respect to external ones, in contrast with the traditional approach of industrial organization. In particular, the intangible resources of a company (e.g. players' registration rights or the brand) are the most critical as they are rare, complex and difficult to imitate. Among the intangible resources, players' registration rights have progressively acquired a relevant role in the financial accounts of professional football clubs; these rights represent the right to the performance of players which embody the set of knowledge, capabilities and routines that are brought in by each single individual that plays for the company. Pfeffer, notorious representative of the universalist current, underlines how companies which aim to success in the global market have the duty to recruit and craft an adequate human capital in order to achieve a competitive hedge with respect to competitors. Hence, the centrality of individuals on the achievement of the competitive advantage leads to a greater emphasis on the systems and practices that deal with human resource management. Theoretically, it is deemed that the human resource strategic management has an impact on the performance through three interrelated processes:

- Starting from the critical resources of the company, it crafts the competences to be developed and spread;
- It motivates and incentivizes workers through the career path and the compensation system;

- It provides to motivated and ambitious workers the ability to develop and grow their competences.

Commonly, it is believed that it is possible to isolate a determined set of best practices, which are influenced by the characteristics of the industry, for the management of human resources that could grant the achievement of excellent results for a company. As a consequence, Pfeffer suggests a compensation system which is contingent to the performance. The key issue then, is the measurement of performance and, as pointed out by salary theories, the incentive system that maximizes utility. In Part II, the aim will be to assess the determinants of football clubs' performance and whether a particular salary structure is to be preferred.

Part II focuses on the development of a model whose aim is to assess whether intra-team wage dispersion has an effect on performance. The empirical analysis has been developed using data from the professional football clubs which have taken part to the last five seasons of Italian Serie A. Before developing the econometric model, the paper introduces the relevant results which have been achieved by past research; this specific section fulfills two major objectives: First, it provides useful suggestions on the variables to be used in the model; Second, it serves as a benchmark for the Results section. After having reported the evidences from past research, the focus shifts on the development of the model. The first step is to illustrate the sources from which the data has been drawn and how the dataset has been built. Then, given the fact that multiple indexes are available for the measurement of salary dispersion, Part II introduces the three measures of inequality – namely, Gini, Shannon and Simpson Index - which have been used in the model. As a matter of fact, the key objective of Part II is to understand which is the best measure of salary dispersion and its effect on the overall team performance. Moreover, Part II checks for relevant insights in the distribution of indexes with respect to the quartiles of teams' population; the partition of clubs in four groups is based on the real wages level. The following stage consists in the introduction of the dependent variables which are exploited by the model in order to reach a significant result. Finally, the results which stem from the panel data regression of the econometric model are reported and analyzed.

Traditionally, the issue of salary incidence on team performance has been explored in the American professional sports leagues. As a matter of fact, the empirical investigations on the Italian football landscape are quantitatively poor. However, even though the evidence from empirical researches on other sports' leagues are undoubtedly uncorrelated to the ones stemming from Italian Serie A, they surely provide insights on the variables which may be used to develop the econometric model. The empirical investigations on the Major League Baseball (MLB) – the second richest league worldwide – have outlined a negative relationship between team performance and salary dispersion;

Hence providing relevant support for the validation of Cohesion theory in professional baseball. A useful insight for the application of the analysis to the Serie A context can be found in the use of the Gini index as a measure of salary entropy and the percentage points as a proxy for performance. The application of the above-mentioned analysis to the National Basketball Association (NBA) have provided support to the Tournament theory, discovering a positive relationship between wage dispersion and player productivity. In the empirical model developed by Simmons and Berri (2011), Relative Salaries – computed by dividing each single payroll by the league average – have been used together with the Gini index to investigate the existence of mitigating factors in the relationship between salary and performance. However, most of the studies on the NBA context, such as the ones on the National Hockey League (NHL) have led to inconclusive results. Oppositely, statistically significant result stem from the analysis of the National Football League (NFL), which is the richest professional sports league worldwide. According to economists Mondello and Maxcy, the relationship between pay dispersion and team performance is negative. Their empirical investigation, based on 254 observations in the period 2000-2007, includes the participation to other competitions (other than the NFL) as a factor that influences the dependent variable; The participation to other competitions is expressed by using a dummy variable. Narrowing the focus to professional soccer, studies on the Bundesliga - the first German soccer league - from season 1995/96 to 2006/07 have discovered a U-shaped relationship between salary dispersion and team performance; teams having either a high or low level of dispersion are more successful than teams with a medium level of wage inequality. Concerning the Italian football context, tradition appears to be a relevant driver of success. Hence, the Italian Serie A appears to be characterized by a self-reinforcing mechanism, where the most successful teams have a competitive edge. the most complete study on the Italian Serie A is carried forward by Caruso et al. (2016). The empirical analysis is based on 180 observations on 32 teams in an eight-season time frame. Using the percentage of points achieved as the dependent variable, the study assesses the statistical significance of three measures of salary entropy, namely the Gini, Shannon and Simpson indexes. Among the other explanatory variables used in the model are the average age of the roster, the foreigners' percentage and the population of the city that hosts the home matches. According to the results achieved by Caruso et al. (2016), the Simpson index appears to be the only statistically significant index, presenting a negative relation between salary dispersion and sport performance.

After having outlined the evidence from past research, it is now time to develop the econometric model. The aim of the empirical model is to solve the following equation:

$$\log(\text{points}_{\%}) = \alpha + \beta_1 \log(X_{i,t}) + \beta_2 \log(\text{Relative Wages}_{i,t}) + \beta_3 \log(\text{Aristocracy}_{i,t}) + \beta_4 \log(\text{Age}_{i,t}) + \beta_5 [\log(\text{Age})]^2 + \beta_6 \log(\text{Population}) + \beta_7 \log(\text{Defensive Efficiency}) + \beta_8 \log(\text{Offensive Efficiency}) + \beta_9 \log(\text{Foreigners}_{\%}) + \beta_{10}(\text{euro}_{cup}) + \mu_{i,t} + \varepsilon_{i,t};$$

by performing both Random Effect (RE) and Fixed Effect (FE) models with standard errors, adjusted for clusters in teams and controlling for potential heteroskedasticity across teams. In the above-mentioned equation, α is the intercept term, $\mu_{i,t}$ and $\varepsilon_{i,t}$ are the between-entity and within-entity errors and $X_{i,t}$ indicates alternatively the Gini, Shannon or Simpson index. To be noticed that all the variables in the equation are expressed in logarithms, so that each coefficient resulting from the models measures the elasticity of the dependent variable with respect to the control variables. In order to signal which model should be preferred, the Hausman specification test will be performed; its scope is to test the statistical consistency of an estimator when compared to an alternative, less efficient estimator which is known to be significant. Hence, the hypothesis of the Hausmann test will be to test whether the estimator of the Random Effects model should be preferred to the one of the Fixed Effects model.

In order to empirically assess the effect of salary dispersion on team performance in Italian Serie A, a pool of data in a five-year timeframe has been collected to create a dataset. The information included comprises 100 observations, from the 27 teams who have participated to the Italian Serie A from season 2014/2015 to season 2018/2019. The dependent variable of the empirical model, seasonal performance, is here measured using the percentage of points achieved by each team at the end of the season; and, in accordance with past research is computed as follows:

$$\text{Points}_{\%i,t} = \frac{\text{points}_{i,t}}{\text{points}_t}$$

where $\text{points}_{i,t}$ are the points achieved by team i during season t and points_t are the maximum points attainable by a single team at the end of the season (38 games x 3 points each = 114). The data on the players' salaries have been drawn from *La Gazzetta dello Sport* and have been adjusted in order to account only for the real cost of the player during the season.

In order to increase the chances to find statistically significant results to the empirical analysis, salary dispersion has been measured using multiple indexes. The indexes used in the paper are the Gini index, the Shannon index and the Simpson index; all three concentration/diversity measures are increasing in diversity and ranged between 0 and 1. From the study of the frequencies distribution of the Gini, Shannon and Simpson indexes it can be noticed that, while the first measure highlights a more equitable distribution of incomes, the other two measures report a completely different outcome (**Appendix III**). The rationale is that the Gini coefficient is not extremely sensitive to the specifics

of the income distribution, but rather only on how incomes vary relative to the other members of a population. Moreover, as the Simpson and Shannon indexes measure the distribution among different species, they may be biased by the differentiation scheme (especially when it comes to salaries). Here the species have been grouped by using as a proxy the average of the distribution of monthly salaries. Hence, each species is differentiated from the other by at least €37.500. In order to better understand the relationship between real wages and the concentration/diversity measures, the indexes are standardized and divided in quartiles based on the wage profile of the teams (High, Medium/High, Low/Medium and Low). As the analysis takes place on a five-season timeframe, the quartiles have been considered as open groups so that clubs can change quartile from year to year. From the standardization of the indexes it results that, again, the Gini index follows a different pattern (**Appendix IV**). In the period under analysis, the Gini index highlights a general tendency towards concentration for the High quartile and a strong unpredictability for the Low/Medium quartile with a growing trend in the first four seasons and a sudden downturn in the last year under analysis. Concerning the Shannon and Simpson standardized indexes, the analysis of the quartiles' behavior reports a more linear relationship between wage differentials and salary dispersion. To be noticed however, that the measures of diversity/concentration in use have nothing to do with wage levels themselves, but rather relate only to the different salary concerns of management with respect to players' performance. Henceforth, a more sophisticated approach to the relationship between salary dispersion and sport performance is needed (**Appendix V**). The scatter plots representing on the y-axis the sport performance and on the x-axis the wage dispersion measures have discovered a positive relationship between the percentage points and the Gini, Shannon and Simpson indexes. However, the coefficient of determination (or R squared), which explains the effect of the independent variable on the dependent variable is extremely low. The absence of a clear and consistent result across the different analyses performed confirms the need for an in-depth study of the multiple factors, other than the simple wage dispersion, that may affect the team performance. Accordingly, the empirical model is composed by the three concentration/diversity measures (alternatively tested) and eight independent variables. The covariates have been designed as follows:

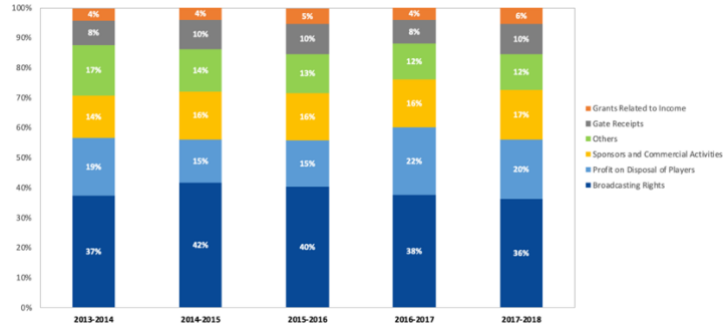
- *Relative Wages*: As it has been already specified, data on the Serie A players' salaries have been taken from the Italian sport newspaper *La Gazzetta dello Sport* and have been adjusted for the effective months that a player is part of the team. That is, only the effective number of paychecks received by each player are accounted. The covariate Relative Wages is obtained by dividing each payroll of team i in season t by the average salary in season t and then summing up all the relative salaries of team i .

- *Aristocracy*: together with *Population* are the only variables which are independent from the management of the club, at least in the short run. *Aristocracy* proxies the history of the club in the most important Italian championship. It counts the number of seasons, including the seasons under investigation, that each club has played in the Serie A. The data for the aristocracy of the club is extracted from the renowned football database *Transfermarkt*.
- *Age*: reports the average age of the team. It is computed using data taken from the Lega Serie A archives, which reports the official list of players which have been regularly part of the team.
- *Age Squared*: The fourth covariate, Age squared, is used to control for any existing non-linearity in the age structure as suggested by Caruso et al. (2016).
- *Population*: intended as the town population of the city that hosts the home games of the club. The data for each season is taken from the *Istituto Nazionale di Statistica* (ISTAT) at the 31st of December of the previous year.
- *Defensive Efficiency*: The variables *Defensive* and *Offensive Efficiency* are based of the Expected Goals Theory, which is a statistical analysis which studies the players' performance using different measures such as goals, shots, attempts, passes, field occupancy, pressing, and many others. The expected Suffered Goals (or xGA) highlight the defensive quality of a team: hence, a team with a strong defensive strategy will exhibit a low xGA . However, in order to understand whether a defensive approach should be preferred to an offensive one, the focus should be on the efficiency rather than on the quality itself. Accordingly, the *Defensive Efficiency* variable is computed by dividing the effective number of goals suffered by team i during season t by the $xGA_{i,t}$.
- *Offensive Efficiency*: As above stated, this variable is based on the use of the Expected Goals Theory and is calculated by dividing the number of goals scored by team i during season t by the offensive quality of the team, measured by the expected goals (xG).
- *Foreigners%*: This variable is introduced as the ratio between the number of foreign players and the total number of players in the team.
- *Euro_cup*: is a dummy variable used to highlight those teams that are also involved in European competitions like the Champions League or Europa League. The choice to use a dummy variable is due to two factors; the first stems from the difficulty to assess the statistical weight of the Defensive and Offensive performance of the European competitions. As a matter of fact, given the fact that these are stage-gate competitions, the value of the players' performance increases as stages are passed. The second factor concerns the will to concentrate the analysis only on the Italian championship and simply assess whether the participation to the European cups drains performance resources from the championship.

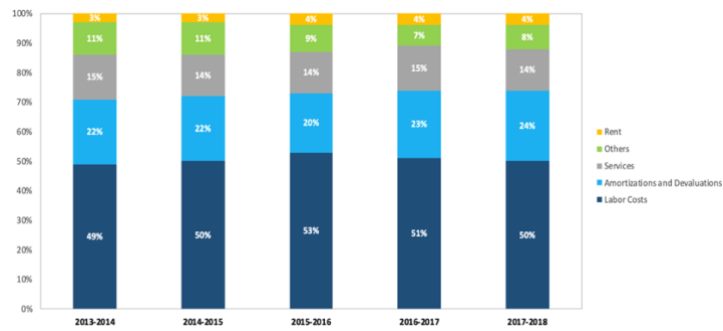
Performing the Hausman test for each model has led to the conclusion the RE model is to be preferred to the FE estimator; hence, the paper concentrates on the Random Effects model. Moreover, the Wald test, used to assess the statistical significance of the RE models, rejects the hypothesis that the coefficients in the regressions are equal to zero. In general, the *R_squared* overall, which reports the ability of the model to explain the variability of the dependent variable, ranges between 0,715 and 0,721; Furthermore, Model 3 (see **Appendix VI**) is able to explain 80,2% of the variability of *Points_%* “between” teams (*R_squared between*), while “within” variability is low (ranging between 0,252 and 0,263). From the analysis of the regression’s coefficients it is possible to notice that the Gini index is the only concentration/diversity measure which appears to be statistically significant (95% confidence level). The relationship with the dependent variable results to be negative, suggesting that as salary dispersion increases, sport performance decreases. Thus, the Gini index provides support for the Cohesion theory as a 1% increase in salary dispersion will cause a -0,153% decrease in the *Points_%* achieved by the team. However, the negative relationship between the Gini index and the team performance may be partially or totally offset by an increase in relative wages; As a matter of fact, a 1% increase in the *Gini index* is faded out by a 0,497% increase in *Relative Wages*. Hence, differentiating the salary structure of a club by increasing the wage diversity may be a safe strategy only if it achieved through a budget increase. Furthermore, according to the RE models, the *Defensive Efficiency* and *Offensive Efficiency* variables too are statistically significant at the 99% confidence level. This result provides insights in two directions; First, the Expected Goals theory is a good proxy for the evaluation of the single players’ performance. Second, by comparing the effect of both coefficients on the dependent variable, it is possible to notice that boosts in the Offensive Efficiency, achieved through the acquisition of more valuable strikers, may be slightly preferred to an increase in the Defensive Efficiency of the team. Finally, the only other independent variable which is statistically significant is *Aristocracy* (90% confidence level); However, the coefficient reports a strongly inelastic relationship, suggesting that the effect of this covariate on the *Points_%* is negligible.

Appendix

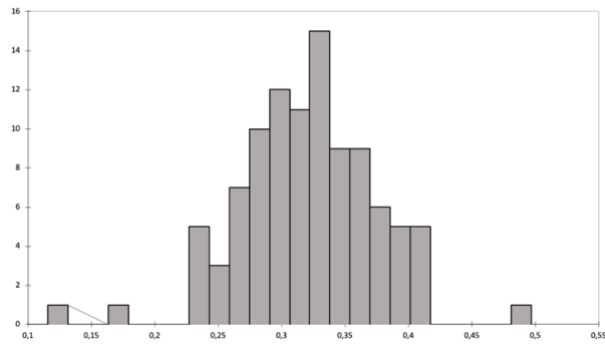
Appendix I:



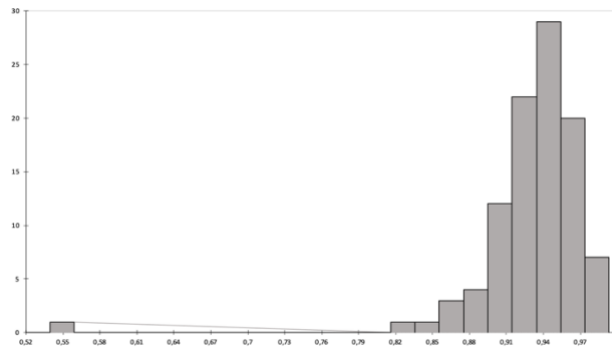
Appendix II:



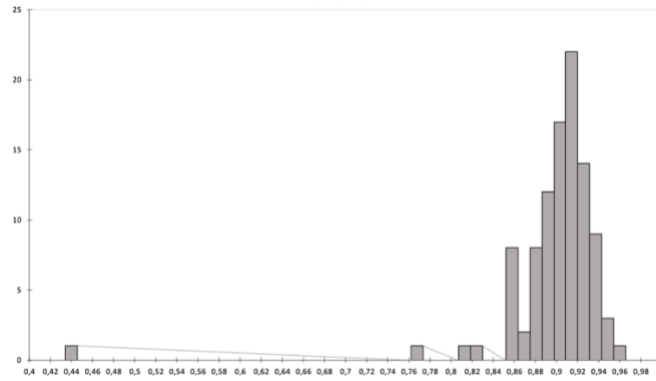
Appendix III:



Frequencies Distribution of Gini Index



Frequencies Distribution of Shannon Index



Frequencies Distribution of Simpson Index

Appendix IV:

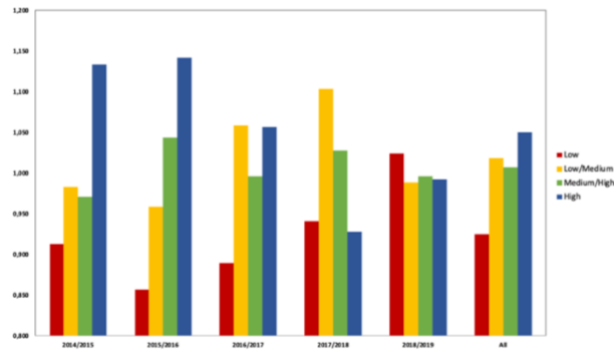


Figure 2.4 – Standardized Gini index and wages profile

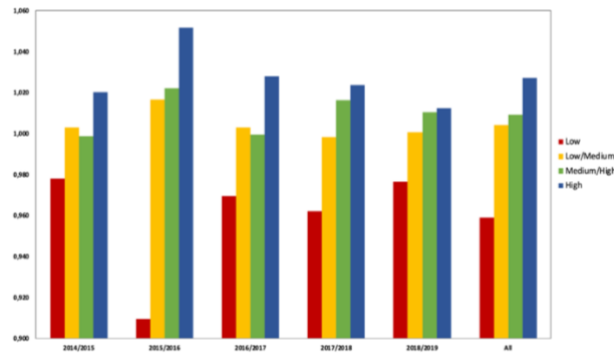


Figure 2.5 – Standardized Shannon index and wages profile

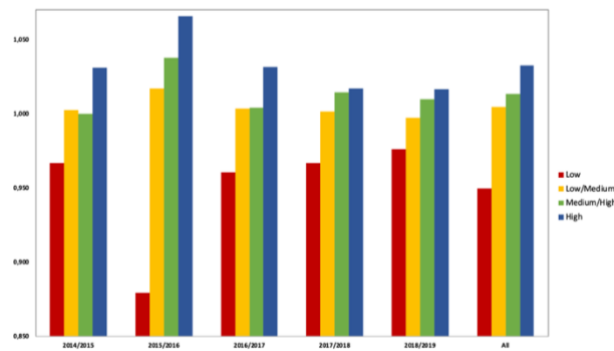


Figure 2.6 – Standardized Simpson Index and wages profile

Appendix V:

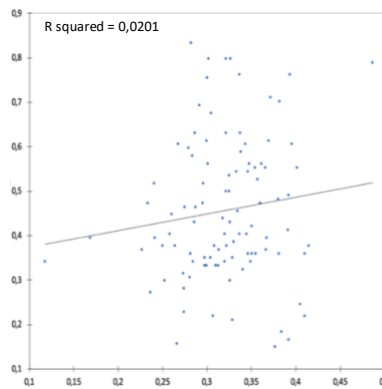


Figure 2.8 – Gini index and sport performance: 2014-2019

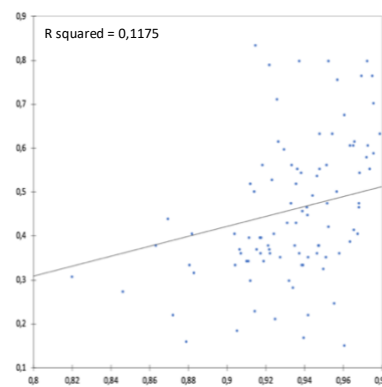


Figure 2.9 – Shannon index and sport performance: 2014-2019

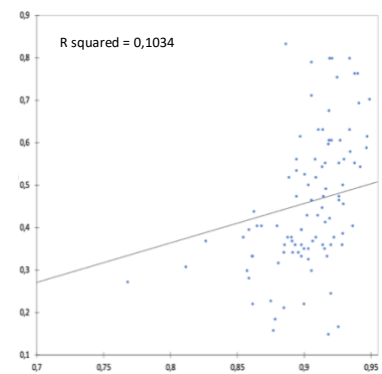


Figure 2.10 – Simpson index and sport performance: 2014-2019

Appendix VI:

	1	2	3	4	5	6	7	8
	RE	FE	RE	FE	RE	FE	RE	FE
<i>Constant</i>	67,662 (44,232)	48,736 (52,214)	58,383 (46,074)	44,715 (54,052)	70,650 (44,683)	50,678 (52,424)	63,369 (44,779)	50,266 (52,759)
<i>log Gini</i>			-0,153** (0,072)	-0,060 (0,075)				
<i>log Shannon</i>					0,089 (0,260)	0,057 (0,171)		
<i>log Simpson</i>							-0,119 (0,108)	0,050 (0,159)
<i>log relative_wages</i>	0,271*** (0,068)	0,082 (0,098)	0,308*** (0,073)	0,111 (0,111)	0,265*** (0,060)	0,075 (0,112)	0,282*** (0,078)	0,072 (0,122)
<i>log aristocracy</i>	0,060* (0,038)	-0,184* (0,098)	0,062* (0,036)	-0,174* (0,097)	0,060 (0,038)	-0,181* (0,099)	0,061* (0,038)	-0,184* (0,099)
<i>log age</i>	-96,428 (62,933)	-68,111 (74,140)	-83,317 (65,560)	-62,446 (76,749)	-100,654 (63,545)	-70,882 (74,420)	-90,374 (63,712)	-70,279 (74,883)
<i>log age_squared</i>	33,933 (22,360)	24,074 (26,428)	29,286 (23,291)	22,047 (27,351)	35,424 (22,563)	25,056 (26,527)	31,800 (22,635)	24,843 (26,687)
<i>log population</i>	-0,005 (0,031)	-0,139* (0,076)	-0,022 (0,034)	-0,142* (0,075)	-0,002 (0,032)	-0,136* (0,076)	-0,009 (0,033)	-0,137* (0,076)
<i>Defensive Efficiency</i>	0,452*** (0,121)	0,421*** (0,112)	0,436*** (0,114)	0,417*** (0,109)	0,453*** (0,122)	0,422*** (0,112)	0,446*** (0,119)	0,423*** (0,112)
<i>Offensive Efficiency</i>	0,514*** (0,159)	0,478*** (0,152)	0,503*** (0,163)	0,478*** (0,155)	0,514*** (0,160)	0,477*** (0,153)	0,512*** (0,159)	0,478*** (0,154)
<i>log foreigners_%</i>	-0,075 (0,082)	-0,086 (0,101)	-0,083 (0,082)	-0,090 (0,101)	-0,077 (0,082)	-0,088 (0,100)	-0,076 (0,084)	-0,087 (0,101)
<i>euro_cup</i>	0,040 (0,027)	0,021 (0,028)	0,037 (0,028)	-0,060 (0,075)	0,040 (0,027)	0,021 (0,028)	0,038 (0,028)	0,021 (0,028)
<i>Observations</i>	100	100	100	100	100	100	100	100
<i>Cross Sections</i>	27	27	27	27	27	27	27	27
<i>Periods</i>	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5
<i>R_squared overall</i>	0,715	0,160	0,721	0,129	0,715	0,160	0,715	0,167
<i>R_squared between</i>	0,767	0,326	0,802	0,295	0,768	0,327	0,767	0,333
<i>R_squared within</i>	0,252	0,313	0,262	0,316	0,252	0,314	0,253	0,314
<i>Sigma_u</i>	0,057	0,278	0,058	0,268	0,059	0,277	0,059	0,280
<i>Sigma_e</i>	0,069	0,069	0,070	0,070	0,070	0,070	0,070	0,070
<i>Rho</i>	0,408	0,942	0,408	0,937	0,415	0,940	0,420	0,942
<i>Wald chi_squared</i>	134,57		159,15		135,97		135,38	
<i>p-value</i>	0,0000		0,0000		0,0000		0,0000	
<i>Fstat</i>		5,32		5,29		4,67		4,73
<i>p-value</i>		0,0004		0,0003		0,0007		0,0007