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How will Brexit affect the English Premier League?

A theoretical study on Brexits effect on competition, wage and labor market in English football.

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Abstract

In this thesis, we have studied how the situation around Brexit will affect the English Premier League (EPL). Surrounding the situation, there are many factors that could be affected. Therefore, in this thesis the main focus will be on competition among clubs, labor market for the players and player salary. In which creates three underlying research questions.

1. How will the labor market for players change in EPL after Brexit?
2. How would the wage determination of players change after Brexit?
3. How will the competition between clubs be affected after Brexit?

It provides a review of theoretical concepts that's relevant for the topic and uses a theoretical study to provide the analysis with an economic model. It finds that, under certain assumptions that's different in foreign players pool and in player's salary, for both foreign and domestic players would change. Undertake by the certain assumptions, the model that we have developed contains some limitations. Such as, the exact number of foreign players, how much the wage will change and that the players are valued equally by quality and ability.

The situation regarding Brexit and EPL is still an ongoing process, but it's delayed due to Covid-19, and nothing is given. Therefore, the thesis only considers a little fraction of the effect of Brexit on EPL. It concludes, for a more precisely analysis of Brexit affecting EPL, an agreement between the EU and the UK needs to be finalized and also including other variables to the model for a more accurate picture of the real-world event.

Preface

This thesis is written as the final part of our Master's Degree in Business Administration at Oslo Metropolitan University, written during the spring of 2020. During the semester we have worked actively to answer our research questions, and to illuminate the topic in an informative and appealing way.

The process has been exciting, because we got the possibility to choose a topic of our own choice and interest. As we both are highly interested in football it was a natural choice to conduct this in a professional approach. Our major in Economics gave us the framework to address this thesis.

First of all, we would like to thank our supervisor, Tapas Kundu, for guidance, help and being available during this writing process. He has been a good and supporting supervisor, especially when we have struggled with the thesis during hard and difficult time.

Secondly, we would like to thank our friends and families for being supportive by giving inspiration and comfort during this period. To spend time with family and friends have provided as necessary breaks, that helped us stay motivated when working on the thesis.

Lastly, we would thank our friends on campus for lunch breaks, quizzes, field trips and laughter during our five years together. We would also like to thank OsloMet and NLA Høgskolen for providing us materials and knowledge that are necessary to complete our degree.

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1 Introduction

1.1 Background

Football is by far (one of) the most followed sports in Europe. Tens of thousands of spectators in the stands and millions in front of the TV every weekend, in all parts of the world. Football has grown from a recreation sport in the 18th century to a professional teams sport in the end of the 19th and start of the 20th century. Into the 21st century, the interest of football has taken off in a way we have never seen before, with sponsors, advertisement and supporters that's generating revenues of billions of pounds every year¹.

Football creates unity between cultures and people with a sense of belonging and proudness when the country's flag is represented. However, football in Europe is not only about the national teams. In each country they have their own national league, such as English Premier League (UK), Bundesliga (GER) and La Liga (ESP), as three of the best leagues nowadays. As the interest increased, international tournaments were created, where the best teams of the best leagues could play against each other. Today we know these as Europa League and Champions League².

The early start of football as we know it was in the UK and a league between teams in England emerged. As a part of industrialization and development, football became more and more widespread. Football became a sport that everyone played, alongside with a rapidly spread abroad to other countries such as Netherlands, Spain, France and Italy. Most of these countries also started to develop big teams, such as Ajax (NL), Barcelona (ESP), Real Madrid (ESP), PSG (FR), Juventus (ITA) and Inter (ITA)³ (talkSPORT, 2019).

¹ See discussion on fotballidioten in: <http://fotballidioten.com/fotball-og-utvikling-i-europa/>

² See discussion on fotballidioten in: <http://fotballidioten.com/fotball-og-utvikling-i-europa/>

³ See discussion on fotballidioten in: <http://fotballidioten.com/fotball-og-utvikling-i-europa/>

To unite the countries and seek fellowship, FIFA was created in 1904. Oddly enough, England didn't want to join, even though they meant that their own football level was much higher than other countries'. This eventually led to the World Cup, so the football could be more widespread to other countries and continents. Nowadays, FIFA consists of 211 affiliated associations, and supports them financially and logistically through various programs. One of their main responsibilities is to arrange the largest tournaments, such as the World Cup (FIFA, 2020).

Eventually, England got their professional league. The players were paid under the table, due to restrictions in the UK, that said being paid to play football was illegal. After many years the professionalism has been put into a system, with for example regular salaries and a club build up close to a regular company. Afterwards, the interest from other European countries arise, and gradually transfer of players between countries became very common. Alongside with the interest, the development of transfer fees has been from a few hundred pounds to 200 million pounds, when the Brazilian star player Neymar moved from Barcelona to PSG in 2017. Some of the biggest transfers in the recent years in the EPL are Harry Maguire from Leicester to Manchester United for 80 million pounds in 2019, Alisson Becker from AS Roma to Liverpool for 56 million pounds in 2018 and Paul Pogba from Juventus to Manchester United for 89 million pounds in 2016 (Wikipedia, 2020).

Since 1973 the UK has been a part of the EU. In June 2016 they held a referendum on whether to remain or to leave the EU. The voters in the UK voted 51.9 percentage to leave, a process known as Brexit (British Exit). The issues that led to the Brexit vote in June 2016 was the questions around sovereignty, memberships costs, trade and economy, immigration and security. The negotiation found place during the fall 2016 about an agreement surrounding the issues. After a formally withdraw January 31, 2020, no agreement was finalized between the UK and the EU (The Choices Program, 2020).

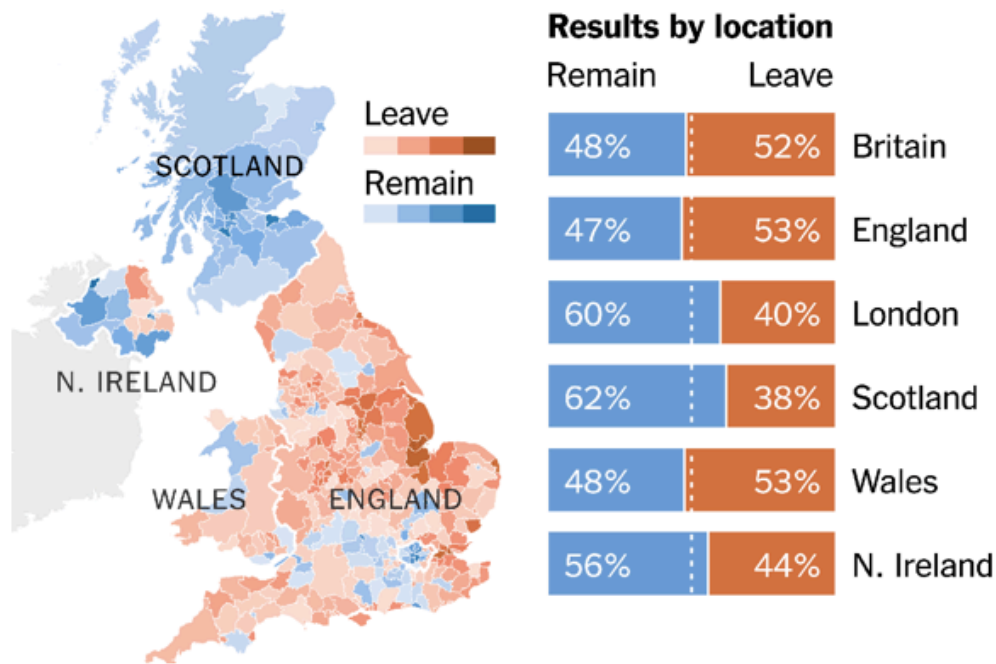


Figure: (Mueller, 2020)

Since the start of this thesis the development of Brexit has changed. Eventually, after the official withdrawal, no final deal was finalized between the UK and the EU, so the situation is still uncertain. One of the principles are the UK's control over immigration. A combination of lack of free movement of labor between UK and EU. In addition, would be harder for the EU citizens to settle in the UK, could potentially be a problem for the EPL (Sivertsen, 2019).

The uncertainty surrounds Brexit and how the situation turns out, this has been on the minds of many companies across the UK since they decided to leave. Not only companies but also the EPL. In recent decades EPL has become increasingly internationalized with clubs attracting talents from all over the world. This has led to significantly reduced playing time for domestic players. Therefore, Brexit could create an opportunity for increased numbers of domestic players in EPL. The issues surrounding Brexit may give some consequences for EPL. Consider the free movement between the UK and the EU. In which, lack of free movement of labor force between the UK and the EU and more difficult for the EU-citizen to settle down in the UK and contrary.

1.2 Research question

As the interest of the EPL has increased since the start of the league in England, EPL has become one of the most watched leagues among football fans all over the world. Since Brexit became a reality for the British people, there has been a concern on how Brexit is going to affect the EPL. Therefore, our research question for this master thesis is:

How will Brexit affect the English Premier League?

This research question is very wide and inaccurate, therefore we narrow down our research question by answering three underlying questions:

1. How will the labor market for players change in EPL after Brexit?
2. How would the wage determination for players change after Brexit?
3. How will the competition between clubs be affected by Brexit?

1.3 Structure of the thesis

For the first part of our thesis we start with an introduction on Brexit and football, on how the development of the two topics have been the last years. In addition, a brief section on the current situation nowadays. Furthermore, our research question will be addressed. Thus, to give focus on what the thesis conduct, as well give a more precise review on what we're going to analyze.

In the following chapter, the review of the theoretical concepts will be presented. The theoretical concepts would explain how EPL look nowadays, pre-Brexit. Hence, they will mainly help to get a better understanding of EPL through an economic perspective. Then a presentation of the methodology approach, it attends to solve and answer our research question through a theoretical study.

Afterwards, a model will be presented and based on that, we analyze it and then implement Brexit to see the changes. For the discussion part, we address the limitations of the model, but also undertake our assumptions and predictions made for the model.

Finally, the conclusion will summarize the whole thesis and thought around Brexit and EPL. Moreover, also a brief section about further research will be conducted.

2 Brexit

The UK has been a member of EU since 1973. During the referendum on June 23, 2016, the choice was either to leave the EU or to stay with new terms. The referendum is the second time they have voted for leaving since they joined the EU. The campaign for staying was called *Remain* or *Bremain* and leading by that time Prime Minister, David Cameron. On the opposite side, leaving the EU, was called *Leave* or *Brexit* and led by Boris Johnson. The result was 51,9 percentage of leaving in favor of 48,1 percentage of remain. Favor of leaving the EU were largest in England and Wales and for remain in North-Ireland and specially in Scotland (Store Norske Leksikon, 2020) (Mueller, 2020).

During the fall of 2016, the negotiations between the UK and the EU found place and they discussed about a trading agreement. Other big questions like how this “divorce agreement” was going to be, the EU citizens’ rights in the UK after Brexit and the border question (Chaplain, 2018).

When it comes to Brexit, they will either have a “hard” or “soft” Brexit. The key elements of a “hard” Brexit means that the UK is completely taking out of the EU and was leaving without agreement. Including both the single market and the Customs Union. Benefiting free from its regulations and tariffs, and more control over borders and immigration. A “soft” Brexit it would keep the UK’s relationship and level closely with the EU. Which means the UK would still be bound by some rules from the EU. Like free movement of labor, goods and service but also the Customs Union - the bloc’s trade and tax agreement (Chaplain, 2018; Store Norske Leksikon, 2020).

The negotiation did not benefit the UK and the EU and encored the UK to release article 50 to start the real negotiation. In article 50, EUs Treaty of Lisbon leads to an increase by leaving over two periods. Former Prime minister, Theresa May released article 50 March 29, 2017, so the withdrawal would take place March 29, 2019. Leaving the EU without any agreement will not be in favor for the UK. Therefore, the agreement called “Blackstop”, was a backup plan that attend the possibility to secure an open and seamless border. The UK should then be a member of a customs union to secure an open border, but in the agreement of Brexit no one specified an exit date for Custom Union. Once again May got overruled her third time, and

needed to postpone Article 50, this led to May announcing her resignation May 23, 2019. Respectively and was succeeded by Boris Johnson (Store Norske Leksikon, 2020).

Johnson was one of the front figures for the *Brexit* campaign. Unlike May, Johnson was for a “hard” Brexit and was willing to leave the EU with or without an agreement within a time limit on October 31, 2019. Likewise May, Johnson also suffered with negotiations, postponing and support, and resulted to that Johnson suspended the Parliament. The Government justify the suspension by cause of the needed time to prepare the new land. However, the Queen reopened the Parliament again on October 14 with the Queen's Speech (Store Norske Leksikon, 2020).

The main problem and concern, was the UK leaving the EU without a new agreement. The Parliament carried out a law called “*Benn Act*”, that said Johnson and the Government were forced to require from the EU a postponing of three months, unless the Parliament got an agreement with the EU that they could support by October 19. Surprisingly Johnson was able to negotiate a new agreement with the EU. Due to an agreement it was still some disagreements about the border problem between Ireland and the British Northern-Ireland. So, the Parliament once again turned down the agreement from the Government and forced Johnson for another postponing, that was a flexible postpone with a three months framework until January 31, 2020 (Store Norske Leksikon, 2020).

After a new election December 12, Johnson and his party gained a pure majority in House of Common and the way lay open for an agreement to leave the EU, with approval from the Parliament who as obstruct the agreement since May’s government. Until December 31, 2019 the parties negotiate about a trading agreement before the transition period was over and Brexit formally took place January 31, 2020. During the transition period the UK still was following EU’s regulation and be part of the single market, but not patriate in the European or other political decision-making bodies. The situation today for Brexit is that they could ask for a postponement during the transition period before June 2020, but Johnson has made it clear that it’s out of date to postpone again. While the EU has said that the time frame will be extremely demanding (Store Norske Leksikon, 2020).

3 Football

Even though there are big disagreements on where football has its origin from, we most certainly can say that the way we know football today, first started in Britain. The game that was played in ways of different and local versions has resulted in different sports, such as football, rugby and Gaelic football (FIFA, 2020).

The start of English football as we know it, started when The Football Association (FA) was founded in 1863. Representatives of certain clubs from the London area met “*for the purpose of forming an Association with the object of establishing a definite code of rules for the regulation of the game*” (The FA, 2020). The FA Cup was founded in 1872, and it’s the oldest known tournament in football. The English Football League was established in 1888, as The Football League, and is the oldest league tournament in football. Afterwards, many other leagues have been established in England, and is built up in a pyramidic system that could give clubs a dream reaching the very top of English football (The FA, 2020).

In 1992 there was a split in English football, and the EPL was established. Consisting of the current 20 best clubs in England and Wales. The English Football League is now ranked as the second-best league in the English league system. They still have a connection to the EPL with teams getting promoted and relegated between those two leagues. The shares of the EPL are evenly split between the 20 clubs playing there in any given season, meaning they are equal owners with equal rights (The FA, 2020).

If we simplify, football is an ever-evolving game. Investors in clubs change, players move frequently between clubs and leagues, managers change, and rules change. The transfers of the players were the most interesting, because this is the most common change in football. A transfer is what happens when a player under contract at one club moves to another club. Usually the buying club pays the selling club a fee, that’s agreed between the two clubs, or they offer another player in switch or other clauses for compensation for getting the player.

The way transfers work at the end of a player's contract was altered in 1995 when the Belgian Jean-Marc Bosman ran out his contract at RFC de Liège, and he decided to move to the French side Dunkerque. After Dunkerque refused to pay the fee Liège wanted, a conflict raised between the two clubs, therefore Bosman couldn't play for either clubs. He took the case to court, and the European Court of Justice ruled that a player could move for free when the contract expires. This resulted in the well-known Bosman-rule (Gardiner & Welch, 2011).

The biggest change in transfer-rules came in 2002, when UEFA, the governing body of football in Europe, decided that there are selected periods during the season when new players can be registered for play. In most European leagues, this is during July and August, and in January to strengthen the squad in the middle of the season, referred to as "Transfer window". Transfers can be agreed outside the transfer window, but the players cannot be registered before the transfer window opens, and players need to be registered to play (Football Stadiums, 2020).

There are already regulations on how many home-grown players clubs in European leagues need in their squad. Home-grown means players from the respective country, or foreign players that have played in the respective country for at least three years before the age of 21. A squad can have a maximum of 25 players, and 17 of these players can be non-home-grown (Gardiner & Welch, 2011).

The EPL has already got restrictions on signing non-EU players, and this will probably influence EU-players too. When the UK leaves the EU, they will not be part of the free movement of labor, and the work licence for the EU citizens will probably be stricter. For foreign players to receive work licence in the UK, they need to have played a given percentage of international matches for their home country over the past two years, based on the FIFA ranking of their country. If not, they will have to be bought for a much higher amount of money. More than 100 players would actually fail to meet the requirements for non-EU players. With the similar rules for EU players following Brexit, players from 27 EU countries would fail to meet the requirements (Messer, 2018).

OFFICIAL FIFA RANKING	REQUIRED % OF INTERNATIONAL MATCHES PLAYED IN THE PREVIOUS TWO YEARS
FIFA 1-10	30% and above
FIFA 11-20	45% and above
FIFA 21-30	60% and above
FIFA 31-50	75% and above

Table 1: (Perry & Steenson, 2019)

We can also see from this table that there's a smaller chance for players from lower ranked countries to earn a place in an EPL Squad.

4 Review of theoretical concepts

In this chapter, we will review some theoretical concepts regarding EPL. For the first part, the competition structure in EPL will be conducted and how the clubs behave in economic terms. Secondly, address the labor market of EPL, where players are suppliers that sell their talents and ability etc. and clubs are demanding the players' talents and ability. Last, emphasize players' wage in different segments in the EPL. Thus, different wage levels of players.

4.1 Competition

4.1.1 Competition structure

In a market theory, both suppliers and demanders, are studied under given conditions. We often distinguish between perfect competition and imperfect competition. It will be natural to use a model of perfect competition as a basis, due to that perfect competition is characterized by multiple suppliers and demands, such as EPL. Some other conditions for a perfect competition are that the products are homogenous, low entry barriers and stakeholders have no impact on the market price, which results in an absence of market power. However, the competition in EPL is more or less given before the start of the season. Not the exact league positions, but in what part of the table the given teams will end up. Of course, there are exceptions, such as Leicester City when they won EPL in the 2015/2016 season, and Sheffield United's battle for Champions League football in the 2019/2020 season (Millward, 2006).

Looking at the Big Six clubs, also the top clubs. These are known for being richer than the rest by having better players and managers. That results in more market power to the Big Six clubs, which are Liverpool, Manchester City, Manchester United, Arsenal, Chelsea and Tottenham. Therefore, EPL will have a competition structure as imperfect competition, which is the opposite of perfect competition. The products of EPL are the players, they have their own talent and ability level. Therefore, the players are heterogeneous. The suppliers are implementing different pricing strategies rather than adjusting the price to market price, so the top clubs have the possibility to set a higher market price for a given player. How will this be post-Brexit? Will richer clubs continue to buy players as nowadays, if the price of the players increases? Will the mediocre clubs buy the players that the top clubs don't prioritize?

And could this lead to a more even league and better competitions among clubs in EPL?
(Pawlowski & Nalbantis, 2015) (Tungehaug & Hoff, 2017)

4.1.2 Oligopoly

Oligopoly is defined by few suppliers in the market and therefore gives the seller market power. The suppliers are often large companies and the level of demand of the products depends on how their competitors will react regarding of price, advertising and etc. Also, the output decisions of its competitors (Estrin, David, Laidler, & Dietrich, 2008). Such as the EPL, who is a large sport industry, is an oligopolistic market due to their independency and indeterminacy nature of products quality and quality in the market. All clubs in EPL are spending major sums of money on advertising for promoting quality perception of their products and service. For example, when Liverpool spend considerable amount on getting new quality top players and sponsorship, the competitors such as Manchester City would need to be compelled to do the same in order to maintain the oligopoly nature (Boots, 2015).

Clubs in EPL may have something similar to an oligopoly structure on domestic quality players, who are at the same levels of the best foreign players. The reason of that, is due to the working license that the domestic players don't need to play for EPL clubs, but the foreign player's needs. To consider foreign players, they need to provide the exact talent and ability to the club if they want to be seen as a good alternative.

When one club is selling a player they need to consider the relationship between the charging price and the quality that it can sell depending on the behavior of its competitions, which will in turn depend on its own decision. Thus, there's no market equilibrium for an oligopolist due to outcomes depending on assumptions on companies behavior. For example, when multiple clubs wish for a particular player. There's often one or two bigger club in the "fight" for that particular player. Therefore, they will set the price for the other competing clubs and limit the offers for the players. They also need to assume that their competitors will react on their actions and about the effects of those reactions on their own sales (Estrin et al., 2008).

Between clubs and players there's also a monopsony structure when it comes to acquisition and transferring of football players. For a monopsony market there is one buyer and multiple sellers. With this structure, the buyer gets an enormous power to control the purchase price of input, but also other factors of production. For the clubs in EPL, the players are the suppliers of their talent and ability and for the production they are a core factor. Further, they have a small impact and influence to determine the wage and transfer price. To determine the transfer fee is to influence on the only variable interdependency and price war between the rival clubs in an oligopoly. For the EPL, their market are operating for an oligopolistic model with clubs that has considerable power to control the cost of factor production (Boots, 2015).

4.1.3 Oligopsony

Oligopsony is a version of oligopoly. The characteristic of oligopsony is described as only few buyers for the products or services. The benefits for the buyer in the market, will allow them to utilize after a great deal of control and push for a lower price (Pindyck & Rubinfeld, 2013).

In the EPL we can think that a few of the big clubs, such as Chelsea, Arsenal and Manchester United, are the few buyers that can attract the greatest players from smaller clubs. The number of suppliers, the smaller clubs, are way bigger. The buyers probably have a bigger opportunity to choose between good players from different clubs. One good example would be Jack Grealish, the star player of Aston Villa. A player at one of the lower sides in the league, but still one of the best English attacking midfielders. Aston Villa wouldn't sell him to a club that's not significantly better than them, and he would probably not sign for any other except from top clubs. The big clubs on the other side have more opportunities, with a lot of players like Grealish in different clubs, from both the UK and other leagues. They have got alternatives, and possibilities to sign other players, or stick with the players they already got.

4.2 Labor market

The labor market has a big impact on most people in a society. Unlike the market of goods, EPL is a labor market that address where players sell their knowledge, competence and a considerable amount of their time. Hence, talents and ability. The functionality of the labor market has a decisive meaning for one of the biggest social issues in the community, unemployment (Andreassen, Bredesen, & Thøgersen, 2017).

The labor market can often be referred to as one market, but it's actually put together by many submarkets, such as EPL, with players, managers and coaching staff. However, the consideration that players are in the "front line" due to that clubs are like all other firms, consisting of the need for different players with different ability to maintain competitive (Andreassen et al., 2017).

We can speak of different segments within the labor market and different types of labor with different knowledge and ability. Therefore, this leads to differentiation in wage levels, both in the short run and the long run (Andreassen et al., 2017). Theories of labor market are often explained with how wages are determined and how workers are allocated to different jobs. In EPL, players are allocated to different positions like; attackers, midfielders, defenders or goalkeepers. Like any other labor market, EPL have segments of players and we will explain which players are in these segments, such as how highly skilled players have higher earning than unskilled players. Furthermore, we divide the labor market of EPL in two segments (Nesje & Ufs, 2015) (Marshall & Scott, 1998).

The primary sector focus on privileged jobs. Those who receive high wages, stability, career prospects and good social protection. Applying these characteristic to the EPL, players with the privileged jobs are those who are most important or the star players of the team (Marshall & Scott, 1998). Such as Kevin De Bruyne, Jamie Vardy or Harry Kane. In addition, they benefit from terms of salary protection and benefits in general, but could also select between the top performing clubs, long term contracts and careers and regarding positions and media exposure. Of the examples above, Kevin De Bruyne, is one that benefits from all of these. He's a star player at Manchester City that would easily go to any other club in EPL and has the talent, quality and ability that's give him the "right" to demand a high wage.

The secondary sector is the opposite. They will receive low wages, job insecurity, poor social cover and limited career prospects. Applying it to EPL, this concern the players who gets shorts-terms contract with much lower pay and additional enforced mobility to “choose” and even unemployment. Their wages in the EPL is generally high, and low earners are rarely seen. Some players live under uncertainty though, and never settle at one club (Marshall & Scott, 1998). Some of the best examples of these players over the past years could be Emmanuel Adebayor, Dwight Gayle and Morgan Schneiderlin.

4.3 Wage determination

In the study of KEA (and CDES) they address three other segments that are more applicable to the reality of the labor market. The European football (EPL) labor market is not a pure market who have perfect competition like others traditional theories would describe a market. The labor market that KEA (and CDES) represent in the study is assembled by three different segments. Each with different structure, wage, market power and stakeholders (Affairs, CDES, & Sport, 2013).

1. The higher primary market concern limited number of players, which are the “superstars”, that faces a limited a number of clubs with a monopolistic structure. Particular for this market, the players and the people who are representing them have a considerable market power. On this market higher wages and transfer fees are expected. One of the best examples here is Paul Pogba of Manchester United. With the super-agent Mina Raiola by his side he became one of the most expensive transfers ever when he transferred from Juventus in 2016. Hence, he has is also one of the highest earners in the EPL.
2. The lower primary market concern limited number of players, which is the experienced and good ones, that faces a huge number of clubs with an oligopolistic structure. Particular for this market, players and the people who are representing them have less market power compared to the superstars and nor can they negotiate the highest wages. This could be players like James Milner of Liverpool or Olivier Giroud of Chelsea, both with great and experienced players, but they’re not the star players of their team and do not earn the highest wage.

3. The secondary market concern multiple players that faces limited numbers of clubs with an oligopsony structure. Which means that clubs in the segment has most impact on market power in determining the prices, wages and transfer fees. One example here could be Wolverhampton, which have a great connection to the Portuguese football industry. This makes them the number one club in the EPL for players from Portugal, they can attract some of their best players, and easily keep some of the best Portuguese players even though they're not the best club in the league.

5 Methodology

In the following, the presentation of the methodological approach will be presented. When choosing a method, it's important to focus on our research question. The social science method emphasizes how the information is presented. In form of, what reality looks like, how the information is analyzed and what it tells about the social condition and process. All thing considered, it's about collecting, analyzing and interpreting data (Johannessen, Tufte, & Christoffersen, 2015, p. 25).

5.1 Theoretical study

To address our research question the best way, we have chosen a theoretical study were we developing an economic model. Developing an economic model will help to understand the process. Therefore, using a mathematical basis will probably precise the shorthand for stating the model and exploring the consequences. A theoretical study is more based on exploring, test or develop theories rather than depending on an experiment, manipulation of variables or empirical evidence. We are more interested in understanding “why” and can be a solution to a problem or a prediction regarding the behavior of variables (Jax, 2020). Therefore, by using a theoretical study with an economic model, due to the lack of literature and predicting different effects of Brexit, meaning predicting the future will give a better understanding.

The model will contain clubs and players in EPL. Moreover, we would implement Brexit to see what's going to happen post-Brexit. Developing a model for thesis, we need to abstract from the complexities of reality and rather develop a model that captures the “essentials”. In which, that's why we created the underlying questions to capture the “essentials” of Brexit through labor market, wage and competition. By using a theoretical model we will try to provide a simplified portrait on how decisions are taken by individuals, how firms behave and how these two interact to establish a market. Like on how clubs are making their decisions to hire players (Nicholson & Snyder, 2017).

However, our model undertake a profit-maximization, were we got inspired by the work from Stefan Késenne(Késenne, 2007), and that's obviously a simplification of reality. By choosing a profit-maximization model, we ignore other goals for a club, such as obtaining prestige and power. There will be some other minor shortcomings of the model, like the model assumes that's club's has sufficient information about its cost. Yet, no model will describe the reality exact. Therefore, the real questions is whether the economic model has any claim to be a good model (Nicholson & Snyder, 2017).

The model that we are developing is also a general equilibrium model that emphasize a Walrasian framework with an indirect approach. Where we "*attempt to confirm validity by showing that a simplified model correctly predicts real-world events*"(Nicholson & Snyder, 2017, p. 4)

By solving the decision of problems for multiple clubs simultaneously, we emphasize on a Walrasian framework of a general equilibrium model. In addition, the profit-maximization conditions by each club, also incorporate the market clearing condition. Based on that, we generate a general equilibrium in the economy. Otherwise, the assumptions we conduct with clubs recruitment decisions are only responsive to the players wage. Clubs in EPL are competing against each other but each club's production decisions only depends on the prevailing market prices, and not on other club's production decision.

The economists from the book "*Microeconomic theory*" address that:

"Only way to determine the validity of a model is to see whether it is capable of predicting and explaining real-world events."(Nicholson & Snyder, 2017)

By testing a profit-maximization model may provide by predicting the behavior of real-world clubs by conjecture that clubs are behaving as if they were profit maximizers. If these conjecture and predictions are reasonable according to the reality, we could accept the hypothesis about profit-maximization. However, if the data from the real-world are inconsistent we would reject the model. Therefore, for any given economic model, the ultimate test is to confront it against data from economy itself and its ability to predict real-world events (Nicholson & Snyder, 2017).

5.2 Inductive and deductive

In an inductive approach, the researcher goes in without any expectation, hypotheses or theory based on the analysis of the empirical, that later will be interpreted and developing of theories. For a deductive approach, the researcher goes the opposite direction; from known theories and previous research to own empirical data (Busch, 2013).

From the existing literature about Brexit and EPL and all the work beforehand with our theoretical understanding it was difficult for us to do an inductive approach. Hence, also to do some extent deduce from the existing literature and theories. As inexperienced researchers, it would be safer for us with a more structured approach. Therefore, a deductive approach seemed more suitable, reasonable and manageable to illuminate our thesis. Thus, this approach could contribute both depth and breadth for our analysis (Busch, 2013, p. 51).

5.3 Review of the literature

When collecting the existing literature, it's important to explore the articulate of them for our study. By analyzing these existing literatures, are analysis of secondary data, such as books, websites and public documents and texts. Hence, it's about the researcher interpreting the meaning of what has been written or said (Sander, 2019). In addition, by ensuring that relevant constructs are included, we need to go through the literature etc. that are relevant and related for addressing our research question. When choosing such articles, we need to take from peer-reviewed journals to ensure their scientific merit but also credibility (Jax, 2020).

During the review of the literature that is relevant for our study, we came over some important terms and theories, as well as their relationships with each other, but also the analytic models that they are presenting or that can be formed. From this the theoretical framework can be provided. A solid framework supports the building of a new theory and the testing or advancement of an existing theory (Jax, 2020).

The work of Stefan Késenne has been crucial for us when developing the model. In his book, *“The Economic Theory of Professional Team Sports”*, he presents the market for professional team sports as a general equilibrium with either profit-maximization or winning-maximization. The book gave us a better understanding of how the model could work, and how the different variables in the market of football could be affected by Brexit. Moreover, the book gave us a better basis to make assumptions and predictions for our thesis.

To get more credibility for our assumptions and predictions we have used existing literature. There is lack of literature on this exact topic, therefore we had to think differently when choosing our literature. To build up on the theory of our thesis, we have used existing literature on how the economic forces work in the market and brought this into our model to make predictions on how Brexit could possibly affect the EPL. To be up to date on both Brexit and the EPL we found newspaper articles, blogs and websites to be most accurate.

5.4 Reliability and validity

When we consider the reliability and validity of a thesis it's about the trustworthiness, accuracy and credibility (Thagaard, 2013) (Johannessen et al., 2015).

The most difficult task that we're going to face is testing the validity of our economic model. Occasionally, our model's validity could be appraised by asking whether the assumptions and predictions we have made are "reasonable". However, we could judge on the basis of how well it actually explains the economic event in the reality. Thus, real-world event. Our model has an indirect approach, that attempts to confirm the validity through a simplified model that correctly predicts real-world events.

With our economic model, we make some assumptions and predictions. Therefore, readers of our thesis can either accept the assumptions to be true or plausible. As, choosing assumptions and predictions we need to make them valid, credible and reliable. In addition, the assumptions and predictions that we make are needed by the reason that they affect our result and for making reasonable conclusion from our thesis.

6 Model

To compete in the top of the league, clubs need to hire players to maintain competitive. Due to this, most clubs get players from other clubs all over the world. In this analysis about EPL and Brexit we will only consider European market. To be on the top of the league, clubs need to hire new players. We suppose there are n clubs which are indexed and given by $i=1, 2, \dots, n$.

To measure the total size of the foreign and domestic talent pool, given:

Total size of the foreign player base: T_f

Total size of the domestic player base: T_d

The parameter ε measures the productivity difference where:

- T_f generates a productive pool of εT_f , when $\varepsilon > 1$
- T_d generates a productive pool of T_d

We assume that only the highly talented players from abroad are being recruited. Therefore, T_f etc. The purpose of doing this simple assumption is to indicate the quality difference between the two talent pools. When we discuss the average quality of all the foreign players and the average quality of all the domestic players there is a difference. Thus, it would be wrong to treat T_f and T_d equally. Further, we therefore assume that foreign players have a higher average quality than domestic players. So, for 1 unit of talent from a foreign player you get ε , which is $\varepsilon \geq 1$ unit of productive talent, whereas 1 unit of talent from a domestic player you get 1 unit of productive units. If we take $\varepsilon = 1$, the model will present is a situation where there is no qualitative difference between the two types of players. Epsilon ε , is used as a parameter, indicating the productivity difference between the foreign and domestic players. However, also assuming homegrown players are within the pool.

Suppose that a club i hires t_{if} of foreign players and t_{id} of domestic players. The total talent productivity hired by the club i is then t_i .

Total talent productivity hired by club i given by

$$t_i = \varepsilon t_{if} + t_{id}$$

When success percentage is

$$p_i = \frac{t_i}{T}$$

And where total players are given by

$$T = \varepsilon T_f + T_d$$

The revenue of club i , we assume that $R_i(t_{if}, t_{id}) = m_i p_i - \beta p_i^2$, in which we also assume that $m_i > 2\beta$ so that R_i is increasing in p_i .

The revenue function is given by a concave function because if $\beta = 0$, $R = m_i p = m \left(\frac{t_i}{T} \right)$ Which is linear in t_i , then the optimal choice of t_i when $\beta = 0$ will give $MR > MC$, where MC is constant or infinity if $MR > MC$. The result is no solution. Getting a solution that is either 0 or ∞ is a bang-bang solution. To get rid of a certain problem like that, we can argue that this thesis emphasizes on that profit is not linear but concave. β is in this case the measure of concavity.

Applying in the real term of this context and the assumption that profit of a club goes up with the winning proportion p_i at decreasing rate - increasing sharply for a low p_i but to a flatter curve for higher p_i . This could be a reasonable assumption, but we need to be careful due to bang-bang solution.

The cost for club i is given by

$$c_i(t_{if}, t_{id}) = c_i w_f t_{if} + c_i w_d t_{id}$$

where

- c_i is the marginal cost of raising fund.
- w_f is the wage of foreign talent.
- w_d is the wage of domestic talent.

In the following sections, will analyze and solve for the equilibrium of the model.

7 Analysis

In this analysis part we will try to conduct how the different variables and factors in the market of EPL influences each other, and how this could possibly change due to Brexit. We will address how the wages of foreign and domestic players are determined when there are changes in the availability of talents. That is also dependent on the costs, revenues, market size and success percentage.

In this part of our thesis we attend to talk about talents, but not in the way as young, up and coming players. Talents in this case is more of the ability of the players. One player isn't necessarily equal to one talent. An example could be, if one regular player is equal to one talent, one top player would be equal to 1,5 or maybe 2 talents. We assume that clubs want as many talents as possible in their squad, but this doesn't automatically mean that they want as many players as possible in their squad.

Further on we will calculate step by step how the different factors in our model affects each other, and finally how the EPL could look when Brexit is implemented. During the calculation we will try to explain and guide through the model by giving interpretation of the equations.

7.1 Profit-maximization and wage determination

Club i chooses (t_{if}, t_{id}) to maximize profit $\pi_i(t_{if}, t_{id})$

$$\pi_i = m_i - \beta p_i^2 - c_i w_f t_{if} - c_i w_d t_{id}$$

To find the maximization profit for each players group we differentiate the club's profit expression. The following are the first-order condition are

$$\frac{d\pi_i}{dt_{if}} = 0 \rightarrow m_i \frac{dp_i}{dt_{if}} - 2\beta p_i \frac{dp_i}{dt_{if}} - c_i w_f = 0 \quad (1)$$

And

$$\frac{d\pi_i}{dt_{id}} = 0 \rightarrow m_i \frac{dp_i}{dt_{id}} - 2\beta p_i \frac{dp_i}{dt_{id}} - c_i w_d = 0 \quad (2)$$

We rewrite 1 and 2, and simplify to get

$$(m_i - 2\beta p_i) \frac{dp_i}{dt_{if}} = c_i w_f \quad (3)$$

$$(m_i - 2\beta p_i) \frac{dp_i}{dt_{id}} = c_i w_d \quad (4)$$

Further simplification given

$$\frac{1}{w_f} * \frac{dp_i}{dt_{if}} = \frac{1}{w_d} * \frac{dp_i}{dt_{id}}$$

$$\frac{w_f}{w_d} = \frac{dp_i/dt_{if}}{dp_i/dt_{id}}$$

(5)

Given the result of the first-order condition we get

$$\frac{w_f}{w_d} = \frac{\varepsilon/T}{1/T} = \varepsilon \rightarrow w_f = \varepsilon w_d$$

From the first-order condition we get $w_f = \varepsilon w_d$ and this is the outcome of the model.

$w_f = \varepsilon w_d$ shows that the wage of a foreign player is equal to the parameter ε multiplied with the wage of the domestic players. ε shows the productivity difference between a foreign player and a domestic player. The interpretation of the $w_f = \varepsilon w_d$, assumes that there's a quality difference between foreign and domestic players in the EPL. This means that the productivity, shown by the parameter ε , also determines the wages of the players. Shown by this, domestic players would need to perform on a higher level to earn themselves the same wage level as the foreign players.

Moreover, we are yet to solve the exact value of w_f or w_d , t_{if} and t_{id} . Going back to equation 1 and replace $\frac{\varepsilon}{T}$ instead of $\frac{dp_i}{dt_{if}}$ and solve for p_i , which given below by

(6)

$$p_i = \frac{\varepsilon m_i - c_i w_f T}{2\beta\varepsilon}$$

In the following, we do the same for equation 2. Place in $\frac{1}{T}$ instead of $\frac{dp_i}{dt_{id}}$ and solve for p_i , and the calculation gives

(7)

$$p_i = \frac{m_i - c_i w_d T}{2\beta}$$

We consider equation 7 and using the fact that $\sum p_i = 1$, we desire the wage of the domestic and foreign players. Respectively, which are given below

(8)

$$w_d = \frac{\sum m_i - 2\beta}{T \sum c_i}$$

And

(9)

$$w_f = \varepsilon w_d = \frac{\varepsilon(\sum m_i - 2\beta)}{T \sum c_i}$$

Equation 8 present the salary for a domestic player and equation 9 presents the salary for a foreign player. We need to note that equation 6 and equation 7 are equivalent given equation 5, $w_f = \varepsilon w_d$. Thus, equation 8 address only the salary of a domestic player when there is no quality and productivity difference between foreign and domestic players. However, we already assume there's a productivity difference between them given by ε . Therefore, by equation 9, is expressing a more specific equation when $w_f = \varepsilon w_d$. That indicates the productivity difference between the two player groups.

Study the comparative effects between the two equations by assuming that a higher T, leads to a lower wage for the two players groups and vice versa. With multiple players available on the market, the clubs have various players to hire that don't require the highest salary. Based on this assumption, clubs could offer a lower salary to their players, by reason of this the clubs could easily hire other talents that's available in the market.

According to $w_f = \varepsilon w_d$, with equation 9. Given a higher ε means that there's a bigger difference in productivity needed from the domestic players, to earn themselves the same salary level as the foreign players. The ε shows how much more productivity the domestic players would provide, compared to the foreign players.

Finally, $p_i = \frac{t_i}{T} \leftrightarrow t_i = T p_i$, by outline equation 7 instead of p_i and calculate. Moreover, simplification given

$$T \left(\frac{c_i}{\Sigma c_i} \right) + \frac{T}{2\beta} \left[m_i - \left(\frac{c_i}{\Sigma c_i} \right) \Sigma m_i \right]$$

Thus, we do a simplification. By simplifying the Σc_i and Σm_i would not lead us to a long expression. Therefore, take Σm_i out of the square bracketed term and gives us

$$t_i = T * \left(\frac{c_i}{\Sigma c_i} \right) + \left(\frac{T \Sigma m_i}{2\beta} \right) * \left[\left(\frac{m_i}{\Sigma m_i} \right) - \left(\frac{c_i}{\Sigma c_i} \right) \right]$$

Furthermore, we rename the given equations:

- $\frac{c_i}{\Sigma c_i} = \theta_i^c$, that's implies the relative cost efficiency of club i and
- $\frac{m_i}{\Sigma m_i} = \theta_i^m$, that's implies the relative size efficiency.

The advantage for use of the notations is to address the clubs relative cost and size parameters in a simple way, likewise an easier way to represent the relative positioning. For example, if $club_1 > club_2$. This will mean that $club_1$ is more cost inefficient than $club_2$. However, exact number of $club_1$ and $club_2$ do not make much sense because if $club_1$ could be from 5 to 5000, then the number will have no interpretation. $\frac{club_1}{\Sigma club_1}$ will become a fraction. Furthermore, all these fractions will add up to 1. By having 5 clubs in the league and then rank them in terms of their money strength. Then consider $\theta_1 < \theta_2 < \dots < \theta_5$ and these fractions together will add up to 1.

By using these equations, we get the final expression in equation 10 and that is given by

(10)

$$t_i = T \theta_i^c + \frac{T \Sigma m_i}{2\beta} [\theta_i^m - \theta_i^c]$$

The outcome of the expression, is the solution of our problem. The solution underline total size of talent pool of a club, in consideration of the relationship of cost and market size.

The interpretation of equation 10 is given by t_i . Assuming T is increasing, then t_i would also increase which means that the total talent productivity hired by club i will increase. That emphasizes that a club would hire more talents in the market to increase their productivity to maintain their winning percentage. If θ_i^c is large, club i is relatively more inefficient and for a large θ_i^m , club i has a relatively bigger size. Following the solution, the general equilibrium^m defined by these three equations:

The solution of our problem given by

$$t_i = T\theta_i^c + \frac{T\Sigma m_i}{2\beta} [\theta_i^m - \theta_i^c]$$

With the respectively of the wage for domestic and foreign player given below

$$w_d = \frac{\Sigma m_i - 2\beta}{T\Sigma c_i}$$

and

$$w_f = \frac{\varepsilon(\Sigma m_i - 2\beta)}{T\Sigma c_i}$$

Note that $w_f = \varepsilon w_d$, we assume $\varepsilon > 1$.

Taking the exact choices of t_{if} and t_{id} are indeterminate, it can be any combination satisfying the following simultaneous equations.

$$\varepsilon t_{if} + t_{id} = t_i = T\theta_i^c + \frac{T\Sigma m_i}{2\beta} [\theta_i^m - \theta_i^c]$$

$T_f, T_d, \{m_i\}, \{c_i\}, \beta$ are constant and parameters of this model.

$$\Sigma t_{if} = T_f$$

$$\Sigma t_{id} = T_d$$

$$T = \varepsilon T_f + T_d$$

Also, note that the winning proportion is given by:

$$p_i = \frac{t_i}{T} = \theta_i^c + \frac{\Sigma m_i}{2\beta} [\theta_i^m - \theta_i^c]$$

After considering the model, we suppose the effect of Brexit can be seen as a shock in the foreign talent pool. For example, a decrease in total size of the foreign player base, talent pool, T_f . With a decreasing in T_f we can also argue that we may expect that only talented players will be recruited or hired, and that will increase ε . Further, the important question is whether εT_f is going up or down.

7.2 Implication of Brexit

A reasonable assumption that we could make here is that εT_f is decreasing for reason of the certainty of the pre-Brexit talent base. The aggregate cost would be higher but also that revenue can't decrease if the club hires more talent, thus the costs can increase. When a club i is hiring more talents they become more competitive, which would help increase their chances to win more tournaments, expand their fan base, more sponsors etc. By looking at the effect of T_f when assuming ε is unchanged $\frac{dT}{dT_f} = \varepsilon$.

If T_f goes down:

- T goes down
- w_f goes up
- w_d also go up

When considering the individual recruitment when T_f goes down. Relative ratio of foreign talent pool over the domestic talent pool, $\frac{T_f}{T_d}$ also goes down.

Another situation is that we can't point out whether one specific club is going to hire more or less of foreign players after Brexit. Thus, can aggregate that $\frac{T_f}{T_d}$ is decreasing and all clubs in EPL will face a higher wage for both foreign and domestic players, due to

$$\frac{T_f}{T_d} \downarrow$$

This equation shows the relationship between the total number of foreign players and the total number of domestic players. T will also decrease when T_f decreases, given the equation $T = \varepsilon T_f + T_d$.

How the wage of foreign players changes when the pool of foreign talents decreases:

$$w_f = \frac{\varepsilon(\Sigma m_i - 2\beta)}{T\Sigma c_i}$$

Where as $T = \varepsilon T_f + T_d$

$$\begin{aligned} \frac{dw_f}{dT_f} &= \frac{dw_f}{dT} * \frac{dT}{dT_f} \\ &= -\frac{1}{T} \left[\frac{\varepsilon(\Sigma m_i - 2\beta)}{\Sigma c_i} \right] * \varepsilon \\ &= -\left(\frac{\varepsilon}{T}\right)^2 \left[\frac{\Sigma m_i - 2\beta}{\Sigma c_i} \right] \end{aligned}$$

How the wage of domestic players changes when the pool of foreign talents decreases:

$$w_d = \frac{\Sigma m_i - 2\beta}{T\Sigma c_i}$$

Where as $T = \varepsilon T_f$

$$\begin{aligned} \frac{dw_d}{dT_d} &= \frac{dw_d}{dT} * \frac{dT}{dT_f} \\ &= -\frac{1}{T^2} \left[\frac{\Sigma m_i - 2\beta}{\Sigma c_i} \right] * \varepsilon \end{aligned}$$

As we can see in this part of our model, there's a negative relationship between the total number of foreign players and wages, for both foreign and domestic players. We assume that when Brexit hits, the total number of foreign players that's relevant for the clubs in the EPL will decrease. The clubs will probably focus on signing fewer, but better foreign players, rather than finding cheaper solutions. When a fewer number of foreign players will be signed by EPL clubs, we could expect the clubs to focus on the best foreign players. That would indicate a higher competition for the relevant players, and the players could demand higher wage because there would probably be a "tug of war" for the best players.

The relationship between total number of foreign players and wage for domestic players are, as mentioned and showed in the model, a negative result. As the number of foreign players in the league will decrease and make holes in the squads, we could expect the clubs to fill the positions earlier filled by foreign players with domestic players. The competition for the best domestic players would also probably increase after Brexit. We could also assume that these players would demand higher wage, as they are getting more attractive to the clubs in the EPL.

As mentioned, the parameter ε , shows the productivity needed from the domestic players to earn themselves the same wage as the foreign players. We assume that this parameter is constant and will not change due to Brexit. This would mean that the productivity of the domestic players would need to stay the same in respect to the productivity of foreign players after Brexit. The relationship between w_d and w_f would stay the same, equivalent to ε , so that when the wages of foreign players increase, the wages of domestic players would follow.

However, when looking at $\frac{dt_i}{dT_f}$ some clubs will relatively be worse off than others.

Going back and recall to equation 10 and $T = \varepsilon T_f + T_d$

$$\begin{aligned}\frac{dt_i}{dT_f} &= \frac{dT}{dT_f} \left[\theta^c + \frac{\Sigma m_i}{2\beta} (\theta_i^m - \theta_i^c) \right] \\ &= \varepsilon \theta_i^c + \frac{\varepsilon \Sigma m_i}{2\beta} (\theta_i^m - \theta_i^c)\end{aligned}$$

To address these two components, it's hard because they have a difficult interpretation. The first part is a direct affect and the second part can be positive or negative. For the first part when T_f is going down, every club in EPL is negatively affected and its hiring goes down by $\epsilon\theta^c$. The second part depends on if $\theta_i^m \geq \theta_i^c$. Suppose that $\theta_i^c < \theta_i^m$ (relatively cost efficient/high market size).

- Then if there is a positive shock they gain more.
- Then if there is a negative shock they lose more.

If we don't discuss $\frac{dt_i}{dT_f}$, our model would produce very similar outcomes for all clubs.

According to $\frac{dt_i}{dT_f}$ from our model, this is the only case where we can see a different effect across the clubs. To see the difference between the clubs, we may consider that they have different revenue and cost for hiring the players. Therefore, $\frac{dt_i}{dT_f}$, could help us to see how many players they are hiring.

8 Discussion

In the following part of the discussion, we will address four subsections. First part, we attend to see the limitations of our model. Our assumptions from the model, which if relaxed, might have produced various types of results. The three next subsections will address labor market, wage and competition. We will attend to make a logical basis from our reviewing literature to undertake our assumptions and predictions.

8.1 Limitations of the model

First of all, the model we have explained is a fixed model, which the models parameters are also fixed, such as ε . Consider the example by that wage of the domestic players are going to increase, but we were expecting that their wage would decrease post-Brexit, due to the ability to hire domestic players would be easier. Why does our model fail to produce that? Is this a limitation of the model? Or is our proposition not right? From the model it's nearly impossible to get an outcome that's an one-line answer. Why our model can't produce the results we conjecture or hope for, could be a result of the inherent assumptions, which might have driven our result.

Moreover our model only consider that all the players are employed. In reality, the demand for club could be constrained, and supply of players could be much more that this constraint. For example: Liverpool can hire four players, that is the constrained for foreign players, but the supply of players that are provides is much larger than four players. However this could lead to more unemployment of domestic players. The model doesn't concern these unemployment domestic players that's not might get hired by clubs in EPL, but rather gets hired by foreign clubs (or taking up other professions). The second, we also assume that domestic players (and foreign players) are homogenous, when they are heterogenous with their different talent and ability. Hence, also the market-clearing competitive pricing. These two assumption together will lead to the same wage for all domestic players.

Supposing that these two assumptions (for example, markets may not necessarily clear, and players are heterogeneous with differing abilities) there's a possibility that only a fraction of the players would be recruited. In addition, some cutoff in terms of ability during the no recruitment of players for a club. As for post-Brexit, we can expect that the cutoff will decrease, as more domestic players would be recruited. When it comes to the average wage, what's going to happen? For new recruitments that haven't been recruited before, will therefore have a lower ability. Further, there will be two effects pulling against each other. The first, is from the higher demand that will be pulling up the wage and the second from a recruited players with lower ability that will pull down the wage. The combination of these two effects can either be positive or negative effect. Wherefore, the average wage can either increase or decrease, depending on other parameters of the model. According to our model these effects can't be explored. In which, this is a limitation of our model.

In a wider and more complex version of this model we could possibly mention different types of players, both in the foreign and domestic players groups. We assume that all foreign players are homogenic, and all domestic players are homogenic. Due to our reasoning that the clubs in the EPL would try to sign the best foreign players. We presume that these players have higher abilities than the domestic players. One way we could modify our model could have been to split the groups of foreign and domestic players into top players and regular players in both segments. Thus, we probably would see a bigger change after Brexit, with a reduction in foreign regular players.

During the work of our model we assume that clubs were profit maximizers. Hence, this is only a limitation of the model if some clubs are not profit maximizers. If we consider this as a limitation of the model, yet all the result from the derived calculation from our current model will fall apart. In which, this we don't know, if the clubs are either profit or win maximizers. However, in the literature there are studies which conduct some other assumption regarding the club's objectives, such as in *The economic Theory of Professional Team sport* by Stefan Késenne that concern a win maximization for club instead of a profit maximization club (Késenne, 2007).

If a club focus on being win maximizers, they necessarily do not focus on keeping their costs low. They would probably buy more of the best players to win trophies, rather than developing players over time, to make quick success. Most clubs probably have a combination of win maximization and profit maximization. Another way to see this is the connection between profit and winning. In most leagues and tournaments there are prize rewards for league positions and tournament results, this would mean that for clubs that seeks win maximization there would probably be possible to increase profit as well.

The last limitation we will discuss is that the model is the assumption that the market are competitive and the clubs are taking their decision to recruit (new) players based on the price (wage) of the players. If we had used a more realistic model for the analysis part, it would be more of imperfect competition, in which club's recruitment strategy would also be conditional on other club's recruitment strategy, a not only on price. To construct and analysis a model would be quite ambition but extremely complex. Thus, we decide not to pursue it because of the complexity. Doing this "simplicity" to answer our research question, we find out which variables we want to study. Further, building the model that only captures the forces that are relevant to study the variables. Therefore, our model only undertakes the question of wage for foreign and domestic players pre-Brexit and post-Brexit. Wherefore, the model we build, which answer our question in a minimalistic way.

8.2 Labor market

To analyze the labor market, we need to take a closer look on who is in the labor market, and who will be in the labor market post Brexit. Addressed in (Halpert, 2020), the

“New immigration system that introduce a points-based system that requires applicants from EU and non-EU countries have an offer for a high skilled job, English skills and a high salary or level of education. The ramifications of these post-Brexit immigration laws could be disastrous for the EPL” (Halpert, 2020).

However, under the Freedom of Movement rules, EU citizens where allowed to move between the other EU countries to seek for jobs etc. With the Freedom of Movement rules there are an open door for elite European players to provide a key labor supply to EPL clubs and elevate the EPL. Different parts of the world and different parts of a country will give different access to labor. Therefore, post-Brexit we could see a change in access of labor for clubs in EPL, due to the Freedom of Movement rule (Andreassen, Bredesen, & Thøgersen, 2017).

Another approach on how the labor market may change, is that the EPL could be less attractive for foreign players. With the working licenses included, the price of the players may increase, and this could possibly mean that the players no longer can demand wages as high as before. At the same time, the pound is weaker than before and players would want higher wages to be on the same level as in other leagues. In BBCs article from 2018 on what effect Brexit could have on football transfers, Stoke City chairman Peter Coates said;

“We’re all keen to get something that works pretty much as the way it does now, but we can’t be confident about it” (BBC, 2018).

We could assume that most clubs would feel this way, and from the clubs perspective, they would want a solution that doesn’t change the labor market drastically (BBC, 2018).

When clubs in EPL will struggle to sign foreign players, and could choose younger domestic players to fill their squad. The current regulation, Article 19 of the FIFA Regulations the Status and Transfer of Players, “*allow the transfers of minor between the age 16 and 18 within the EU or EEA*” (Messer, 2018). With a Brexit, this article 19 would no longer apply for EPL and the league would suffer from the loss of up-and-coming football stars (Messer, 2018) (Halpert, 2020).

Therefore, it will be hard for young talents from other EU countries to be prioritize or hard to transfer for the EPL clubs, due to the price and international experience needed for the working license. Players such as N’golo Kanté and Riyad Mahrez would not have been part of the title winning Leicester City side that won the EPL in 2016 if this was the case at this point. This would also mean that the clubs would choose to hire less EU players, rather than giving them lower wages. Fewer EU players would be considered top players, and these could demand higher wage to play for the best clubs in EPL (BBC, 2018).

8.3 Wage

From the book *“Money and soccer”* by Stefan Szymanski, he addresses that for the last 20 seasons, the team who spend most money on player salary won EPL nine out of twenty times. He mentions that Blackburn Rovers who won in 93/94 season used the fourth-highest wage bill and no team since then have won by paying less, such as Manchester City that has won the EPL the last couple of years. In most countries, the teams paying the highest wages usually win the league (Szymanski, 2015).

Sculthorpe (2018) address in his article that *“experts have suggested a no deal Brexit in March could see a fresh fall in the pound”* (Sculthorpe, 2018). Since the vote of Brexit in June 2016, the pound has plunged in value. So, when Brexit was a fact, the pound fell immediately, and the value dropped. With a weaker pound, British clubs need to pay more for a given currency. As a result, EPL players moved their wages aboard to protect it against the weak pound. By sending their wages back to their home country or buying assets overseas, they ensure that their wage will keep its values (Sculthorpe, 2018).

McMahon (2016) undertakes the value of the pound, like Sculthorpe (2018), would drop by cause of Brexit. He also undertakes that foreign players regularly take their wages overseas. They will immediately experience that the pound will be less worth converted to a given currency (McMahon, 2016).

As Stoke City counterpart, Peter Coates undertakes, a decreasing in pounds means that *“players are getting less money”* (BBC, 2018). Therefore, the clubs need to pay their player more in wages. Further, he also claims that Brexit had already made it hard to sign players. Wherefore when the value of pound has decreased clubs need to spend more money to sign new players.

However, Crystal Palace chairman, Steve Parish consider that signing non-EU players will be easier post-Brexit due to the competition will increase and will therefore reduce the transfer fees and wages. He said:

“When we open up to talent from all over the world, we’ll gain access to thousands of more players and that will down the cost of the acquisition of the talent and could drive down wages” (BBC, 2018).

In addition, clubs in EPL need to pay more wage for the players they want, but also to sign them for strengthen their positions and to maintain competitive in the league.

Post-Brexit EPL would potentially be facing challenges about the ability to attract and develop foreign players. As we see in the table of (Perry & Steenson, 2019), the working license for players is given by their international appearance or the buying club’s in terms of wages offered or feed paid (Moore, 2020). Further, clubs offer good wages to players with the quality and ability that its need for the team. Each club in EPL would seek for the best foreign and domestic players across Europe (and the world) for staying competitive in both continental and domestic leagues and competitions (LatitudeLaw, 2020).

Therefore, in this section we attend to explain which wage the club need to offer different player in different segments, by using KEA (2013) framework (Affairs et al., 2013).

Using the framework of different level of market would give us a pin point of which salary is offered to different players, a pre-Brexit to a post-Brexit situation.

The higher primary market emphasizes the elite or star players. From a pre-Brexit to a post-Brexit situation, these types of players will still expect to receive the highest salary.

Like addressed in the article of Ahmed et. al. in Financial Times: Home secretary Priti Patel, unveiled a controversial immigration system aimed at reducing the number of low-skilled workers from EU countries, setting a salary threshold of £25,600. Players in EPL are among the top earners in the country, a post-Brexit, foreign players from EU can expect to be treated the same as stars from other parts of the world. In addition, they will maintain their strong negotiation power by reason of that the clubs are dependent of the star players quality and ability for increasing their winning percentage. They would also need to pay salaries at the same level as other European top clubs to be attractive for these types of players (Ahmed, Burn-Murdock, & Mngqosini, 2020).

In the lower primary market, we can assume that domestic players are getting more attractive than foreign players, by cause of the cost of the free movement a working license etc. Ahmed et. al. conduct of a lack agreement between the EPL and the FA would lead to issues for many top clubs concerning to satisfy the immigration rules with working licensee. Therefore, it will force the clubs in EPL to develop more local talent, rather to get young foreign talents and developing them. Further, they conduct that these changes could have unintended consequences on players such as Jack Grealish (Aston Villa) and James Maddison (Leicester City), but the football industry executives believe that under such conditions that these domestic players would become bigger targets for the Big Six clubs. Assuming from this article. The attention around domestic players will increase, gives them more attraction and would gain more negotiation power (Ahmed et al., 2020).

The last market, secondary market contains the average players that don't have much negotiation power. As in the previous section mention such as international appearance, working license and such. Hence, we can assume foreign players in this market will not be prioritized by reason of the financial regarding for example working license. In consideration, average domestic players could get higher salary because they are attractive and the demand for them are increasing. Some young talents in this group can probably get more attractive to English club and get more game time at their club due to Brexit.

8.4 Competition

Analysis of the football industry barely existed ten years ago. With the development of the internet, and a bigger desire to work on this area of sports, the amount of these analyses has exploded the past decade. Analytics of football is a part of the “big data” revolution, probably for two reasons. The first one is the ability to collect and record a large number of data digitally. The second one is the ability to process this data on way more powerful computers than we had before the last decade, the mathematics can be applicate on a vaster scale to be more complex than before (Szymanski, 2019).

Statistical modeling in football has a history of analyzing results. These models were developed, formed and tested to predict outcomes of matches, tournaments and seasons. These statistical models were benchmarked against bookmakers odds. In the past models like these were restrained by the lack of availability of data, and the lack of ability to process it. The exception was in football prediction, these worked quite well. The difference here is that football has a relatively stable entity, at least over short time periods. According to Szymanski, football teams are in general fairly stable over a ten game period, but on periods longer than this it's harder to predict the outcome (Szymanski, 2019).

As long as analytics have tried to outrun bookmakers in football predictions, we now face a new challenge as Brexit makes its entrance. To predict the outcome of this case there's some aspects that is useful to focus on. Theories can help us to identify causal effects, if only big data is approached there may be a risk of only discovering correlations, but theory can show us the big picture. It's hard to test causal effects in football analytics, as we can use controlled experiments in natural science. Most football analytics has a financial profit aspect to it, as it is linked to bookmakers, this leads to results that are announced due to the given profit, but they are rarely explained. But in the end, football analytics are mainly judged by its capacity to predict future outcomes.

As mentioned in our theory part, the football market can be seen as kind of an oligopoly. Consider a possible reduction of players in the talent pool of foreign players, we could say there would be less talents available for the clubs in EPL. We could then assume that the competition for the available players would be higher than before, because there's fewer players that would be focused on by the clubs. The top clubs would probably compete for top foreign players, but rather choose regular domestic players to fill their squads. This could

mean that regular clubs in the EPL could sign better foreign players, that would not be chosen by the top clubs anymore. The quality of all clubs in EPL could possibly be more similar after this, and the competition would increase due to this. This is unclear though. We could also think the smaller clubs still couldn't sign these players due to higher transfer fees. This would have opposite effect on the competition than our last assumption, and there would be a bigger difference between the top clubs and the smaller clubs (BBC, 2018).

Peter Coates also expresses his worries on this in the BBC article from 2018 and said:

“The big clubs might be less affected because they tend to buy at the top end, the very established best players and they meet the criteria, but we don't know, for us to sign a 19-year-old hot prospect from Peru is almost impossible so we are driven towards the EU market, if we had access to global talent it would reduce our costs of acquisition of talent and improve the quality of talent we can get” (BBC, 2018).

A last one to express his worries on how the gap between top clubs and regular clubs in the EPL could get bigger is Daniel Halpert. In his article in Brown Political Review he asserts that post-Brexit immigrations rules will cut into the inelastic labor supply, and lower the overall quality of the league. Teams will lose a key market to recruit new players, and as most of the best domestic players already play in the EPL, we could see more of these move to the better teams. The smaller clubs fear that they no longer can turn to the EU market to recruit, and need to look to lower divisions instead. They would also need to invest more in training academies to find young, domestic talents. But this could still not justify for the loss of EU players (Halpert, 2020).

9 Conclusion

In this thesis we have tried our best to examine how Brexit possibly could affect the EPL. To give the best solutions on this, we tried to answer the three following questions,

1. How will the labor market for players change in EPL after Brexit?
2. How would the wage determination of player change after Brexit?
3. How will the competition between clubs be affected after Brexit?

As we developed and interpreted the model, the result showed some changes from pre-Brexit to post-Brexit. There are several points to pin out. But the two most interesting changes are the change in wages, and the change in foreign player pool.

In a real-world event, change in wages for both foreign and domestic players are authentic. As of the result of the negative relationship between the size of the foreign player pool and wages of both foreign and domestic players, we can assume that their wages will increase. With an assumption of fewer foreign players signed, the competition for the best players will be higher and we could expect these to demand higher wages. The domestic players would also demand higher wages, as the competition for the best of these also probably will be higher than before because the top clubs switch some of their foreign players with better domestic players from the other smaller clubs.

The model that was developed doesn't give the exact number of reduction in the foreign player pool. The conjecture surrounding the difficulty to sign foreign players due to the working license also point out that the foreign player pool would reduce in a real-world event. Based on today's situation around getting players outside the EU and the EEA, requires a working license. Therefore, we could presume that this will be needed for all players outside the UK post-Brexit.

The model conducts how wages are affected by changes in the total number of foreign players, but doesn't undertake how the change in the number of domestic players could change the wage. If the model had showed this relationship, a better prediction on how the number of foreign players in respect to domestic players would be hired, could be presented.

Since the Big Six Clubs have strongly amount of resources, the competition within EPL would more or less remain the same, pre-Brexit to post-Brexit. The top clubs would still probably attract the best players, and smaller clubs would still struggle to keep their best players from transferring to the top clubs. Another approach to this is how the English clubs would compete against clubs from other leagues in Europe. If the quality of English clubs gets poorer, they may struggle to compete in the Champions League and Europa League.

However, as mentioned, there are some limitations of the model. First of all, the model is a fixed model, where all the foreign players are valued equally by talent and ability, and so for the domestic players. In real-world, it would be a distinguish between talents, abilities and quality of players. Otherwise, it only concern that all players are employed and clubs are only profit-maximizers. Therefore, the model doesn't represent a realistic picture and it could be hard to put the model directly into the real-world. Furthermore, an agreement of Brexit is still not finalized, the conjecture and predictions could be inaccurate. By implementing other variables that possible could be affected by Brexit, the model would probably be more accurate. In which, also give a more realistic picture of EPL post-Brexit.

With the income that EPL generates annually, and the popularity it has all over the world, we find it hard to believe that we will see any big changes from how it looks today. As mentioned, we made contact with Stefan Szymanski and he told us that he also believes Brexit probably won't have that big of impact and effect on EPL (Szymanski, 2020).. That's in accordance with the prediction we thought.

10 Further research

In this section of our thesis we will discuss other factors that will be affected by Brexit. Some of them we don't have much knowledge of or we just make some conjecture. By suggesting some other options, it could give a bigger specter of the effect of Brexit.

Since we started working on our thesis, the negotiations between EU and UK has been delayed due to the situation around Covid-19. When an agreement between the EU and the UK the prediction of different scenarios could be more precisely. Such as, signing a player under 18, Brexit in lower divisions and the effect on the national team.

As a result of the restriction of free movement, clubs will have difficulties to hire young talents under 18. Therefore, it could be interesting to measure the effect of young talents pre-Brexit and post-Brexit.

EPL is a league with much power, influence and money, they would not be that affected by Brexit as lower divisions. Compared to the other leagues in Europe, EPL has the highest amount of the richest clubs. We could then think that they still have a possibility to compete against other top clubs in Europe, both in quality and financially.

When Brexit is more implemented, there's a possibility to raise the standard of play in England, Scotland, Wales and Northern Ireland. Thus, the discussion concerning how the national team is going to perform with fewer foreign players has been a topic. So, either under UEFA European Championship or FIFA World Cup, they can measure the national team performance by seeing how far they are getting in the tournaments or the players level. With less foreign players in the league, we could assume that more domestic players would play at higher levels at younger age. This could possibly strengthen the national team.

As for now, our model is a very simplified model and conduct only few variables on the effect of Brexit on football. Therefore, the possibility to conduct other variables to the model, such as transfer fees, ticket prices, advertisements, sponsorships etc. To carry out another result. It's interesting to study if these other variables are going to impact football from pre-Brexit to post-Brexit. In such, to find the impacts of these variables it's possible to include them in either the revenue or cost function, and even in the profit function.

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