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1.0 Introduction

With the publication of Moneyball in 2003, it really captured the attention of an international audience and raised questions regarding the use of player performance data for player valuation and recruitment in sports. Michael Lewis book tells the story about Billy Bean and the baseball club Oakland Athletics ability in sustaining a competitive advantage eight years in a row, despite being one of the teams with lowest wage expenditures. This new rational of player recruitment in baseball got other sports industries more engaged in sports analytics to help sporting decisions. In all the book and the later released movie contributed with raising general awareness around decision making in sports, enabling the abundance of performance data especially in football.

As football being one of the most watched sports in the world, capturing the hearts and minds of million fans across the globe. It is naturally, due to the huge amounts of capital involved in player acquisition, to wonder how the business of the industry is being conducted. The football industry in recent years has experienced a profound growth in revenues and is still continuing to grow to this day, especially in England. Since the formation of the English premier league in 1992, revenues in terms of broadcasting rights throughout the world has been flourishing, alongside with substantial investments in clubs (Sloane, The Economics of Professional Football Revisited 2015). Competing in top European cups such as UEFA Champions League has evolved to become a crucial aspect for club's financial success, and so reflected in increase transfer fee and wage records within the industry.

Between Alan shearer GBP 15 million transfer record to Newcastle in 1996 and Manchester United GBP 89 million record acquisition of Paul Pogba this summer, illustrates some of the eagerness to maximize team performance to reap the financial rewards that football has to offer. In fact, the the total spending by the top five leagues has only increased since 2012, even though the capital spent in player acquisition can be explained by the inflation in player's market value, due to commercializing of football. As the report from FIFA TMS shows, the summer transfer window comprised of 7,325 international transfers, with a global spending amounting to USD 3.72 billion (FIFATMS 2016). The current market depicts a higher activity level then ever before, whilst the prices of players have

sky rocketed. Given the availability in detailed player information such as performance data, transfer fees and wages makes football an interesting market to investigate various economic theories. (Frick 2007). With applying more advanced performance metrics we would, essentially we want to investigate how football players are valued and which factor that determine the prices, as they are the biggest value drivers of the club.

2.0 Research question

In relevance of the introduction our research question is as following;

“Is the European transfer market for football efficient, and what determine transfer fees in football?”

3.0 Literature Review

The literature and research published in relation to the economics of sports is nothing of news, since they can be dated all the way back to around the late 1960's. Whilst these studies were few in relation to sports in general, it has recently flourished especially in football (Sloane, 2015). The scholars of earlier studies conducted in the late 90's seem to agree on one thing, that the determination of transfer fees could make better use of advanced player performance metrics. The assumption Sloane made in relation to the football club being a utility maximizer, seem also to be broadly accepted and used amongst scholars as well. An interesting aspect is how scholars sates in their conclusion how it will be interesting to repeat their analysis in future years (Fiona Carmichael 1999), suggesting that field of study has been on standby until recent years. Starting with Sloane's study regarding the behavior of the club, we below will present a review of literature in relevance to our research area.

Sloane (1969) discusses the extent North American team sports models fits in the European team sports. In attempt to classify the primary business activity of football clubs, he analyses the behavior of English football clubs. Challenging Rottenberg's suggestion that football clubs are profit maximizers since he saw no reason to threat professional sports leagues different from conventional business firms, hence the assumption of sports clubs being profit maximizing. Sloane argues

that perhaps that the assumption of profit maximization behavior is an unfitting, based on the fact that clubs operated in losses while having limits on payment of fees to directors and dividends to shareholder. He argues that clubs are utility maximizers with a financial constraint, and the utility function having two arguments; team performance and club profits.

Gerrard (1999) developed a model estimating player transfer fees in the English premier league. The was based on the TP-CP model derived from Sloane's assumption. With the foundation of 1350 transfer fees between the time period of June 1990 and August 1996, his model observers that the prices are mainly reflected by Player characteristics, selling-club characteristics, buying club characteristics and time effects. As the result the model showed that these factors explains 79 % percent of the variations in real transfer fees. By also using the model to examine the inflation rate in the market, he concludes that statically the market is highly rational.

Gerrard (2007) analyses the transferability of Billy Bean and Oakland Athletic success in sustaining a competitive advantage in baseball, over to the more dynamic and complex team sport. In this analysis he identifies and discusses the issue with three main measurement problems in relation to copying the success of Oakland A's. This ultimately being the conceptual, technological and cultural barriers. Concluding that the two first mentioned issues are difficult but manageable, he emphasizes that the cultural barrier is the most enduring challenge.

Leach and Szymanski (2015) reviews and challenges the generally adopted assumption that European football clubs are not profit maximizing. Their study examines the performance of 16 English football clubs that acquired a stock exchange listing in the mid 90s, and tracked the behavior of these clubs. Advocating that since the companies where listed in stock exchange their behavior should have moved towards profit maximizing behavior if Sloane's assumption were to hold. The study depicted no change after the listing, and they concluded that the result is more consistent with assumption that clubs are perhaps more profit maximizing then assumed.

Even though the increase in literature in recent years' scholars still haven't found an answer to the puzzle, in relation to the peculiarities of the economics of football.

As we have seen going through studies that has been playing vital role has started to be revised. Still the assumption of clubs being utility maximizers still carries a major influence on the this particular of study field, and as Sloane and several other scholars suggest, the economics of sport has now only started to flourish. (Sloane, 2015).

4.0 Theory & Methodology

In regards to the theories applicable to our field of research, we find at this point of time that *the market efficiency hypothesis* will be the one with most influence. We will in more detail also look at theories in relation to managerial decision making, law of one price and behavioral finance. However, at this time we have not managed to properly sink our teeth into these theories.

The theory states that in a efficient capital market prices should fully reflect available information (Fama 1970). The empirical work conducted can be divided into three categories; *strong-form*, *semi-strong* and *weak form*. First, weak form test if the information is considered at all, hence the it implies that it should reflect all market information. Secondly, semi-strong form test if the prices adjust in terms of other information, hence it should reflect publicly available information such as historical performance. Finally, *strong-form* test if investors have monopolistic access to any information, in other terms prices should reflect all information to obtain this degree of market efficiency.

The multidimensional relationship between off field and on field success as an intriguing aspect to consider in relation to expenditure in wages and transfer fees. Our plan for testing the application of this theory in the transfer market of football involves some extensive work. This is mainly to avoid any measurement barriers, due to the complexity of assigning individual player contribution in a dynamic team sport. first we will conduct investigation on the relationship between individual player performance metrics and the uncertainty outcome of the match. This will be done through multiple regression analysis, by assigning player ratings based on the individual performance. We will try to apply advance metrics such as Expected goals and Peaking-Rate which are proven to be better

metrics in relation to both goal scoring and match outcomes, then statistics such as historical goals. Progressing further, we will be dividing the positions into the following sections: Defenders (center backs, left backs, right backs) midfielders (central, defensive, attacking), Wingers (LM, LW, RM, RW) and strikers. After assigning player ratings with respect to their position, the next step would be a benchmark valuation of these players.

The assumed close linkage between high expenditure, team performance and the club's financial success, is an interesting topic especially when the uncertainty outcome of affecting team performance. After investigating the transfer fees purely based performance, we will continue extend the model with variables such as buying club size and selling club size from (Dobson 1999), in order to reconstruct the work to see if we can get a better explanatory power with the new performance data. From her we will compare the transfer fees regressed with market value to observe if players are over/under-priced, and conclude.

5.0 Data Collection

By contacting OPTA, which is the world's leading sports data provider, they agreed to help us get performance data that need. Having maintained contacted with them during the previous semester, we have arranged a meeting that will take palce in the near future with a representative from OPTA Norway. At this meeting we will discuss in detail what they can do for us in relation to data. Data in relation to transfer fees will we find at Tranfermarkt.com.

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