

Louvain School of Management

The Impact of Stadium Renaming on the Expected and Realized Sporting Performance of European Football Clubs

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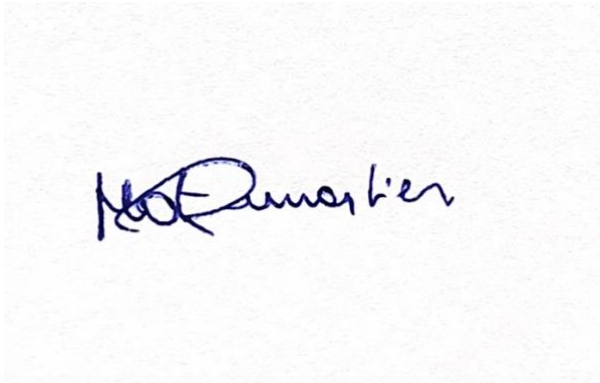
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1. Introduction

Over the past three decades, professional football in Europe has undergone a profound transformation. Clubs have progressively evolved from sporting associations deeply anchored in a community into complex commercial organizations operating within a highly competitive global market (Rohde & Breuer, 2016). One of the most visible manifestations of this commercialization process is the increasing prevalence of stadium naming rights agreements, whereby clubs sell the right to attach a corporate sponsor's name to their home ground in exchange for substantial financial returns (Mozzillo & Amatucci, 2024). They are also sometimes part of a sponsoring package, for example Spotify, which paid FC Barcelona around 65 million euros for an annual deal including the presence of their logo on the team's shirt, and an additional 20 million euros solely for the stadium sponsorship (Carp, 2025).

Beyond their financial dimension, stadiums act as a physical and symbolic space and occupy a unique position in the culture of football. For supporters, the stadium represents far more than a venue for athletic competition: it is a site of collective identity, shared memory, and community belonging (Delassus & Descotes, 2018). The decision to rename such a space after a corporate entity therefore introduces a fundamental tension between the financial imperatives of modern football and the preservation of the emotional and cultural bonds that define supporter relationships with their clubs. It must however be considered that our study focuses on venues that were originally named traditionally and were later renamed after a brand, having previously been named differently, usually after an important personality or landmark. Two exceptions to this commercial logic are Napoli and Ajax. For those two clubs the stadium was renamed after a club legend rather than a corporate sponsor. These commemorative cases are retained in the sample and analyzed separately as a robustness check to compare commercial and symbolic renaming. The venues of our analysis therefore differ from venues that were recently built and directly associated with a commercial name. The latter is, for example, the case of the Emirates Stadium, built for Arsenal in 2006, which immediately received its commercial name upon its inauguration and was not preceded by a traditional name as the airline had already bought the naming rights in 2004 during the construction of the stadium (*Emirates Stadium History | Everything You Need to Know*, n.d.).

This tension is compounded by a concern about short-termism. Commercial naming rights agreements generate immediate financial revenues, but they may do so at the expense of

the long-term intangible assets that contribute to the club's competitive position. Supporters who feel that their club is drifting toward a purely transactional relationship may gradually disengage, reducing the atmospheric and reputational advantages that historically loyal fanbases confer (Ronald & Damiano, 2019). Since supporter loyalty is itself a driver of sporting performance through ticket revenues, home advantage, and the strength of the club's brand on the transfer market, a strategy that prioritizes short-run financial gains over the preservation of tradition may ultimately be counterproductive. Whether this risk materializes in practice is one of the empirical questions this thesis seeks to address. We therefore formulate our research question as follows:

Does stadium renaming have a positive or negative impact on the expected and realized sporting performance of European professional football clubs?

To address this question, the empirical analysis relies on a panel dataset covering nine European football clubs from six different national leagues over the period 2007 to 2024. The choice to stop our study at the end of 2024 has been made to ensure data completeness and consistency across all clubs and leagues, avoiding the inclusion of seasons for which match-level data were not yet fully available. The clubs selected all underwent at least one stadium renaming event during this period, allowing for a quasi-experimental comparison of pre- and post-renaming outcomes. Match-level data are drawn from football-data.co.uk (n.d.) and expected sporting performance is proxied by betting odds provided by Bet365, a source recognized for its efficiency in aggregating publicly available information about team quality. Bet365 is a global betting brand that was created in 2000. It has around 10,000 employees and more than 100 million customers worldwide. It is a licensed bookmaker regulated by the Malta Gaming Authority (Owen, n.d.).

The choice of betting odds as a proxy for expected performance is motivated by a well-established literature on the informational efficiency of prediction markets. Bookmaker odds represent a continuous, market-based measure of perceived team quality that incorporates a wide range of publicly available information including financial capacity, squad strength, managerial quality, and recent form. It must be considered however that each bookmaker assigns its own odds and keeps a profit margin to be able to continue its activities. As such,

they provide a more comprehensive and objective measure of expected performance than alternative proxies such as league position or points accumulated over a given window.

To answer our research question, our empirical study relies on a Poisson Pseudo-Maximum Likelihood (PPML) estimator with multi-dimensional fixed effects, controlling for unobserved heterogeneity at the level of the home team, away team, league, and year. For our analysis we have decided to build four models. While the first one focuses on the impact of renaming on bookmaker expectations, the second one assesses the impact of renaming on actual match outcomes. Finally, the third and fourth ones focus on goal-level outcomes.

Beyond its academic contribution, this thesis aims to provide insights relevant to decision-makers in professional football clubs. As clubs increasingly turn to stadium naming rights as a source of alternative revenue, understanding the full consequences of such agreements in terms of sporting performance is essential. The findings of this analysis may help inform the trade-offs faced by club management when evaluating whether the financial gains associated with naming rights justify any potential negative externalities.

The results of our analysis provide limited evidence that stadium renaming affects sporting performance. This is because the results of our models lead to coefficients that are not statistically significant. It suggests then that stadium renaming does not systematically influence either bookmakers' expectations or realized sporting outcomes. However, the commemorative renamings of Ajax and Napoli show some different patterns. It may indicate that symbolic renamings may have different implications from purely commercial naming-rights agreements.

The remainder of this thesis is structured as follows. Section 2 explores the academic literature relevant to our research question and formulates the hypotheses derived from this exploration. Section 3 describes the data and econometric methodology employed. Section 4 presents and interprets the empirical results. Section 5 provides an overall conclusion and discusses the limitations of the analysis, its contribution to the literature, and its impact on the football industry and on society overall. It also discusses the avenues for future research, and finally a bibliography concludes the document.

2. Literature Review

The academic literature relevant to our analysis covers three different angles. It first covers the sociological and economic aspects of football clubs which are important to understand the club's values and its cultural heritage. It then examines the economic aspects of stadium naming rights and football sponsorship, and finally the econometric work that is related to the statistical methodology used for our quantitative analysis of performances thanks to panel data. Those angles are covered in the following subsections.

2.1 Stadium Naming Rights and Club Identity

2.1.1 Club Identity and Fan Attachment

Football clubs are similar to conventional commercial organizations as the fans fulfill the role of the customers; a significant portion of a club's value is indeed produced by supporters through their active participation in the sporting experience. Bull & Whittam (2020) argue that fans play a central role in value creation within football organizations and should therefore be considered as an important barometer of whether clubs create value through their strategic decisions. This suggests that football fans are very important for a football club, and that without a solid fan base a club could not remain at the top level in a sustainable manner.

The relationship between a club and its supporters is deeply tied to questions of identity. Delassus & Descotes (2018) demonstrate that being a supporter of a football club forms part of an individual's social identity. This identity is expressed through several symbolic elements such as the club's colors, emblem, stadium and atmosphere. Because of this strong attachment, certain strategic decisions taken by club management such as stadium renaming can be perceived by supporters as a threat to the club's identity. This may lead to resistance from fans and impact the club with, for example, smaller stadium attendance or a general loss of interest towards the club. Abosag et al. (2012) also underline that European football clubs are characterized by a strong territorial anchoring. Unlike North American sports franchises which can relocate geographically, European football clubs are closely associated with a specific city or region. As a result, supporters often perceive their clubs less as commercial brands and more as social institutions embedded in a local community. This strong emotional attachment can make supporters reluctant to accept strategies that appear excessively commercial.

2.1.2 Commercialization and Naming Rights

The commercialization of football has led clubs to seek additional revenue streams, among which the sale of stadium naming rights has become increasingly prominent. Naming rights agreements, multi-year contracts granting a corporate sponsor the right to attach its name to the stadium in exchange for financial compensation, were first introduced in North American sports in the early 1970s and spread to European football from the late 1990s onward (Mozzillo & Amatucci, 2024). Huth (2018) identifies the primary motivation for clubs as the generation of additional revenues linked to stadium infrastructure, which can in turn be reinvested in squad quality and competitive capacity within an increasingly commercialized football environment.

Even if they bring additional revenues and may seem to be a positive initiative, naming rights agreements may lead to negative consequences in the relationship between the fans and their clubs. Those consequences are explained in the following subsection of the Literature Review.

2.1.3 Tensions and Fan Resistance

Despite their financial rationality, naming rights agreements are not without controversy. Huth (2018) notes that the renaming of stadiums can give supporters the impression that they are being treated primarily as consumers rather than as members of a community defined by shared traditions. Gillooly et al. (2020) show that fan reactions to corporate stadium names are highly context-dependent: while some supporters have organized protests, others are more accepting when the sponsoring brand is perceived as compatible with the club's values. Ronald & Damiano (2019) further argue that excessive commercialization can gradually erode the emotional bond between clubs and supporters over the long term. And therefore, the short-term financial benefits might not compensate for the deterioration of the relationship the club has with its fans in the long term. They suggest that clubs should try to find a balance between financial strategies and preservation of supporter loyalty.

The impact of this resistance from fans also has consequences on the brand of the clubs. This is why the following subsection focuses on what constitutes the value of a football club as a brand and what could deteriorate its DNA and traditions.

2.1.4 Brand Equity and Tradition

The literature on sports brand equity provides an additional perspective on the potential consequences of stadium renaming. Blumrodt (2014) emphasizes that tradition and historical identity are central components of football club brand equity and can influence supporter behavior, including stadium attendance. Yousaf & Gupta (2013) propose a fan-based brand equity pyramid comprising behavioral loyalty, attitudinal attachment, sense of community, fan engagement, and social responsibility. These dimensions suggest that any commercial strategy perceived as threatening the club's identity may have measurable consequences for the fan-club relationship and, by extension, for the club's commercial and sporting performance.

The following subsection explores the link between clubs' financial means and sporting performance. It is interesting to have a look at this subject as naming rights agreements, as seen above, generate revenues for football clubs.

2.1.5 Financial Resources and Sporting Performance

A substantial body of literature confirms the positive relationship between financial resources and sporting performance in professional football. Matesanz et al. (2018) find correlation coefficients between 0.42 and 0.52 between net transfer spending and UEFA points, rising to between 0.80 and 0.95 for UEFA competition results specifically. This means that the correlation is very high between transfer spending and results in the UEFA competitions. Rohde & Breuer (2016) further document, through Deloitte's Football Money League ranking, the association between investment capacity and competitive success. The Deloitte ranking is an annual report that ranks the 20 football clubs that generate the most revenues through their direct activity. Leksowski (2021) nuances this relationship by showing that financially dominant clubs do not systematically win every match, suggesting that while financial resources are a key determinant of performance, they do not guarantee outcomes at the individual game level, and outcomes often depend on how efficiently those resources are spent.

2.1.6 Betting odds as an indicator of implied probabilities for match outcomes

As our data relies on betting odds as an indicator of probability, it is interesting to examine the efficiency of these odds in predicting match outcomes. This is why we introduce a short literature section on this matter.

Betting odds are often seen as a reliable proxy for estimating the probability of a match outcome. It must, however, be considered that recent studies, such as that of Hegarty & Whelan

(2025) based on a large sample of European football games, found evidence of a favourite-longshot bias in the traditional betting odds market. This means that the implied probabilities for win outcomes are too low for favorites and too high for outsiders. In contrast, they found that the Asian handicap market, where betting odds are based on a goal deduction applied to the weaker team, is more reliable for predicting the implied probability of a match outcome. While the Asian handicap market appears more reliable for estimating implied probabilities, this does not necessarily make it more attractive from a betting perspective. Another study by Constantinou (2022) compared the profitability of Asian handicap and 1X2 bets over 13 English Premier League seasons. The results showed that traditional odds generate substantially higher profit and ROI for bettors than Asian handicap odds, but at the cost of considerably higher volatility. As a result, Asian handicap returns are subject to a lower risk of loss.

It must therefore be considered that, since our study relies on traditional market odds, the probabilities extracted from these odds may slightly overestimate the likelihood of outsider teams winning and, on the contrary, underestimate the frequency with which dominant teams win.

2.1.7 Home Advantage in Football

In this subsection we will discuss the home advantage, defined as the number of points won by the home team expressed as a percentage of all points obtained during the season (Chacón-Fernández et al., 2025). Pollard & Pollard (2005), as cited in Chacón-Fernández et al. (2025), have shown that the crowd plays a central role in the home advantage teams experience. One of the channels through which the crowd operates is referee decisions. Goumas (2014), as cited in Chacón-Fernández et al. (2025), found that in the Champions League, away teams have on average received 25% more yellow cards than home teams, and 10% more in the Europa League. A similar observation has been made regarding the average number of penalties granted in the Premier League, as home teams had an average of 0.1 penalty granted per game while it was only 0.05 for away teams. Studies reviewed by Chacón-Fernández et al. (2025) also observed that the advantage in referee decisions was dampened or almost disappeared during COVID-19, when matches were played without spectators, confirming that the crowd plays a central role in this phenomenon.

The home advantage is the main motivation behind our second hypothesis: as renaming might affect the attachment fans have towards their clubs, it could lead to a deterioration of the home advantage and therefore also of the sporting performances of the renamed teams when playing at home.

Peeters & van Ours (2021) show that stadium attendance as well as the use of an artificial pitch is associated with a greater home advantage. They also observed that the home advantage has declined over the past 45 years. This suggests therefore that the lower fan attachment towards their club due to the over-commercialization of football might have a limited effect on a team's home performances, as the home advantage has already been declining independently of naming rights agreements.

2.2 Empirical and Econometric Approaches

We will now turn to the econometric perspective of our field of study by reviewing the work that has been done with similar data and methodologies.

The analysis of clubs' performance over time could methodologically align with a panel data framework. Panel data combine observations from multiple clubs over multiple seasons. It allows us to track how each club evolves over time. Moreover, panel data contain richer information than cross-sectional or time-series data alone, and allow the researcher to control for unobserved, time-invariant heterogeneity across units of observation. The choice of estimator within the panel data setting depends on the nature of the dependent variable, whether it is independent or not, and on the statistical properties of the data. If this assumption holds, fixed effects or random effects models may be used in order to account for unobserved heterogeneity across units and over time (Kumar et al., 2021).

For count variables and non-negative outcomes, the Poisson Pseudo-Maximum Likelihood estimator has become increasingly standard in applied econometrics. Elisabeth & Verico (2022) highlight that the ordinary least squares (OLS) method applied to log-linear specifications requires the dropping of observations with zero values, a problem that does not arise under the Poisson Pseudo-Maximum Likelihood (PPML) estimator, which relies on a multiplicative functional form. Kumar et al. (2021) further note that PPML is robust to heteroskedasticity and tends to outperform log-linear alternatives when the proportion of zero

or near-zero observations is non-negligible. These properties make it particularly attractive for the present application, given the presence of zero-goal observations in the goals-scored specifications. Indeed, roughly 5 to 7% of the games end in a 0-0 draw (Editor, 2026).

In addition to estimator choice, the literature also discusses alternative methods for dealing with panel data. Some authors point out that ordinary least squares and panel-corrected standard errors (PCSE) can be used in panel settings, especially as robustness checks. However, these approaches may be less appropriate when correlation and contemporaneous correlation are present across panels (Polzin et al., 2015). In such cases, PCSE is often justified as a way to obtain more reliable standard error estimates in datasets combining cross-sectional and time-series dimensions.

Finally, the literature also highlights the relevance of lag structures in empirical models of strategic decisions, since the effects of interventions such as stadium renaming may materialize both immediately and with some delay (Polzin et al., 2015).

2.3. Hypotheses

The aim of this subsection is to determine which hypotheses can be tested in order to answer our research question empirically. Drawing on the literature reviewed above, three main hypotheses are formulated. These hypotheses are directly linked to the empirical models presented in the following section and structure the interpretation of the results.

The first hypothesis is the following:

H1: Teams that renamed their stadium tend to be perceived more positively by bookmakers with respect to their expected sporting performance, both at home and away.

This hypothesis follows from the financial channel identified in the literature with the work of Huth (2018): naming rights agreements generate additional revenues which, through investment in squad quality and infrastructure, may lead bookmakers to revise their assessment of a club's competitive strength upward.

The second hypothesis is formulated as follows:

H2: Stadium renaming is associated with divergent effects on home and away performance. Specifically, we expect renaming to be associated with (a) a reduction in home team performance due to diminished supporter attachment and atmosphere, and (b) an increase in away team performance as financial improvements dominate over the loss of home-ground advantage.

While the financial channel may improve realized performance in general, the commercialization of the stadium name may dampen the home advantage through its effect on supporter attachment and atmosphere. As Delassus & Descotes (2018) explained, it may reduce the overall attendance of the football stadiums. When playing away, however, the positive financial effect is expected to dominate, as stadium atmosphere plays a smaller role. Moreover, as Pollard & Pollard (2005) pointed out, the crowd pressure tends to lead to more favorable referee decisions for the home teams, a decline in stadium atmosphere following renaming could therefore also weaken this additional source of home advantage.

And finally, we formulate the last hypothesis as:

H3: Teams that entered into naming rights agreements tend to score more goals and concede fewer goals, reflecting an improvement in underlying sporting quality.

Additional financial resources generated through naming rights agreements may enable clubs to recruit stronger players, improving both offensive output and defensive solidity. This supposition is based on the work of Matesanz et al. and Rohde & Breuer (2018; 2016) who found a relationship between clubs' financial means and their sporting performances. This hypothesis is however tested through goal-level outcomes rather than binary match results.

We will now present in the following section the methodology employed to test our hypotheses and derive our results.

3. Methodology and Data

3.1 Sample Construction

The empirical analysis is based on a panel dataset covering nine European professional football clubs drawn from six national top-tier European leagues. The clubs were selected on the basis of two criteria: (i) the occurrence of at least one stadium renaming event over the study period from 2007 to 2024; and (ii) the availability of complete match-level betting odds data from Bet365 for all seasons in which the club participated in its national league during this period.

The nine clubs included in the sample are presented in Table 1 below, together with their country, national league, previous stadium name, new stadium name following the renaming event, and the year in which the renaming took place. We can observe that the sample is composed of clubs from different prestige levels as clubs like Manchester City or Juventus

usually go far in European competitions while Belgian clubs like Anderlecht and Genk or the Dutch club AZ Alkmaar only occasionally manage to dominate their domestic leagues. Moreover, the diversity in the countries analyzed reinforces the robustness of the study.

Table 1: Sample of Clubs and Stadium Renaming Events

Club	Country	League	Former Name	New Name	Date of Renaming
Manchester City	England	Premier League	City of Manchester St.	Etihad Stadium	08/07/2011
KRC Genk	Belgium	Pro League	Luminus Arena	Cegeka Arena	26/08/2021
RSC Anderlecht	Belgium	Pro League	C. Vanden Stock St.	Lotto Park	12/07/2019
Fenerbahçe	Turkey	Süper Lig	Ş. Saraçoğlu Stadium	Ülker Stadium	14/08/2015
Juventus	Italy	Serie A	Juventus Stadium	Allianz Stadium	01/07/2017
SSC Napoli	Italy	Serie A	Stadio San Paolo	Stadio D.A. Maradona	04/12/2020
Ajax Amsterdam	Netherlands	Eredivisie	Amsterdam ArenA	Johan Crujff ArenA	10/08/2018
O. Marseille	France	Ligue 1	Stade Vélodrome	Orange Vélodrome	02/10/2016
AZ Alkmaar	Netherlands	Eredivisie	DSB Stadion	AFAS Stadion	06/08/2010

It must be considered that not all renaming events in the sample correspond to commercial naming rights agreements. The renaming of Napoli's stadium in 2020 was decided by the Naples City Council as a tribute to Diego Armando Maradona following his death and does not involve a commercial sponsor. Similarly, the renaming of Ajax's stadium in 2018 honored the club's legendary former player and manager Johan Cruyff and was also non-commercial in nature. That is why when we run our model, we isolate those two cases as a robustness test to analyze whether they follow the same trend or whether their cases are different. We also must consider that Racing Genk and AZ Alkmaar already had a commercial name on their stadium before the date we have chosen to work on. This date was the date on which the name of today's stadium was implemented. We still wanted to include them as we thought fans would be attached to their previous names even though it was a sponsor, and we also thought that the clubs might have benefited from a better contract, therefore choosing to change sponsorship contracts.

Several considerations have also been taken into account in the selection of the nine clubs of our sample. The first consideration was to have diversity in the clubs, that is why we have chosen to pick clubs from different leagues and therefore not more than two clubs per league, even though more clubs could have been analyzed. The goal was to capture the effect of stadium renaming in different leagues that differ economically, as some leagues are more affluent than others. The financial weight the naming rights contract represents differs proportionally to the overall budget of the clubs from one league to the other. By doing so, we are able to analyze the effect of renaming in different environments. This therefore reinforces the robustness of our work thanks to the use of fixed effects.

Furthermore, the selection of our clubs has been done based on their historical dominance in their domestic leagues. We thought it would be more interesting to select clubs that are already powerful, as one could argue that the effect of a naming agreement is probably very positive with clubs with lower financial means, while we were trying to identify whether it was a good idea for traditional clubs that could face resistance from their fans.

We have also decided to exclude German clubs from our analysis. Despite the fact that Germany has experienced many naming agreements, most of those renamings took place in the early 2000s, which falls outside our study period of 2007 to 2024. They have therefore not been included in our sample.

The construction of our dataset was carried out by extracting the data in the form of Excel files from the website football-data.co.uk, a widely used open-access database providing historical match results and betting odds for a large number of European leagues. After that, a Stata script that can be found in appendix 1 allowed us to automate the collection of the data of interest. For our models that used betting odds, the choice of Bet365 has been made since it is the most commonly used bookmaker in the literature on football match outcomes, and it ensured that the data were available for our entire sample. A consideration must be kept in mind when interpreting our Model 1: the implied probabilities calculated from odds as $1/\text{odds}$ tend to slightly overestimate the likelihood of outsiders winning their games, due to the favorite-longshot bias.

The dataset covers all matches played by the nine clubs in their respective national leagues between the 2007–08 season and the 2023–24 season, resulting in a total of approximately 34000 match-level observations. Each observation corresponds to a single

league match and includes the home team, the away team, the season, the league, the match outcome (home win, draw, or away win), the number of goals scored by each side, and the pre-match betting odds provided by Bet365 for the three possible outcomes. The choice of Bet365 as the bookmaker was motivated by its availability for all the leagues concerned, allowing us to make a relevant comparison on the same basis.

In the following subsection we present the characteristics of the data that will be used in our analysis. We computed the mean, and standard deviation of our sample as well as made a comparison in the period before and after the renaming.

3.2 Descriptive Statistics about the data

Descriptive Statistics

Table 2.1: Overall Descriptive Statistics (full sample, 9 clubs)

Variable	N	Mean	SD	Min	Max
B365H (home odds)	34,182	2.635	1.711	1.02	26
B365D (draw odds)	34,182	3.887	1.086	1.40	17
B365A (away odds)	34,182	4.494	3.419	1.05	41
Goals scored (home)	34,243	1.559	1.298	0	10
Goals scored (away)	34,243	1.205	1.161	0	13
Goal difference	34,243	0.354	1.805	-13	10
Home win	34,243	0.453	0.498	0	1
Draw	34,243	0.252	0.434	0	1
Away win	34,243	0.295	0.456	0	1

N = 34,243 matches (9 clubs). Betting odds (B365) reflect decimal odds; a lower value corresponds to a higher implied win probability.

The full sample comprises 34,243 matches across nine clubs. We can observe that during our studied period, home teams have won 45.3% of their matches, compared to 29.5% for away teams and 25.2% for draws. This pattern is consistent with the well-documented home advantage in European football. Betting odds mirror this asymmetry: the average home win odds (2.635) are substantially lower than the average away win odds (4.494). This indicates that bookmakers in general assess home teams as more likely to win. Goal-scoring also reflects an advantage for the home teams as they score on average 1.559 goals per match against 1.205 for away teams. This yields a positive average goal difference (0.354) in favor of home teams.

Table 2.2: Descriptive Statistics, Pre- vs. Post-Renaming (pooled across all clubs)

Variable	N	Mean	SD
Pre-renaming			
Goals scored	66,039	1.359	1.228
Goals conceded	66,039	1.394	1.248
Betting odds (own win)	65,923	3.626	2.886
Win	66,039	0.366	0.482
Draw	66,039	0.254	0.435
Loss	66,039	0.380	0.485
Post-renaming			
Goals scored	2,447	2.013	1.477
Goals conceded	2,447	1.054	1.065
Betting odds (own win)	2,441	1.916	1.020
Win	2,447	0.588	0.492
Draw	2,447	0.212	0.409
Loss	2,447	0.200	0.400
Total			
Goals scored	68,486	1.382	1.244
Goals conceded	68,486	1.382	1.244
Betting odds (own win)	68,364	3.565	2.859
Win	68,486	0.374	0.484
Draw	68,486	0.252	0.434
Loss	68,486	0.374	0.484

Home and away appearances are pooled: each match contributes one observation for the home club and one for the away club, both taken from that club's perspective ("Goals scored" = goals scored by the club in that match, regardless of venue).

When pooling all clubs and comparing the pre- and post-renaming periods, several variables move in the same direction. For example, post-renaming observations show higher average goals scored (2.013 vs. 1.359), a higher win rate (58.8% vs. 36.6%), and markedly lower betting odds on the club's own win (1.916 vs. 3.626, implying a higher bookmaker-assessed win probability). It is important to consider two things before drawing any conclusion from this pattern. First, this is a purely descriptive, unconditional comparison: it does not control for which clubs, seasons, or opponents make up each period, and therefore cannot be read as evidence of a renaming effect. That's why we use a regression model with fixed effects to isolate the renaming effect. Second, the post-renaming period is far smaller (2,447 observations, about 3.6% of the pooled sample) and is not evenly distributed across clubs, so it is heavily influenced by whichever clubs contribute the most to the post-renaming period.

Table 2.3: Descriptive Statistics by Club and Period

Club	Period	N	Goals scored	Goals conceded	Odds (own win)	Win rate
AZ Alkmaar	Pre-renaming	102	1.745	1.069	2.048	53.9%
AZ Alkmaar	Post-renaming	467	1.895	1.287	2.316	52.0%
Ajax	Pre-renaming	373	2.429	0.901	1.592	67.0%
Ajax	Post-renaming	195	2.805	1.005	1.435	69.2%
Anderlecht	Pre-renaming	366	1.945	0.956	1.719	61.2%
Anderlecht	Post-renaming	171	1.678	1.094	2.167	46.2%
Fenerbahce	Pre-renaming	270	1.933	1.000	1.737	63.0%
Fenerbahce	Post-renaming	322	1.960	1.047	1.797	58.7%
Genk	Pre-renaming	433	1.649	1.254	2.312	45.5%
Genk	Post-renaming	105	1.838	1.210	2.126	49.5%
Juventus	Pre-renaming	380	1.832	0.829	1.794	62.9%
Juventus	Post-renaming	266	1.789	0.887	1.761	63.2%
Man City	Pre-renaming	152	1.553	1.191	2.744	45.4%
Man City	Post-renaming	494	2.368	0.866	1.512	70.0%
Marseille	Pre-renaming	349	1.516	1.046	2.213	46.4%
Marseille	Post-renaming	283	1.643	1.152	2.347	50.5%
Napoli	Pre-renaming	502	1.781	1.092	2.231	53.6%
Napoli	Post-renaming	144	1.889	0.979	1.919	57.6%

Win rate is computed regardless of venue (home or away). Shaded rows indicate the post-renaming period. AZ Alkmaar and Genk already held commercial naming rights prior to the start of the sample period (see Discussion, Limitations).

When we observe the statistics for each club between the two periods we can observe substantial heterogeneity. Some clubs improve markedly in the post-renaming period, for example Manchester City's win rate rises from 45.4% to 70.0% and its average goals scored from 1.553 to 2.368. The same can be observed for Ajax as it also improves on both dimensions. Other clubs, on the other hand, move in the opposite direction. It is the case of Anderlecht, whose win rate falls from 61.2% to 46.2%. The remaining clubs (Fenerbahçe, Juventus, Marseille, Napoli) show comparatively small changes in either direction. Because Manchester City and Ajax together account for a large share of the post-renaming observations (494 and 195 matches respectively, out of 2,447), the pooled improvement in Table 2 is disproportionately driven by these two clubs rather than reflecting a broad-based pattern across the sample. AZ Alkmaar and Genk are included here for completeness, but as noted elsewhere they both had already held commercial naming rights before the start of the observed period, so their "pre-renaming" rows do not correspond to a genuine untreated state.

3.3 Variables

3.3.1 *Dependent Variables*

Three sets of dependent variables are used across the three empirical models.

In Model 1, the dependent variables are the pre-match betting odds provided by Bet365 for home win (B365H), draw (B365D), and away win (B365A). Betting odds represent the inverse of the bookmaker's implied probability for a given outcome, adjusted for a profit margin. Higher odds therefore correspond to lower implied probabilities. Using odds as dependent variables allows us to assess whether bookmakers systematically adjust their expectations following stadium renaming, treating the odds market as an information aggregator.

In Model 2, the dependent variables are binary outcome indicators: a variable equal to one if the home team wins and zero otherwise (HomeWin); a variable equal to one in the event of a draw (Draw) and zero otherwise; and finally, a variable equal to one if the away team wins (AwayWin) and zero otherwise. These variables are constructed directly from the final score recorded for each match.

In Model 3, the dependent variables are the number of goals scored by the home team (FTHG), the number of goals scored by the away team (FTAG); those variables are count variables.

Finally, the last model uses the goal difference computed as FTHG minus FTAG as the dependent variable. As the goal difference can take negative values, it requires the use of a linear estimator rather than a Poisson Pseudo-Maximum Likelihood estimator with fixed effects.

3.3.2 *Treatment Variables*

The key explanatory variables of interest are two binary treatment indicators. RenamingHome takes the value one if the home team has renamed its stadium and the match is played after the date on which the renaming took place, and zero otherwise. RenamingAway takes the value one if the away team has renamed its stadium and the match is played after the renaming date, and zero otherwise. Both variables switch from zero to one permanently at the time of renaming and remain at one for all subsequent matches in the dataset.

This binary specification captures the average treatment effect of stadium renaming in the post-renaming period relative to the pre-renaming period, controlling for fixed characteristics of the clubs involved and for common time trends.

3.4 Econometric Methodology

3.4.1 Model 1: Effect on Betting Odds (Hypothesis 1)

In order to test Hypothesis 1, which states that teams that have renamed their stadium tend to be perceived more positively by bookmakers, we run a first model in which betting odds are the dependent variable and the stadium renaming indicators are the explanatory variables. Concretely, this model estimates whether the fact of having renamed a stadium, captured by the variables *RenamingHome* and *RenamingAway*, is associated with a systematic change in odds, after controlling for each club's inherent quality.

The model can be written as follows:

$$B365O_{ijt} = \exp (\beta_0 + \beta_1 \text{RenamingHome}_{ijt} + \beta_2 \text{RenamingAway}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l) \times \varepsilon_{ijt}$$

where *B365O* is the betting odds for outcome *O*. The outcome is respectively home win, draw, and away win, in the match between home team *i* and away team *j* in season *t* in league *l*. Fixed effects are included for the home team (δ_i), the away team (γ_j), the year (λ_t), and the league (μ_l). Home and away team fixed effects allow us to account for the fact that each club has its own characteristics, such as financial means, management quality, or historical competitive level. Season fixed effects capture shocks that are common to all clubs in a given year, such as the COVID-19 crisis which prevented supporters from attending matches and reduced clubs' financial revenues. League fixed effects control for structural differences across national competitions.

3.4.2 Model 2: Effect on Match Outcomes (Hypothesis 2)

We then test Hypothesis 2, which states that stadium renaming influences actual sporting outcomes, with potential divergences between games played at home and away. In order to test this hypothesis, we build a recursive model composed of three successive steps.

In the first step, we test whether bookmakers are a good predictor of actual match outcomes. The equation can be written as follows:

$$\text{Outcome}_{ijt} = \exp (\beta_0 + \beta_1 \text{B365O}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l) \times \varepsilon_{ijt}$$

where the dependent variable is the actual match outcome. The outcome can be either HomeWin, Draw, or AwayWin, while the explanatory variable is the corresponding betting odds for each outcome. Fixed effects are included to account for the characteristics of each team, the season, and the league in which each game is played.

The results of this first step will allow us to determine whether bookmakers are reliable predictors of actual match outcomes. It will then allow us to use them in the third step to assess whether they have fully captured the effects of renaming.

In the second step, we test the direct impact of renaming on actual match outcomes, without controlling for bookmakers' expectations:

$$\text{Outcome}_{ijt} = \exp (\beta_0 + \beta_1 \text{RenamingHome}_{ijt} + \beta_2 \text{RenamingAway}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l) \times \varepsilon_{ijt}$$

The equation is estimated three times, using HomeWin, Draw, and AwayWin as the dependent variable in turn. We are aware that using PPML on a binary dependent variable may appear unconventional. However, as Greene (2004) points out, Probit and Logit estimators suffer from the incidental parameters problem in panel data settings with fixed effects. As a result, the maximum likelihood estimator becomes inconsistent. We therefore rely on PPML, which avoids this issue and remains robust to heteroskedasticity.

This step allows us to identify the direct association between stadium renaming and match outcomes.

Finally, in the third step, we analyze match outcomes by including both the renaming variables and the betting odds simultaneously:

$$\text{Outcome}_{ijt} = \exp (\beta_0 + \beta_1 \text{B365O}_{ijt} + \beta_2 \text{RenamingHome}_{ijt} + \beta_3 \text{RenamingAway}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l) \times \varepsilon_{ijt}$$

The results of this third step will allow us to determine whether bookmakers have fully incorporated the effects of renaming, or whether the renaming coefficients remain significant. The latter would suggest that renaming has an effect on match outcomes that goes beyond what bookmakers anticipated. It must however be considered that betting odds may themselves have

already incorporated the effects of stadium renaming. It means then that this third specification includes a potential post-treatment "bad" control. The results of this step should therefore be interpreted as an exploratory robustness check rather than as part of our main specification.

It should be noted that since HomeWin, Draw, and AwayWin are estimated as separate equations rather than as a joint system, the implied probabilities do not necessarily sum to one. In a consistent probabilistic framework, a decrease in the probability of a home win should mechanically be associated with an increase in the probability of a draw or an away win. However, as each equation is estimated independently, this adding-up constraint is not imposed, and coefficients should therefore be interpreted as partial associations rather than as components of a coherent probability distribution.

3.4.3 Model 3: Effect on Goal-Level Outcomes (Hypothesis 3)

Finally, in order to test Hypothesis 3, which states that teams whose stadiums have been renamed score more goals and concede fewer goals, we run two equations. Both are estimated by PPML and can be written as follows:

$$FTHG_{ijt} = \exp(\beta_0 + \beta_1 \text{RenamingHome}_{ijt} + \beta_2 \text{RenamingAway}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l) \times \varepsilon_{ijt}$$

$$FTAG_{ijt} = \exp(\beta_0 + \beta_1 \text{RenamingHome}_{ijt} + \beta_2 \text{RenamingAway}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l) \times \varepsilon_{ijt}$$

The first equation tests the effect of renaming on the number of goals scored by the home team, while the second follows the same structure but uses the number of goals scored by the away team as the dependent variable. Fixed effects are included to account for the characteristics of each team, year, and league. These two equations will allow us to determine whether teams that have renamed their stadium score more goals than before the renaming.

3.4.4 Model 4: Effect on Goal difference (Hypothesis 3)

After that we run a fourth model with an equation where the dependent variable is the goal difference. But since goal difference can sometimes take negative values when the away

team scores more goals than the home team, PPML is no longer applicable due to its exponential link function. We therefore estimate the following equation using ordinary least squares with fixed effects:

$$\text{GoalDiff}_{ijt} = \beta_0 + \beta_1 \text{RenamingHome}_{ijt} + \beta_2 \text{RenamingAway}_{ijt} + \delta_i + \gamma_j + \lambda_t + \mu_l + \varepsilon_{ijt}$$

We compute the variable *GoalDiff* as the number of goals scored by the home team minus the number of goals scored by the away team. This equation will allow us to assess whether studied teams have experienced an improvement in goal difference after their stadium was renamed, providing a more comprehensive picture of their overall sporting performance.

Taken as a whole, Models 3 and 4 will allow us to determine whether hypothesis 3 is verified.

All the computations of our models are performed using the software Stata 19, which allowed us to handle a large amount of data. The Stata code corresponding to each model is provided in Appendix 2.

3.4.5 How does PPML actually work?

PPML is an estimator based on the assumption that the conditional expectation of the dependent variable follows an exponential function of the explanatory variables, that is, $E[y|x] = \exp(x\beta)$. The parameters β are estimated by maximizing the Poisson quasi-likelihood function (Motta, 2019).

$$\ln L(\beta) = \sum_i [y_i(x_i\beta) - \exp(x_i\beta)]$$

To maximize this function, we solve the first-order condition $\sum_i [y_i - \exp(x_i\beta)]x_i = 0$. This condition states that the weighted average discrepancy between the observed values and the predicted values is equal to zero. As this equation is nonlinear, it is solved using an iterative algorithm such as Newton-Raphson (Motta, 2019). In practice, this simply means that the computer iteratively refines its estimates until it finds the values that best fit the data.

This maximization yields the parameter β , which is then used in the conditional expectation equation to compute predicted values. For models such as the one involving the binary variable *RenamingHome*, this allows us to compare the predicted value before and after the event, that is, when the variable takes the value 0 versus 1, holding all other variables constant. Since the function takes an exponential form, this comparison takes the form of a ratio

rather than a difference. The relative change associated with the renaming event is given by $\exp(\beta) - 1$, which is why coefficients are typically interpreted in percentage terms.

3.4.6 Justification of the PPML Estimator

The first downside of the log-linear specification is the possibility of results being biased due to heteroskedasticity. As Silva and Tenreiro (2006) explain, estimating parameters from log-linearized models with Ordinary Least Squares (OLS) can lead to misleading results in the presence of heteroskedasticity. This is because the expected value of the logarithm of a random variable depends on the higher-order moments of its distribution, leading to inconsistent estimates of the equation under OLS.

Silva and Tenreiro (2006) show that the Poisson Pseudo-Maximum-Likelihood (PPML) estimator only requires the correct specification of the conditional mean, that is, $E[y|x] = \exp(x\beta)$, to produce consistent estimates. Importantly, this does not require the data to follow a Poisson distribution.

Model 2 uses binary outcome variables (HomeWin, Draw, AwayWin). These would usually be appropriate for a Probit or Logit estimator. However, in panel data settings with fixed effects, Probit and Logit estimators suffer from the incidental parameters problem. As a result, the maximum likelihood estimator becomes inconsistent and biased when the panel length T is fixed (Greene, 2004). The PPML estimator does not suffer from this issue. It therefore remains a standard and widely accepted approach in applied econometrics when fixed effects are required.

3.4.7 Fixed Effects Structure

All four models include the same set of fixed effects: home team fixed effects (δ_i), away team fixed effects (γ_j), year fixed effects (λ_t), and league fixed effects (μ_l). The aim of Home and Away fixed effects is to control for elements that remain the same for a club over the years. For example, their historical quality, their fanbase size, the stadium capacity as well as their management structure. All those elements might affect the initial decision of a club to enter into a naming rights agreement as well as its outcome. Year fixed effects, on the other hand, take into account all shocks commonly affecting all the clubs such as the change in a competition format, as well as macroeconomic conditions such as the recent COVID-19 crisis that prevented fans from attending the games at the stadiums. And finally, league fixed effects allow us to control for the structural differences between national competitions, such as one team

dominating the league for years thanks to a financial advantage, a dominant playing style or a better commercial development.

By including both home team and away team fixed effects, the model compares each club's performance before and after its stadium was renamed, rather than comparing different clubs with each other. For instance, the effect of the renaming for Manchester City is identified by comparing Manchester City's results before 2011 to its results after 2011, holding constant the identity of the opponent, the season, and the league.

The following section aims to present the results of our empirical analysis through five different tables. Tables 3.1 to 3.3 summarize the results of our first model testing Hypothesis 1. Tables 4.1 to 6.3 present the results of our second model aimed at verifying Hypothesis 2. Finally, Tables 7 and 8 summarize the results of our third and fourth models testing Hypothesis 3. Below each set of table there is an interpretation of the results and after each model, an assessment of whether our hypotheses are verified. The difference in the number of observations between each model is due to the absence of data for a few games, leading the number of observations to differ slightly from one model to another.

As can be observed in the following tables, each coefficient has one of the following symbols: ***, **, *, or no symbol. These symbols indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Lower p-values indicate stronger statistical evidence against the null hypothesis. To account for within-club correlation over time, all reported standard errors are clustered at the club level. Consequently, statistical inference is based on cluster-robust standard errors throughout the empirical analysis.

4. RESULTS

4.1 Model 1: Effect of Stadium Renaming on Betting Odds

Table 3.1: Main Results (9 clubs, without La Liga)

Variable	(1)	(2)	(3)
	Home Odds	Draw Odds	Away Odds
renaming_home	-0.088 (0.059)	0.071 (0.070)	0.132 (0.115)
renaming_away	0.104 (0.107)	0.056 (0.046)	-0.059 (0.086)
Constant	1.077*** (0.007)	1.368*** (0.004)	1.661*** (0.008)
Observations	34,173	34,173	34,173
Pseudo R ²	0.168	0.036	0.291

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.2: Excluding Commemorative Renamings (7 clubs)

Variable	(1)	(2)	(3)
	Home Odds	Draw Odds	Away Odds
renaming_home	-0.082 (0.074)	0.037 (0.080)	0.095 (0.146)
renaming_away	0.063 (0.131)	0.023 (0.036)	-0.050 (0.108)
Constant	1.060*** (0.007)	1.360*** (0.003)	1.641*** (0.009)
Observations	32,959	32,959	32,959
Pseudo R ²	0.157	0.032	0.277

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.3: Commemorative Renamings Only (Napoli, Ajax)

Variable	(1)	(2)	(3)
	Home Odds	Draw Odds	Away Odds
renaming_home	-0.071 (0.095)	0.171*** (0.060)	0.313*** (0.087)
renaming_away	0.252** (0.121)	0.164*** (0.046)	0.009 (0.092)
Constant	1.457*** (0.039)	1.584*** (0.005)	2.046*** (0.028)
Observations	1,202	1,202	1,202
Pseudo R²	0.378	0.139	0.508

*Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

We can observe from our first model that none of our coefficients remain significant even at the 10% confidence level. It seems therefore that we cannot affirm whether renaming its stadium is associated either with an improvement or a deterioration of the expected performance of the concerned teams. If it was the case, that would have been translated into a change of the betting odds. The change of the odds would have had a positive coefficient if the expected performance had been worsened, as is the case for `renaming_away`. On the contrary, the coefficient would have been negative if we expected the odds to decrease. That would have translated into a smaller odd and therefore a higher implied probability, computed as $1/\text{odds}$. That would have been the case for `renaming_home` in Table 2.1.

We can, however, observe some significant coefficients in the third part of our first model, which isolates commemorative renaming from the others. In this sub-sample we have only kept Ajax and Napoli. We can first observe that the `renaming_away` coefficient is positive for the home odds, indicating that renaming its stadium is associated with fewer expected wins for the opponent playing at home. This effect is of around 28.7%, computed as $\exp(0.252) - 1$. The same idea can be observed for `renaming_home` with regard to the away odds. As the coefficient is positive, it indicates that the opponent of a team that has renamed its stadium and plays at home is expected to win less, by approximately 36.8%, computed as $\exp(0.313) - 1$. Finally, we can observe that the coefficients of both `renaming_home` and `renaming_away` are positive for the draw odds, indicating that renaming a stadium commemoratively is associated with fewer expected draw results.

The commemorative renaming sub-sample nevertheless provides an interesting exception. Since these renamings were not motivated by commercial revenues, the positive effects observed cannot be explained through the financial channel underlying Hypothesis 1. They seem more in accordance with the literature on fan attachment and home advantage. Commemorative renamings may strengthen supporters' identification with the club, resulting in a more intense stadium atmosphere. As discussed by Delassus and Descotes (2018) and by Chacón-Fernández et al. (2025), stronger fan engagement may reinforce the home advantage for example through greater atmosphere leading to more favorable referee decisions. This interpretation therefore provides a more plausible explanation for the significant coefficients observed for Ajax and Napoli than the financial mechanism proposed by Huth (2018).

Overall, our first model does not allow us to confirm Hypothesis 1, according to which teams that renamed their stadium would be perceived more positively by bookmakers. None of the coefficients in the main sample is statistically significant. It suggests then that stadium renaming does not systematically modify market expectations regarding future sporting performance. This finding contrasts with the financial mechanism proposed by Huth (2018), who argues that the additional revenues generated through naming rights agreements can be reinvested in squad quality and infrastructure which strengthens the club's competitive position. If this mechanism were sufficiently strong, bookmakers would be expected to revise their odds accordingly. Our results suggest that perhaps these financial gains are not large enough to affect expected performance at the match level.

4.2 Model 2: Effect of Betting Odds and Stadium Renaming on Match Outcomes

Step 1 — Effect of Betting Odds on Match Outcomes

Table 4.1: Main Results (9 clubs, without La Liga)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
B365H	-0.264*** (0.017)	—	—
B365D	—	-0.266*** (0.020)	—
B365A	—	—	-0.161*** (0.011)
Constant	-0.148*** (0.036)	-0.354*** (0.071)	-0.555*** (0.034)
Observations	34,173	34,173	34,120
Pseudo R²	0.052	0.019	0.077

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.2: Excluding Commemorative Renamings (7 clubs)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
B365H	-0.267*** (0.018)	—	—
B365D	—	-0.280*** (0.019)	—
B365A	—	—	-0.166*** (0.012)
Constant	-0.144*** (0.038)	-0.304*** (0.068)	-0.550*** (0.036)
Observations	32,959	32,959	32,906
Pseudo R²	0.050	0.019	0.074

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.3: Commemorative Renamings Only (Napoli, Ajax)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
B365H	-0.196** (0.078)	—	—
B365D	—	-0.066** (0.031)	—
B365A	—	—	-0.150** (0.062)
Constant	-0.134 (0.155)	-0.996*** (0.137)	-0.279* (0.168)
Observations	1,084	1,077	994
Pseudo R²	0.091	0.062	0.124

Standard errors clustered at the club level (*HomeTeam*, *AwayTeam*) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The first observation we can make from the first step of our second model is that all the coefficients are significant and negative. As a negative coefficient is associated with a decrease in the concerned odds, we can observe that when the odds increase by one unit, the number of home wins, draws or away wins decreases by $\exp(\text{coefficient}) - 1$. This is the case, for example, in Table 3.1: when the home win odds increase by one unit, the number of home wins decreases by 23.2%, computed as $\exp(-0.264) - 1$. For the draw result, when the odds increase by one unit, the number of draws decreases by 23.4%, computed as $\exp(-0.266) - 1$. Finally, for the away win odds, when they increase by one unit, the number of away wins decreases by 14.9%, computed as $\exp(-0.161) - 1$. The same observation can be made when we isolate commercial renaming in Table 3.2, while in Table 3.3, for commemorative renaming, the coefficients are also negative but significant at the 5% confidence level. Overall, those results suggest that bookmakers are a good predictor of actual match results.

Step 2 — Effect of Stadium Renaming on Match Outcomes

Table 5.1: Main Results (9 clubs, without La Liga)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
renaming_home	0.020 (0.051)	0.134* (0.071)	-0.080 (0.156)
renaming_away	-0.099 (0.107)	-0.061 (0.087)	0.031 (0.080)
Constant	-0.712*** (0.003)	-1.349*** (0.003)	-1.069*** (0.005)
Observations	34,234	34,234	34,181
Pseudo R ²	0.044	0.013	0.069

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.2: Excluding Commemorative Renamings (7 clubs)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
renaming_home	0.030 (0.063)	0.146 (0.089)	-0.138 (0.182)
renaming_away	-0.099 (0.125)	-0.011 (0.100)	0.020 (0.104)
Constant	-0.716*** (0.003)	-1.344*** (0.003)	-1.077*** (0.006)
Observations	33,020	33,020	32,967
Pseudo R ²	0.042	0.013	0.066

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.3: Commemorative Renamings Only (Napoli, Ajax)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
renaming_home	0.144 (0.103)	-0.427*** (0.065)	0.063 (0.042)
renaming_away	0.137 (0.151)	-0.716*** (0.066)	-0.009 (0.074)
Constant	-0.577*** (0.025)	-1.124*** (0.010)	-0.706*** (0.023)
Observations	1,084	1,077	994
Pseudo R²	0.084	0.064	0.115

Standard errors clustered at the club level (*HomeTeam*, *AwayTeam*) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We can observe from the results of the second step of our second model that, when we analyze the full sample of clubs, only one coefficient remains significant: *renaming_home* for draw results. As the coefficient is positive and significant at the 10% level, it suggests that renaming its stadium while playing at home is associated with an increase in the number of draw results of approximately 14.3%, computed as $\exp(0.134) - 1$. When we isolate solely the commercial renaming sub-sample, none of the coefficients are significant. Finally, in the sub-sample restricted to commemorative renaming, we can also observe that the draw coefficients for both *renaming_home* and *renaming_away* are significant. As they are both negative and significant at the 1% level, renaming its stadium commemoratively is associated with a decrease in the number of draw results, both at home and away.

Step 3 — Combined Effect of Betting Odds and Renaming on Match Outcomes

Table 6.1: Main Results (9 clubs, without La Liga)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
renaming_home	-0.015 (0.038)	0.188*** (0.065)	-0.044 (0.123)
renaming_away	-0.006 (0.079)	-0.012 (0.063)	0.032 (0.058)
B365H	-0.264*** (0.017)	—	—
B365D	—	-0.266*** (0.019)	—
B365A	—	—	-0.161*** (0.011)
Constant	-0.146*** (0.036)	-0.357*** (0.069)	-0.556*** (0.035)
Observations	34,173	34,173	34,120
Pseudo R²	0.052	0.019	0.077

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.2: Excluding Commemorative Renamings (7 clubs)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
renaming_home	-0.005 (0.048)	0.169** (0.073)	-0.114 (0.127)
renaming_away	-0.024 (0.073)	0.015 (0.073)	0.019 (0.074)
B365H	-0.267*** (0.018)	—	—
B365D	—	-0.280*** (0.018)	—
B365A	—	—	-0.166*** (0.012)
Constant	-0.143*** (0.038)	-0.308*** (0.065)	-0.549*** (0.037)
Observations	32,959	32,959	32,906
Pseudo R²	0.050	0.019	0.074

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.3: Commemorative Renamings Only (Napoli, Ajax)

Variable	(1)	(2)	(3)
	Home Win	Draw	Away Win
renaming_home	0.083 (0.104)	-0.373*** (0.051)	0.182 (0.161)
renaming_away	0.238 (0.238)	-0.662*** (0.077)	0.015 (0.121)
B365H	-0.202*** (0.064)	—	—
B365D	—	-0.047* (0.024)	—
B365A	—	—	-0.152** (0.059)
Constant	-0.160 (0.145)	-0.931*** (0.102)	-0.291 (0.184)
Observations	1,084	1,077	994
Pseudo R²	0.091	0.064	0.125

*Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

In the results of this model, we can observe that the betting odds remain significant and negative, as in the first step of the model. This suggests that bookmakers had already captured most of the effects of renaming: the coefficients remain negative, indicating that when the odds increase by one unit, the probability of the result decreases by $\exp(\beta) - 1$. We can also observe that only the `renaming_home` coefficient for draw results is significant, at the 1% level. And as it is positive, it suggests that renaming its stadium while playing at home is associated with an increase of approximately 20.7% in the number of draw results, computed as $\exp(0.188) - 1$.

While the same observation can be made for the part of this step that isolates commercial renaming, we must add that for commemorative renaming, both the `renaming_home` and `renaming_away` coefficients are negative and significant. This suggests that renaming its stadium commemoratively is associated with a decrease in the number of draw results, both at home and away.

Taken together, the results of the second model provide only limited support for Hypothesis 2. We expected stadium renaming to reduce home performance through weaker supporter attachment while improving away performance through increased financial resources. However, except for a few isolated coefficients, most of them are not statistically significant. As a result, we cannot conclude that stadium renaming systematically affects

realized sporting performance. These findings suggest that the positive financial effects emphasized by Huth (2018) and the potential negative consequences of commercialization discussed by Delassus and Descotes (2018) may offset one another, leading to no measurable effect on match outcomes. The third specification additionally includes betting odds as control variables. Since bookmakers' expectations may themselves be influenced by stadium renaming, these variables may constitute post-treatment controls (or "bad controls"). Consequently, this specification should be interpreted primarily as an exploratory robustness analysis rather than as our main empirical specification, and its results should therefore be interpreted with additional caution.

4.3 Model 3: Effect of Stadium Renaming on Goals Scored

Table 7.1: Main Results (9 clubs, without La Liga)

Variable	(1)	(2)
	Home Goals	Away Goals
renaming_home	0.052 (0.054)	-0.003 (0.061)
renaming_away	-0.067 (0.070)	0.020 (0.048)
Constant	0.486*** (0.003)	0.237*** (0.002)
Observations	34,234	34,234
Pseudo R²	0.042	0.043

*Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

Table 7.2: Excluding Commemorative Renamings (7 clubs)

Variable	(1)	(2)
	Home Goals	Away Goals
renaming_home	0.049 (0.065)	-0.017 (0.079)
renaming_away	-0.059 (0.087)	0.010 (0.062)
Constant	0.479*** (0.003)	0.230*** (0.003)
Observations	33,020	33,020
Pseudo R²	0.040	0.040

*Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

Table 7.3: Commemorative Renamings Only (Napoli, Ajax)

Variable	(1)	(2)
	Home Goals	Away Goals
renaming_home	0.129 (0.140)	0.117 (0.078)
renaming_away	0.010 (0.024)	0.097 (0.086)
Constant	0.665*** (0.032)	0.440*** (0.027)
Observations	1,199	1,198
Pseudo R ²	0.114	0.131

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We can observe that none of the coefficients are significant, which indicates that we cannot affirm whether stadium renaming is associated with a greater or smaller number of goals scored by the concerned teams.

4.4 Model 4: Effect of Stadium Renaming on Goal Difference

Table 8.1: Main Results (9 clubs, without La Liga)

Variable	(1)
	goal_diff
renaming_home	0.144 (0.145)
renaming_away	-0.163 (0.152)
Constant	0.354*** (0.007)
Observations	34,234
R ²	0.188

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8.2: Excluding Commemorative Renamings (7 clubs)

Variable	(1)
	goal_diff
renaming_home	0.145 (0.178)
renaming_away	-0.132 (0.191)
Constant	0.351*** (0.007)
Observations	33,020
R ²	0.177

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8.3: Commemorative Renamings Only (Napoli, Ajax)

Variable	(1)
	goal_diff
renaming_home	0.202 (0.404)
renaming_away	-0.114 (0.256)
Constant	0.395*** (0.100)
Observations	1,202
R ²	0.445

Standard errors clustered at the club level (HomeTeam, AwayTeam) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The same observation can be made for our last model: none of the coefficients are significant, even at the 10% level, suggesting that it cannot be affirmed that renaming its stadium is associated with a better or worse goal difference.

Our third and fourth models also fail to confirm Hypothesis 3. Stadium renaming is not significantly associated with either the number of goals scored at home or away and the goal difference. This suggests that, despite the potential financial benefits generated by naming rights agreements, these additional resources do not translate into higher offensive or better defensive performances at the match level. Likewise, any potential reduction in fan attachment does not appear to reduce attacking performance in a statistically detectable way.

Overall, our empirical analysis does not provide sufficient evidence to support the three hypotheses developed in this study. First, Model 1 does not allow us to confirm Hypothesis 1,

as none of the renaming coefficients are statistically significant. Consequently, we cannot conclude that stadium renaming is associated with an improvement in bookmakers' expectations regarding clubs' future sporting performance.

Second, Model 2 also fails to support Hypothesis 2, according to which stadium renaming affects realized sporting performance. The lack of statistically significant coefficients suggests that stadium renaming does not systematically influence teams' realized performances on the pitch.

Finally, Models 3 and 4 do not confirm Hypothesis 3, according to which stadium renaming would lead to different match results through changes in goals scored, goals conceded, and goal difference. The absence of statistically significant coefficients suggests that stadium renaming does not systematically influence these dimensions of sporting performance.

Taken together, these findings indicate that stadium renaming, whether commercially motivated or commemorative, has little measurable impact on either expected or realized sporting performance. Although a few isolated significant effects emerge in specific robustness analyses, the overall evidence does not support the hypothesis that stadium renaming systematically affects clubs' performances on the pitch.

5. Conclusion

As our research question aimed to assess whether stadium renaming affects the expected and realized sporting performance of football clubs, our empirical analysis provides little evidence of such an effect. Across the main models, the estimated coefficients are generally not statistically significant. This means that we cannot conclude that stadium renaming systematically influences bookmakers' expectations or clubs' realized sporting performances. Although some significant effects emerge in the robustness analyses, particularly for commemorative renamings, these results remain limited and should be interpreted with caution.

When compared with the existing literature, our findings provide a more nuanced perspective. Contrary to the argument of Huth (2018), our results do not allow us to conclude that the financial resources generated by naming rights agreements systematically translate into improved sporting performance. This suggests that either the additional revenues are not sufficiently large to influence performances on the pitch or that other determinants of sporting success may play a greater role. However, the significant coefficients observed for commemorative renamings are more consistent with the work of Delassus and Descotes (2018),

which emphasizes supporter attachment and home advantage. Since commemorative renamings preserve or even reinforce the symbolic identity of the stadium, they may strengthen supporters' identification with the club and could consequently contribute to a more favorable sporting environment.

From a managerial perspective, our findings provide a useful insight to club decision-makers by suggesting that stadium naming rights should mainly be viewed as a financial and commercial decision rather than as a strategy aimed at improving sporting performances. Although the additional revenues generated through naming rights agreements may potentially be reinvested in the club, our analysis does not provide evidence that these revenues systematically translate into better results on the pitch.

Taken as a whole, our results suggest that clubs should not expect their sporting performances to improve simply by entering into a naming rights agreement. While such agreements may indeed generate financial benefits, which remain an important motivation for signing them, the main objective should be to strengthen the club's financial position rather than to improve sporting performances. On the other hand, as very few results point towards a deterioration in performances after the agreement, decision-makers should also be aware that these agreements appear to have only limited measurable consequences on sporting performance.

To our knowledge, few studies have examined the relationship between stadium renaming and sporting performance using match-level data and a Poisson Pseudo-Maximum Likelihood estimator with multidimensional fixed effects. We therefore hope that this thesis contributes to the existing literature by providing new evidence on this topic and encourages further research in this area.

Beyond its academic contribution, this thesis also addresses a broader issue concerning the commercialization of football. Over the past decades, football has evolved from the world's most popular sport into an increasingly commercialized industry, in which supporter interests are not always prioritized. Ticket prices, broadcasting rights and sponsorship revenues have all increased considerably. Stadium naming rights represent another aspect of this commercial evolution. Through this study, we aimed to assess whether the financial benefits associated with stadium renaming are accompanied by improvements in sporting performance, and whether this commercial strategy may ultimately benefit football clubs.

Nevertheless, several limitations should be acknowledged. First, we did not distinguish the case of AZ Alkmaar and Racing Genk for which the stadium had already had a commercial name for more than a decade. Those clubs already benefited from revenues on their stadium name, and we do not know whether the contracts improved when the clubs became sponsored by the companies we decided to work on. We also need to consider that although the use of fixed effects helps control for time-invariant differences between clubs, other events occurring around the renaming date, such as managerial changes, ownership changes or transfer policies, may also have influenced sporting performance. Therefore, our results should be interpreted as evidence of an association rather than as definitive proof of a causal relationship. It must also be considered that due to time constraints and computational limitations, this analysis does not include league $\times$ season fixed effects, a linear probability model, or a wild cluster bootstrap as additional robustness checks. As the latter was computationally infeasible in Stata given the high-dimensional fixed-effects structure of the model. Future work could revisit these specifications, for instance using alternative software better suited to combining bootstrap inference with high-dimensional fixed effects.

We also acknowledge that a sample of nine clubs cannot fully reflect the diversity of stadium naming agreements across European football. In addition, the German Bundesliga was not included because most naming rights agreements took place in the early 2000s. Including Germany would have required extending the study period considerably and comparing football environments characterized by very different economic conditions. Moreover, we did not consider the share that naming rights agreements represent in the overall revenues of each club. Future research could examine whether the sporting impact depends on the financial importance of the agreement. It could also include measures of supporter engagement, such as stadium attendance, merchandising sales or supporter participation in club decisions, in order to better understand the mechanisms through which stadium renaming may influence sporting performance.

Finally, several avenues for future research emerge from this study. Investigating the first generation of naming rights agreements in Germany would allow researchers to assess whether the effects observed in this thesis also apply in a different historical context. Future studies could also distinguish more clearly between commercial and commemorative renamings in order to determine whether these two forms of stadium renaming have different sporting and social consequences. Finally, combining sporting, financial and supporter-related

indicators would provide a more comprehensive understanding of the overall effects of stadium naming rights agreements on professional football clubs.

Overall, our findings suggest that stadium naming rights should primarily be viewed as a commercial and financial decision rather than as a strategy aimed at improving sporting performance. Although the additional revenues generated through naming rights agreements may strengthen the financial position of football clubs, our empirical analysis does not provide evidence that they systematically translate into better performances on the pitch. Nevertheless, this thesis contributes to the existing literature by providing new empirical evidence on a topic that has received relatively little academic attention and may encourage future research on the relationship between stadium renaming and sporting performance, with a particular emphasis on commemorative renamings, as these produced the most significant results in our analysis. As discussed in the limitations, future research could also incorporate more qualitative variables, such as fan engagement, as well as quantitative indicators, such as stadium attendance, in order to better understand the mechanisms through which stadium renaming may influence sporting performance.

Abstract

Professional football clubs increasingly rely on stadium naming rights agreements to generate additional revenues. However, while the financial consequences of these agreements have been widely discussed in the literature, little attention has been devoted to their potential impact on sporting performance.

The study therefore investigates the consequences of a stadium renaming in football from a sporting performance point of view. The study has been conducted in the form of a quantitative analysis through a Poisson Pseudo-Maximum Likelihood estimator with fixed effects as well as a traditional regression with fixed effects on a panel of nine clubs from 6 different European football leagues over the period from 2007 to 2024. The analysis is based on three hypotheses that have been tested through four models using match-level data. Our first hypothesis assesses whether renaming has some effects on expected performance through bookmaker expectations. The second one assesses whether renaming has a differentiated impact on match outcomes at home and away, with financial gains potentially offsetting a weaker home advantage. And finally, the third one analyzes whether it has an impact on the number of goals scored as well as on goal difference.

As most of our coefficients were not statistically significant, we were unable to confirm any of our three hypotheses. We found no evidence that stadium renaming is associated with a change in expected performance, nor in realized performance and match results. The latter measured through match outcomes, goals scored and conceded, or goal difference.

Overall, our findings suggest that stadium naming rights should primarily be considered as a financial and commercial strategy rather than as a means of improving sporting performance. This thesis contributes to the existing literature by providing new empirical evidence on a topic that has received relatively limited academic attention and highlights the need for further research, particularly on the role of commemorative renamings and supporter attachment.

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Appendix

Appendix 1: Stata code to generate the database

```
*=====
* BUILD_DATABASE.do
* Construction de la base agr\og\oe
*=====

clear all
set more off

*-----
* Dossier principal
*-----
local root "/Users/mateodumortier/Library/Mobile
Documents/com~apple~CloudDocs/Master thesis dataset /Database 04:08"

local outfile "`root'/database_aggregated.dta"

tempfile master

local first = 1

*-----
* Liste des championnats
*-----
local championships : dir "`root'" dirs "*"

foreach champ of local championships {

    di "======"
    di "Championnat : `champ'"
    di "======"

    local files : dir "`root'/'`champ'" files "*.xlsx"

    foreach f of local files {

        di "Import : `f'"

        local season = substr("`f'", ".xlsx", "", .)

        capture noisily import excel using ///
        "`root'/'`champ'/'`f'", ///
        firstrow clear

        if _rc {
            di as error "Impossible d'importer `f'"
            continue
        }

        *-----
        * Renommer les variables avec leur label
        *-----

        foreach v of varlist _all {
```

```

local lab : variable label `v'

if "`lab'" != "" {

    local new = substr("`lab'", " ", "", .)

    capture confirm name `new'

    if !_rc {
        capture rename `v' `new'
    }
}

}

*-----
* V\@rification
*-----

capture confirm variable HomeTeam

if _rc {
    di as error "HomeTeam absent -> `f'"
    continue
}

gen championship = "`champ'"
gen season = "`season'"

if `first' {

    save `master', replace
    local first = 0

}
else {

    append using `master', force
    save `master', replace

}

}

}

use `master', clear

save "`outfile'", replace

di as result "====="
di as result "Base cr\@v\@e : `outfile'"
di as result "Nombre d'observations : " _N
di as result "====="

```

Appendix 2: Stata code to launch the regressions

```
*****
* ROBUSTNESS TESTS - CLEANED DATABASE
* EXCLUDING LA LIGA (ATLETICO MADRID)
* STADIUM RENAMING - MASTER THESIS
*****

clear all
set more off

cd "/Users/mateodumortier/Library/Mobile
Documents/com~apple~CloudDocs/Master thesis dataset /Database 04:08"
use "database_aggregatedfinalversion .dta", clear

* SINGLE DOCUMENT CONTAINING ALL 18 TABLES
local alltables "ALL_18_REGRESSION_TABLES.rtf"
capture erase "`alltables'"

* HARMONISE LEAGUE VARIABLE
capture confirm variable league
if _rc != 0 {
    capture confirm variable championship
    if _rc == 0 {
        rename championship league
    }
    else {
        di as error "Neither league nor championship exists in the
database."
        exit 111
    }
}

* STEP 1: EXCLUDE LA LIGA ONLY IF PRESENT
quietly count if league == "La Liga"
if r(N) > 0 {
    drop if league == "La Liga"
}

* HARMONISE NUMERIC VARIABLES
foreach v in B365H B365D B365A FTHG FTAG {
    capture confirm variable `v'
    if _rc != 0 {
        di as error "Variable `v' is missing from the database."
        exit 111
    }

    capture confirm numeric variable `v'
    if _rc != 0 {
        replace `v' = strtrim(`v')
        replace `v' = subinstr(`v', ",", ".", .)
        destring `v', replace force
    }
}

* CREATE NECESSARY VARIABLES
capture drop year home_win draw_match away_win goal_diff
gen int year = year(Date)
```

```

gen byte home_win = (FTR == "H") if !missing(FTR)
gen byte draw_match = (FTR == "D") if !missing(FTR)
gen byte away_win = (FTR == "A") if !missing(FTR)
gen double goal_diff = FTHG - FTAG

* INSTALL PACKAGES ONLY IF MISSING
capture which ppmlhdfe
if _rc != 0 ssc install ppmlhdfe

capture which reghdfe
if _rc != 0 ssc install reghdfe

capture which esttab
if _rc != 0 ssc install estout

* CREATE RENAMING VARIABLES
capture drop renaming_home renaming_away
gen byte renaming_home = 0
gen byte renaming_away = 0

* Genk
replace renaming_home = 1 if HomeTeam == "Genk" & Date >= td(26aug2021)
replace renaming_away = 1 if AwayTeam == "Genk" & Date >= td(26aug2021)

* Anderlecht
replace renaming_home = 1 if HomeTeam == "Anderlecht" & Date >=
td(12jul2019)
replace renaming_away = 1 if AwayTeam == "Anderlecht" & Date >=
td(12jul2019)

* Ajax
replace renaming_home = 1 if HomeTeam == "Ajax" & Date >= td(10aug2018)
replace renaming_away = 1 if AwayTeam == "Ajax" & Date >= td(10aug2018)

* AZ Alkmaar
replace renaming_home = 1 if inlist(HomeTeam, "AZ", "AZ Alkmaar") &
Date >= td(06aug2010)
replace renaming_away = 1 if inlist(AwayTeam, "AZ", "AZ Alkmaar") &
Date >= td(06aug2010)

* Marseille
replace renaming_home = 1 if HomeTeam == "Marseille" & Date >=
td(02oct2016)
replace renaming_away = 1 if AwayTeam == "Marseille" & Date >=
td(02oct2016)

* Fenerbahçe
replace renaming_home = 1 if inlist(HomeTeam, "Fenerbahce",
"Fenerbahçe") & Date >= td(14aug2015)
replace renaming_away = 1 if inlist(AwayTeam, "Fenerbahce",
"Fenerbahçe") & Date >= td(14aug2015)

* Napoli
replace renaming_home = 1 if HomeTeam == "Napoli" & Date >=
td(04dec2020)
replace renaming_away = 1 if AwayTeam == "Napoli" & Date >=
td(04dec2020)

```

```

* Manchester City
replace renaming_home = 1 if inlist(HomeTeam, "Man City", "Manchester
City") & Date >= td(08jul2011)
replace renaming_away = 1 if inlist(AwayTeam, "Man City", "Manchester
City") & Date >= td(08jul2011)

* Juventus
replace renaming_home = 1 if HomeTeam == "Juventus" & Date >=
td(01jul2017)
replace renaming_away = 1 if AwayTeam == "Juventus" & Date >=
td(01jul2017)

* FINAL TYPE CHECK
describe B365H B365D B365A FTHG FTAG

* SAMPLE DIAGNOSTICS
di as result "=====
di as result "Observations after opening database and excluding La
Liga: " _N
foreach v in B365H B365D B365A FTHG FTAG home_win draw_match away_win
goal_diff {
    quietly count if !missing(`v')
    di as result "`v' available observations: " r(N)
}
di as result "=====

**VERSION 1: MAIN RESULTS (9 CLUBS - WITHOUT LA LIGA)

**Step 1: Renaming to Betting Odds
eststo clear
eststo v1_s1_m1: ppmlhdfc B365H renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s1_m2: ppmlhdfc B365D renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s1_m3: ppmlhdfc B365A renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v1_s1_m1 v1_s1_m2 v1_s1_m3 using "`alltables'", replace se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Odds" "Draw Odds"
"Away Odds") stats(N r2_p, labels("Observations" "Pseudo R-squared"))
label compress nogaps title("Main Results: Step 1 - Renaming to Betting
Odds")

**Step 2: Betting Odds to Match Outcomes
eststo clear
eststo v1_s2_m1: ppmlhdfc home_win B365H, absorb(HomeTeam AwayTeam year
league) vce(cluster HomeTeam AwayTeam)
eststo v1_s2_m2: ppmlhdfc draw_match B365D, absorb(HomeTeam AwayTeam
year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s2_m3: ppmlhdfc away_win B365A, absorb(HomeTeam AwayTeam year
league) vce(cluster HomeTeam AwayTeam)
esttab v1_s2_m1 v1_s2_m2 v1_s2_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Main Results: Step 2 - Betting Odds to Match
Outcomes")

**Step 3: Renaming to Match Outcomes
eststo clear

```

```

eststo v1_s3_m1: ppmlhdfe home_win renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s3_m2: ppmlhdfe draw_match renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s3_m3: ppmlhdfe away_win renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v1_s3_m1 v1_s3_m2 v1_s3_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Main Results: Step 3 - Renaming to Match
Outcomes")

```

****Step 4: Betting Odds + Renaming to Match Outcomes**

```

eststo clear
eststo v1_s4_m1: ppmlhdfe home_win B365H renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s4_m2: ppmlhdfe draw_match B365D renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s4_m3: ppmlhdfe away_win B365A renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v1_s4_m1 v1_s4_m2 v1_s4_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Main Results: Step 4 - Betting Odds and Renaming
to Match Outcomes")

```

****Step 5: Renaming to Goals Scored**

```

eststo clear
eststo v1_s5_m1: ppmlhdfe FTHG renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v1_s5_m2: ppmlhdfe FTAG renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v1_s5_m1 v1_s5_m2 using "`alltables'", append se b(3) se(3)
star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Goals" "Away Goals")
stats(N r2_p, labels("Observations" "Pseudo R-squared")) label compress
nogaps title("Main Results: Step 5 - Renaming to Goals Scored")

```

****Step 6: Renaming to Goal Difference**

```

eststo clear
eststo v1_s6_m1: reghdfe goal_diff renaming_home renaming_away,
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v1_s6_m1 using "`alltables'", append se b(3) se(3) star(* 0.10
** 0.05 *** 0.01) stats(N r2, labels("Observations" "R-squared")) label
compress nogaps title("Main Results: Step 6 - Renaming to Goal
Difference")

```

****VERSION 2: ROBUSTNESS - EXCLUDE NAPOLI + AJAX (7 CLUBS)**

****Step 1: Renaming to Betting Odds**

```

eststo clear
eststo v2_s1_m1: ppmlhdfe B365H renaming_home renaming_away if HomeTeam
!= "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam !=
"Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam
AwayTeam)
eststo v2_s1_m2: ppmlhdfe B365D renaming_home renaming_away if HomeTeam
!= "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam !=
"Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam
AwayTeam)

```

```

eststo v2_s1_m3: ppmlhdfe B365A renaming_home renaming_away if HomeTeam
!= "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam !=
"Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam
AwayTeam)
esttab v2_s1_m1 v2_s1_m2 v2_s1_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Odds" "Draw Odds"
"Away Odds") stats(N r2_p, labels("Observations" "Pseudo R-squared"))
label compress nogaps title("Robustness V2: Step 1 - Excluding
Commemorative Renamings")

```

****Step 2: Betting Odds to Match Outcomes**

```

eststo clear
eststo v2_s2_m1: ppmlhdfe home_win B365H if HomeTeam != "Napoli" &
AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam != "Ajax",
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v2_s2_m2: ppmlhdfe draw_match B365D if HomeTeam != "Napoli" &
AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam != "Ajax",
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v2_s2_m3: ppmlhdfe away_win B365A if HomeTeam != "Napoli" &
AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam != "Ajax",
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v2_s2_m1 v2_s2_m2 v2_s2_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Robustness V2: Step 2 - Betting Odds to Match
Outcomes")

```

****Step 3: Renaming to Match Outcomes**

```

eststo clear
eststo v2_s3_m1: ppmlhdfe home_win renaming_home renaming_away if
HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v2_s3_m2: ppmlhdfe draw_match renaming_home renaming_away if
HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v2_s3_m3: ppmlhdfe away_win renaming_home renaming_away if
HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
esttab v2_s3_m1 v2_s3_m2 v2_s3_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Robustness V2: Step 3 - Excluding Commemorative
Renamings")

```

****Step 4: Betting Odds + Renaming to Match Outcomes**

```

eststo clear
eststo v2_s4_m1: ppmlhdfe home_win B365H renaming_home renaming_away if
HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v2_s4_m2: ppmlhdfe draw_match B365D renaming_home renaming_away
if HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)

```

```

eststo v2_s4_m3: ppmlhdfe away_win B365A renaming_home renaming_away if
HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
esttab v2_s4_m1 v2_s4_m2 v2_s4_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Robustness V2: Step 4 - Betting Odds and
Renaming to Match Outcomes")

```

****Step 5: Renaming to Goals Scored**

```

eststo clear
eststo v2_s5_m1: ppmlhdfe FTHG renaming_home renaming_away if HomeTeam
!= "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam !=
"Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam
AwayTeam)
eststo v2_s5_m2: ppmlhdfe FTAG renaming_home renaming_away if HomeTeam
!= "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" & AwayTeam !=
"Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam
AwayTeam)
esttab v2_s5_m1 v2_s5_m2 using "`alltables'", append se b(3) se(3)
star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Goals" "Away Goals")
stats(N r2_p, labels("Observations" "Pseudo R-squared")) label compress
nogaps title("Robustness V2: Step 5 - Excluding Commemorative
Renamings")

```

****Step 6: Renaming to Goal Difference**

```

eststo clear
eststo v2_s6_m1: reghdfe goal_diff renaming_home renaming_away if
HomeTeam != "Napoli" & AwayTeam != "Napoli" & HomeTeam != "Ajax" &
AwayTeam != "Ajax", absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
esttab v2_s6_m1 using "`alltables'", append se b(3) se(3) star(* 0.10
** 0.05 *** 0.01) stats(N r2, labels("Observations" "R-squared")) label
compress nogaps title("Robustness V2: Step 6 - Excluding Commemorative
Renamings")

```

****VERSION 3: ROBUSTNESS - ONLY NAPOLI + AJAX (COMMEMORATIVE ONLY)**

****Step 1: Renaming to Betting Odds**

```

eststo clear
eststo v3_s1_m1: ppmlhdfe B365H renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v3_s1_m2: ppmlhdfe B365D renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v3_s1_m3: ppmlhdfe B365A renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
esttab v3_s1_m1 v3_s1_m2 v3_s1_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Odds" "Draw Odds"
"Away Odds") stats(N r2_p, labels("Observations" "Pseudo R-squared"))
label compress nogaps title("Robustness V3: Step 1 - Commemorative
Renamings Only")

```

**Step 2: Betting Odds to Match Outcomes

```
eststo clear
eststo v3_s2_m1: ppmlhdfe home_win B365H if (HomeTeam == "Napoli" |
AwayTeam == "Napoli" | HomeTeam == "Ajax" | AwayTeam == "Ajax"),
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v3_s2_m2: ppmlhdfe draw_match B365D if (HomeTeam == "Napoli" |
AwayTeam == "Napoli" | HomeTeam == "Ajax" | AwayTeam == "Ajax"),
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v3_s2_m3: ppmlhdfe away_win B365A if (HomeTeam == "Napoli" |
AwayTeam == "Napoli" | HomeTeam == "Ajax" | AwayTeam == "Ajax"),
absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v3_s2_m1 v3_s2_m2 v3_s2_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Robustness V3: Step 2 - Betting Odds to Match
Outcomes")
```

**Step 3: Renaming to Match Outcomes

```
eststo clear
eststo v3_s3_m1: ppmlhdfe home_win renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v3_s3_m2: ppmlhdfe draw_match renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v3_s3_m3: ppmlhdfe away_win renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
esttab v3_s3_m1 v3_s3_m2 v3_s3_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Robustness V3: Step 3 - Commemorative Renamings
Only")
```

**Step 4: Betting Odds + Renaming to Match Outcomes

```
eststo clear
eststo v3_s4_m1: ppmlhdfe home_win B365H renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v3_s4_m2: ppmlhdfe draw_match B365D renaming_home renaming_away
if (HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
eststo v3_s4_m3: ppmlhdfe away_win B365A renaming_home renaming_away if
(HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" |
AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster
HomeTeam AwayTeam)
esttab v3_s4_m1 v3_s4_m2 v3_s4_m3 using "`alltables'", append se b(3)
se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Win" "Draw" "Away
Win") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label
compress nogaps title("Robustness V3: Step 4 - Betting Odds and
Renaming to Match Outcomes")
```

```

**Step 5: Renaming to Goals Scored
eststo clear
eststo v3_s5_m1: ppmlhdfe FTHG renaming_home renaming_away if (HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" | AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
eststo v3_s5_m2: ppmlhdfe FTAG renaming_home renaming_away if (HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" | AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v3_s5_m1 v3_s5_m2 using "`alltables'", append se b(3) se(3) star(* 0.10 ** 0.05 *** 0.01) mtitles("Home Goals" "Away Goals") stats(N r2_p, labels("Observations" "Pseudo R-squared")) label compress nogaps title("Robustness V3: Step 5 - Commemorative Renamings Only")

**Step 6: Renaming to Goal Difference
eststo clear
eststo v3_s6_m1: reghdfe goal_diff renaming_home renaming_away if (HomeTeam == "Napoli" | AwayTeam == "Napoli" | HomeTeam == "Ajax" | AwayTeam == "Ajax"), absorb(HomeTeam AwayTeam year league) vce(cluster HomeTeam AwayTeam)
esttab v3_s6_m1 using "`alltables'", append se b(3) se(3) star(* 0.10 ** 0.05 *** 0.01) stats(N r2, labels("Observations" "R-squared")) label compress nogaps title("Robustness V3: Step 6 - Commemorative Renamings Only")

di as result "=====
di as result "ALL 18 TABLES WERE EXPORTED TO:"
di as result "`c(pwd) '/'`alltables'"
di as result "=====

** END OF ROBUSTNESS TESTS

```

Appendix 3: Stata code for descriptive statistics

```

*****
* DESCRIPTIVE STATISTICS - PRE/POST RENAMING BY CLUB
* STADIUM RENAMING - MASTER THESIS

* Adapted for database_aggregatedfinalversion.dta
* (variable "championship", full 2007-2024 coverage)
*****

clear all
set more off

cd "/Users/mateodumortier/Library/Mobile Documents/com~apple~CloudDocs/Master thesis dataset /Database 04:08"
use "database_aggregatedfinalversion.dta", clear

* Nettoyage de base
drop if missing(Date)
replace championship = strtrim(championship)

* Les colonnes de cotes ont été importées en texte lors de la fusion
* (probablement une cellule non-numérique dans un des fichiers Excel sources)

```

```

destring B365H B365D B365A, replace force
destring FTHG FTAG, replace force

* La Liga n'est pas présente dans cette base (Atlético absent)
:
* pas besoin de "drop if championship == La Liga"

* RECREATE NECESSARY VARIABLES
capture gen year = year(Date)
capture gen home_win = (FTR == "H")
capture gen draw_match = (FTR == "D")
capture gen away_win = (FTR == "A")
capture gen goal_diff = FTHG - FTAG

* RECREATE RENAMING VARIABLES (mêmes dates que le code principal)
gen renaming_home = 0
gen renaming_away = 0

replace renaming_home = 1 if HomeTeam == "Genk" & Date >= td(26aug2021)
replace renaming_away = 1 if AwayTeam == "Genk" & Date >= td(26aug2021)

replace renaming_home = 1 if HomeTeam == "Anderlecht" & Date >=
td(12jul2019)
replace renaming_away = 1 if AwayTeam == "Anderlecht" & Date >=
td(12jul2019)

replace renaming_home = 1 if HomeTeam == "Ajax" & Date >= td(10aug2018)
replace renaming_away = 1 if AwayTeam == "Ajax" & Date >= td(10aug2018)

replace renaming_home = 1 if HomeTeam == "AZ Alkmaar" & Date >=
td(06aug2010)
replace renaming_away = 1 if AwayTeam == "AZ Alkmaar" & Date >=
td(06aug2010)

replace renaming_home = 1 if HomeTeam == "Marseille" & Date >=
td(02oct2016)
replace renaming_away = 1 if AwayTeam == "Marseille" & Date >=
td(02oct2016)

replace renaming_home = 1 if HomeTeam == "Fenerbahce" & Date >=
td(14aug2015)
replace renaming_away = 1 if AwayTeam == "Fenerbahce" & Date >=
td(14aug2015)

replace renaming_home = 1 if HomeTeam == "Napoli" & Date >=
td(04dec2020)
replace renaming_away = 1 if AwayTeam == "Napoli" & Date >=
td(04dec2020)

replace renaming_home = 1 if HomeTeam == "Man City" & Date >=
td(08jul2011)
replace renaming_away = 1 if AwayTeam == "Man City" & Date >=
td(08jul2011)

replace renaming_home = 1 if HomeTeam == "Juventus" & Date >=
td(01jul2017)
replace renaming_away = 1 if AwayTeam == "Juventus" & Date >=
td(01jul2017)

```

```

* Vérification rapide : combien de matchs "post" par club, pour
replacer
* tout de suite un nom de club mal orthographié dans la base
di "--- Vérification des noms de clubs (post-renaming) ---"
foreach c in "Genk" "Anderlecht" "Ajax" "AZ Alkmaar" "Marseille"
"Fenerbahce" "Napoli" "Man City" "Juventus" {
    quietly count if (HomeTeam == "`c'" | AwayTeam == "`c'")
    di "`c' : " r(N) " matchs trouvés au total"
}

ssc install estout, replace

*****
* PART A - OVERALL DESCRIPTIVE STATISTICS (whole sample)
*****

eststo clear
estpost summarize B365H B365D B365A FTHG FTAG goal_diff home_win
draw_match away_win
esttab using "descriptives_overall.rtf", replace ///
    cells("count mean(fmt(3)) sd(fmt(3)) min max") ///
    label title("Table: Overall Descriptive Statistics") ///
    nomtitle nonumber

*****
* PART B - DESCRIPTIVE STATISTICS BY PERIOD (pre/post), POOLING HOME +
AWAY
*****

preserve

* --- Home-team observations ---
tempfile home_obs
keep HomeTeam AwayTeam championship year renaming_home renaming_away
///
    FTHG FTAG B365H B365D B365A home_win draw_match away_win goal_diff
gen team          = HomeTeam
gen goals_for     = FTHG
gen goals_against = FTAG
gen odds_for      = B365H
gen win_ind       = home_win
gen draw_ind      = draw_match
gen loss_ind      = away_win
gen period        = renaming_home
keep team goals_for goals_against odds_for win_ind draw_ind loss_ind
period championship year
save `home_obs'

restore
preserve

* --- Away-team observations ---
tempfile away_obs
keep HomeTeam AwayTeam championship year renaming_home renaming_away
///

```

```

    FTHG FTAG B365H B365D B365A home_win draw_match away_win goal_diff
gen team          = AwayTeam
gen goals_for     = FTAG
gen goals_against = FTHG
gen odds_for      = B365A
gen win_ind       = away_win
gen draw_ind      = draw_match
gen loss_ind      = home_win
gen period        = renaming_away
keep team goals_for goals_against odds_for win_ind draw_ind loss_ind
period championship year
save `away_obs'

* --- Stack both together ---
use `home_obs', clear
append using `away_obs'

label define periodlbl 0 "Pre-renaming" 1 "Post-renaming"
label values period periodlbl

* Table: pre/post, pooled across all clubs
eststo clear
estpost tabstat goals_for goals_against odds_for win_ind draw_ind
loss_ind, ///
    by(period) statistics(n mean sd) columns(statistics)
esttab using "descriptives_pre_post_pooled.rtf", replace ///
    cells("count mean(fmt(3)) sd(fmt(3))") label ///
    title("Table: Descriptive Statistics, Pre vs Post Renaming
(pooled)")

*****
* PART C - DESCRIPTIVE STATISTICS BY CLUB x PERIOD
*****

* Garder uniquement les 9 clubs traités (exclure les adversaires)
keep if inlist(team, "Genk", "Anderlecht", "Ajax", "AZ Alkmaar", ///
    "Marseille", "Fenerbahce", "Napoli", "Man City",
"Juventus")

collapse (count) n_matches=goals_for ///
    (mean) mean_goals_for=goals_for
mean_goals_against=goals_against ///
    mean_odds_for=odds_for mean_win=win_ind ///
    (sd) sd_goals_for=goals_for, ///
    by(team period)

sort team period
label values period periodlbl

export excel using "descriptives_club_periode.xlsx",
firstrow(variables) replace

list team period n_matches mean_goals_for mean_win, sepby(team)

restore

```

```
di "DONE - files saved: descriptives_overall.rtf,  
descriptives_pre_post_pooled.rtf, descriptives_club_periode.xlsx"
```

```
** END OF DESCRIPTIVE STATISTICS
```

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