Against All Odds?

National Sentiment and Wagering on European Football

Sebastian Braun
Humboldt University Berlin

Michael Kvasnicka*
RWI Essen

Abstract. This paper studies how national sentiment in the form of a perception or loyalty bias of bettors may affect pricing patterns on national wagering markets for international sport events. We show theoretically that both biases can be profitably exploited by domestic bookmakers through price adjustment (odds shading). Analyzing empirically a unique data set of betting quotas from online bookmakers in twelve European countries for qualification games to the UEFA Euro 2008, we do find evidence of systematic biases in the pricing of own national teams, deviations that can be explained by the aforementioned two biases.

Keywords: Football, Home Bias, Investment, Patriotism.
JEL Classification: L20, L83.

*Contact author: Michael Kvasnicka, Rheinisch-Westfälisches Institut für Wirtschaftsforschung e.V. (RWI Essen), Berlin Office, Hessische Straße 10, 10115 Berlin, Germany. Email: Michael.Kvasnicka@rwi-essen.de.

Introduction

Consumer preferences for home country products, "buy domestic" campaigns, the issuing and success of war bonds, or the home equity puzzle in international financial markets suggest that national sentiment may be of importance for individual consumption and investment choices. Little empirical research, however, has been done to substantiate such conjectures. For example, Shankarmahesh (2006) provides evidence on consumer ethnocentrism, and Morse and Shive (2008) explore the importance of patriotism for the portfolio choices of domestic investors. This paper contributes to this insufficiently researched area in economics by studying the international football betting market, a market that is likely to be strongly influenced by national sentiment.

The online betting market in international football exhibits a number of features that make it particularly suited for analyzing the influence of national sentiment on economic behavior. First, there appears to be a strong bonding of patriotism and sports, especially in football, the most popular sport in Europe. Second, information on the quality of national teams and odds marketed (prices offered by bookmakers) should be largely symmetric across countries, as detailed information, including statistics on past performance of teams and expert analyses, can be obtained online easily, quickly, and at negligible if not zero cost. Given our focus on online wagering, access of bettors to this source of information is furthermore warranted. Third, there is a single homogeneous good traded on this market ("outcome of a game"). Variations in prices across countries therefore cannot be caused by (potentially unobservable) differences in the respective products traded. Finally, online betting markets in Europe still appear segmented between countries, as legal constraints, language barriers, and transactions costs impede wagering abroad.[1]

Segmentation of national betting markets (pools of bettors) is important for our analysis. With a homogeneous product and symmetric information, prices (quotas) should be identical across countries if markets are unified. With segmented markets, however, prices may differ. They will differ in terms of the average payout per monetary unit waged, if different industry structures across countries support different markups charged by bookmakers. They will also differ in terms of relative quotas for particular outcomes of a game, if bookmakers can profitably exploit either a *perception bias* among bettors that induces them to overrate the winning chances of their national team, or a *loyalty bias* that keeps bettors from wagering against their own team even under favorable odds. Both type of biases reflect bettor sentiment. Empirical support for their influence on betting market outcomes has been found for club sports at national level. On the perception bias, see for example, the study by Levitt (2004) which explores wagering behav-

ior on NFL games in the US. Evidence for the loyalty bias is provided by Forrest and Simmons (2008) who analyze wagering on top tier Spanish and Scottish football. Among the extensive and growing body of literature on sports wagering, however, no study has yet explored betting markets across countries, let alone the influence of national sentiment on cross-country differences in wagering behavior (for a comprehensive survey of the economics literature on sports wagering markets, see Sauer, 1998). In theoretical models of wagering markets, in turn, only the misperception bias has yet been formally modeled and analyzed. And as regards wagering on European football, that is the very context of our analysis, but a single study has explored this bias and then only by means of a numerical example (Kuypers, 2000).

This paper develops a theoretical model of wagering markets that allows for both types of biases and it provides first empirical evidence on their influence on betting odds for international sport events in a cross-country context. Based on a unique data set of betting quotas from online bookmakers in twelve European countries for qualification games to the UEFA Euro 2008, we analyze differences in odds for win offered across countries for evidence of systematic biases in the pricing of domestic teams. For the majority of countries in our sample, we find evidence for such systematic biases. Variations in the sign and magnitude of these deviations can be explained by differences in the respective strengths between countries of the perception and the loyalty bias among bettors. Overall, our empirical results provide strong evidence for a sizeable influence of national sentiment on wagering market outcomes in Europe.

The paper is structured as follows. Section I. analyzes theoretically the price setting behavior of a bookmaker in the absence and in the presence of bettor national sentiment as expressed in a perception or a loyalty bias. Section II. describes the data, Section III. presents and discusses the empirical results, and Section IV. concludes.

I. Theoretical Considerations

On wagering markets, prices (odds) are set by bookmakers. Hence, for prices to be informative about any national sentiment of bettors, it must be profitable for bookmakers to shade their odds when faced with such underlying bettor preferences. This we show in this section by studying the price setting behavior of a profit-maximizing (risk-neutral) bookmaker in the absence and in the presence of bettor national sentiment. We first describe the model setup in the absence of any perception and loyalty bias of bettors and then examine their respective effects on bookmaker odds offered.

To formalize the decision problem of the bookmaker, consider a football match between countries A and B and assume, for simplicity, that there are only two potential outcomes, either

country A or country B wins.[2] Wagering markets are assumed to be separated between countries and to be served each by a single bookmaker. Bettors in both countries may hence place bets only with their respective domestic bookmaker. Information on the quality of national teams is furthermore assumed to be freely available and symmetric across countries, bookmakers, and bettors. In the absence of any national sentiment bias, quotas marketed in countries A and B would hence be identical.

Given the symmetric setup for the two countries, we can restrict the analysis in the following without loss of generality to the pricing behavior of a bookmaker in just one of the countries, say country A. The choice variable of the bookmaker in country A is the probability $a \in [0, 1]$ of win for country A. The resulting odds for this outcome as offered by the bookmaker (the quota marketed), is just the inverse of this probability, i.e. $\frac{1}{a}$, or simply the payout for a single monetary unit waged on this event. Likewise, the probability and the resulting odds for win of country B are given by $1 - a$ and $\frac{1}{1-a}$, respectively. The bookmaker's subjective probability for win of country A, denoted $\hat{a}$, need not coincide with probability a underlying the odds actually offered to bettors. In reality, bookmakers typically charge a fixed markup. Here we abstract from such markups, as they would merely complicate the model but not affect any of the theoretical results. In the empirical part, we will of course account for them.

Regarding the behavior of bettors, we first assume in line with Kuypers (2000) and Levitt (2004) that the decision of bettors to enter the market (to place a bet on the game) has already been made and concentrate on how punters spread the total volume of bets on the two outcomes. Each bettor is assumed to place a monetary unit on one of the two teams. A bettor will place her money on country A, if a is equal to or smaller than her subjective probability for win of country A. Otherwise, she will bet on country B. Let $f(a)$ represent the fraction of punters that for a given probability a will bet on country A. The function $f(a)$ is assumed to be nonincreasing in a, differentiable ($f'(a) \leq 0$), and known to the bookmaker.

The bookmaker's expected profit on a unit bet on one of the two teams is the unit itself minus the expected payout. The latter is given by the corresponding odds multiplied by the subjective outcome probability of the bookmaker. To obtain total profits per unit bet, the (per unit) profit generated by a bet on one of the two teams has to be weighted by the corresponding fraction of bettors. Summing up across the two outcomes yields

$$\left(1 - \frac{\hat{a}}{a}\right) f(a) + \left(1 - \frac{1 - \hat{a}}{1 - a}\right) (1 - f(a)) \,. \tag{1}$$

The bookmaker will choose a as to maximize expression (1). The corresponding first-order

condition is given by

$$\frac{\hat{a}}{a^2}f(a) - \left(1 - \frac{1-\hat{a}}{1-a}\right)f'(a) = -\left(1 - \frac{\hat{a}}{a}\right)f'(a) + \frac{1-\hat{a}}{(1-a)^2}(1-f(a)), \tag{2}$$

which is fulfilled at the optimal $a = a^*$. The terms on the left-hand side of the equation represent the marginal benefits of a small increase in the probability a, while the right-hand side contains the corresponding marginal costs. Since a reflects the probability for country A winning the match, an increase in a translates into lower odds for bets on team A. Consequently, the bookmaker's expected profit for any monetary unit placed on country A increases in a, as reflected by the first term on the left-hand side of equation (2). However, lower odds also induce punters to switch to team B so that the expected gross profit per-unit bet on country A now applies to a smaller fraction $f(a)$ of bettors (first term on the right-hand side). For bets waged on team B, the findings are just reversed as the corresponding probability $1 - a$ gets smaller.

Within this basic analytical framework, we can now explore the two pathways by which bettor national sentiment may affect pricing patterns on domestic wagering markets. We consider the perception bias first.

Perception Bias

National sentiment may bias bettors' perceptions of the winning chances of their national team upwards. In principle, of course, one may also allow for under-confidence in the national team. However, the (albeit rare) existing evidence suggests that supporters, if at all biased in their perceptions, tend to over- rather than under-estimate the winning chances of their own team (see Babad and Katz, 1991). If so, then for any given probability set by the bookmaker, the fraction of bettors placing a bet on country A is equal to or greater than the corresponding fraction in the absence of a perception bias. The bookmaker is hence faced with a function $f^{Bias}(a)$ such that $f^{Bias}(a) \geq f(a) \; \forall \; a \in [0,1]$. Assuming that the slopes of the two functions coincide at $a = a^*$, i.e. $f^{Bias\prime}(a^*) = f'(a^*)$,[3] and provided that $f^{Bias}(a^*) > f(a^*)$, a perception bias among bettors unambiguously increases the bookmaker's profit-maximizing choice of the probability a for win of country A.

This finding can be appreciated by inspecting the first-oder condition at $a = a^*$. When bettors overrate the winning chances of the domestic team, marginal benefits to the bookmaker of an increase in a rise, because the higher expected profit per unit bet on country A now applies

to a larger fraction of bettors. At the same time, the corresponding marginal costs decline, as lower expected profits on any monetary unit waged on country B now accrue only for a reduced fraction $1 - f^{Bias}(a^*)$ of bettors. It is therefore unambiguously profitable for the bookmaker to increase probability a and thereby reduce the odds for win of team A offered to bettors. It is straightforward to show that this result also holds when the bookmaker's subjective probability $\hat{a}$ is biased upwards by national sentiment as well. In fact, the bookmaker's tendency to reduce the odds for win of team A will be reinforced in this case. Levitt (2004), however, presents evidence that bookmakers are more skilled than bettors at predicting match outcomes. This finding suggests that bookmakers, if anything, are less affected by any sentiment in their assessment of objective outcome probabilities.

Summarizing the above, the more confident are bettors regarding the success probability of their home team, that is the stronger is the perception bias, the lower will be the actual odds for such an outcome offered by the domestic bookmaker. A similar point has been made by Kuypers (2000) by means of an illustrative numerical example. He shows that a bookmaker may take advantage of bettors who overrate the winning chances of their favorite team by shading odds against this team.

Loyalty Bias

Up to now it was assumed that punters always place a bet on a game. Their only decision therefore concerned how to spread their betting stakes over the two possible match outcomes. However, as noted but not formalized by Forrest and Simmons (2008), wagering against the own team may well be unacceptable to supporters. Committed bettors, the authors note, might be as unwilling to switch bets to the opponent team if odds on win offered for the own team get unfavorable, as they are unlikely to switch to replica shirts of the opponent team only because these got relatively cheaper. Viewed as an act of disloyalty, supporters may just be interested in a bet on their team or none at all (loyalty bias).

If bettors only consider whether or not to bet on their national team, the actual betting volume is no longer fixed, only the *potential* one.[4] If the bookmaker sets probability a below the corresponding subjective probability of a loyal bettor for win of the own national team, this bettor will not switch to wager money on country B but instead refrain from wagering altogether. The bookmaker's profit function hence consists only of the first term of equation (1), i.e. the profit generated by bets on country A. The corresponding first order condition

then reads

$$\frac{\hat{a}}{a^2} f(a) = -\left(1 - \frac{\hat{a}}{a}\right) f'(a). \tag{3}$$

As is evident from equation (3), the impact of a loyalty bias of bettors on offered quotas can not be unambiguously determined. The probability chosen by the bookmaker will increase (decrease) whenever at $a = a^*$ marginal benefits of further increases in a are larger (smaller) than the corresponding marginal losses, i.e. whenever at $a = a^*$ the left hand-side of equation (3) exceeds the right-hand side. Benefits arise from higher expected profits per unit bet and losses from a reduction in the actual betting volume. If the behavioral response of bettors to changes in a is sufficiently strong, i.e. if $f'(a^*)$ is sufficiently large in absolute terms, odds for win of country A will actually be biased in favor of domestic bettors. Note that by increasing marginal benefits, an additional perception bias among bettors will as before increase the probability a set by the bookmaker.

Summarizing our analysis of the loyalty bias, if national sentiments induce bettors to wager, if at all, only on win for their home team, then domestic bookmakers may profitably bias odds in favor of rather than against committed bettors. More favorable odds on win for domestic teams, if indeed observed in the data, therefore provide evidence for a loyalty bias of domestic bettors. Although bettors need not necessarily be free of a perception bias in this case, any over-confidence on their part would have to be very weak. If, in contrast, odds on win for domestic teams are found to be less favorable, national sentiment in the form of either or both a perception and loyalty bias may sign responsible. While deviations, however signed, in the probabilities underlying odds for win of the domestic team therefore provide evidence for an influence of national sentiment on bettor behavior, only negative biases produce sufficient information to assess the respective strengths of the perception and loyalty bias.

II. Data

The empirical analysis is based on a unique dataset of betting quotas that we collected from online bookmakers in twelve European countries for qualification games of national football teams to the UEFA Euro 2008. The dozen countries sampled represent a selective subset of the 50 UEFA member countries participating in the qualification, including both some potential favorites as well as likely underdogs. The bets considered are simple bets on home win, draw, and away win (respectively, $quota^H$, $quota^D$, and $quota^A$). Quotas for games were collected online in the morning of a qualification round in random order across countries to avoid potential sampling bias due to systematic early or late recording. Online bookmakers for the twelve countries considered were primarily selected from members of the European Lotteries and Toto

Association which is composed of State Lottery and Toto companies established in Europe (see www.european-lotteries.org). For each country, a bookmaker was chosen that operated online and offered simple home win, tie, and away win bets. If none of the members of a country met these conditions, we selected a large private online bookmaker from the internet. Throughout this process, we disregarded bookmakers who operated via subsidiaries in more than one European country.[5]

Table 1 describes our final dataset, which covers betting quotas on 218 qualification games from 12 European countries in 6 qualification groups, sampled online between November 2006 and November 2007. Starting the research project only after the qualification had started, we did not record the first 5 qualification rounds. Our sample, however, covers 71% of all qualification games. As can be seen in column (2) of Table 1, no bookmaker offers bets on all games. The number of games for which bets are offered range from as few as 141 in the case of the Dutch bookmaker to 217, or almost the total number of matches sampled, for bookmakers in the Czech Republic and in the Netherlands. To gauge the influence of any sample selection bias arising from this differential coverage of games, we will use three estimation samples in the regression analysis. The first, or 'Total Sample', includes all games for which at least one bookmaker offers quotas (218 games). The second ('Restricted Sample I') includes all games for which at least six bookmakers offer quotas (208 games), and the third ('Restricted Sample II') all games for which at least nine bookmakers offer quotas (189 games). Sample sizes decline significantly if this minimum threshold is further increased. Only for less than half of all games covered in our data (107 games) do all twelve betting countries offer quotas. For each country in our sample, we observe a total of eight to nine home and away matches (columns 3 and 4), that is games in which the national team takes part.

<Table 1 about here>

Columns (5) and (6) report means and standard deviations of the so-called overround which can be taken as a measure of a bookmaker's gross margin. The overround is defined as the expected (gross) profit a bookmaker makes from a wager of a punter who bets on all three match outcomes such that she collects an expected unit return. For a given match, the overround is equal to the sum of the inversed quotas minus one. As is evident, overrounds differ significantly between bookmakers in different countries (column 5), but vary hardly across games for individual bookmakers (column 6). The former finding supports our assumption of nationally separated online betting markets, as such marked differences in (gross) profits across countries could not persist if betting markets were unified. The latter finding, in turn, suggests that bookmakers seek to realize a specific gross margin. It also implies that the overround is not

used by bookmakers as a means to price potential variation across games in either outcome uncertainty or bettor sentiment. Note that a constant overround has also been found in studies on national wagering markets (see, for example, Kuypers, 2000).

Measures for our primary outcome of interest considered in the theoretical analysis, the probability of win for a domestic team, can be obtained from the respective odds offered for win of the home team in home games and of the away team in away games. As odds offered to bettors also contain the overround, however, they need to be adjusted first so as to obtain the underlying probabilities for the respective outcomes as marketed by bookmakers. Specifically, the implied probability of win for the home team (a^H) and the probability of win for the away team (a^A) can be calculated from the quotas bookmaker j offers on match i as the inverse of the quota for the respective outcome, adjusted by the sum of all inverse quotas for the three potential match outcomes:

$$a_{ij}^k = \frac{1}{\rho_{ij} * quota_{ij}^k},$$

where $k = \{H, A\}$ and ρ_{ij} is given by $\frac{1}{quota_{ij}^H} + \frac{1}{quota_{ij}^D} + \frac{1}{quota_{ij}^A}$. In the following analysis, these probabilities will be used as our endogeneous variables to assess whether domestic teams are priced differently at home and abroad.

III. Results

To investigate whether betting behavior in any of our twelve European countries sampled is subject to a national sentiment bias, we run separate regressions for home ($k = H$) and away games ($k = A$) of the following type:

$$\begin{aligned} a_{ij}^k &= \beta_0 + \beta_1(HomeGame_{ij} \times Bookmaker_j) + \beta_2(AwayGame_{ij} \times Bookmaker_j) \\ &\quad + \beta_3 Bookmaker_j + \beta_4 Game_i + \epsilon_{ij}, \end{aligned} \tag{4}$$

where a_{ij}^k is the implied probability of win for the home (away) team in game i as set by bookmaker j, and $Bookmaker_j$ ($Game_i$) is a set of betting country dummies (game dummies). Game fixed effects capture all relevant information on the objective winning chances of teams on the day of a game (recall that quotas have been sampled in the morning of a qualification round). If information is indeed symmetric across countries, we should be able to account for most of the variation in probabilities in the data. To capture the potential influence of national sentiment bias of bettors on prices set, we furthermore include a full set of interaction terms of betting country identifiers and dummies for home, respectively away game status, where

$HomeGame_{ij}$ ($AwayGame_{ij}$) is a dummy variable that indicates whether bookmaker j's national team participates as the host (visitor) in a particular match.[6] As odds for win of the home (away) team marketed in the country of the away (home) team may be biased as well, we also include as additional controls a set of interaction terms of betting country identifiers and dummies for away (home) game status (alternatively, one could drop odds offered by bookmakers of opposing teams from the estimation sample). Odds offered in non-participating countries to a game hence constitute our control group of objective price measures. In regressions that use the probablity of win for the home (away) team as the endogenous variable, our primary coefficient vector of interest is β_1 (β_2). If wagering behavior of domestic bettors is unaffected by national sentiment, that is free of any perception and loyalty bias, then elements in β_1 (β_2) will be zero throughout.

As shown in Table 2, which contains the regression output for the probability of win for home teams, we obtain an $R^2 \approx 1$ across the different estimation samples considered, a consequence of the inclusion of game dummies into the regression equation. This suggests that outcomes of games are indeed priced very similar across bookmakers (cf. Strumpf, 2003). Of primary importance for the purpose of our analysis, however, probabilities for home win implied by quotas offered appear systematically biased in several countries when it is their respective national team that has the home game. Biases, however, are not uniform, either in sign or magnitude. In Bulgaria, Denmark, and Italy, the bias is positive, in France, Slovenia, and Sweden, it is negative. Among the former, the bias is most pronounced in Bulgaria and Denmark (approx. +5%), among the latter it is largest in Sweden (approx. -4% each). Note that results are remarkably consistent across estimation samples in terms of the sign, magnitude, and statistical significance of estimated coefficients. Only for Slovenia, does the estimated coefficient, although unchanged in size, turn insignificant in the third estimation sample. Potential sampling bias due to non-coverage of particular games by bookmakers, if indeed present at all, hence appears negligible.

<Table 2 about here>

Following our theoretical discussion in Section 2, the empirical finding of a downward bias in the probability for home win in France, Slovenia, and Sweden suggests that national sentiment in these countries primarily expresses itself in terms of committed bettors that only consider betting on the home team if at all (loyalty bias). Bettors in these countries hence do not - or only to a very limited degree - overrate the winning chances of their home team. The positive biases found for Bulgaria, Denmark, and Italy can, following our formal treatment, be explained with reference to both types of sentiment biases. Bettors may only consider bets on their home

team and / or overrate the winning chances of their national team in home games relative to the chances as they are on average marketed in countries not participating in a game. If the loyalty bias were generally negative in sign, however, bettors' perceptions of the winning chances of their national team would have to be significantly upward biased for a positive bias in the odds for win for the domestic team to be in the interest of a profit-maximizing bookmaker. In this case, the magnitude of the bias in the odds for win is again informative about the respective strengths of the two biases. Specifically, the level of over-confidence will *ceteris paribus* increase the degree to which odds are biased upwards.

Rerunning the same regressions, but now with the probabilities for win in an away game as implied by quotas set, we get results that are qualitatively identical for countries exhibiting the largest upward, respectively downward bias in home games (Table 3). Specifically, in Bulgaria and Denmark (Sweden) implied probabilities for win of the home team are again biased upwards (downwards), albeit to a lesser degree. However, there are also some differences observable. Italian (French and Slovenians) bettors, who in home games are faced with less (more) favorable odds for win of the own team, are not confronted with such biases in away games of their national team. This may point to a greater importance of national sentiment biases in home games. In addition, for Spain an upward bias is observed in away but not in home games. Note, however, that the estimated positive coefficient for Spain in home games is only barely insignificant at the 10% level.

<Table 3 about here>

Table 4 summarizes the qualitative findings of our baseline regressions. Entries along its main diagonal are comprised of countries that display consistent patterns regarding the presence or absence and direction of biases in odds marketed for win of domestic teams across both home and away games. Eight out of twelve countries in our sample, and hence the majority, belongs to this group. The remainder (off-diagonal entries) are countries in which probabilities for win of the national team are biased upwards or downwards in home or in away games, but not in both. Overall, we find evidence for systematic biases in the rating of own national teams in seven out of the twelve countries in our sample, with incidences of a positive bias outnumbering those of a negative bias. The latter, as argued, can be attributed to a loyalty bias of domestic bettors for their national team, while the former may be the result of either or both a perception and loyalty bias.

<Table 4 about here>

Note that the biases emerging from our empirical analysis are different from (and hence cannot

be explained by) a major bias investigated in the literature on sports wagering, the favorite-longshot bias according to which favorites tend to be overbet and longhots underbet. Nor do they reflect mere home team advantage, as it is differences across bookmakers in the odds for a particular outcome of a specific game that we consider. Biases also do not resemble simple patterns of overall country performance in the qualification to the UEFA Euro 2008. Odds for win of the Swedish team, for instance, have been unfavorable in Sweden, but the team safely qualified as second best in its group. English bettors, in contrast, appear not to have suffered from any sentiment bias, although their national team did not qualify for the Euro finals in Austria/Switzerland. Estimated biases also do not fit a simple national-private bookmaker divide. Among the countries with a positive sentiment bias, there are both countries with state-run bookmakers (Bulgaria and Denmark) and countries with private bookmakers (Italy and Spain). A negative bias, in contrast, is observable only in countries with state-run bookmakers (France, Slovenia, Sweden), and among countries that do not exhibit any bias at all, again both state-run (Netherlands and Norway) as well as private bookmakers (Czech Republic, England, and Germany) can be found.

We checked the robustness of our results to changes in both regression specification and estimation sample. Checks of the former type included the clustering of standard errors at game level, the inclusion of country-specific time trends across qualification rounds, and the use of identifiers for games of teams that are in the same group as the respective betting country. Changes in the latter dimension included the restriction of the estimation sample to games in which at least one of the betting countries participated, to games not involving teams in the same qualification group as the betting country unless the latter itself represents the home or away team, and to games for which quotas are offered by all twelve betting countries. None of these checks changed our results materially. The already noted near statistically significant positive (negative) bias for Spain (the Netherlands) in home games in our baseline regressions at times turned significant, while the weakly statistically significant positive (negative) bias for Italy (Slovenia) in home games occasionally got insignificant, although only barely (p-values then mostly fall in the range of 0.10-0.12). Results for away games were virtually unchanged throughout (regression outputs of these robustness checks can be obtained from the authors upon request).

IV. Conclusion

This paper has provided a first theoretical treatment of how national sentiment in the form of either a perception or a loyalty bias of bettors may bias across countries odds for win marketed for own national teams in sports competitions. Based on a unique data set of online

betting quotas from twelve European countries for qualification games to the UEFA Euro 2008, we then analyzed empirically differences in odds for win offered across countries for evidence of systematic biases in the pricing of own national teams.

We found several countries to exhibit such biases in pricing behavior, some positive, and some negative. Biases furthermore appeared to be more frequent in home than in away games, and countries with positive biases (Bulgaria, Denmark, Italy, and Spain) outweighed in number countries with negative biases (France, Slovenia, and Sweden). For the former group of countries, national sentiment of bettors in the form of either or both a perception and a loyalty bias may explain observed deviations in odds marketed. In the latter group of countries, in contrast, bettors must have been subject to a loyalty bias that dominated domestic wagering behavior. Overall, our empirical results provide strong evidence for a sizeable influence of sentiment on wagering market outcomes in Europe. An interesting question, though one beyond the scope of the present paper, is why national sentiments seem to express themselves so differently across wagering markets in Europe. Another natural extension to our study would be the analysis of further markets to see whether national sentiment influences behavior also in other areas of the economy.

Acknowledgments

This paper has benefited from comments by Ronald Bachmann, Thomas Siedler, Martin Spieß, Thorsten Vogel, participants of the 2008 Conference on Economics and Psychology of Football and the 2008 meeting of the European Economic Association, and participants of research seminars of the Berlin Network of Labour Market Research (BeNA), at the RWI Essen and the Humboldt University Berlin.

References

[1] Babad, E. and Katz, Y. (1991). Wishful thinking against all odds. *Journal of Applied Social Psychology*, 21 (23), 1921 - 1938.

[2] Forrest, D. and R. Simmons (2008). Sentiment in the betting market on Spanish football. *Applied Economics*, 40 (1), 119 - 126.

[3] Kuypers, T. (2000). Information and efficiency: an empirical study of a fixed odds betting market. *Applied Economics*, 32 (11), 1353 - 1363.

[4] Levitt, S.D. (2004). Why are gambling markets organised so differently from financial markets? *The Economic Journal*, 114 , 223 - 246.

[5] Morse, A. and S. Shive (2008). Patriotism in your portfolio. *Journal of Financial Markets*, forthcoming.

[6] Sauer, R.D. (1998). The economics of wagering markets. *Journal of Economic Literature*, 36 (4), 2021 - 2064.

[7] Shankarmahesh, M.N. (2006). Consumer ethnocentrism: an integrative review of its antecedents and consequences. *International Marketing Review*, 23 (2), 146 - 172.

[8] Strumpf, K.S. (2002). Illegal sports bookmakers. *Mimeo*, Department of Economics, University of North Carolina.

[9] William, R.J. and R.T. Wood (2007). *Internet Gambling: A Comprehensive Review and Synthesis of the Literature*. Report prepared for the Ontario Problem Gambling Research Centre, Guelph, Ontario, Canada.

Notes

[1]For a recent survey of national regulations in European countries governing online wagering markets, see Williams and Wood (2007). In a perfectly unified market, competitive pressures should eliminate excess profits of bookmakers. For our sample of European countries, however, we show in Section 3 that the fixed markups charged by online bookmakers in different countries vary considerably.

[2]See Kuypers (2000) for a related model that allows for three distinct outcomes. In the empirical analysis, we concentrate solely on the effect of national sentiment on odds for win of the home team. Accordingly, one may re-interpret the model as distinguishing between the outcomes 'win' and 'non-win' of a team.

[3]Alternatively, one can assume that the responsiveness of bettors to the odds offered by the bookmaker is larger (smaller) with biased perceptions than without, i.e $f^{Bias\prime}(a^*) < f'(a^*)$ ($f^{Bias\prime}(a^*) > f'(a^*)$). The effects identified in the following are then still present. But the negative effect of an increase in a on the fraction of bettors wagering on country A would be more (less) pronounced, and the positive effect on the fraction $1 - f(a)$ would be reinforced (dampened). The bookmaker would hence face two additional effects that pull odds into different directions.

[4]One could also assume that only a fraction of bettors exhibits a loyalty bias. For the sign of the induced deviation in marketed odds, however, such change in assumption is immaterial.

[5]For Germany, we had to drop the state-run online bookmaker Oddset from our sample, as its online betting service was temporarily discontinued during the observation period. Note also that the choice of an English bookmaker poses some problems since its service is likely to be taken up also by Scots which do not share much sympathy with the English national team. However, the English are by far in the majority among potential bettors in the United Kingdom. Nevertheless, the estimates for the national sentiment bias in England should be taken with some caution. Dropping England from our dataset does not affect the results for the other countries.

[6]Our estimation sample includes odds from bookmakers both for games in which the domestic team participates and for games in which the domestic team does not participate. We can hence include a full set of interaction terms of betting country identifiers and dummies for home, respectively away game status.

TABLE 1: COUNTRIES, BOOKMAKERS, AND SUMMARY STATISTICS

Country: Name	Bookmaker	Group	Games Covered: Total	Home	Away	Overround: Mean	St.d.
		(1)	(2)	(3)	(4)	(5)	(6)
Bulgaria*	eurofootball.bg	7	194	4	4	0.207	0.019
Czech Republic	eurotip.cz	4	217	4	4	0.110	0.007
Denmark*	danskespil.dk	6	171	5	4	0.146	0.011
England	skybet.com	5	217	4	4	0.123	0.007
France*	fdjeux.com	2	181	4	4	0.228	0.034
Germany	sportwetten-gera.de	4	210	5	4	0.122	0.008
Italy	match-point.it	2	202	4	4	0.112	0.010
Netherlands*	toto.nl (De Lotto)	7	141	4	4	0.246	0.020
Norway*	norsk-tipping.no	3	154	5	4	0.176	0.002
Slovenia*	sportna-loterija.si	7	200	5	4	0.149	0.018
Spain	miapuesta.com	6	217	5	4	0.101	0.004
Sweden*	svenskaspel.se	6	207	4	4	0.250	0.003

NOTE: * denote countries for which the respective bookmaker is state run. (1): qualification group of betting country; (2): total number of games for which betting country has complete triplet (win, tie, loss) of quotas; (3),(4): number of home and away games of betting country; (5): average (gross) profit of bookmaker from a wager of a punter who bets on all three match outcomes such that she collects a unit return; (6): standard deviation of average (gross) profit.

Table 2: ols estimates for winning probability in home games

Dependent variable: probability win home team			
Covariates	Total Sample	Restr. Sample I	Restr. Sample II
Home team and bookmaker from:			
Bulgaria	5.1^{***}	5.1^{***}	5.0^{***}
	(1.3)	(1.3)	(1.3)
Czech Republic	-0.6	-0.6	-0.5
	(1.1)	(1.1)	(1.1)
Denmark	4.8^{***}	4.8^{***}	5.2^{***}
	(1.0)	(1.0)	(1.1)
England	-0.6	-0.6	-0.6
	(1.1)	(1.1)	(1.1)
France	-2.4^{**}	-2.4^{**}	-2.4^{**}
	(1.2)	(1.1)	(1.1)
Germany	-1.1	-1.2	-1.1
	(1.0)	(1.1)	(1.1)
Italy	2.0^{*}	2.0^{*}	2.6^{**}
	(1.2)	(1.2)	(1.3)
Netherlands	-1.9	-1.9	-1.9
	(1.3)	(1.3)	(1.3)
Norway	0.9	0.9	0.8
	(1.0)	(1.0)	(1.0)
Slovenia	-1.9^{*}	-1.9^{*}	-1.9
	(1.1)	(1.1)	(1.1)
Spain	1.6	1.6	1.7
	(1.0)	(1.0)	(1.0)
Sweden	-3.8^{***}	-3.9^{***}	-4.0^{***}
	(1.1)	(1.1)	(1.1)
Away team × bookmaker interactions	*yes*	*yes*	*yes*
Country dummies	*yes*	*yes*	*yes*
Game dummies	*yes*	*yes*	*yes*
N	2311	2267	2131
R^2	0.99	0.99	0.99

Note: *,**,*** denote statistical significance at the 10%, 5%, and 1% level. Standard errors in parentheses. Total Sample: at least 1 obs. per match; Restr. Sample I: at least 6 obs. per match; Restr. Sample II: at least 9 obs. per match. Base group: betting countries not participating in a game.

Table 3: ols estimates for winning probability in away games

Dependent variable: probability win away team			
Covariates	Total Sample	Restr. Sample I	Restr. Sample II
Away team and bookmaker from:			
Bulgaria	3.5^{***}	3.5^{***}	3.5^{***}
	(1.1)	(1.1)	(1.1)
Czech Republic	-0.6	-0.6	-0.6
	(1.3)	(1.3)	(1.3)
Denmark	4.0^{***}	4.0^{***}	4.0^{***}
	(1.1)	(1.1)	(1.1)
England	-0.4	-0.4	-0.2
	(1.1)	(1.1)	(1.3)
France	0.1	0.1	0.1
	(1.3)	(1.3)	(1.3)
Germany	1.0	1.0	1.0
	(1.3)	(1.3)	(1.3)
Italy	-0.1	-0.1	-0.4
	(1.1)	(1.1)	(1.3)
Netherlands	1.3	1.3	1.3
	(1.1)	(1.1)	(1.1)
Norway	0.5	0.5	0.5
	(1.1)	(1.1)	(1.1)
Slovenia	-0.4	-0.4	-0.4
	(1.1)	(1.1)	(1.1)
Spain	3.8^{***}	3.9^{***}	3.8^{***}
	(1.1)	(1.3)	(1.3)
Sweden	-3.7^{***}	-3.7^{***}	-3.8^{***}
	(1.1)	(1.1)	(1.1)
Home team × bookmaker interactions	*yes*	*yes*	*yes*
Country dummies	*yes*	*yes*	*yes*
Game dummies	*yes*	*yes*	*yes*
N	2311	2267	2131
R^2	0.99	0.99	0.99

Note: *,**,*** denote statistical significance at the 10%, 5%, and 1% level. Standard errors in parentheses. Total Sample: at least 1 obs. per match; Restr. Sample I: at least 6 obs. per match; Restr. Sample II: at least 9 obs. per match. Base group: betting countries not participating in a game.

TABLE 4: SUMMARY OF RESULTS FROM BASELINE REGRESSIONS

Home Game \ Away Game	Positive Bias	Negative Bias	Objective
Positive Bias	*Bulgaria, Denmark*		*Italy*
Negative Bias		*Sweden*	*France, Slovenia*
Objective	*Spain*		*Czech Republic England, Germany Netherlands, Norway*

NOTE: 'Objective' denotes countries which do not differ in their odds for win of their domestic team from odds on the same outcome as on averaged marketed in countries not opposing these countries. Spain (the Netherlands) only exhibits a barely insignificant positive (negative) bias in home games.