



Center for Research in Economics, Management and the Arts

Football spectator no-show behavior in Switzerland: Empirical evidence from season ticket holder behavior

Working Paper No. 2021-06

CREMA Südstrasse 11 CH - 8008 Zürich www.crema-research.ch

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This version: February 10, 2021

Current version: February 10, 2021

Abstract: For football executives, understanding the determinants of spectator no-show behavior better is of utmost importance. Recent research efforts, however, have primarily focused on exploring the potential effects of determinants that the club management can hardly influence (e.g., potential scheduling effects, the visiting team's quality, and the weather). In contrast, our understanding of factors relating to both accommodation (e.g., the ticket price), socio-demographics (e.g., age), and also emerging no-show habits, in predicting no-show behavior is still limited. Here, departing from more traditional survey-approaches, we address this shortcoming by exploring disaggregated behavioral season ticket holder data provided by an established Swiss Super League club. Analyzing a rich data set containing roughly 2.09 million attendance decisions made by ticket holders in Switzerland between 2013 and 2016, we observe that both a season ticket holder's accommodation and his (or her) socio-demographic information can help predict subsequent no-show behavior. In particular, we notice an important role of a season ticket holders' age, his (or her) domicile, and emerging no-show habits, as well as the season ticket price. Although our results suggest that the management of clubs with a strong demand for tickets might be well-advised to begin experimenting with strategies to exploit emerging no-show habits among their season ticket holders, most executives, i.e., those operating at clubs that sell-out their stadium only occasionally, might want to prioritize efforts to increase the inherent ticket value (e.g., by reducing the ticket supply).

Keywords: attendance, decision-making, demand, football/soccer, no-shows, season tickets, spectator sports, stadiums

JEL Codes D12, L83, R22, Z20

Running head: Football spectator no-show behavior in Switzerland

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**Football spectator no-show behavior in Switzerland:
Empirical evidence from season ticket holder behavior**

Introduction

Today, for professional football executives, understanding the determinants of spectator no-show behavior better is of utmost importance. Although one might argue that a ticket holder's decision to forgo physical attendance on matchday, thus being a no-show, is mostly irrelevant to a football club once the ticketing department has sold the ticket to him (or her), and generated the necessary income, this subsequent decision, however, poses several severe challenges for the club management. First, as such spectator no-show behavior is more likely among a club's many season ticket holders (STHs; e.g., Schreyer, 2019), those football executives running a club facing a strong ticket demand lose substantial match day income if those season tickets, usually offered at a significant discount, remain unused but could have been otherwise sold to the public on the short term for the regular price or, perhaps, even more. Similarly, the very same executives, second, increasingly need to manage complaints from impatient future STHs on the waiting list that often remain empty-handed for long periods, despite frequently observing empty seats. Third, as spectators must be considered an integral part of the product offered to third parties (e.g., Correia & Esteves, 2007; Kuenzel & Yassim, 2007; Morrow, 1999), a large number of no-shows is, further, in diametric opposition to the interest of the club management's most valuable external stakeholders (e.g., broadcasters, corporate sponsors, and also those customers in the hospitality section), all of whom benefit from the atmosphere created in a packed stadium (e.g., McDonald, 2010). In other stakeholder groups, most notably among TV audiences, sold-out yet unoccupied stadiums, fourth, might decrease future stadium visit intentions (e.g., Oh et al., 2017), thus endangering the success of the management's initial ticketing strategy. Somewhat related, among STHs – the ticketing department's most important stakeholder group – frequent no-show behavior might, fifth, ultimately result in future season

ticket churn (e.g., McDonald et al., 2014). Sixth, in the stands, every no-show results in reduced income generated from selling food and beverages, team merchandise, and often also parking tickets. Despite this shortfall in matchday revenue, seventh, club management often has to plan according to information from ticketing sales and might, thus, misspend not on only personnel but also goods. Further, as football clubs are increasingly interested in diversifying their income sources (cf., Schmidt & Holzmayr, 2018), some clubs, eighth, might also benefit from a decrease in auxiliary revenues generated through, for example, hotel stays, museum visits, and stadium tour bookings if spectator no-show behavior increases. On the field, ninth, thousands of empty seats might diminish an otherwise often significant home advantage (e.g., Bryson et al., 2021; Krumer & Lechner, 2018; Reade et al., 2020a).

More recently, two mostly independent, complementary streams of empirical research on the phenomenon of spectator no-show behavior have emerged in the literature. While their authors have employed different methodological approaches to various sporting markets, most of these studies, however, offer only a few answers to the critical question of how to manage spectator no-show behavior.

Those authors in the first stream began early – perhaps often unintentionally – to document the existence of no-shows in different sporting environments, but were mostly interested in exploring related concepts, such as season ticket churn (e.g., McDonald, 2010), relationship quality (e.g., Lee et al., 2019), and satisfaction (e.g., McDonald et al., 2017). Accordingly, although most of the research generated in this stream of the literature relies on cross-sectional survey data collected on the individual level, and, thus, might help us grasp the magnitude and, perhaps, also infer the cultural robustness of the increasingly important phenomenon better, only a few studies (e.g., McDonald et al., 2017; Sampaio et al., 2015; Solberg & Mehus, 2014) add to our understanding of its potential antecedents. Further, as Karg and McDonald (2011), among others, observe, it ultimately remains questionable as to whether ticket holders, when surveyed, give an accurate indication of their – socially undesirable – no-

show behavior. As such, the use of survey-data to understand no-show behavior better might be considered inappropriate.¹

In contrast, the authors in the second stream only recently began explicitly modeling the determinants of spectator no-show behavior by employing behavioral rather than survey data.² Although not without its merits, most of this previous research (e.g., Schreyer & Däuper, 2018) suffers from not only a focus on exploring the effect of determinants that the club management can hardly influence (e.g., potential scheduling effects, the visiting team's quality, and the weather) but also from the use of aggregated data that, in turn, has yet prevented the field from analyzing relevant parameters such as the ticket price in the necessary detail. Those few authors that do exploit individual data, however, only present results for a rather short period of observation (e.g., Schreyer et al., 2016), and, as becomes evident during their analysis, fail to exclude those debtors holding multiple season tickets, which, in turn, might affect the robustness of the reported results.

In this paper – perhaps best understood as documenting an enhanced replication study – we add to the emerging empirical literature on spectator no-show behavior in two important ways. First, drawing on the core elements from both literature streams discussed above, i.e., the use of data collected on the individual level and a timely move towards exploring behavioral data rather than mere behavioral intentions, we are first to examine whether earlier results on both the existence of no-show behavior and its antecedents are potentially generalizable beyond the German market. More precisely, by exploring a unique and original data set containing roughly 2.09 million distinct attendance decisions from a Swiss professional football club, we loosely replicate the early work of Schreyer et al. (2016) – to the best of our knowledge, the only similar study in the field – in an alternative, but more importantly different, environment;

¹ On a more general note, as Katz et al. (2019) summarize, such behavioral intentions “are often a poor predictor of actual behavior” (5)

² Intriguingly, this stream of the literature originated in the late 70s (cf., Siegfried & Hinshaw, 1977; 1979) but, then abated, perhaps because the access to such behavioral data is typically (still) scarce.

i.e., the Swiss football market, and over a significantly extended period of observation. Although there is no need for a wide range of similar case studies from different countries, a case study originating from Switzerland is particularly interesting because the rather small Swiss football market is not only surprisingly under-researched but also differs from the German market in several ways,³ not least in terms of the championship format (e.g., Pawlowski and Nalbantis, 2015) and the significance of matchday income.⁴ In addition, exploring individual no-show data from STHs over multiple seasons for the first time also allows us to control for any time-varying trends. Second, as we are primarily interested in those determinants over which football club executives might ultimately have at least some control, we provide a significantly more nuanced evaluation of the previously discussed role of STHs' age, the paid season ticket price, and, even more important, emerging no-show habits in predicting spectator no-show behavior, as well as the potential downside of offering previously unexplored family areas and also a potential substitution effect due to STHs' birthday on matchday. Although most (not all) of these factors have been explored earlier in Schreyer et al. (2016), these previous attempts have predominantly failed to account for the potential non-linearity in the relationship between, for instance, the season ticket price and subsequent spectator decision-making. Similarly, the role of habit in shaping no-show behavior has – so far – only been considered to a limited extent.

Intriguingly, our empirical results suggest that previous results observed in the German Bundesliga seem to be only partially robust across borders. That is, although we observe a crucial role of, for example, both a STHs' geographical distance to the stadium and his or her

³ That is, unlike the 18 German Bundesliga teams, the 10 Swiss Super League (RSL) clubs play each other four times each season in a quadruple round-robin tournament, which might affect STH decision-making. In addition, RSL stadiums, some of which were significantly expanded before the 2008 UEFA European Championship, are typically less crowded, which might affect the perceived atmosphere considerably, while matches staged in these stadiums usually feature fewer stars as approximated by transfer market values.

⁴ For major European football clubs, today, matchday income still corresponds to about 15 percent of total turnover (Deloitte, 2020), despite an increasingly important role of media income. In some leagues, most notably, Scotland (43 percent), Switzerland (31), the Netherlands (29), Ireland (28), Sweden (24), Israel (24), and Belgium (22) however, gate revenues often remain an even more significant part of the revenue mix (UEFA, 2020).

no-show habit when predicting spectator no-show behavior that is in line with previous research, we note a significantly more nuanced role of the season ticket price. More specifically, we discover a robust, non-linear relationship between the price and STH no-show behavior, indicating that a club's ticket pricing strategy might have a lasting effect even beyond the initial sales process.

What do we know about spectator no-show behavior?

Although there already exists a rich and continuously growing body of literature on football stadium attendance demand (e.g., Buraimo et al., 2018; Pawlowski & Anders, 2012; Reade et al., 2020b; Watanabe et al., 2019; Valenti et al., 2020), as yet, only a few authors have made an attempt to model admission behavior in general, and spectator no-show behavior in particular. Putting the dichotomy between sports management and sports economic research aside, these few behavioral studies can be structured along multiple lines, including, for example, the market (e.g., Brazil: Sampaio et al., 2015; Scotland: Allan & Roy, 2008; United States: Putsis & Sen, 2000) or the sport under investigation (e.g., American Football: Zuber & Gandar, 1988), and the chosen methodological approach – in particular, the distinction between whether the data captures aggregated (e.g., Schreyer, 2019) or disaggregated (e.g., Schreyer et al., 2016), i.e., individual, spectator behavior decision-making. Further, content-wise, the existing literature has provided first insights on both the antecedents (e.g., Schreyer et al., 2019), and the potential consequences, most notably season ticket churn (e.g., McDonald, 2010; McDonald & Stavros, 2007; McDonald et al., 2014) of spectator no-show behavior.

To gain a better understanding of the literature on the potential determinants of football spectator no-show behavior, in Table 1, we provide an extended overview of the determinants of such no-show behavior in the German Bundesliga, i.e., the professional football league that has recently attracted the greatest research interest. As can be clearly seen from that table, most of this previous research has already established a robust relationship between spectator no-

show behavior and factors relating to either match quality aspects, primarily those shaped by the visiting team (e.g., the market value), and the opportunity costs arising from attending live matches (e.g., from extreme temperatures, mid-week fixtures, and precipitation).

- - - Insert Table 1 about here - - -

However, this does not mean that our current understanding of those factors shaping football spectator no-show behavior is complete. In fact, as Schreyer et al. (2019) observe when exploiting panel data on aggregated no-show behavior among 25 Bundesliga and Bundesliga 2 clubs between August 2014 and May 2017, those factors shaping Bundesliga no-show behavior might not necessarily also affect spectator decision-making in Bundesliga 2. That is, while the authors confirm earlier findings by Schreyer and Däuper (2018) regarding the role of both midweek matches and the temperature in shaping Bundesliga no-show behavior, both factors had no effect in Bundesliga 2. Further, as most authors still employ aggregated data on behavioral decision-making generated from multiple external stakeholders, including, for example, corporate sponsors in the hospitality section, whose behavior is likely to differ from that of the typical fan in the stands, our understanding of socio-demographic factors in shaping spectator no-show behavior such as age, gender, and habit, as well as the ticket price and emerging no-show habits is still rather limited.

To the best of our knowledge, so far, only two studies have modeled football spectator no-show behavior by analyzing disaggregated STH data. First, Schreyer et al. (2016), primarily interested in the role of match outcome uncertainty in shaping STH decision-making, explore a panel data set containing 236,164 individual admission decisions from 13,892 STHs during the Bundesliga season 2012-13. Interestingly, the authors provide some first empirical evidence on the potential differences in spectator no-show behavior based on factors relating to individual socio-demographics, and also stadium accommodation. More precisely, Schreyer et al. (2016) observe, for example, that no-show behavior increases if a STHs' age, his/her pitch and travel distance, and the number of season tickets in possession increases, but decreases if

the ticket price increases. Also, no-show behavior was more likely to occur if the STH was accommodated in the standing terraces, had already missed the last home match, and had already resigned. In contrast, the authors did not observe substantial gender differences in spectator no-show behavior – a finding that is largely consistent with related survey results (e.g., McDonald et al., 2017; Schreyer, 2019; Solberg & Mehus, 2014). Second, in a short, and related study employing the same data set, Schreyer et al. (2018) primarily focus on the role of geographical distance in shaping STH behavioral loyalty, adding some necessary nuance to our current understanding of the travel distance. However, the authors of both studies not only present results generated from only one season, i.e., 17 consecutive Bundesliga home matches, but, as becomes evident during their analysis, also fail to exclude those STHs holding multiple season tickets – a procedure that might ultimately affect the robustness of the reported effect sizes. As such, our current understanding on both the role of socio-demographic antecedents and factors relating to a STHs' accommodation in shaping spectator no-show behavior is still limited at best.

Data set, explanatory variables and empirical approach

To address previous shortcomings in the literature, we base our analysis on an original dataset containing roughly 2.09 million ticket holder attendance decisions made between February 2013 and December 2016. This information, generously provided by RSL club FC Basel 1893 (FCB), was recorded with the help of the club's stadium access system and shared at the end of season 2017-18. During our period of observation, the club hosted a total of 72 RSL matches, all of which we considered in our subsequent analysis.⁵

Founded in 1893, FCB is certainly the most successful club in modern Swiss football. In fact, the club secured 12 out of their currently 20 domestic championships since the season

⁵ We chose this period of observation for two reasons: First, in Basel, ticketing executives sell season tickets at the begin of each year rather than at the begin of each season; Second, in January 2017, the management altered STH allocation numbers.

2001-02 and, during our period of investigation, ranked first at the end of each season. Therefore, it is perhaps not surprising that based on their estimated winning probability, FCB was the bookmakers' (often heavy) favorite before each of the 72 RSL home matches in our data set ($M = 0.65$, $SD = 0.08$; $Min = 0.45$; $Max = 0.81$). Having reached the lucrative group stage of the UEFA Champions League (UCL) in the three seasons 2013-14, 2014-15, and 2016-17, and of the UEFA Europa League (UEL) in the seasons 2012-13 and 2015-16, FCB has successfully competed in European football over the entire sample period.⁶

Since 2001, the club has played their home matches at St. Jakob-Park, also known as Joggeli, which with 38,512/37,500 seats (domestic/international matches), is currently the largest football stadium in Switzerland. However, as indicated in the club's official annual reports (e.g., FCB, 2017), stadium attendance demand rarely matched ticket supply during our four-year-long period of observation. More precisely, the club distributed, on average, between 27,595 and 29,706 tickets per domestic league match, most of them to their roughly 24,000 STHs.⁷ As is common practice in European professional football, these season tickets are sold at a reasonable discount. For instance, in the recent year 2019, STHs attending all RSL matches received a discount between 39 and 46 percent relative to purchasing the 18 individual match tickets (c.f., FCB, 2020), depending on STH accommodation.

- - - *Insert Figure 1 about here* - - -

In Figure 1, we first present information on the club's no-show rate (NSR). On average, this rate – the relative share of distributed, though subsequently unused tickets – was effectively about 26.77 percent during our period of observation, and has slightly increased over time. More precisely, we observe that the NSR in RSL home matches is about 25.81, 23.41, 26.61, and 31.27 percent in the four consecutive years 2013, 2014, 2015, and 2016, respectively.

⁶ More precisely, in 2014-15, the club reached the UCL round of Last 16 and was UEL a semi-finalist and a quarter-finalist in the seasons 2012-13 and 2013-14, respectively.

⁷ According to information in the club's official annual report (FCB, 2017), FCB distributed between 23,671 and 24,265 season tickets per year. Intriguingly, between the stadium opening in 2001 and the 2019, the club always distributed more than 20,000 season tickets.

Somewhat similarly, in the German Bundesliga, the most-attended football league in the world, the NSR also has recently significantly increased from roughly 9.25 percent in season 2014-15 to about 11.96 percent in season 2017-18 (cf., Schreyer, 2019). In this and other European markets, anecdotal evidence has it that many football clubs tend to observe two-digit NSRs, in particular among their STHs (e.g., FC Business, 2018). For example, Schreyer et al. (2016) – in an early attempt to analyze spectator no-show behavior among 13,892 STHs of a German club – observe a NSR of approximately 17 percent. In Brazil, Sampaio et al. (2015) document a similar NSR among Porto Alegre FC STHs during the three seasons 2008 to 2010.

Intriguingly, as can be seen from Figure 1, we observe a significantly higher NSR among STHs than among matchday ticket holders. As STHs are, therefore, responsible for the vast majority of all no-show occurrences in our data set, we focus our subsequent analysis on better understanding spectator no-show behavior by exploring detailed (panel) data from this particular group.

- - - Insert Table 2 about here - - -

In Table 2, we present descriptive information on our explanatory variables, including the controls capturing either quality aspects or factors relating to the opportunity costs arising from attending live matches (cf., once more, Table 1). As we are primarily interested in those factors that link to potential management implications, we focus on either a STHs' socio-demographics or those explanatory variables capturing STH accommodation. Nonetheless, to provide a more complete picture of the determinants of football spectator no-show behavior in Switzerland, in the Appendix, we also present extended specifications, i.e., including control variable effect sizes (cf., Table A1).

The first set of explanatories includes variables capturing a STHs' accommodation. Whereas most previous research has centered on factors that relate to either match quality aspects or the opportunity costs arising from attending a home match in the stadium (e.g., Schreyer & Däuper, 2018), our understanding of the role of these factors in shaping STH no-

show behavior is still underdeveloped. In fact, as sketched out above, there exist, to the best of our knowledge, only two studies that have started to explore the effect of such factors using STH data generated in German football (e.g., Schreyer et al., 2018). Here, we modify their empirical approach by analyzing a total of five factors, one of which has previously been neglected. First, we add the season ticket price, including its squared term, on a per match basis. Although Schreyer et al. (2016; 2018) observe that STH no-show behavior decreases as the season ticket price increases, a finding that has subsequently been replicated using survey data (Schreyer, 2019), it seems reasonable that the respective relationship is non-linear with an inverted u-shape, due to diminishing price sensitivity among those STHs with a rather high income (e.g., Solberg & Mehus, 2014). Second, we add the impact of being located in the standing terraces. In line with previous research (e.g., Schreyer et al., 2016), we expect a higher NSR among STHs in these sections of the stadium, primarily because those STH in the stands might face rather high opportunity costs due to, for example, occasional work commitments on the weekend. Third, we add a somewhat related dummy that takes the value of 1 if a STH is located in the family area of the stadium. Previously unexplored, we expect a higher NSR among these STHs because such family visits are typically associated with an increase in coordination costs. As Schreyer et al. (2016) demonstrate, such costs are correlated with an increase in STH no-show behavior. Further, to control for differences in atmosphere between stands and stadium sectors, we also include stand and sector fixed effects, respectively.

The second set of explanatory variables includes a number of variables capturing STH characteristics. First, we are interested in revisiting the role of STH age in no-show behavior. Interestingly, while earlier research (e.g., Schreyer et al., 2018) has established a robust linear relationship between AGE and no-show behavior, indicating that the NSR is higher among younger STH, survey data suggests a non-linear, inverted U-shaped relationship between age and spectator no-show appearances (e.g., Solberg & Mehus, 2014). Second, and somewhat related, we also test whether a STH's birthday on matchday increases no-show behavior. Here,

perhaps best understood as (further) increasing the opportunity costs arising from attending a match in the stadium, STHs may omit attendance on their birthday to instead celebrate with their family and friends. Third, primarily to explore the robustness of previous results, we add a STH's gender, a factor that has been previously reported as insignificant (e.g., Schreyer et al., 2016). Fourth, we add DISTANCE, a proxy that captures the beeline between St. Jakob-Park/Basel and a STHs' place of residence in kilometers, including its squared term. As Schreyer et al. (2018) observe, the NSR seems to be particularly low among those STHs living in close proximity to the stadium. Somewhat similarly, Solberg and Mehus (2014), analyzing survey data from Norwegian STHs, observe that travel time seems to shape the decision whether to attend a home match. Finally, fifth, complementing an approach from Schreyer et al. (2016), we successively test several dummy variables with differing cut-off points capturing a STHs' emerging no-show habit. Here, the corresponding dummy variable takes the value of 1 if a STH has previously omitted the last home match or home matches, respectively. In contrast, most likely due to the rather short observation period of only 17 home matches, previous research has refrained from exploring emerging STH no-show habits in more detail. Although STHs are often characterized as being behaviorally loyal (e.g., Benz et al., 2009), missing a home match or two might increase the probability of not attending a subsequent match.

Unlike previous research (e.g., Schreyer et al., 2016), we explore STH no-show behavior using a variety of different specifications, primarily to increase the robustness of our empirical results. More specifically, as can be seen from Table 3, for three different models, we estimate both a random-effects probit model and a pooled probit model in which standard errors are estimated with a cluster-robust covariance-estimator.⁸ We use matchday as the cluster variable to measure the effect of STH no-show behavior using micro unit STH data with

⁸ All reported effects are robust to employing additional logit specifications, which are available from the authors upon request.

aggregate match level information. Clustering allows to take into account the multi-level structure of data. Not clustering can lead to standard errors that are biased downward and subject to the possibility that the random disturbances in the regression are correlated within groupings (Moulton, 1990). The bias of the standard errors can result in spurious findings of statistical significance for those aggregate variables. In addition, for the first two panel models, we also estimate additional results excluding the higher-level aggregate level variables but adding matchday dummies to control for unobserved match-level characteristics.

Here, we measure a STH's decision whether to attend a particular home match using a binary scale. Accordingly, NO-SHOW, our dependent variable, takes the value of 1 if STH i omits a particular home match t and a value of zero otherwise. Further, mirroring the approach chosen in Schreyer et al. (2018), we also present two alternative specifications applying Poisson and fractional probit regression on two alternative dependent variables; i.e., a STHs' absolute and relative no-show behavior in the complete period of observation.

Breaking the habit? Results and arising management implications

To ensure the robustness of our empirical results, we initially report the estimates from a total of three different models. First, in Model (01), we only include those factors that relate to either a STH's accommodation and his or her socio-demographic information, thereby excluding higher-level secondary data. Second, in Model (02), we add a dummy for no-show habit that take the value of 1 if a STH has for attendance for the last two home matches. By definition, there is no information on a STHs' no-show habit for the first two home matches in our data set; thus, we employ a slightly smaller panel data set containing information on about 611,380 individual attendance decisions made by 8,734 permanent STHs on 70 consecutive matchdays. Finally, in Model (03), we add those controls relating to either the match quality or the opportunity costs that may arise from attending a football match on site. Note that, for these first three models, we present estimates generated through both panel probit regression and

pooled probit regression with standard errors clustered by subsequent matchdays. Further, we also present additional estimations from a reduced specification (3c),⁹ where we only include those explanatory variables that were, and remain, significant across the previous models.

In addition, to ensure the comparability of our results to previous STH research – primarily that of Schreyer et al. (2018) – we present two more models that include both the total number of absolute no-show appearances during the period of investigation, i.e., 72 consecutive home matches (04), and its relative share (05).¹⁰ On average, the 8,734 STHs skipped about 21 home matches over the course of four years. Thus, STHs missed, on average, between five to six home matches per year. Interestingly, only about one percent of those STHs were behaviorally loyal and attended all 72 matches; excluding these behaviorally loyal STHs from our sample does not affect the reported results.

- - - *Insert Table 3 about here* - - -

In Table 3 and Figure 2, we report our estimation results and present an overview of the relative effect sizes, respectively. Although we can confirm some of the results obtained earlier in those studies exploring individual spectator decision-making in the German Bundesliga (cf., once more, Table 1), we observe some notable differences that are worth discussing in more detail. This is particularly true with respect to the potential role of a STHs' age, the paid season ticket price, and – even more important – emerging no-show habits in predicting spectator no-show behavior.

- - - *Insert Figure 2 about here* - - -

Interestingly, and in contrast to earlier findings (e.g., Schreyer et al., 2016), we first observe a non-linear, inverted U-shaped relationship between a STHs' age and spectator no-

⁹ It is noteworthy that the reported effects from specification (03c) are robust to the exclusion of those STH with either zero (Pseudo $R^2 = 0.0863$) or perfect attendance (0.0865). Further, the reported effects are robust to employing alternative habit dummies capturing the omission of either only one (0.0853), three (0.0818), four (0.0766), and five (0.0699) subsequent home match(es), despite the gradually decreasing number of observations.

¹⁰ Although we employ Poisson and fractional probit regression to model the cumulated absolute number (04) and the relative share (05) of no-show appearances, respectively, all reported effects are also robust to employing alternative ordinary least squares (OLS) specifications. These additional estimates are available from the authors upon request.

show behavior with a turning point at about 40 years. Although earlier research based on survey data (e.g., Solberg & Mehus, 2014) has long indicated that no-show behavior might be particularly likely among those STHs in their midlife phase – perhaps because team identification, i.e., the degree to which a fan identifies with a particular team, varies over time (cf., Bergmann et al., 2016) – previous behavioral research has not explored such a potential non-linearity.

Accordingly, those football executives interested in maximizing their stadium capacity utilization need to solve an interesting paradox: Interested in selling more season than matchday tickets, their ticketing executives are most likely to sell season tickets to individuals from the club's most natural customer segment, i.e., middle-aged fans who can afford the cost of attending matches live in the stadium. Somewhat ironically, it is these STHs, in particular, that are more likely to skip matches, at least occasionally. In fact, as can be seen in Figure 3, here, we observe a similar tendency, as about 56 percent of all STHs in our data set were between the age of 40 and 60 years. Therefore, as long as decreasing the number of available season tickets is not a viable option to reduce spectator no-show behavior, ticketing executives might want to explore alternative customer segments; i.e., local teenagers. Interestingly, anecdotal evidence has it that football clubs such as Manchester United have already started moving in this direction to address a perceived decrease in stadium atmosphere due to a collectively aging audience (cf., Irish Times, 2018).¹¹ Alternatively, primarily reflecting the significantly higher NSR among STHs in the family section of the stadium, increasingly targeting children and their grandparents, rather than their parents (perhaps the more traditional market), might be an interesting option to increase stadium attendance on matchday. Further, as we observe an increase in no-show behavior among birthday boys/girls, football clubs might want to explore ways to make a birthday visit to the stadium more appealing to their STHS – for example, by

¹¹ In our initial data set, we observe a similar aging effect – a moderate increase from about 42.48 years, on average, on the first matchday in 2013 to about 43.83 years, on average, on the first matchday in 2016.

allowing those STHs to bring a friend to the often underutilized stadium, or by offering cost-effective presents.

- - - *Insert Figure 3 about here* - - -

As with the role of a STH's age, we also observe a non-linear, U-shaped relationship between the season ticket price and no-show behavior with a turning point at about 23 CHF per match; i.e., an equivalent of about 20 Euro.¹² This indicates that a simple strategy of increasing the season ticket price to reduce no-show behavior as suggested by earlier research might not necessarily work in all customer segments and across all European football clubs. More precisely, as we observe exceptionally high NSRs among both those STHs in our sample holding free season tickets and those with relatively expensive season tickets, increasing entry-level prices might, in fact, decrease STH no-show behavior, whereas raising already high prices might not. Intriguingly, this finding is supported by previous survey results, indicating that an increase in income is likely to reduce STH appearances in Norway (Solberg & Mehus, 2014).

While our results suggest that those executives operating at a football club where the demand for tickets does not exceed its (fixed) supply might want to reconsider their season ticket pricing strategies, perhaps by offering significant discounts only to those STHs with perfect (or near-perfect) attendance, they, in turn, also pave a way to monetize no-shows for those executives operating at in-demand clubs. More precisely, curing the symptoms of spectator no-show behavior rather than eliminating the initial cause (cf., Schreyer, 2019), these executives might not only want to increase season ticket prices until the demand nears available ticket supply – thus generating more initial income on matchdays – but might then also want to overbook some of these tickets. Intriguingly, this hints at an important point: That is, depending on a clubs' ticketing strategy, a large number of no-shows can – but does not necessarily – present a challenge. In contrast, it can also be an opportunity. In Germany, for example,

¹² During the 4-year-long period of investigation, 1 CHF was, on average, worth approximately 0.87 Euro.

anecdotal evidence has it that football club Bayern Munich have already begun overbooking parts of their stadium (cf., Smart Pricer, 2018), although the approach, for now, seems not to include substantial season ticket price increases.

Although both a STHs' age and the paid season ticket price are robust predictors of STH no-show behavior, the associated effects are modest when compared to a STHs' no-show habit. Intriguingly, as can be seen in the three graphs depicted in the lower row of Figure 3, the observed effect size, further, seems to increase with every additional no-show appearance. That is, while we observe that the NSR among those STHs forgoing physical attendance once is about 47 percent on the subsequent matchday, it increases to 60, 68, 79, 89, and 96 percent after two, three, five, ten and twenty consecutive no-show appearances, respectively. Although this tendency seems to point to a growing disinterest over time, it is, perhaps, better explained by an increasing differentiation of STHs, all of which might have distinct motivations to purchase a ticket in the first place (cf., Karg et al., 2019). In fact, survey-based research has long established that a fair share of fans purchases their season ticket to either financially support or to feel more involved with the club rather than to gain a reserved seat (e.g., McDonald & Stavros, 2007). In other words, there might be no habit to break. As such, while anecdotal evidence has it that the management of clubs with a strong demand for tickets, i.e., a ticket demand continuously exceeding ticket supply, such as Borussia Dortmund, have recently begun experimenting with strategies based on STH punishment to break negative STH no-show habits (e.g., Ruhr Nachrichten, 2019), executives operating at football clubs that sell-out their stadium only occasionally might want to prioritize their efforts in selling additional season tickets rather than reduce subsequent no-show behavior.¹³

On a more general note, however, this observation directly points to the important strategic question of whether these clubs, per se, supply too many seats, resulting in an inferior

¹³ As one reviewer has rightfully argued, for these executives, the potential disadvantages arising from STH no-show behavior must be balanced against the main advantage of selling season tickets in the first place; i.e., mitigating a club's financial risk through a guaranteed minimum funding early in the season.

stadium experience for those fans with (season) tickets. Here, a significant decrease in the stadium capacity available to interested parties, for instance, by partly dismantling/remodeling an oversized stadium, might help revalue the (season) ticket in the medium term by inducing a scarcity effect.

The remaining findings are in line with previous research and our expectations. More specifically, we observe a higher NSR among STHs located in both the standing terraces and the family area of the stadium, and a lower NSR among those STHs that live in close proximity to the stadium. To better understand the distance effect geographically, in Figure 4, we illustrate this outcome by plotting the average number of no-show appearances per postcode on a map of Switzerland. In contrast, we do not observe a significant gender effect.

- - - *Insert Figure 3 about here* - - -

Limitations and future research

Although our empirical results presented above shed some additional light on the determinants of STH no-show behavior, we believe that there are still a number of open questions left to be answered in future research. This is particularly true for questions addressing the management of such no-show behavior. As Schreyer (2019) summarizes, previous research on reducing the negative effects from no-show behavior in alternative environments seems to distinguish two strategies to maximize capacity utilization. The first is to treat the immediate cause, which in this case is to motivate STHs to either use or share their ticket(s). The second is to cure the negative symptoms arising from this immediate cause: here, to explore alternative ways to compensate for the resulting shortfall in additional matchday revenue.

Accordingly, analyzing the effectiveness of corresponding measures could make for an exciting new path in sports management research; i.e., no-show management. In fact, as discussed above, increasing anecdotal evidence has it that some football clubs have already begun experimenting with mechanisms of rewards and punishment to reduce no-show behavior

among STHs. Alternative research approaches might explore the role of reminders (e.g., Schreyer et al., 2020), alternative payment and pricing mechanisms, and consumer apps that allow for convenient season ticket sharing in reducing spectator no-show behavior.

In addition, we suggest future research to explore the robustness of our empirical results not only in alternative football leagues such as the English Premier League but also across different sports. In fact, as most previous research exploring behavioral intentions has focused on analyzing stadium attendance demand for US sports leagues, it would be interesting to explore whether these intentions to attend ultimately translate into subsequent behavior in alternative environments such as in College Football. High NSRs in this context have not only become a topic of media concern recently (Wall Street Journal, 2018) but, apparently, have already begun motivating further research in the field (cf., Popp et al., 2019).

Finally, although we hope to add to the field's current understanding of those factors shaping STH decision-making, there are still numerous possible factors influencing spectator decision-making that, unfortunately, are not part of our otherwise rich data set. For example, as Deserpa (1994) argues, STHs might purchase their ticket(s) because of the included additional rights. In fact, some clubs offer season tickets that also include access to matches in domestic and/or international cup competitions. Accordingly, if STHs have a specific interest in these sets of matches, it seems likely that such product characteristics, as well as potential variations in the season ticket bundle, affect subsequent STH decision-making. Further, as both team identification and variations in social status might play an essential role in explaining spectator decision-making (cf., Schreyer, 2019), future research might be well-advised to revisit the determinants of spectator no-show behavior by combining behavioral and survey data, thus drawing a more complete picture of those factors that need to be addressed to minimize NSRs.

Conclusions

In a rapidly changing football environment (cf., Merkel et al., 2016), a better understanding of the determinants of spectator no-show behavior is of utmost importance to football executives. Exploring a rich data set containing roughly 2.09 million attendance decisions made by ticket holders in Switzerland between 2013 and 2016, we observe that both a STH's accommodation and socio-demographic information can help predict subsequent no-show behavior. In particular, we notice an important role of a STHs' age, his (or her) domicile and emerging no-show habits, as well as the season ticket price. In contrast, we observe no gender differences in football spectator no-show behavior. While these results can be helpful in defining measures to overcome the challenges arising from spectator no-show behavior, the ideal measure might be context-sensitive.

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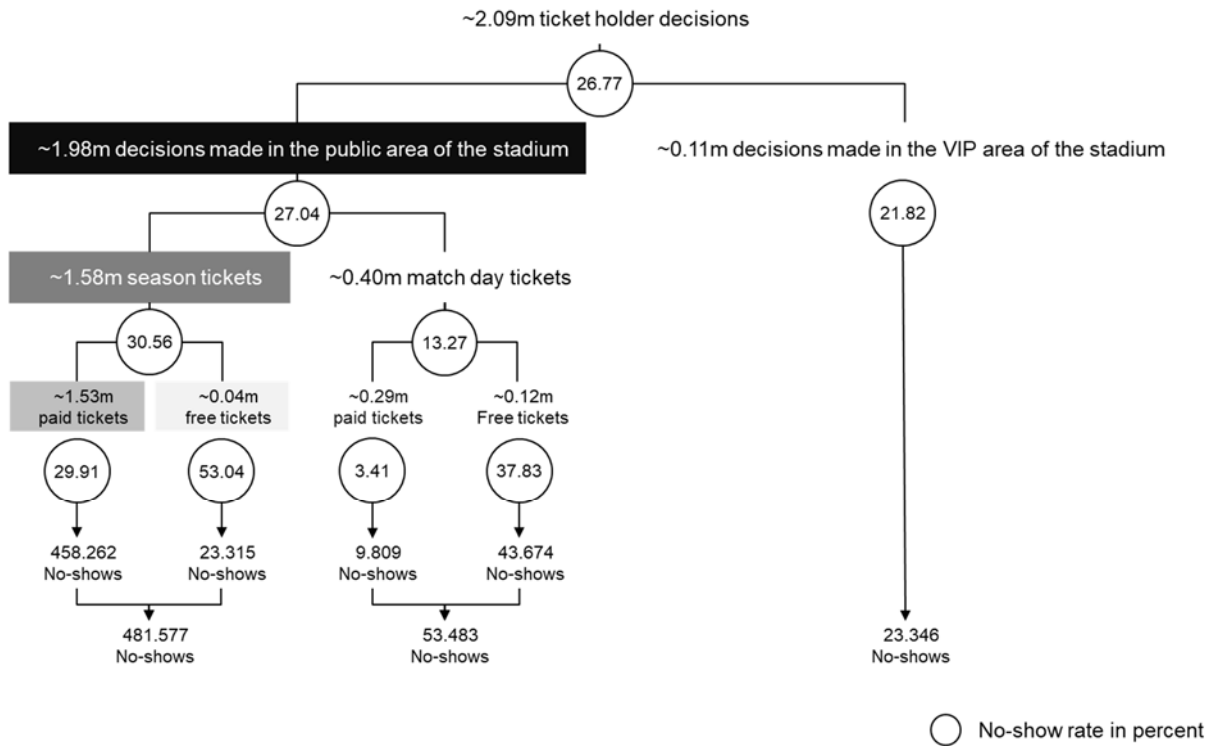
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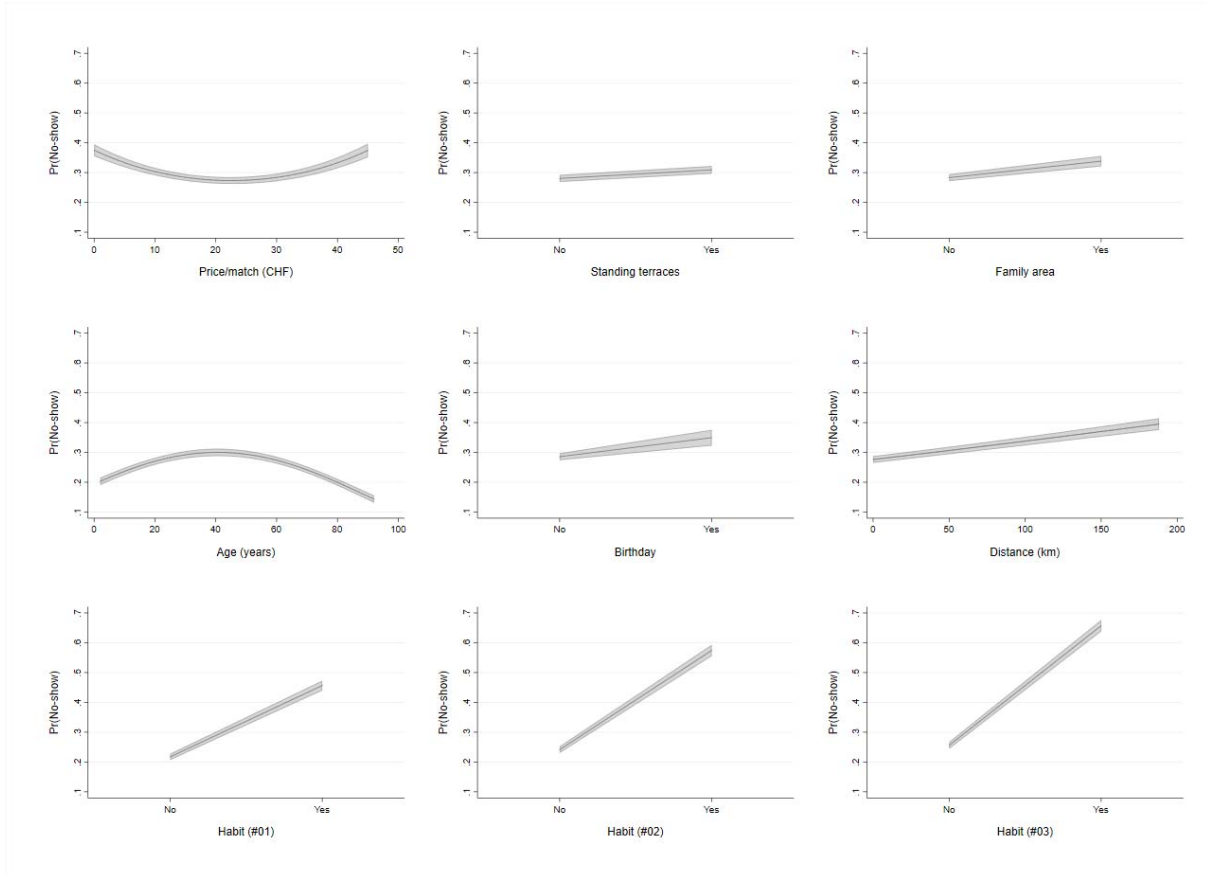
Figures and Tables

Figure 1 Football spectator no-show behavior per ticket category



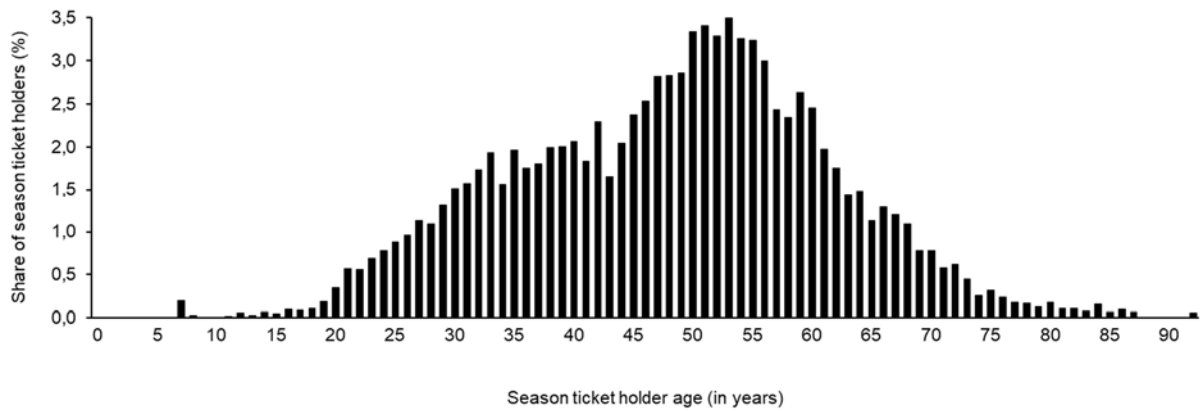
Abbreviations and notes: All figures are rounded.

Figure 2 Determinants of season ticket holder no-show behavior in Switzerland



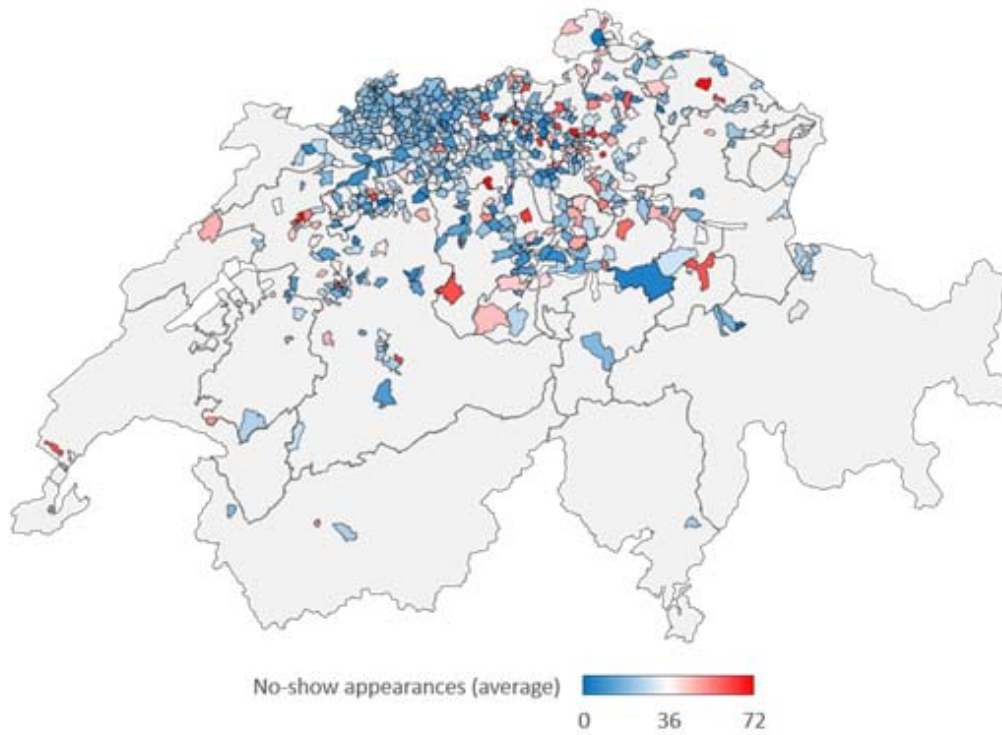
Abbreviations and notes: Marginal effects of selected explanatory variables (cf., specification 03c in Table 3)

Figure 3 Distribution of STH age (N = 8,734)



Abbreviations and notes: STH age in years on matchday 72.

Figure 4 Average number of STH no-show appearances per postcode area



Abbreviations and notes: Figure based on 8,734 STHs ($M = 20.75$, $SD = 14.79$).

Table 1 Determinants of football spectator no-show behavior in the Bundesliga

	Schreyer et al. ¹ (2016) 17 Matches	Schreyer et al. ² (2018) 17 Matches	Schreyer & Däuper (2018) 704 Matches	Schreyer et al. (2019) 710 Matches	Frevel & Schreyer (2020) 285 Matches	Schreyer (2019) 1,149 Matches	No-show-rate increases...
Economic aspects							
Market size				↓			...rather not (no significant effect).
Unemployment				↓			...rather not (no significant effect).
Quality aspects							
Home win probability	↑↓ ***						...if the winning probability of the home team increases, then decreases.
Competitive balance			↑ ***	↑		↑ ***	...if the absolute difference in the winning probability of home and away team increases.
Competitive intensity			+/-				...rather not (no significant effect).
Market value			+/- ***	↓ ***			
Market value, home					+/-		...rather not (no significant effect).
Market value, away					↓ ***		...if market value (away) decreases.
Promotion, home				↓ ***	↓ ***		...if home team was not promoted.
Promotion, away					↓ ***		...if away team was not promoted.
Pioneer, home					+		...rather not (no significant effect).
Tradition, away			↓ ***	↓ ***	↓ ***		...if away team tradition decreases.
Geographical derby			↓ ***	↓ ***	↓ ***		...if match is not a derby.
Pitch quality					↓		...rather not (no significant effect).
Opportunity costs							
Midweek match			↑ ***	↑ ***	↑ ***		...if match is play midweek.
Match day			↑↓ ***	↑↓ ***	↑↓ ***		...until midseason, then decreases.
First half					↑		...rather not (no significant effect).

Holidays			↓		...rather not (no significant effect).
Substitute, free-TV			↓		...rather not (no significant effect).
Temperature	↓↑ ***		↓↑ ***	+/-	...for extreme temperatures.
Precipitation	↑ ***		↑	↑ ***	...if rain sets in.
Air pressure	↑				...rather not (no significant effect).
Interval			↓		...rather not (no significant effect).
Terrorist attacks				↑ ***	...temporarily after an attack.
Season fixed effects	Yes	Yes		Yes	...over time.
Other					
Stadium capacity	↑ ***	+/- ***		↑ ***	
Distributed tickets				↑ ***	...if number of tickets increases.
Sold tickets				↑ ***	...if number of sold tickets increases.
Sold tickets, season				↑ ***	...if number of season tickets increases.
Sold tickets, match				↓ ***	...if number of match tickets increases.
Free tickets				↑	...rather not (no significant effect).
Accommodation					
Ticket quantity	↑ ***	↑ ***			...if number of tickets increases.
Ticket, standing area	↑ ***	↑ ***			...if spectator stands.
Ticket, distance to pitch	↑ ***	↑ ***			...if distance to pitch increases.
Ticket, cost	↓ ***	↓ ***			...if ticket price decreases.
Socio-demographics					
Age	↓ ***	↓ ***			...if spectator age decreases.
Gender, male	↓	↓ †			...rather not (no significant effect).
Inhabitant	↓ ***				...if spectator lives not in host city.
Geographical distance		↑↓ ***			...if the distance in kilometers between home and stadium increases, then decreases.
Habit, missed match	↑ ***				...if spectator missed last match.
Churn	↑ ***				...if spectator has already resigned.

Abbreviations and notes: ¹ Final specification(s); ² Excl. an alternative dichotomous dependent variable capturing perfect STH attendance (LOYALTY); significant effect (***).

Table 2 Descriptive statistics of explanatory variables, including controls

Explanatory variables	Description	Source	M	SD
Accommodation				
Price	Price of season ticket (in CHF)	Club	23.51	8.14
Standing terraces ¹	Season ticket is located in the standing area	Club	0.18	0.38
Family area ¹	Season ticket is located in the family area	Club	0.05	0.21
Stand (fixed effects)	Stand in which the STH is accommodated	Club		
Sector (fixed effects)	Sector in which the STH is accommodated	Club		
Sociodemographic				
Age	STH age (in Years)	Club	46.27	13.28
Birthday ¹	STH's birthday is on matchday	Club	0.00	0.05
Female ¹	STH is female	Club	0.17	0.38
Distance	Distance between place of residents and the stadium (in km)	Club	17.62	132.96
Habit ^{1,2}	STH has missed last two home matches	Club	0.13	0.34
Controls (Quality³)				
APD ⁴	Absolute difference in home and away win probability	Football-data.co.uk	0.50	0.13
Market value (home)	Summed market value of the home teams' matchday squad (in m €)	Transfermarkt.com	42.78	7.09
Market value (away)	Summed market value of the home teams' matchday squad (in m €)	Transfermarkt.com	12.95	5.83
Promoted (away) ¹	Away team has been promoted	Kicker.de	0.11	0.31
Tradition (away)	Away team's years in the RSL (in years)	Swiss Super League	52.22	24.31
Beeline/Derby	Distance between the stadium of home/away team (in km)	Luftlinie.org	104.69	41.30
Controls (Opportunity effects³)				
First half ¹	Match is scheduled in the first half of the season	Kicker.de	0.50	0.50
Holidays ¹	Match is scheduled during the holidays	Schulferien.org	0.35	0.48
Midweek ¹	Match is scheduled during the week	Kicker.de		
Matchday	Matchday	Kicker.de		
Temperature	Average temperature on matchday (in °C)	Meteoblue.com ⁵	14.80	6.93
Precipitation ¹	Precipitation	Meteoblue.com ⁵	0.26	0.44
Interval/pause	Absolute number of days past since the last home match	Kicker.de	20.42	16.81

Abbreviations and notes: All figures are rounded; ¹ Dummy variable (Yes = 1; otherwise = 0); ² Unavailable for home match #01 and #02; ³ In the Appendix, we present extended specifications, i.e., including control variable effect sizes (cf., Table A1); ⁴ In line with previous research, we calculate APD using adjusted probabilities after excluding the bookmakers' margin (cf., Benz et al., 2009); ⁵ all values as of matchday, 12:00.

Table 3 Determinants of season ticket holder no-show behavior in Switzerland

	Match-Level ⁵						Full period of investigation		
	(01a) Probit regression ⁵	(01b) Probit regression	(02a) Probit regression ⁵	(02b) Probit regression	(03a) Probit regression	(03b) Probit regression	(03c) Probit regression	(04) Poisson regression	(05) Fractional probit regression
Accommodation									
Price	-.0182** .0056	-.0336*** .0019	-.0154** .0055	-.0261*** .0021	-.0208*** .0056	-.0278*** .0019	-.0278*** .0019	-.0386*** .0073	-.0333*** .0068
Price ²	.0004*** .0001	.0007*** .0000	.0003** .0001	.0006*** .0000	.0005*** .0001	.0006*** .0000	.0006*** .0000	.0009*** .0002	.0008*** .0001
Standing terraces ¹	.2601*** .0339	.1295*** .0112	.2424*** .0321	.0924*** .0116	.1633*** .0331	.0920*** .0121	.0918*** .0120	.1475*** .0346	.1294*** .0305
Family area ¹	.3013*** .0468	.1964*** .0160	.2859*** .0447	.1670*** .0176	.2965*** .0460	.1725*** .0168	.1723*** .0168	.2518*** .0519	.2171*** .0463
Stand (fixed effects)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector (fixed effects)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographics									
Age	.0393*** .0028	.0230*** .0009	.0355*** .0027	.0186*** .0010	.0236*** .0028	.0184*** .0010	.0184*** .0010	.0299*** .0040	.0232*** .0032
Age ²	-.0003*** .0000	-.0003*** .0000	-.0003*** .0000	-.0002*** .0000	-.0003*** .0000	-.0002*** .0000	-.0002*** .0000	-.0003*** .0000	-.0003*** .0000
Birthday ¹	.2424*** .0336	.1905*** .0405	.2504*** .0342	.2054*** .0403	.2460*** .0347	.1966*** .0384	.1971*** .0386		
Female ¹	.0009 .0197	.0027 .0059	-.0047 .0185	-.0060 .0057	-.0146 .0191	-.0068 .0060	-.0068 .0059	.0025 .0200	.0021 .0172
Distance	.0030*** .0003	.0024*** .0001	.0029*** .0002	.0019*** .0001	.0028*** .0002	.0020*** .0001	.0020*** .0001	.0020*** .0006	.0024** .0007
Distance ^{2,3}	-3.46e*** 2.99e	-2.87e*** 1.64e	-3.29e*** 2.82e	-2.24e*** 1.55e	-3.24e*** 2.91e	-2.31e*** 1.55e	-2.31e*** 1.55e	-2.45e** 7.20e	-2.89e** 9.31e

Habit			.3189*** .0057	.9176*** .0248	.2897*** .0058	.9236*** .0161	.9234*** .0158		
Controls ⁴	No	No	No	No	Yes, Full set	Yes, Full set	Yes, Reduced	No	No
Estimation Cluster (SE)	Panel	Pooled Matchday	Panel	Pooled Matchday	Panel	Pooled Matchday	Pooled Matchday		
Observations	628,848	628,848	611,380	611,380	611,380	611,380	611,380	8,734	8,734
Groups	8,734		8,734		8,734				
Matches	72	72	70	70	70	70	70	72	72
Wald chi2	842.91	3,321.31	4,169.02	5,776.60	26,596.38	14,991.28	12,321.62	511.68	498.42
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R ²		0.0119		0.0615		0.0880	0.0875	0.0475	0.0120

Abbreviations and notes: All figures are rounded; Standard errors (SE) in bold; *, ** and *** indicate statistical significance at the 5% ($p < .05$), 1% ($p < .01$) and 0.1% ($p < .001$) level, respective; ¹ Dummy variable; ² Squared term; ³ e-07 and e-08 for coefficients and robust standard errors, respectively; ⁴ For the full list of controls, including effect sizes, please see Table 3b; ⁵ All effects are robust when adding matchday dummies to control for unobserved match-level characteristics.

Appendix

Table A1 **Determinants of season ticket holder no-show behavior in Switzerland**

	(03a) Probit ³	(03b) Probit ³	(03c) Probit ³
Quality aspects			
APD	.7619*** .0228	.5899* .2559	.5848* .2501
Market value (home)	.0016*** .0003	.0026 .0033	
Market value (away)	-.0135*** .0006	-.0133** .0044	-.0174*** .0048
Promoted (away) ¹	-.0142* .0064	-.0115 .0678	
Tradition (away)	-.0022*** .0001	-.0017 .0011	
Beeline/Derby	.0010*** .0001	.0010† .0006	.0011* .0006
Opportunity costs			
First half ¹	-.0454*** .0094	-.0274 .0870	
Holidays ¹	-.0187*** .0052	-.0230 .0505	
Midweek ¹	.0023 .0059	.0255 .0640	
Matchday	-.0144*** .0005	-.0120* .0056	-.0104** .0033
Temperature	-.0226*** .0004	-.0172*** .0042	-.0180*** .0042
Precipitation ¹	.0062 .0046	.0155 .0412	
Interval/pause	.0018*** .0001	.0021† .0012	.0023* .0010
Season FEs	YES	YES	YES
Explanatory variables ²	Yes, Full set	Yes, Full set	Yes, Full set
Estimation	Panel	Pooled	Pooled
Cluster (SE)		Matchday	Matchday
Observations	611,380	611,380	611,380
Groups	8,734		
Matches	70	70	70
Wald chi2	26,596.38	14,991.28	12,321.62
Prob > chi2	0.0000	0.0000	0.0000
Pseudo R ²		0.0880	0.0875

Abbreviations and notes: All figures are rounded. Standard errors (SE) in bold; †, *, ** and *** indicate statistical significance at the 10% ($p < .10$), 5% ($p < .05$), 1% ($p < .01$) and 0.1% ($p < .001$) level, respective; ¹ Dummy variable; ² For the full list of explanatory variables, including effect sizes, please see Table 3a; ³ Reported effects are robust to employing additional logit specifications, and the exclusion of those STH with either zero (Pseudo

$R^2 = 0.0863$) or perfect attendance (0.0865), as well as employing alternative habit dummies capturing the omission of either only one (0.0853), three (0.0818), four (0.0766), and five (0.0699) subsequent home match(es), despite the gradually decreasing number of observations.