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Original Research

Characterising online gamblers exceeding financial risk thresholds in the UK: A retrospective analysis using open banking data

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ABSTRACT

Objectives: In February 2025, the UK Gambling Commission mandated that online gambling operators must conduct financial risk checks for customers incurring a net loss of over £150 in any rolling 30-day period. This policy aims to mitigate gambling-related harm by identifying potentially vulnerable individuals. This study provides a pre-policy baseline profile of individuals who would have triggered these newly mandated thresholds, using large-scale open banking data.

Study design: Retrospective cross-sectional analysis.

Methods: We used a 12-month period of bank transaction data from 243,478 UK-based gamblers to characterize individuals who would have exceeded the threshold. We examined demographic and behavioural characteristics of this group and used cluster analysis to identify subgroups with distinct financial and gambling profiles.

Results: Nearly a quarter of gamblers triggered the threshold and accounted for the vast majority of total gambling expenditure (~92%). These Exceeding Threshold Gamblers (ETGs) were disproportionately male, younger, and exhibited significantly greater gambling involvement. Cluster analysis revealed three ETG subgroups, with approximately half classified as diversified spenders whose gambling appeared proportionate to income and part of broader discretionary spending, while others exhibited patterns more consistent with potential financial vulnerability.

Conclusions: While the policy may effectively flag at-risk individuals, it also captures a heterogeneous population.

1. Introduction

Markets for potentially addictive products (e.g., tobacco, alcohol, and gambling) attract heightened regulatory scrutiny because excessive consumption can impose substantial public-health costs.[1–3] Whilst gambling is a safe recreational activity for most, a minority experience harms that range from reduced discretionary spending to severe financial distress and suicidality.[4] Financial harms are particularly significant, as they often trigger other negative consequences and are more readily identifiable through observable losses,[5] making them a critical focus of consumer protection policy.

In 2023, the UK Gambling Commission (UKGC) released a white paper outlining new proposals for the industry on issues such as advertising, online gambling, and harm prevention.[6] Among the key proposals were requirements for operators to conduct financial risk checks to identify financially vulnerable individuals. From February 2025, operators must run light-touch financial risk checks – frictionless processes to determine whether an individual, for example, is under bankruptcy orders or has a record of outstanding debts – when a customer exceeds a threshold of a £150 net loss (defined by the UKGC as the loss of deposited money with an operator, based on the net outcome of wagers) within any rolling 30-day period.[7] Understanding the population impacted by this significant policy change is crucial for evaluating its effectiveness and informing refinements.

Historically, researchers have relied on operator-held wagering records to analyse gambling populations and identify risk,[8] but a significant limitation is the reliance on data from a single gambling operator.[9] In competitive markets, like the UK, this approach inevitably captures

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only a partial view of individuals' gambling behaviour.[10] By contrast, bank transactions capture deposits to – and withdrawals from – a wide range of gambling operators. Thus, banking data can help situate gambling activity within a person's broader financial life, and reveal objective markers of vulnerability.[11]

Open banking data holds particular promise, given its ability to aggregate an individual's financial data across potentially all of their checking, savings, credit, and other accounts.[12] Open banking frameworks in the UK allow consumers to grant time-limited authorization for regulated third-party providers to securely access their account information using standardized Application Programming Interfaces (APIs). Adoption of this technology has grown rapidly; as of 2025, there are 13.3 million active users in the UK (approximately 1 in 5 consumers), a significant increase from just 1 in 17 in March 20, 2021.[13] Accordingly, the UKGC called out open banking as a technology that could help facilitate their mandate of financial risk checks, providing operators with a potentially more frictionless pathway for the growing number of consumers who use it, alongside other methods for those who do not.[14] Beyond assisting with the implementation of such checks, such data can also be useful for research investigating this policy and the population it might impact.

1.1. The present study

In this study, we analysed a historical open banking dataset of transactions from 243,478 gamblers for the 12-month period ending March 31, 2024. Although our dataset predates the policy's enforcement, analysing it helps establish a pre-policy baseline and characterizes the population whose gambling patterns would have originally triggered these checks, which can be useful context for regulators and operators alike as they navigate the policy's ongoing impacts.

Our objectives were threefold. First, we sought to quantify the prevalence of threshold exceedance in this historical cohort, examining the proportion of gamblers who would have triggered the £150 check, the frequency and magnitude of their exceedances, and the distribution across gambling operators. Second, we aimed to compare the demographics of gamblers who exceed the threshold (hereafter, Exceeding Threshold Gamblers, ETGs) with those who do not. Finally, recognizing that the ETG group may exhibit diverse behaviours, we conducted a cluster analysis to identify distinct behavioural subgroups.

2. Methods

2.1. Data

The data for this study were sourced from a UK credit scoring provider. The raw dataset contained 24 months of anonymized bank transaction records from a subset of over 1 million users of this service who had voluntarily provided consent to share their transaction history via open banking protocols. Users opted-in to this data sharing in exchange for receiving personalized financial insights from the provider. Each transaction included metadata such as the transaction amount, whether it was a debit (a deposit to a merchant) or credit (funds added to the account), and the inferred purpose of the transaction. Transaction purpose was defined using a proprietary algorithm developed by the credit scoring provider, which automatically categorizes transactions into groups such as home, bills, dining, gambling, and others. In addition to transaction-level data, the dataset also included self-reported user-level demographic information, including age (5-year bands), salary (£10,000 bands), and gender.

To create a computationally manageable analytic sample, we aggregated transaction-level data at the user-month level using a non-relational database. To ensure consistency and avoid biases introduced by rolling opt-in patterns due to the nature of user consent in open banking, we selected the most recent 12-month period ending March 31, 2024 and excluded users who did not have activity recorded in all 12 months. This resulted in a core sample of 515,562 users, including both gamblers and non-gamblers.

To address our objectives, we constructed an analytic sample of users who engaged in gambling-related transactions during any month within the observation period (i.e., gamblers). We identified gambling transactions using a two-stage process. First, we utilized the credit score provider's algorithm, which automatically categorizes transactions as "Gambling" based on merchant name data. This initial step identified approximately three-quarters of all transactions ultimately classified as gambling. Second, to ensure comprehensive capture, we identified missed transactions by cross-referencing the remaining uncategorized data against a supplementary list of known gambling operators. We excluded users whose only gambling activity was with lotteries, resulting in an analytic sample of 243,478 gamblers. This exclusion was made because the financial risk checks do not apply to lottery products.

2.2. Measures

We focused on gambling behavioural measures across our 12-month study period, as these would provide insight into the behaviour directly related to the policy trigger. We computed several metrics to characterize gambling behaviour, including measures of volume (how much individuals spent: e.g., Total Debited Amount, Net Deposits), frequency (how often they gambled: e.g., Debits, Active Days and Months), and variety (the number of different merchants they gambled with: e.g., Merchants), all of which are detailed in Table 1. We also computed variables related to broader discretionary spending (Leisure Spend) and how gambling expenditure relates to this spending (% Leisure) and users' income (% Income). We included these measures as they help situate an individual's gambling expenditure within their broader discretionary budget (leisure) and financial capacity (income), which can help provide important context related to the policy's "affordability" aims.

2.3. Statistical analysis

We first calculated descriptive statistics for all variables for our

Table 1
Variable definitions.

Variable	Definition
Total Debited Amount (£)	Total amount of all deposits to gambling merchants (i.e., spend on gambling).
Debits (n)	Count of deposits to gambling merchants.
Average Debit Amount (£)	Total Debited Amount divided by Debits.
Total Credited Amount (£)	Total amount of all withdrawals from gambling merchants.
Credits (n)	Count of withdrawals from gambling merchants.
Average Credit Amount (£)	Total Credited Amount divided by Credits.
Active Days (n)	The number of days with a gambling transaction.
Active Months (n)	The number of months with a gambling transaction.
Merchants (n)	Count of unique gambling merchants debited to by a user during the study period.
Net Deposits (£)	Total Debited Amount minus Total Credited Amount.
Leisure Spend (£)	Total amount of deposits across leisure categories including gambling.
% Leisure	Total Debited Amount divided by Leisure spend.
% Income	Total Debited Amount divided by the midpoint of the user's reported salary band.

Note. Leisure spend was computed by summing total debited amount for each user across the following merchant categories: Take-away, Concert & Theatre, Media bundle, Entertainment, TV, Media, Garden, Music, Hobbies or Activities, Hotel/B&B, Museum/exhibition, Dining and drinking, Gym Membership, Games and gaming, Enjoyment, Gym Membership, Social club, Cinema, Holidays, Alcohol, Dining or Going Out, Sports Club Membership, Cycling, Flights, Sports event, TV/Movies Package, Art Supplies, Zoo/theme park, Sports Equipment.

sample of 243,478 gamblers across the 12-month study period. To operationalize the threshold check, we computed the prevalence of threshold exceedance based on fixed calendar months. We acknowledge this differs from the official policy, which utilizes a rolling 30-day window. Our calendar month approach was adopted because it aligned with the user-month data aggregation strategy implemented for computational manageability with this large dataset. Thus, to compute the prevalence of threshold exceedance (i.e., the number of ETGs), we arranged the analytic sample by user, month, and merchant, then aggregated the data by user and merchant for each month period, filtering and then counting gamblers whose total Net Deposits (gambling debit transactions minus credit transactions) exceeded £150 in any given calendar month with a specific merchant[e]. By using this fixed-month methodology we are likely underestimating the true number of gamblers who would trigger the official rolling 30-day threshold.

For these identified ETGs, we then calculated additional metrics to characterize their threshold exceedance behaviour. Specifically, we counted how many distinct calendar months these gamblers exceeded the threshold and computed the amount by which each exceeded it. We also determined the number of distinct merchants with whom each ETG exceeded the threshold (i.e., whether high spending occurred with single or multiple operators).

We also wanted to understand how the number of ETGs would differ if we based our calculations on cross-operator Net Deposits (a perspective unavailable to individual operators, which is how the current policy is designed). So, we aggregated Net Deposits by user for each calendar month, summing expenditures across all merchants. We then identified the number of gamblers whose total cross-merchant Net Deposits exceeded £150 in any given month and compared this to the count identified via single-operator exceedances.

To compare the characteristics of ETGs with those who did not, we tested for group differences across numeric variables using t-tests and across demographic distributions (gender, age, and salary) using chi-square tests. For all tests, statistical significance was determined using a p-value of 0.001.

Finally, we conducted a cluster analysis to see if there were distinct groups within the ETG group. The selection of input features was guided by three criteria: (1) removing highly correlated variables (Pearson's $r > 0.7$; Table S1); (2) removing redundant or derived metrics (e.g., averages); and (3) prioritizing variables that are established indicators of gambling behaviour and/or are directly relevant to financial affordability. This process resulted in a final set of 7 numerical input features for clustering. To align with established literature,[8] we selected variables representing gambling volume (Total Debited Amount, Net Deposits), frequency (Active Days), and involvement (Number of Merchants). To address the policy context of affordability, we also included % Leisure, % Income, and Leisure Spend (excluding gambling). We used the k-means algorithm with the k-means++ initialization method, 10 separate initializations, and a fixed random state on the scaled data of these 7 features for the entire cohort of ETGs ($n = 57{,}952$). We used the Elbow method and silhouette score to determine the optimal number of clusters by examining the reduction in within-cluster sum of squares for k = 2 to 10.

[e] While the UK Gambling Commission (UKGC) defines net loss based on wins and losses from wagers with a particular operator, open banking data does not provide visibility into gambling account balances. Therefore, we used Net Deposits as a proxy for net loss, a method consistent with the UKGC's own approach when analysing open banking data (see: https://www.gamblingcommission.gov.uk/report/open-banking-data-modelling-of-gambling-spend-thresholds/data-and-model-open-banking-data-modelling-of-gambling-spend-thresholds)

3. Results

On average, gamblers spent (Total Debited Amount) £1,804.47 (SD = £7,003.65) on gambling over the 12-month study period, with a highly skewed distribution (median = £108.00), for a total expenditure of £439.3M across the sample. Gambling represented approximately 17% of these users' overall leisure spending and 7% of their estimated income. Gamblers were active in gambling-related transactions for an average of 5.32 months (SD = 4.10), making approximately 81 debit transactions and 12 credit transactions per year. Average Net Deposits was £534.35 (median = £41.06). Table 2 presents descriptive statistics for the sample.

The sample was predominantly male (63.16%), with females comprising 33.96% of users; 2.89% had unknown gender. Fig. 1 presents the joint distribution of age and salary bands for the 12-month study period. Over half the sample (51.92%) were aged 34 or younger, with the most represented groups being 30–34 (19.00%) and 25–29 (17.84%). Salary was skewed toward lower- and middle-income bands, with 67.43% of gamblers earning between £10,000 and £40,000 annually.

3.1. Prevalence and characteristics of ETGs

The number of gamblers who exceeded the threshold with a single operator in at least one calendar month was 57,592 (23.80%). On average, ETGs exceeded the threshold for 4.05 months (median = 3.00). Fig. 2 shows the number of ETGs for the 12-month study period, grouped by the number of months they exceeded the threshold.

For ETGs, the average excess amount was £290.57 (median = £159.66) per instance of exceeding the threshold. The maximum recorded excess amount was £19,323.43. On average, ETGs exceeded the £150 Net Deposits threshold with 2.13 gambling operators, though most did so with just a single operator (median = 1.00). If Net Deposits were considered across all operators, the number of ETGs would increase to 60,837 (24.99%), or an additional ~1% of gamblers would have triggered the threshold if their gambling activity across multiple operators was considered collectively.

ETGs exhibited significant differences in gender, age, and self-reported salary compared to non-ETGs. A higher proportion of ETGS were male (73.20% vs. 60.02%), while the proportion of females was lower (23.76% vs. 37.14%) ($\chi^2 = 3{,}549.55$, $p < 0.001$). In terms of age, ETGs showed higher representation in the 30–34 (21.36%) and 35–39 (18.62%) age groups compared to non-ETGs (18.27% and 15.81%, respectively), and lower representation in the youngest age band (18–24: 12.83% vs. 15.79%) ($\chi^2 = 1{,}039.48$, $p < 0.001$). Differences across salary bands were also significant ($\chi^2 = 318.58$, $p < 0.001$), where ETGs had slightly lower representation in some of the lower salary bands (e.g., 10K–20K: 11.60% vs. 13.48%), and slightly higher representation in the upper bands (e.g., >80K: 4.46% vs. 3.58%). Full results of these demographic comparisons are presented in Fig. S1. Additionally, a supplementary median regression analysis (Table S2) showed that ETG group membership was associated with a £889.70 increase in median annual Total Debited Amount ($p < 0.001$), with male gender (β = £25.45, $p < 0.001$) and non-linear age effects also significant, but salary was not.

In terms of gambling transaction activity, ETGs exhibited significantly higher gambling activity across all measured variables ($p < 0.001$). For example, average Total Debited Amount among ETGs was £7,002.82, compared to £180.68 in the non-ETG group. Similarly, ETGs had significantly more gambling-related transactions (286.03 vs. 17.05), higher Average Debit Amounts (£43.47 vs. £13.44), more Active Months (8.97 vs. 4.17), and were more likely to engage with multiple gambling operators (4.94 vs. 1.89). Reflecting these substantial differences in activity levels, the ETG group accounted for the vast majority (92.37%, approximately £405.8M) of the total £439.3M gambling expenditure observed across the analytic sample.

Table 2
Gamblers' descriptive statistics.

Variable	Mean	SD	Median	Min	Max
Total Debited Amount (£)	1,804.47	7,003.65	108.00	0.00	471,871.92
Debits (n)	81.07	244.93	9.00	0.00	21,246.00
Average Debit Amount (£)	20.71	62.06	11.22	0.01	7,000.45
Total Credited Amount (£)	1,270.12	6,304.97	20.00	0.00	1,369,615.63
Credits (n)	11.68	44.39	1.00	0.00	2,356.00
Average Credit Amount (£)	118.18	405.74	50.00	0.01	59,318.58
Active Days (n)	21.45	39.98	5.00	0.00	337.00
Active Months (n)	5.32	4.10	4.00	1.00	12.00
Merchants (n)	2.62	2.81	2.00	1.00	44.00
Net Deposits (£)	534.35	4,009.33	41.06	−1,312,687.23	163,701.42
Leisure Spend (£)	5,472.29	8,171.27	3,594.37	0.00	539,727.84
% Leisure	0.17	0.26	0.04	0.00	1.00
% Income	0.07	0.37	0.00	0.00	40.07

Note. Descriptive statistics are for the 12-month study period. Missing data were minimal and limited to a few variables due to user-specific activity: 4,177 users had no debit transactions, 105,763 had no credit transactions, 6,754 had missing or unreported income, and 10 users had zero leisure spending.

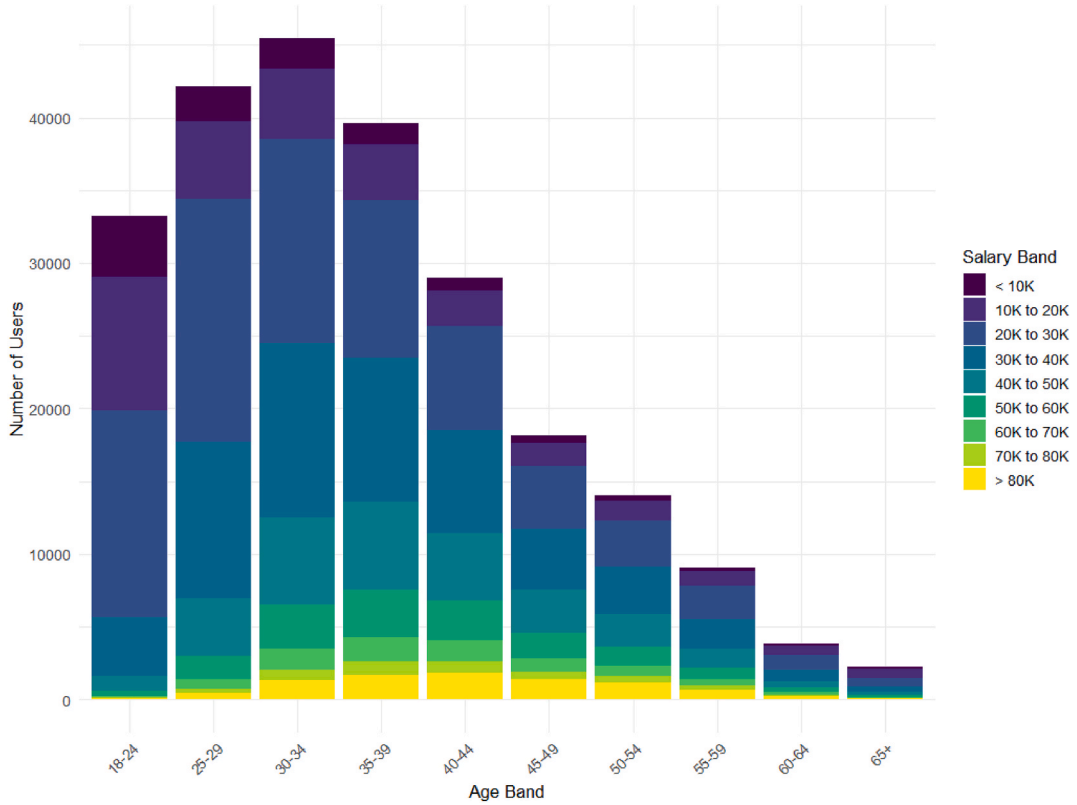

Fig. 1. Age and salary band distribution.

ETGs spent a higher proportion of their self-reported income on gambling compared to the non-trigger group – spending 28.84% on average versus 0.79% ($p < 0.001$) – and spent a significantly larger share of their overall leisure spending on gambling – averaging 52.61% compared to 6.20% ($p < 0.001$). For ETGs, gambling made up a substantially greater portion of their discretionary spending. Full results of these comparisons are presented in Table S3.

3.2. Cluster analysis of ETGs

Based on the evaluation metrics we deemed a k = 4 solution as optimal (Fig. S2). Three distinct clusters were revealed – two larger clusters representing approximately 97% of ETGs and a relatively smaller cluster representing ~4% – and a singleton cluster ($n = 1$) of an individual with an extreme negative Net Deposit (a "win" of ~£1.3M). The clusters (excluding the outlier) and their mean values for each input variable as well as the average number of months the threshold was exceeded are provided in Table 3.

The largest cluster (*Diversified ETGs*; $n = 32,013$; ~56%) exhibited a relatively lower gambling intensity. This group of ETGs was characterized by the lowest mean Total Debited Amount (£2,000.54), Active Days (~31 days), number of Merchants (~3), Net Deposits (~£759.40), and % Income (~7%). Diversified ETGs' exhibited the highest mean spend on non-gambling leisure categories (~£4,749.31) and their total gambling spend (Total Debited Amount) accounted for the lowest proportion of their total leisure spending (~36%). The second largest cluster (*Engaged ETGs*; $n = 23,597$; ~41%) represented a profile with higher gambling activity compared to the Diversified ETGs: mean Total Debited Amount (~£9,465.08), number of Merchants (~7), Active Days (~99 days), and Net Deposits (~£2,986.70). For this group, gambling accounted for a much larger majority of leisure spend (~76%) and income (~37%). A smaller but distinct third cluster (*Highly Engaged ETGs*;

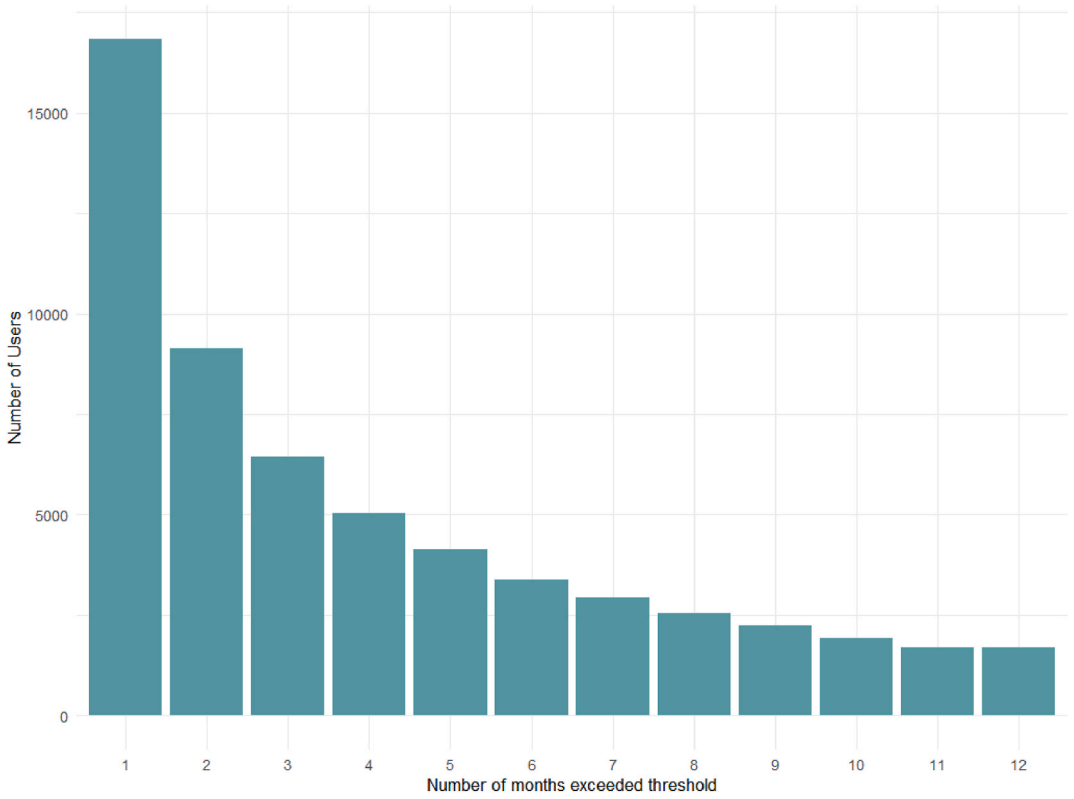

Fig. 2. Number of ETGs by number of months exceeding the threshold.

Table 3
Mean variable values per ETG cluster.

	Diversified ETGs (n = 32,013)	Engaged ETGs (n = 23,597)	Highly Engaged ETGs (n = 2,341)
Total Debited Amount (£)	2,000.54	9,465.08	50,567.97
Active Days (n)	30.83	99.34	153.48
Merchants (n)	3.15	6.81	10.65
Net Deposits (£)	759.40	2,986.70	15,958.99
Leisure Spend (£)	4,749.31	2,612.64	3,896.06
% Leisure	0.36	0.76	0.93
% Income	0.07	0.37	2.38
Months exceeding threshold (n)	2.32	5.80	10.07

Note. Months exceeding threshold was calculated based on gamblers exceeding the threshold with a single operator.

n = 2,341; ~4%) displayed even higher mean Total Debited Amount (~£50,567.97), the highest Active Days (~154 days, ~11 Merchants), and Net Deposits (~£15,958.99). Additionally, this groups' Total Debited Amount represented ~93% of total leisure spend and ~233% of income.

On average, the Diversified ETGs exceeded the threshold for 2.32 months (median = 2.00), which was less frequent that Engaged (mean = 5.80, median = 6.00) and Highly Engaged (mean = 10.07, median 11.00) ETG clusters.

We performed a post-hoc analysis to explore the demographic distribution across these clusters (Table S3 and S4). Of note were the differences in salary band distribution, particularly among the Highly Engaged ETGs, where ~17% of members in this group fell into the <£10,000 salary band. We can also observe a greater representation across lower salary bands for the Engaged ETGs compared to the Diversified ETGs. A visualization of salary distribution across clusters (excluding the outlier) is presented in Fig. 3.

4. Discussion

Our analysis revealed that ~24% of gamblers exceeded the £150 Net Deposits threshold under our single operator calendar-month framework. This prevalence was slightly higher than our expectations. The UKGC estimated that checks at a slightly lower threshold (£125 net loss) would affect 20% of accounts.[15] Our finding is also interesting given our approach of using calendar months instead of the policy's rolling 30-day window, which would likely reduce the observed rate by missing cumulative spend crossing month boundaries. Notwithstanding, our findings indicate a considerable number of our sample exhibited spending patterns at a level that is now subject to financial risk checks. While the precise proportion triggering the current checks may differ, our baseline finding highlights the potential scale of impact for the UK online gambling market.

We also identified a potential blind spot in the current single-operator implementation of the policy. When adopting a cross-operator perspective an additional ~1% of gamblers in our sample would have exceeded the threshold. This translates to approximately 2,500 individuals in our sample, a non-trivial number that could represent a meaningful portion of the entire UK gambling population. Ongoing monitoring of this gap, and whether it expands under the current policy environment, will be important – particularly as our findings suggest that high-spending gamblers are more likely to engage with multiple operators. A "global" view of an individual's gambling activity could address this, and such a strategy has been proposed in the literature.[9]

The relationship between gambling involvement, salary, and discretionary spending emerged in interesting ways in our cluster analysis. Over half of ETGs were characterized by a "diversified" profile, exhibiting large volumes of non-gambling leisure spending. This may suggest access to greater disposable income. Notably, this group also showed greater representation across higher salary bands compared to the rest of the ETG population, potentially indicating a subgroup of

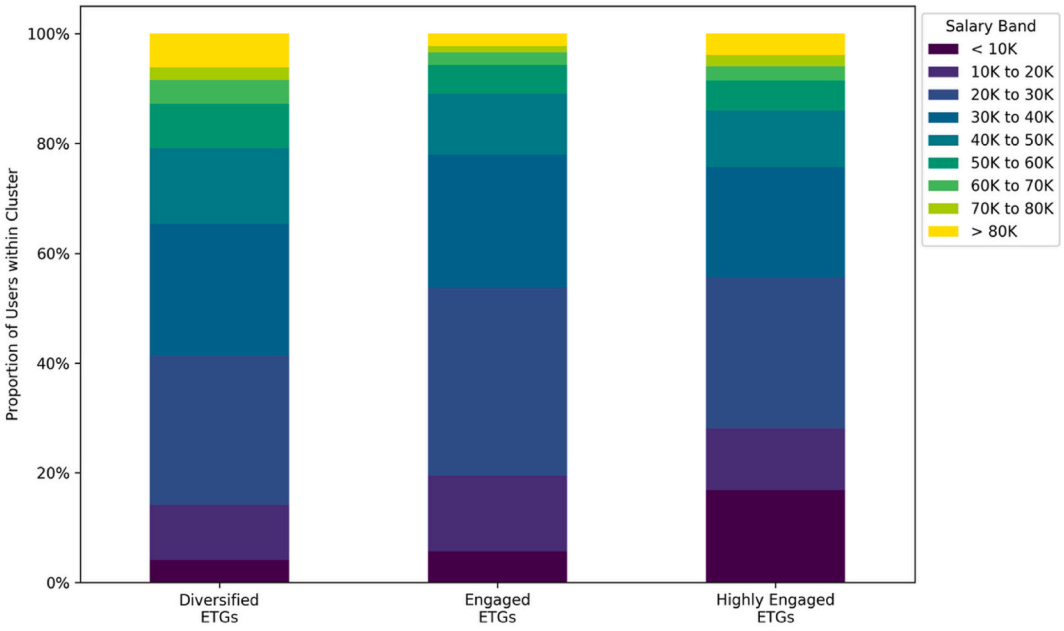

Fig. 3. Salary distribution per ETG cluster.

higher-income gamblers for whom gambling is one of several discretionary expenditures. For the Diversified ETGs, gambling made up, on average, approximately 7% of their self-reported income. Gambling within one's means is a hallmark of "responsible gambling", but the specific thresholds that define this behaviour are often unclear or not explicitly stipulated. Lower-risk gambling guidelines in Canada include the recommendation to "gamble no more than 1% of household income"[16] and the Netherlands recently introduced a guideline limiting gambling deposits to 30% of net income.[17] Thus, Diversified ETGs appear potentially less financially extended by their gambling relative to income but Engaged ETGs (at 37%) and certainly Highly Engaged ETGs (at 238%) seem to be exhibiting gambling spending patterns indicative of potential financial harm. These findings therefore raise critical questions about the £150 threshold: while it clearly captures segments engaging in harmful behaviour, the diversity of those exceeding it warrants further analysis into whether the policy optimally targets those most vulnerable.

While a low-specificity screen can be appropriate for some contexts, its application to gambling regulation may present challenges. From an operational standpoint, implementing frequent checks adds friction to what is, for most customers, a leisure and entertainment product. Some consumers may perceive these checks negatively and/or as an invasion of their privacy. Such perceptions could have unintended consequences, such as driving consumers towards unregulated, black-market operators.[18] This shift would be counterproductive, as these illicit operators may lack safer gambling protocols and consumer protections that the policy is designed to uphold. Unfortunately, the evidence base supporting this "black market threat" is sorely limited.[19] However, the UKGC is undertaking research in this area. A 2025 report found that users of illegal gambling websites (n = 117) were significantly more likely than all gamblers to cite "avoiding bans or account restrictions placed on me by other gambling companies" and "avoiding bank gambling blocks" as reasons for choosing which websites to gamble on.[20] For individuals identified as financially vulnerable by these checks, operators are required to take "proportionate action". However, the context surrounding an individual's situation and, in particular, their psychological readiness to change, could make what constitutes "proportionate action" challenging to define. For example, *the transtheoretical approach* suggests that interventions are most effective when matched to an individual's readiness.[21] Further study is therefore warranted on how actions taken in response to these automated flags align with individual psychological states, as well as to validate the accuracy of the positive identifications themselves.

Furthermore, the income characteristics of the Highly Engaged ETG cluster presents a significant anomaly. Despite this group exhibiting gambling expenditure equivalent, on average, to 238% of their reported income, a notable proportion reported annual salaries below £10,000. This inconsistency raises questions about the reliability of self-reported income data for such extreme gamblers. It suggests possibilities such as: income underreporting, gambling funded through means not captured in the analysed account data (e.g., significant borrowing, undeclared income, funds from other accounts), or perhaps deliberate non-disclosure. Consequently, the self-reported income figures for this specific high-expenditure, high-risk subgroup likely require cautious interpretation and may not accurately reflect the true financial resources enabling their gambling activity.

Our results also corroborate a well-established finding in the gambling literature: gambling expenditure is highly concentrated among a relatively small subset of individuals. ETGs accounted for over 90% of all gambling debits. This concentration has been consistently demonstrated across various gambling modalities and datasets.[22–24] This level of dependence on a small group of high-spending individuals raises questions about the long-term sustainability of industry revenues, particularly as regulatory interventions increasingly focus on this group.

4.1. Limitations

Our findings may not be fully generalizable to the broader population, as the sample was drawn exclusively from users of a single credit scoring service who explicitly opted-in to share their financial information via open banking protocols. This self-selecting group may differ systematically from other gamblers, for instance, by being more actively engaged in managing their finances compared to the general population of gamblers. While this transaction data offers a relatively comprehensive view of users' gambling behaviour, some activity may remain unobserved; for example, gambling involving cryptocurrency, unregulated markets, or black-market operators. Moreover, although most of our analyses were based on objective financial data, demographic variables were self-reported and therefore subject to typical limitations, including recall bias and potential inaccuracies. Future work could explore the

validity of self-reported income by comparing it against available income indicators derived from open banking data.

Finally, while our study uses open banking data to model the policy's impact, open banking adoption is not universal. A substantial portion of gamblers may be unable or unwilling to consent to such a system for financial risk checks, which creates challenges for the universal and equitable implementation of the policy.

4.2. Conclusion

Overall, our retrospective analysis suggests that the financial risk check policy recently enacted by the UKGC is likely to affect a meaningful proportion of online gamblers. According to our findings, our £150 Net Deposits threshold captures a diverse range of individuals, whom we categorized into three distinct profiles. Notably, over half of those who exceeded the threshold appeared to be gambling in a manner that could be considered proportionate to their income and part of a broader, diversified pattern of leisure spending. While the checks are designed to reduce gambling-related harm, their implementation will likely entail significant costs in terms of time, money, and operational resources. As such, ongoing evaluation of the cost-benefit trade-off, between the extent to which the policy effectively identifies individuals at genuine risk versus those flagged unnecessarily, will be critical to ensuring the policy remains proportionate, effective, and sustainable.

From a gambling harm reduction perspective, our findings bear important implications for public health practitioners, researchers, and policymakers. For policymakers, this study provides support for the new financial risk checks given the prevalence of high spending, but it also highlights potential shortcomings. For example, we show that a single-operator framework creates a blind spot that could miss some at-risk individuals who gamble with multiple operators. Thus, policymakers, regulators, and gambling operators should further explore how they can work together to obtain a more holistic view of gamblers' spending, such as by leveraging financial technology (i.e., open banking) and specialized service providers to facilitate access to transaction data. Additionally, our finding that the £150 threshold captures a diverse set of individuals suggests that policymakers may wish to consider fine-tuning the strategy. This could help mitigate potential unintended consequences of the policy (e.g., displacement to the unregulated black market). And for public health practitioners, including safer gambling personnel within operators, this diversity amongst ETGs reinforces that an automated flag (in this instance, the £150 threshold) should be considered as an initial indicator, and that a one-size-fits-all response is likely inappropriate. Instead, follow-up actions should be contextualized, with customer interactions and any subsequent interventions tailored to each individual's distinct profile and financial reality.

Finally, our study contributes to the research field by demonstrating the use of large-scale financial transaction records to assess gambling harms at scale. More broadly, our work also highlights the utility of such digital footprint data for studying other complex, consumption-driven harms (e.g., online shopping, video gaming). Within gambling studies, this methodology supports the field's recent shift toward a public health perspective and away from a narrow focus on problem gambling as a minority issue.[25] As gambling evolves and becomes increasingly digitized, such data-driven, public health-oriented approaches can help build a stronger evidence base to inform more effective policy and interventions.

Ethical statement

The study was deemed not to involve human subjects by the University of Nevada, Las Vegas Institutional Review Board.

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Declaration of competing interest

During the past 5 years, Kasra Ghaharian has received funding for research and/or consulting services from the Nevada Department of Health and Human Services, the Nevada Governor's Office of Economic Development, the Massachusetts Gaming Commission, AXES.ai, Playtech, Sightline, IGT, Differential, Focal Research Consultants, GP Consulting, and the International Center for Responsible Gaming. Ghaharian has received honoraria/travel reimbursement from the Responsible Gambling Council, the Illinois Council on Problem Gambling, and Kindred Group. None of these entities played roles in the design, analysis, or interpretation of research, and imposed no constraints on publishing.

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IGI is home to an industry-focused advisory board (https://www.unlv.edu/igi/advisory-board), and specific programs, such as AiR Hub, have their own advisory panels. These advisory roles include resource support, and individual advisors are required to adhere to IGI policies. IGI maintains a strict research policy (https://www.unlv.edu/igi/research-policy), as well as a partnership and transparency framework (https://www.unlv.edu/igi/policies/partnership), to ensure appropriate firewalls exist between funding entities and IGI's research and programs.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the authors used Google Gemini in order to improve language and readability. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2025.106080.

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