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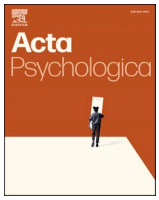

Differences in online gambling expenditure between players from Germany, Spain, Netherlands, Great Britain, US and Canada: A largescale online player tracking study

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ABSTRACT

The present study aimed to compare the expenditure of real-world online gamblers (N = 926,086) from six countries (Great Britain, Netherlands, Germany, Spain, Canada [Ontario], and US) to identify potential impacts of specific regulatory aspects on the amount of money gambled by players. The dataset comprised 233,221 British players, 167,826 Dutch players, 89,456 German players, 55,229 Spanish players, 18,463 Canadian players, and 361,891 US players. Data were analyzed using the total amount of money bet, lost, and deposited. German players bet (median = €74) and lost (median = €15) the lowest amounts of money gambling. Moreover, the average bet per game (median = €0.17) was the lowest among German players. Canadian (mean = €11,165) and US players (mean = €6434) bet the highest amounts. The US and Canada were the two countries with the largest outliers with respect to amount bet. Analysis also showed that a small percentage of players were responsible for the majority of the revenue in each of the six jurisdictions. More specifically, in the US, the 20% highest spending players accounted for 95% of the amount of money bet. The respective percentages for Canada, Great Britain, Germany, Spain and the Netherlands were 94%, 88%, 86%, 91%, and 79%. The present study's findings suggest that less restrictive regulation is associated with higher gambling expenditure, and that very strict regulation is associated with lower gambling expenditure.

1. Introduction

Commercial forms of online gambling first emerged in the mid-1990s, with some of the earliest betting and casino platforms going live in 1996 and 1997 (Williams, West, & Simpson, 2012). These sites were typically operated from Caribbean regulatory jurisdictions and were designed primarily for customers in the United States (Williams et al., 2012). Since then, the online gambling sector has grown rapidly and now represents a substantial global market. Moreover, the availability of gambling has been associated with increased risk of problem gambling (Jacques, Ladouceur, & Ferland, 2000; Zoglauer, Czernecka, Buhringer, Kotter, & Kraplin, 2021).

An estimated 46.2% of adults globally have gambled in the past 12 months, equating to 2.3 billion individuals worldwide (Tran et al., 2024). The same study estimated that more than one in six adolescents had gambled in the past 12 months (17.9%), including commercial forms of gambling, which are largely age-restricted, equating to an estimated 159.6 million adolescents (Tran et al., 2024). Tran et al. (2024) also estimated that 8.7% of adults had engaged in any risk gambling in the past 12 months (i.e., the broadest interpretation of self-reported risk severity). Tran et al. (2024) defined risk gambling as not only those who meet the thresholds for problem gambling or gambling disorder but also includes those who, at minimum, report sometimes or occasionally experiencing at least one behavioral symptom or adverse personal, social, or health-related consequence from gambling. This group represents the full spectrum of risk severity. This estimate equates to 439.6 million adults engaging with any risk gambling globally. They further estimated the population prevalence of problematic gambling to be 1.41% among adults. Regional estimates of problem gambling ranged from 0.7% in Australasia to 1.6% in North America. Tran et al. (2024) also reported that prevalence of problem gambling among those using online casinos (15.8%), casino gambling (10.0%), online gambling (8.6%), and sports betting (8.9%) was substantially higher than for other forms of gambling.

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The European Gaming and Betting Association (EGBA) reported an online gross gaming revenue (GGR) of €47.9 billion in 2024 (EGBA, 2025). This was a 5% increase from 2023. By 2029, the online gambling GGR is expected to reach €66.8 billion. The largest total GGRs (online and land-based) are generated by Italy, Great Britain, Germany, Spain and the Netherlands (EGBA, 2025). The American Gaming Association (2025) reported an annual total gambling revenue of US$72 billion for 2024. Online gambling revenue across the seven states with legal online casinos (New Jersey, Nevada, Delaware, Pennsylvania, West Virginia, Michigan, Connecticut, Rhode Island) was $8.41 billion in 2024 (AGA, 2025).

1.1. Gambling regulation and expenditure

Gambling regulation attempts to minimize black market participation and therefore minimize tax loss. Gambling regulation also aims to keep problem gambling to a minimum. Regulators apply various approaches such as limiting the number of operating licenses, having maximum spending/loss limits, allowing limited gambling products (e.g., only online slots, no in-play betting), and limiting advertising and marketing. If the offer is too restrictive, gamblers might move towards the black market which in turn reduces tax and could also fuel problem gambling because of limited player protection measures at unregulated sites. Indications of such trends have been noted in the Netherlands (Porter, 2025). A recent review of offshore market gambling in the Nordic countries concluded that industry numbers are likely larger than government-produced figures (Marionneau, Kristiansen, Roukka, & Wall, 2026). Moreover, the offshore market gambling topic is a highly political debate. Given the increase in gambling and gambling-related harm, researchers have noted that gambling regulation should focus on the reduction of harm (Baxter, Hilbrecht, & Wheaton, 2019; Gainsbury, Blankers, Wilkinson, Schelleman-Offermans, & Cousijn, 2014; Wardle et al., 2024). Moreover, the Word Health Organization has recognized the impact of gambling on public health and the necessity for respective regulation (Abbott, 2020).

Several researchers have noted that gambling operators' revenue is predominantly generated by a small number of extreme players (Fiedler, 2019; Grönroos, Kouvonen, Kontto, & Salonen, 2022; Orford, Griffiths, & Wardle, 2013). Forrest et al. (2025) studied the distribution of actual gambling expenditure with a sample of 140,000 UK online gamblers. They found that overall, 20% of the players were responsible for 89.2% of the net revenue, and concluded that the Pareto ratio supported the notion that online gambling is more dependent on the highest volume customers than may be the case in some other industries.

Several regulators have introduced maximum monetary limits to decrease the risk of high individual losses. In 2022, Finland's state-operated gambling provider introduced a monthly loss cap of €2000 for online slot machine play. Similarly, Germany's revised Inter-State Gambling Treaty established a €1000 monthly deposit limit for online sports wagering, applied across all licensed operators to prevent players from avoiding the restriction by using multiple platforms (International Comparative Legal Guides, 2022). In Norway, those gambling with *Norsk Tipping* (the state-owned monopoly gambling operator), only lose up to NOK 20,000 (approximately US$2000) per month. This applies to online casino, online lottery, online sports betting, land-based lottery and land-based slot machines (Lyutskanova, 2025). In February 2025, a maximum loss limit of NOK 3000 was introduced for players aged 20–21 years and a maximum loss limit of NOK 5000 for players aged 22–24 years (Lyutskanova, 2025). A longitudinal analysis of data from the Finnish monopoly gambling operator (*Veikkaus*) between 2019 and 2022 showed that availability restrictions and mandatory precommitment reduced the total consumption of gambling in land-based environments (Marionneau, Selin, Impinen, & Roukka, 2024). This reduction was not offset by increases in online environment nor by other products.

At present, the Spanish Government is considering the introduction of a comparable universal, multi-operator limit (Menmuir, 2023). In Belgium, a €200 weekly deposit cap has been implemented, although this applies per gambling website, and players may request individual exemptions (Orme-Claye, 2022). In Great Britain, the Government has proposed making enhanced affordability checks mandatory for customers who incur net losses of £1000 or more in a single day, or £2000 or more over a 90-day period (UKGC, 2023b). Meanwhile, in the Netherlands, since 2024 operators have been required to conduct affordability assessments when players deposit more than €700 per month, and deposits exceeding 30% of a customer's income will not be allowed (Thomas-Akoo, 2024).

1.2. The present study in context

To the authors' knowledge, the present study is the first to attempt to link regulatory differences to differences in gambling behavior among real-world online players. Regulation attempts to limit problem gambling but create an attractive enough gambling environment to limit black market gambling. Moreover, the authors are not aware of any previous empirical study which has attempted to analyze the impact of different regulations on actual gambling behavior in a real-world sample of online gamblers. The insights of such an analysis could help policy-makers and regulators to further tailor regulation to create an attractive, yet low risk gambling environment. Therefore, the present study focused on online gambling behavior in six countries (Great Britain, Germany, Spain, the Netherlands, Canada [Ontario], and US). This means that apart from the USA and Canada, three out of the five largest European countries with respect to GGR were included in the present study. The six countries' online gambling prevalence rates and specific aspects are described in the Supplementary Materials.

1.3. Relevant regulatory aspects of gambling in Great Britain, Germany, Spain, the Netherlands, Canada [Ontario], and US

Table 1 lists the relevant regulatory aspects that were considered most important by the authors in relation to the present analysis. Stake limits refer to the maximum amount of money that can be gambled on a single spin of an online slots game. Great Britain and Germany limit these stake amounts, whereas the other countries do not. The German regulation also forbids losses disguised as wins. This means that the amount of money won on a single slots game must always be greater than the amount of money staked on that game.

The current German online gambling law came into effect in July 2021. It allowed licenses for online slots, online sports betting, online poker, and online casino table games. Online slots can only be offered exclusively at gambling websites and must not be offered together with other casino games such as roulette or blackjack. In 2023, the online gambling market contributed €3 billion in GGR to the total GGR of €13.7 billion (Jung et al., 2025). The most notable part of Germany's online gambling regulation is a ‘single customer view’ which connects all licensed online gambling providers. Players are identified across the licensed online gambling providers and therefore their total amount of money deposited is known to the regulatory body. To the best of the present authors' knowledge, everywhere else in the world, voluntary or mandatory limits only apply to the amount of money deposited/lost or bet with a single operator. In Germany, the limits apply across all regulated operators.

The Netherlands and Germany also limit the total amount of money that can be gambled each month by players. In Germany, this amount applies to all licensed online gambling operators and refers to the amount of money deposited. If a player attempts to deposit money to gamble, the request is first sent to a governmental database. The database then determines if the player is eligible to deposit and gamble. The maximum monthly deposit limit of €1000 cannot be exceeded by players. Moreover, every player must set a voluntary monthly deposit limit which has to be smaller than or equal to the maximum monthly

Table 1
Relevant gambling regulatory aspects by country.

	Stake limit on slots	Maximum spend limits	Minimum game duration (slots)	Products available	Single customer view	Affordability checks/ risk analysis	Mandatory to set limits
USA	No	No	No	All	No	Partly	No
Canada (Ontario)	No	No	No	All	No	Yes	Yes
Great Britain	£5 adults £5 (18–24 yrs)	No	2.5 s	All	No	Yes	No
Netherlands	No	€700, €300 (18–24 yrs)	No	All	No	Yes	Yes
Spain	No	No	No	All	No	Yes	Yes
Germany	€1	€1000	5 s	Slots	Centralized governmental database	Yes	Yes

deposit limit of €1000.

As of 2024, players could request to increase the monthly deposit limit of €1000. Operators must then determine if the player can afford to deposit more than €1000 in a month. Moreover, operators have to apply for a special license with the regulator which allows them to increase the deposit limit beyond €1000 for specific players. Once a player's monthly deposit limit is increased beyond €1000, extensive continuous monitoring by the operator must be applied. In the Netherlands, the monthly deposit limit is €700, and for young adults (18–25 years), the limit is €300.

Germany and Great Britain also require a minimum duration between two slot games (2.5 s in Germany, and 5 s in Great Britain). These two countries have also banned autoplay features on slot machines. Autoplay refers to game events in slots that do not require the player to do anything. During autoplay, a number of games are triggered automatically without the player having to do anything each time (e.g., click a button). In Germany, online casinos are not allowed to provide slots games and other casino games (e.g., roulette, black-jack) on the same website. Currently, apart from one licensed operator in Germany, all other operators offer slots games exclusively. This means that players cannot play slots, roulette or blackjack at the same online gambling website.

In 2023, a voluntary single customer view trial called *GamProtect* was launched in Great Britain (Vixio, 2024a). UK operators are being encouraged to voluntarily sign up for this industry-led data-sharing scheme. In 2023, 5527 vulnerable consumers were flagged by gambling operators to the *GamProtect* scheme, with 88% of these players being flagged and matched by at least one operator, and 66% being flagged and matched by at least two operators (Vixio, 2024a). Only Germany has a true 'single customer view'. Here, each player's gambling behavior is reported to a government database across all the licensed online gambling operators in real-time. This means that the mandatory as well as the individual monthly deposit limit applies to gambling expenditure across all the online gambling operators. In contrast, the maximum or individual limit in the other five countries only applies to a single gambling operator.

Five countries (the US only partially) require licensed online gambling operators to monitor player risk and interact with players after detecting indicators of risky gambling. The UK Gambling commission (UKGC) specifically describes the need to detect, interact, and monitor the player's behavior. Apart from excessive gambling expenditure, operators must also have systems in place to identify potentially risky patterns of gambling (e.g., frequent depositing or nighttime play), excessive time spent gambling, as well as increases in voluntary limit-setting. The UKGC's documentation of the customer interaction guidance is by far the most elaborate compared to all other regulators considered in the present study (UKGC, 2023a). Although there is no maximum amount spend in Great Britain, the UKGC recommends operators check affordability after players have deposited £500 since opening their account. For young adults (18–24 years), the recommended amount for affordability checks is £150.

In Spain, online gambling was initially legalized in June 2022. Online slots gambling was added to the regulation in 2024 and could only be offered by licensed online gambling operators starting in 2024. Players who have incurred weekly net losses equal to or greater than €600 for three consecutive weeks are defined as having intensive gambling behavior. The respective net loss limit for young adults (18–24 years) is €200. This requires operators to send a specific message which alerts players about their losses, a monthly summary of game history, and prohibition of depositing money using credit cards. Moreover, operators must detect at-risk players. It is not specifically described how such detection must be executed. In the first half of 2025, the Spanish gambling regulator announced a plan to roll out an inhouse developed problem gambling detection algorithm across all the licensed online gambling operators (Ryan, 2025). The authors are not aware of any other country which has introduced a similar requirement.

The Netherlands requires operators to monitor indicators of problematic gambling. It was only in January 2025 that this requirement was specified in more detail (Weeren & Pannekoek, 2025). Operators are required to monitor gambling behavior in real-time and block accounts when specific behavior is detected until interventions have taken place. The behavioral indicators that have to be monitored are excessively trying to recoup losses, urgently or repeatedly complaining about not winning or not winning enough, using credit cards or e-wallets to deposit money into the gaming account, using multiple payment methods, gambling between midnight and 6 am, gambling for more than 6 h in a 24-h period, and playing significantly more often than other players (Weeren & Pannekoek, 2025; Kansspelautoriteit, 2024). Interventions have to take place within one hour after critical behavior has been detected. This means that players who show indications of problematic play must blocked until the gambling operator has intervened. An intervention could be a phone call, an e-mail, a pop-up message, or (for example) a recommendation to lower a limit (Weeren & Pannekoek, 2025).

The German Interstate Treaty requires online gambling operators to apply a scientifically sound algorithm to monitor players for risks of problem gambling. However, it does not specify details nor the action necessary. Affordability checks are part of the duty of care. The approved system does not check for income or source of wealth but is limited to credit default events. After introducing the possibility for operators to increase the monthly deposit limit beyond €1000, the regulator also introduced several monitoring criteria. Among others, these include gambling expenditure, time expenditure, changes in play, limit-setting behavior, and depositing frequency. The monitoring is not required real-time and once players trigger three out of several criteria, they must be reported to the regulator. Moreover, the monthly deposit limit must be reset to €1000.

The Alcohol and Gaming Commission of Ontario in Canada specifically requires operators to continuously monitor player behavior to identify those at risk of harm, and intervene appropriately when risk indicators appear (AGCO, 2025a). However, there are no details regarding the actual monitoring procedures or necessary actions that

operators have to take.

Only in Great Britain, Ontario and the US, are players not required to set deposit limits. Recently (October 31, 2025), it was deemed that players must be prompted to set a deposit limit after registration in Great Britain (UK Gambling Commission, 2025). However, this does not mean that players must set a limit. Operators merely have the duty to alert them to the possibility after registration. In all jurisdictions, players cannot simply increase a limit. In Ontario, a 24-h cool-off period must elapse before an existing limit can be increased. In Spain, players have default deposit limits after registration (€600 per day, €1500 per week, and €3000 per month). To increase a limit, players must request it manually, pass a seven-day 'cooling-off' period, and undergo an affordability/self-verification check (self-declared income). In the Netherlands and Germany, a limit increase only becomes valid after a seven-day cool-off period.

The US clearly stands out with respect to a lack of specific regulatory restrictions which could impact gambling behavior. Out of all the states which allow online casino or online sports betting, only five (Colorado, Washington, D.C., Massachusetts, New Jersey, Virginia) require online gambling operators to monitor player behavior for signs of problem gambling (Vixio, 2024b). None of the states require players to set money spending limits. Moreover, the five states do not require operators to provide players the option to set monetary spending limits.

There is a large variation across the regulatory requirements across the six countries. Monetary fines are one way to determine how strict the requirements are enforced. It can be assumed that operators more likely adhere to the regulatory requirements if the likelihood of fines is higher. In Great Britain, the UKGC's fines are listed at a dedicated website (i.e., https://www.gamblingcommission.gov.uk/news/enforcement-action; (UKGC, 2025). In 2025 (up to November 10), 25 enforcements for licensed operators were listed. These ranged from £95,000 to £10 million. Suspension of licenses as well as arrests had also been enforced. In Ontario, four penalties had been issued in 2025 (up to November 10) (AGCO, 2025b, 2025c, 2025d, 2025e). The penalties ranged from CA $54,000 to CA$151,000. Spain publishes an annual list of fines (Ministerio de Derechos Sociales, Consumo y Agenda 2030, 2025). In 2024, a total of 14 unlicensed operators were fined €5 million each, and one operator was fined €10 million for repeated offences. Moreover, 12 licensed operators were fined for serious infringements (e.g. insufficient player monitoring) totaling €2.396 million. Including 2024, Spain handed out fines amounting €475 million, the majority being issued to unlicensed operators.

The Netherlands issued the majority of fines ($N = 33$ in 2025, up to November 10) ranging from €10,000 to €19,679,000 for unlicensed online gambling websites for offering their products without license in the Netherlands (Kansspelautoriteit, 2025). Only one fine for licensed operators was issued in 2025 (up to November 10). The amount was for €2.65 million. In 2024, the German regulator investigated 23 criminal complaints, 459 illegal online gambling sites were issued a cease-and-desist order, 657 illegal online gambling sites were blocked, and 165 online gambling sites payments were blocked. However, no fines for licensed or unlicensed operators have yet been issued in Germany (Gemeinsame Glücksspielbehörde der Länder, 2025).

In 2024 The New Jersey Division of Gaming Enforcement issued *DraftKings* a $100,000 fine for reporting inaccurate sports betting data (Evans, 2024). In November 2024, the Ohio Casino Control Commission (OCCC) levied a $425,000 (€408,042) fine on *DraftKings* for two separate violations. The OCCC said *DraftKings* took college-player proposition bets, which are banned in the state. It also said the company allowed accounts to be funded at *"unauthorised"* locations (Dorson, 2024).

1.4. The present study

The present study aimed to compare real-world online gamblers spending from six countries (Great Britain, Netherlands, Germany, Spain and Canada [Ontario], and US) to identify potential impacts of specific regulatory aspects on money spent. The multijurisdictional dataset afforded a unique opportunity to study this aim. The authors chose six countries, three of which are among the largest in terms of GGR in Europe (i.e., Great Britain, Germany and the Netherlands). These countries were also chosen for their diverse approach to gambling regulation. Both Germany and the Netherlands have introduced maximum monthly deposit limits whereas there are no maximum limits in Great Britain and Spain. Great Britain on the other hand is one of the most active jurisdictions regarding financial fines which are enforced when operators violate gambling regulations. Canada (Ontario) was chosen as the fifth jurisdiction because it is in North America and online casino gambling/online sports betting were only introduced in 2022. The online gambling regulation in Ontario is also less strict compared to the other four aforementioned jurisdictions. Ontario is the only Canadian province which has introduced an online gambling license scheme which allows private operators to offer online casino gambling. In the other Canadian provinces and territories (British Columbia, Quebec, Nova Scotia, New Brunswick, Alberta, Saskatchewan, Manitoba, Prince Edward Island, Newfoundland and Labrador, Yukon, Northwest Territories, Nunavut) Canadians can only gamble on casino, sports-betting and lottery with the state-owned lottery operator. The US was chosen for the obvious reason that is the largest economy in the world and one of the most dynamic gambling environments. As of 2024, 64% of the US states had introduced online casinos ($n = 7$) or online sports betting ($n = 32$). The present study could help these states to make educated decisions about future regulatory frameworks. The study had three research questions (RQs):

- Are there any differences in gambling behavior between the six jurisdictions, and are such differences related to different types of regulatory measures? (RQ1)
- Is gambling expenditure across players unequally distributed? (Is there a small percentage of players who contribute a large proportion of the amount spent?) (RQ2)
- Is the gambling expenditure distribution across players less unequal in highly regulated jurisdictions compared to less regulated jurisdictions? (RQ3)

Because the present study was exploratory, there were no a priori hypotheses. As far as the authors are aware, the study is also the largest multinational real-world player sample to date.

2. Method

Online gambling data from operators in each of the six countries were analyzed with respect to aspects that could have a direct impact on the amount of money spent on gambling. The element of regulation had to be specific to be considered relevant for impacting actual gambling behavior. For example, restrictions on general advertising were not included in the regulatory comparison of the six countries' regulation. Restrictions on advertising usually limit customer acquisition, but once a player has signed up, advertising does not impact the intensity of play. On the other hand, mandatory maximum money expenditure limits can have a direct impact on a players' gambling intensity. The same holds true for maximum stakes on slots games.

The authors were given access to secondary datasets on the total amount of money bet, lost, and deposited from players from 15 online gambling websites, three from each of the six countries (Great Britain, Netherlands, Germany, Spain, Canada, and US). No data from any other country were available in the provided datasets. Although the total number of participants was large, it was not a random sample because the researchers did not have access to datasets from all online gambling operators in these six countries. The aforementioned aggregated metrics of all players who gambled during October 2025 on the 15 online gambling websites were analyzed. The datasets included each active players' average amount of money gambled per game and the average

amount of money deposited per deposit event in October 2025. This means that the total amount of money deposited for each player was divided by the number of times the player deposited money in October 2025. The data also contained the total number of minutes played during October 2025 and the mean number of deposits per session. Moreover, the mean average money gambled per game was available for each player. Because most of the metrics were naturally skewed, the quantile-based descriptive statistics were also obtained.

Given the skewed distribution of the dataset, confidence intervals (CIs) were computed using the bootstrap approach (Hesterberg, 2011). The typical CI computation assumes a normal distribution and is based on the respective 95% ($t = 1.96$) or 99% ($t = 2.58$) density values from standard normal distribution. This approach is only valid in the case of a normal distribution. The bootstrap method computes the CIs based on many random samples. The bootstrapping process in the present study consisted of 1000 randomly drawn samples each consisting of 100,000 players. For each of the 1000 samples, the average mean and median values of the different metrics (e.g., amount of money bet) were computed. The CIs of the average mean and median metrics are simply the 50th and the 950th value after sorting the 1000 samples respective metric (e.g., median amount of money bet) in ascending order. Therefore, the CIs are not computed based on the mean of the entire sample applying the formula mean +/− 1.96*stdev_mean, but are the actual 50th and 950th value of the 1000 bootstrap values.

A Lorenz curve (Gastwirth, 1971) and the corresponding Gini coefficient (Gastwirth, 1972) were used to analyze the distribution of the gambling expenditure across the active players. Lorenz curves are useful instruments for understanding the degree to which gambling expenditure is generated by a small group of intense players. Previous gambling studies have also applied Lorenz curves in the understanding of the distribution of gambling expenditure (Fiedler, Kairouz, Costes, & Weißmüller, 2019; Forrest et al., 2025). For example, Lorenz curves are also used to understand the distribution of electricity consumption in a population (Jacobson, Milman, & Kammen, 2005) and in the analysis of income distributions (Dagum, 1980). The present study examined how gambling expenditure was distributed across the population (the population here being the gambling clientele of the gambling operator websites examined).

The Lorenz curve plots the cumulative share of players on the *x*-axis. In the present study, the amount of money gambled in descending order was used. This means that an inverse Lorenz curve was used. On the *y*-axis, the cumulative share of the metric (amount of money gambled) was plotted. If every player spent exactly the same amount of money, a diagonal line would appear (i.e., 10% of players would generate 10% of the total amount of money gambled, 50% of players would generate 50% of the amount of money gambled, etc.). Previous gambling studies (Fiedler et al., 2019; Forrest et al., 2025; Orford et al., 2013) have demonstrated that a small percentage of gamblers are responsible for the majority of gambling revenue.

The Gini index was also calculated. This computes the area between the Lorenz curve and the diagonal line. It is 0 if every gambler spends the same amount of money, and 1 if one gambler spends the entire amount and all other gamblers spend nothing. Mathematically, the Gini coefficient is described as follows:

$$G = 1 - 2\int_0^1 L(p)dp$$

The following interpretation of the Gini coefficients are common (Gastwirth, 1972): Gini ≈ 0.3 indicates moderate inequality, Gini ≈ 0.5 indicates strong inequality, and Gini >0.7 indicates extreme inequality (which is common in gambling losses across a population of gamblers). The data were analyzed using the *Python* programming language (Van Rossum, 2007).

3. Results

3.1. Data analysis

The authors received access to a number of secondary datasets comprising 233,221 British players, 167,826 Dutch players, 89,456 German players, 55,229 Spanish players, 18,463 Canadian players, and 361,891 US players. In total 926,086 players who gambled on at least one day during October 2025 at one of the 15 online gambling websites from the six countries were analyzed. Table 2 reports the distribution of the total amount bet in Euros, total amount lost in Euros, and the mean bet per game in Euros for October 2025. The 25% percentile (Q1), mean, median, and the 75% percentile (Q3) are also reported. On mean average, US players bet €11,165 in October 2025 and the respective median value was €395. This indicates a heavily skewed distribution and for that reason the median is more appropriate to describe the distribution. The same holds true for Canadian players whose mean average amount bet was €6434 and the respective median value was €272.

German players' gambling expenditures were the smallest with respect to all the distribution metrics. Moreover, German players' mean average total amount of money lost in October 2025 was among the smallest (€73). German players median loss was €15, and 20% of German players lost more than €78. In contrast, Canadian players median loss was €30, and 25% of Ontario players lost more than €172. Dutch players' median loss was €30, British players' median loss was €28, and Spanish players median loss was €18. Moreover, 25% of Dutch players lost more than €125, 25% of British players lost more than €131, and 25% of Spanish players lost more than €127. Although US players had the highest mean average bet (€11,165) and median average bet (€395), the respective loss distribution was lower compared to the other countries. Moreover, 75% of the total amount bet was highest in the US, and 25% of US players bet more than €2862 in October 2025.

To understand the discrepancy between the total amount lost and the total amount bet in the US, it is important to take a closer look at the distribution of the loss. The loss is computed as the difference between the total amount won and the total amount bet. A negative value reflects a lower amount won than bet (i.e., the player lost money). A positive value reflects that a player won more money than was bet. For every casino game that is played, a random number generator decides whether there is a win or not. Even over a longer period of time (in the case of the present study, October 2025) some players can either lose large amounts of money or win large amounts of money. Large amounts in either direction distort the distribution, and the mean average loss as well as the median loss can be deceiving.

In Germany, players with the ten largest wins, won amounts ranging between €4000 and €50,000. In Spain, players with the ten largest wins, won amounts ranging between €12,000 and €55,000. In the UK, players with the ten largest wins, won amounts ranging between €30,000 and €1000,000. In the Netherlands, players with the ten largest wins, won amounts ranging between €20,000 and €50,000. In Canada, players with the ten largest wins, won amounts ranging between €16,000 and €215,000. In the US, players with the ten largest wins, won amounts ranging between €630,000 and €11,140,000. The extreme wins in the US explain why US players are losing less than would be expected based on the amount bet. US players had the highest median (€11,165) as well as mean average bet (€395). However, US players median (−€6.17) and mean loss (−€12.73) was smallest among all the countries. In casino games, the amount lost is typically 1%-10% of the amount bet which indicates the return to player rate. For example, in Ontario the (average) mean bet was €6434 and the mean average loss was €221. This is a ratio of 3.4% (221/6434). In the Netherlands, UK, Germany and Spain the respective ratios were 4.8%, 5.5%, 11.4% and 4.4%. The US respective value was 0.055% (6.17/11,165). For that reason, the authors conclude that the total monetary loss distribution of the US players does not reflect their monetary intensity because some players won very large amounts.

Table 2
Total amount of money bet (€), lost (€) and average bet (€) per game for each country.

	Total amount of money bet (€)			Total amount of money lost (€)			Average bet per game (€)		
	Q1	Mean/Median	Q3	Q1	Mean/Median	Q3	Q1	Mean/Median	Q3
USA	34	11,165/395	2862	-148	−6.17/−12.73	0.2	0.23	9.1/0.85	2.6
Canada (Ontario)	31	6434 /272	2034	-172	-221/−30	-0.43	0.18	4.7/0.502	0.45
Great Britain	25	2123/215	1305	-131	-117/−28	-1.27	0.18	2.45/0.43	0.36
Netherlands	58	1327/317	1219	-125	-64/−30	-0.67	0.29	5.31/0.76	0.18
Spain	4	2868/150	1445	-127	-128/−18	0	0.10	3.18/0.30	0.14
Germany	1	638/74	484	-78	-73/−15	0	0.02	0.27/0.17	0.021

German players had the lowest average bet per game. The median average bet per game was €0.30 in Germany. In the US, 25% of players on average bet more than €2.6. In Germany, 25% of players on average bet more than €0.021. US players on average bet the highest amounts per game played (€9.1), followed by Dutch players (€5.31). Spanish players on average bet €3.18 per game, and British players bet €2.45 per game. Canadian players had the third highest average bet per game with €4.7. Kruskal Wallis tests reported significant differences on the three metrics (total amount of money bet, total amount of money lost, and average bet per game) between the six countries: (i) total amount of money bet: K^2 (4) = 20,991, $p < 0.001$, (ii) total amount of money lost: K^2 (4): 3006, $p < 0.001$, and (iii) average bet per game: K^2 (4) = 92,898, $p < 0.001$.

Table 3 reports the distribution of the mean and median total amount of money bet across the 1000 bootstrap samples. Each bootstrap sample comprised 100,000 gamblers. The mean values in Table 3 are the same as in Table 2 which confirms the validity of the bootstrap approach. There were only small differences between the median values in Table 3 and Table 2 which further shows that the bootstrapping samples were truly random. The advantage of the bootstrap approach is that the CIs of the mean can be interpreted because they have been computed empirically and not based on the standard normal distribution.

If CIs do not overlap there is a significant difference between countries. In the USA, the lower CI was €9101 and the upper CI in Canada was €7285. The CIs of the USA and Canada did not overlap. This means that there was a significant difference with respect to the amount of money bet between the USA and Canada. None of the mean CIs in Table 3 were overlapping. This means that each country was significantly different from any other country with respect to the amount of money bet. The same applies to the empirically computed median CIs. Therefore, the bootstrap analysis confirms the findings using Kruskal Wallis tests. As none of the country specific CIs overlap, all possible country comparisons led to a significant difference. Therefore, each country is significantly different from any country other with respect to the total amount of money bet.

Table 4 reports the distribution of the total amount of money deposited (in Euros) in October 2025. The distribution is skewed as indicated by the difference between the median and mean. However, whereas in the case of the total amount bet in Table 4, the ratio between the mean and the median within each metric is often more than 10 or even 20 (US, Canada), and the amount of money deposited is less skewed. US players median total amount of money deposited was highest (€188), followed by Spain (€160) and Canada (€129). German, British, and Dutch players deposited similar amounts (€100, €108, and €90, respectively). The largest 75% percentile was observed among US players, with 25% depositing more than €717 in October 2025. In Germany, the respective value was €350, and in the Netherlands, it was €275. In Spain, 25% of players deposited more than €610, and in Great Britain the respective value was €409. The US and Canada also had the highest mean average total amount deposited values (€1688 and €1406). The large ratio between the mean average total amount deposited and the median total amount deposited in the US and Canada also indicated a skewed distribution with very large amounts of money deposited by some extreme players. A Kruskal Wallis test showed significant differences of the total amount deposited between the six countries: K^2 (4) = 9732, $p < 0.001$.

Table 4
Total amount of money deposited (€) in October 2025 for each country.

	25% Percentile	Mean/Median	75% Percentile
USA	43	1688/188	717
Canada (Ontario)	50	1406/129	615
Great Britain	28	441/108	409
Netherlands	25	241/90	275
Spain	40	689/160	610
Germany	35	336/100	350

Table 5 reports the distribution of the mean and median total amount of money deposited across 1000 bootstrap samples. Each bootstrap sample comprised 100,000 randomly selected gamblers. The mean and median values in Table 5 which were computed based on the 1000 samples were very similar to the mean and median values based on the entire dataset (see Table 6). Except, for Great Britain and Germany, none of the CIs in Table 5 were overlapping. Great Britain's lower mean CI was €337 and Germany's upper mean CI was €344. This means that these two countries' total amount of money deposited were not significantly different. The median CIs were very narrow or even 0 (e.g., in the case of the USA, Netherlands, and Germany) because the amount of money deposited was less skewed than the amount of money bet. A CI of 0 in Table 5 means that each of the 1000 samples resulted in the same median value. None of the median CIs overlapped which means that the amount of money deposited in all countries were different with respect to the median.

Table 6 reports the distribution of the average single amounts of money deposited. In Germany, players typically deposited €19 as indicated by the median value. This was also the lowest average single amount of money deposited compared to the other five countries. The median values of US (€21), Great Britain (€20), Netherlands (€20) and

Table 3
Distribution of the mean and median values of the total amount of money bet (€) across 1000 bootstrap samples.

	Mean	Mean 5% CI	Mean 95% CI	Median	Median 5% CI	Median 95% CI
USA	11.165	9.101	16.513	386	376.9	395.5
Canada (Ontario)	6.434	5.717	7.285	271	253.7	286.9
Great Britain	2.123	2.056	2.184	215	210.5	219.4
Netherlands	1.327	1.299	1.354	317	311.8	322.9
Spain	2.862	2.688	3.056	151	144.8	156.0
Germany	638	627	648	74	72.8	76.2

Table 5
Distribution of the mean and median values of the total amount of money deposited (€) across 1000 bootstrap samples.

	Mean	Mean 5% CI	Mean 95% CI	Median	Median 5% CI	Median 95% CI
USA	1.685	1.592	1.819	179	179.4	179.4
Canada (Ontario)	1.408	1.247	1.605	129	122.7	138.1
Great Britain	342	337	346	84	83.5	87.1
Netherlands	240	237	243	90	90.0	90.0
Spain	686	656	726	161	159.5	165.0
Germany	336	328	344	100	100.0	100.0

Table 6
Average amount of money deposited (€), total session length in minutes and number of deposits per session in October 2025 for each country.

	Average amount of money deposited (€)			Session length (mins)			Number of deposits per session		
	Q1	Mean/Median	Q3	Q1	Mean/Median	Q3	Q1	Mean/Median	Q3
USA	13	60/21	43	15	373/79	324	–	0/0.39	0.40
Canada (Ontario)	12	69/29	61	8	315/64	255	–	0/0.37	0.3300
Great Britain	11	39/20	36	14	280/68	268	–	0/0.37	0.4300
Netherlands	10	42/20	48	14	167/54	172	–	0/0.36	0.4700
Spain	11	45/20	50	11	348/58	287	–	0/0.28	0.2700
Germany	10	25/19	28	18	281/75	277	–	0/0.21	0.1800

Spain (€20) were very similar. Only Canada displayed a slightly higher median value (€29). This means that 50% of Canadian players deposited more than €29 in a single instance. In fact, 25% of Canadian players typically deposited at least €61. In Germany, the most extreme 25% of players only deposited more than €28 in a single instance. The largest ratio between mean average value and median value was again the US and Canada. This indicated a skewed distribution with some very large values.

The median session length was quite similar across the six countries. The median values were between 54 and 79 min. Dutch players' session length median as well as 75% quantiles were the lowest. A quarter of Dutch players (25%) spent almost three hours gambling in October 2025 (172 min), and 25% of German players spent almost five hours gambling in October 2025 (277 min). A quarter of British players (25%) spent almost four hours gambling in October 2025 (268 min). The 75% percentile was lowest among Dutch players in October 2025 (172 min). US players had the largest 75% percentile, indicating that 25% of US players spent more than five hours per session gambling in October 2025.

The median number of deposits per session was 0 in each country. This means that 50% of players do not deposit multiple times in a session. For that reason and because this metric is less prone to outliers, the arithmetic mean was compared between the countries. The number of deposits per session being smaller then 1 means that players typically deposited once or not at all, in one session. Germany had the lowest average mean number of deposits per session (0.21) followed by Spain (0.28). Germany also had the lowest 75% percentile (0.81). Kruskal Wallis tests showed significant differences in the three metrics (average amount of money deposited, session length, total amount of money lost, and number of deposits per session) between the six countries: (i)

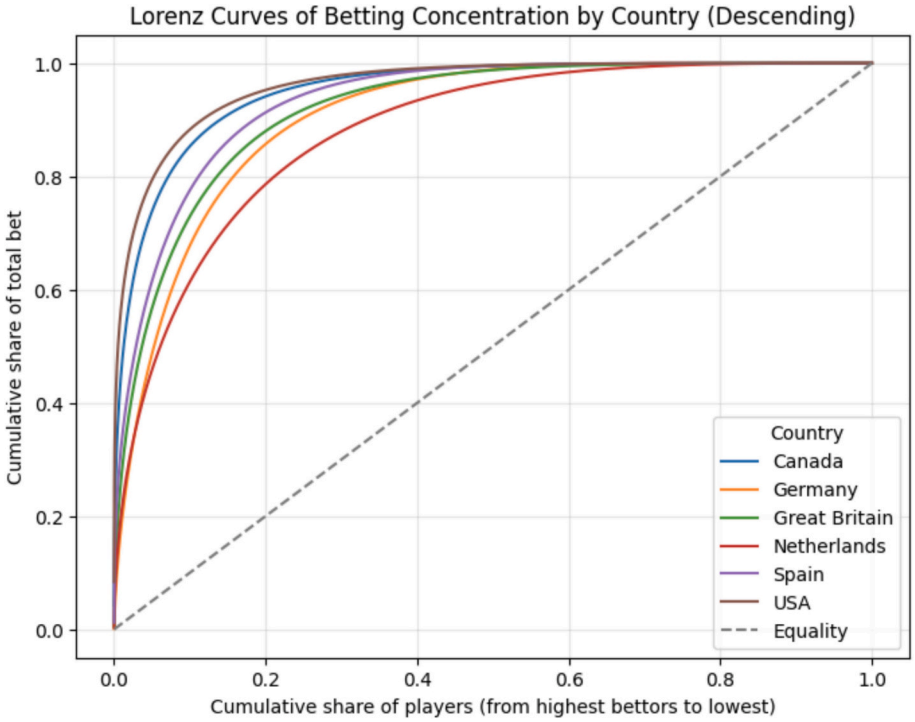

Fig. 1. Lorenz curve of the total amount of money bet (€) in October 2025 across the six countries.

average amount of money deposited: K^2 (4) = 13,521, $p < 0.001$, (ii) session length (in minutes): K^2 (4): 2834, $p < 0.001$, and (iii) number of deposits per session: K^2 (4) = 5987, $p < 0.001$.

Fig. 1 shows the Lorenz curve with respect to the total amount of money bet in October 2025 across the six countries. In all countries, a small proportion of players accounted for a large proportion of the total amount of money bet. The US (blue line), followed by Canada (purple line) had the most extreme distribution, whereas players in the Netherlands (red line) had a slightly more equal distribution. Table 7 reports the statistics derived from the Lorenz curve in Fig. 1. The visual interpretation was in line with the statistics. The US, followed by Canada displayed the largest values whereas the Netherlands displayed the smallest values. More specifically, 20% of US players generated 95% of the total amount of money bet. In the Netherlands, 20% of players generated 79% of the total amount of money bet. The US and Canada also had the highest Gini coefficients (both 91%), followed by Germany (81%), and the Netherlands (76%). Great Britain had a Gini coefficient of 84%, and Spain's Gini coefficient was 87%. As aforementioned, the Gini coefficient is an indication of the overall distribution and measures the area between the curve and the diagonal line. Each country's Gini coefficient showed an extremely unequal distribution which means that the majority of the gambling operator's revenue was generated by a small percentage of the player population.

Fig. 2 shows the Lorenz curve with respect to the total amount of money deposited in October 2025 across the six countries. Similar to the amount of money bet, a small proportion of players accounted for a large proportion of the total amount of money deposited. The US (blue line), followed by Canada (purple line) had the most extreme distribution, whereas players in the Netherlands (red line) had a slightly more equal distribution. Table 8 reports the statistics derived from the Lorenz curve in Fig. 2. The visual interpretation was in line with the statistics. The US and Canada displayed the largest values whereas the Netherlands displayed the smallest values. More specifically, 20% of US and Canadian players generated 90% of the total amount of money deposited. In the Netherlands, 20% of players generated 71% of the total amount of money deposited. The US and Canada also had the highest Gini coefficients (both 87%), followed by Spain (75%), and Great Britain (74%). Germany (70%) and the Netherlands (68%) had the lowest Gini coefficients.

4. Discussion

The present study compared the gambling behavior among a sample of 926,086 online gamblers from the US, Canada (Ontario), Great Britain, Netherlands, Spain, and Germany. The six countries' regulation has many common aspects as well as significant differences. Except for the US, each country requires its gambling operators to track risk of problematic gambling. However, only two countries have introduced maximum monthly monetary deposit limits (Germany and Netherlands). Only Germany limits the online gambling product to online slots, whereas in the other five countries any casino game can be offered online. Only Germany has introduced a 'single customer view' in which monetary deposits are monitored across all licensed operators. The countries are also significantly different with respect to enforcement. In 2025 (up to November 10), Great Britain had issued the largest number of monetary fines to licensed operators ($N = 25$) and Germany had issued one. Given the size of the market, the US also issued very few fines.

Considering all the regulatory aspects of each jurisdiction, it can be concluded that the US and Canada's (Ontario) regulation contain the least number of restrictive elements. Players do not have to set limits, there is no maximum spend limit, and no maximum stake limit per game. Also, the US and Canada (Ontario) did not issue any significant fines to regulated operators. Germany and the Netherlands are on the other end of the regulatory spectrum. Both countries enforce maximum monthly deposit limits and Germany's limits apply across all licensed operators. The Netherlands' regulation also requires operators to monitor behavior and identify risky aspects in real-time. Moreover, in the Netherlands, operators have to take action within one hour after detecting suspicious patterns of play in real-time.

4.1. Are there any differences in gambling behavior between the six jurisdictions, and are such differences related to different types of regulatory measures? (RQ1)

German players bet (median = €74) and lost (median = €15) the lowest amounts of money gambling. Also, the average bet per game was the lowest in Germany (median = €0.17). Canadian and US players were at the upper end with respect to these three metrics. More specifically, Canadian players' median amount of money bet/lost and bet per game were €272, €30, and €0.85, respectively. US players' respective values were €395, €12.73, and €0.85. A deeper analysis of the loss distribution showed that some US players had won very large amounts (€11 million). Such extreme wins were not observed in any of the other five countries. This heavily impacted the distribution of the amount lost in the US and for that reason it is not in line with the mean average and median values of the total amount bet in the other countries.

The differences with respect to the amount of money bet reported by the Kruskal Wallis test were further confirmed by the non-overlapping bootstrap confidence intervals. Here, 1000 samples of 100,000 players each were used to compute mean and median values of the amount of money bet. This approach was chosen because of the heavily skewed distribution. All six countries confidence intervals had a distinct range which meant that the total amount of money bet by players in these countries was significantly different.

The countries differences with respect to the amount of money spent were broadly line with the regulatory aspects which are strictest in Germany and loosest in the US and Canada (Ontario). The Dutch players' average mean gambling loss was €64 which is not too different from the €80 reported by Fletcher (2025). The Netherlands' loss is also less skewed (median €30 and mean €64) compared to the other five countries. In Ontario, the mean loss was €221 and the median was €30 which is a seven-fold difference. This indicates a highly skewed distribution with a few very large losses.

US players losses could not be interpreted because of the highly skewed distribution. The largest total amount won in the US October 2025 was € €11,140,000. Among the other five countries the largest amount won was reported for Canada (€215,000). Except for the US, the ratio between the mean average amount lost and the mean average amount bet was between 4% and 11%. This reflects a value typical for online casinos. In the US the respective value was 0.055% which is a result of extremely high wins. Considering the other five countries return to player (4%-11%) the mean average amount bet in the US of €11,165 would lead to an expected mean average loss in the range between €447 and €1117. This is the largest value across all of the six countries.

The second largest empirically observed mean average loss value was observed in Ontario (Canada). IGaming Ontario (2024) reported monthly gambling expenditure between €160 and €200. However, it is not clear what metric 'spending' actually refers to. A similar pattern was observed among Spanish gamblers. Table 2 reports a mean loss of €128 which contrasts to €58 reported by the Spanish gambling regulator

Table 7
Lorenz curve statistics and Gini coefficient for total amount of money bet (€).

	Lorenz 10%	Lorenz 20%	Gini
USA	88%	95%	91%
Canada (Ontario)	85%	94%	91%
Great Britain	73%	88%	84%
Netherlands	61%	79%	76%
Spain	78%	91%	87%
Germany	68%	86%	81%

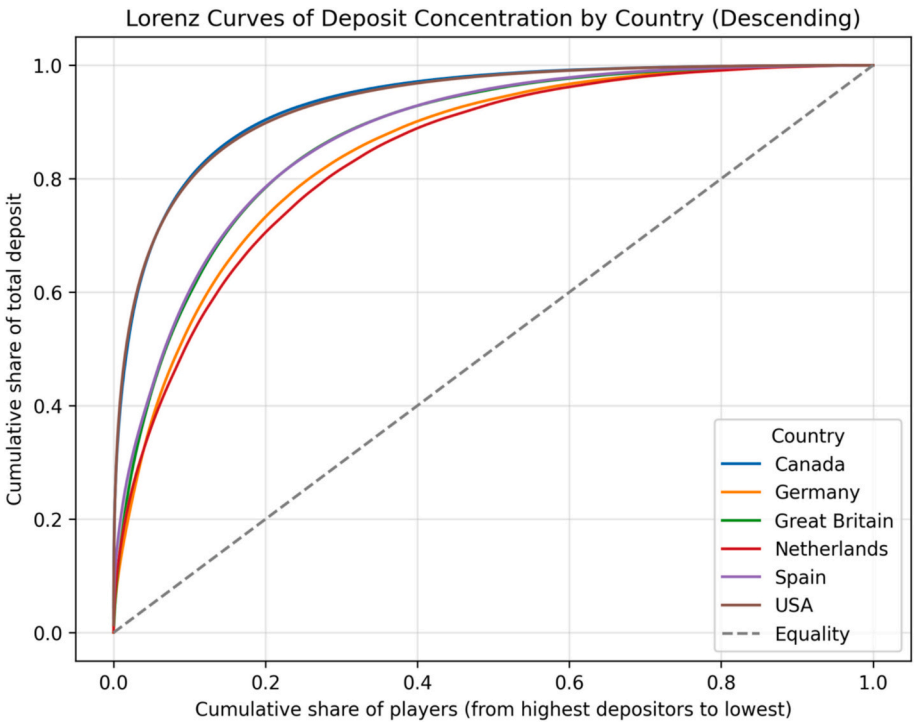

Fig. 2. Lorenz curve of the total amount of money deposited (€) in October 2025 across the six countries.

Table 8
Lorenz curve statistics and Gini coefficient for total amount of money deposited (€).

	Lorenz 10%	Lorenz 20%	Gini
USA	80%	90%	87%
Canada (Ontario)	80%	90%	87%
Great Britain	59%	79%	74%
Netherlands	52%	71%	68%
Spain	60%	79%	75%
Germany	54%	73%	70%

(Dirección General de Ordenación del Juego, 2025). The median loss was €18 which also indicates a heavily skewed distribution because the mean was seven times larger (€128 vs. €18).

An international survey-based study by Fiedler et al. (2019) with participants from both Canada and Germany reported that problem gamblers in Quebec (Canada) reported monthly gambling expenditure of €187, and the respective value for problematic German online gamblers was €21. The mean gambling losses in the present study clearly exceed these values. However, the median values were both below the reported expenditure from players with gambling problems. Canadian players' median loss was €48 and German players' median loss was €15. This means that more than 50% of the players are below the thresholds of problem gambling reported by an international survey-based study which asked problem gamblers about their expenditure (Fiedler et al., 2019).

Several studies have noted discrepancies between players estimated gambling expenditure and actual gambling expenditure (Auer & Griffiths, 2017; Auer, Hopfgartner, Helic, & Griffiths, 2024; Heirene et al., 2022). Auer et al. (2024) argued that it is very difficult for players to keep track of their losses. It is difficult for players to keep track of overall losses due to the high event frequency of casino games. Monetary loss is a random metric and in the long run, the casino's house edge is always positive which means that players' winnings will be smaller than the amounts they have bet. The amount of money deposited is much easier to comprehend for players because players deposit much less frequently than the number of bets.

The median of the average amount bet per game was lowest in Germany (€0.17). This is most likely a consequence of the €1 stake limit per game in Germany. Also, Germany's online gambling is restricted to slots. Players typically wager larger amounts on games such as roulette or blackjack than on slots (Auer & Griffiths, 2023a). The median of the average amount bet per game was highest in the US (€0.85). The discrepancy between the mean average and the median with respect to average amount bet per game was largest in the US (€0.85 vs. €9.1). This is in line with the aforementioned skewed distribution of gambling intensity in the US. A few players appeared to show extreme monetary expenditure on their gambling.

The amount of money deposited was largest in the US followed by Canada, which is in line with the low regulatory restrictions compared to the other four countries. A quarter of US players (25%) deposited more than €717 in October 2025. A quarter of Canadian players (25%) deposited more than €615 in October 2025. The respective amounts among German and Dutch players were €350 and €275.

A bootstrap analysis further confirmed the significant differences reported by a Kruskal Wallis test. Only the mean confidence intervals of Germany and Great Britain overlapped. Germany's upper confidence interval was €337 and Great Britain's lower confidence interval was €344. The median amount deposited across the 1000 bootstrap samples varied very little and was the same for the US, Netherlands and Germany. This was because the amount of money deposited was less skewed than the amount of money bet.

The average amount deposited per deposit event (i.e., the total amount of money deposited in October 2025 divided by the number of times the player deposited in October 2025) was largest with respect to all the computed statistics for Canadian players. Canadian players' typical deposit amount was therefore largest compared to players from the other countries. This is again in line with the fewer regulatory restrictions in that region. The median value of the typical deposit amount was between €19 and €21 in the other five countries. US players showed a similar large gap between the mean average and the median with respect to the average amount deposited per deposit event. This indicates a few US and Canadian players had very large values. In the other

four countries, the difference between the mean average and the median value were much smaller. The median total session length was between 54 and 79 min across the six countries. US players spent the most time gambling, with 25% of US players gambling at least five hours per session in October 2025.

Players did not tend to deposit multiple times per session in any of the six countries. Canadian and US players did not particularly stand out from other countries (mean = 0.39 and 0.37). German players tended to deposit money least often per session (mean = 0.21). The average number of deposits per session for Great Britain, Netherlands, and Spain were 0.37, 0.36, and 0.28], respectively. The number of deposits per session can be indicative of problem gambling (Auer & Griffiths, 2023b; Hopfgartner, Auer, Helic, & Griffiths, 2024) and is expected to be low among the general population of gamblers. Depositing multiple times within sessions has shown to be indicative of problem gambling (Auer & Griffiths, 2023b; Hopfgartner et al., 2024). Gambling behavior was different between the jurisdictions and there is pattern which indicates that highly regulated jurisdictions generate higher gambling intensity than less regulate jurisdictions.

4.2. Is gambling expenditure across players unequally distributed? (RQ2)

The Lorenz curve clearly showed that a small percentage of players were responsible for the majority of the revenue in each of the six jurisdictions. More specifically, across the six countries, 20% of the most intense players generated between 79% to 95% of the total amount of money bet. Moreover, the amount bet was unequally distributed across the active player base. The same held true for the amount of money deposited, although the concentration among the highest spending players was less extreme. Across the six countries, 20% of the most gambling-intense players generated between 71% and 90% of the total amount of money deposited.

4.3. Is the gambling expenditure distribution across players less unequal in highly regulated jurisdictions compared to less regulated jurisdictions? (RQ3)

The Lorenz curve plots showed that in the US, the 20% highest spending players accounted for 95% of the amount of money bet. The respective percentages for Canada, Great Britain, Germany, Spain and the Netherlands were 94%, 88%, 86%, 91%, and 79%. Therefore, the Netherlands adhered most closely to the pareto principle which states that 20% of a population are typically responsible for 80% of a specific value (Dunford, Su, Tamang, & Wintour, 2014). The same ranking resulted from the Lorenz curve regarding the amount of money deposited. The lowest value was observed for the Netherlands where 20% of the most intense players generated 68% of the amount of money deposited. In the US and Canada, 20% of the most gambling-intense players generated 90% of the amount of money deposited.

In a British sample of 140,000 online gamblers, Forrest et al. (2025) found that the 20% of highest spending players accounted for 89.2% of the revenue which is in line with the present study's findings. Visually, it appears that US and Canadians' most intense players generated the largest percentage of the amount of money gambled. The Netherlands' Lorenz curve reflected the most balanced distribution. This means that the most intensive Dutch players generated the least amount of money compared to the other five countries. This was confirmed by the Gini coefficient which measures the area between the Lorenz curve and the diagonal line. Canada's Gini coefficient was the largest, and the Netherlands' Gini coefficient was the smallest. Germany had the second smallest Gini coefficient. This is in line with the distribution of the aforementioned statistics (amount of money bet, lost, etc.) and confirms that the US's and Canada's (Ontario) looser regulation generates the highest gambling expenditure. It also generates the most unbalanced distribution because a small number of players are responsible for a very large proportion of the monetary gambling revenue. The Netherlands and Germany's strict regulation, and most likely the maximum monthly deposit limits, generate the least dependence on a few high spending gamblers. Based on a survey of self-reported spending from Quebec, France, and Germany, Fielder et al. (2019) also reported Gini coefficients larger than 60%.

In a real-world sample of 140,000 British online gamblers, Forrest et al. (2025) reported a Gini coefficient of 88.2% which is in line with the present study's Gini coefficients. Irrespective of regulation, the present study clearly confirmed that online casinos' profits depend heavily on a small minority of high spending individuals. However, this does not mean that low-spending players do not suffer from harm caused by gambling. The 'prevention paradox' points out that a large number of low spending players can still amount to a larger total amount of harm than the small group of high spending players (Canale, Vieno, & Griffiths, 2016; Delfabbro & King, 2017). Also, several studies have shown that problem gambling is not exclusively linked to monetary spending (Auer & Griffiths, 2023b; Hopfgartner et al., 2024).

Recent developments in Great Britain suggest that major online gambling companies have begun actively reducing their reliance on players who generate exceptionally high revenues. In a speech, Andrew Rhodes of the UKGC (Rhodes, 2023) noted this trend in its monthly monitoring data—collected from the largest operators since 2020—which introduced new behavioral indicators. According to these data, the number of players losing more than £500 per month declined by approximately 8%. For online slots—the industry's most profitable product—some operators almost halved the proportion of players placing wagers above £50 per spin. The UKGC also reported substantial reductions in the share of gross revenue coming from players who spend the most gambling. For example, one large operator, stated that the percentage of its income attributable to 'high-spending customers' had dropped from 19% to 5% over the previous three years, although the UKGC did not specify how this category was defined.

Several major companies have publicly stated that future expansion will rely on attracting more 'recreational players', a label typically used to describe low-intensity gamblers. However, as illustrated in the Lorenz curves, light users historically contribute only a very small proportion of total revenue, making it improbable that they could meaningfully compensate for reductions in heavier-spending gamblers. This aligns with the more recent UKGC figures. Despite growth in both active accounts and total bets placed, operators reported an overall decline in gross gambling yield of approximately 16%. Rhodes (2023) attributed this drop to operators *"withdrawing from what they regard as higher-risk staking and losses"*.

4.4. Limitations

The present study was based on a sample of 926,086 online players from six countries. To the authors knowledge, this is the largest real-world player sample which has been used to compare gambling behavior across different countries. Many previous player tracking studies used arbitrarily selected operators and were not random samples from the respective populations (e.g., Auer & Griffiths, 2017; Heirene, Wang, & Gainsbury, 2022; Hopfgartner et al., 2024; Percy, França, Dragičević, & d'Avila Garcez, 2016). However, future studies should use different and more balanced samples from other operators and with preferably larger and more representative samples. The present study used data from a single month (October 2025). This is a short period of time. However, it was chosen because regulation is very dynamic and constantly changing. The authors wanted to analyze a period with relative stability in regulatory changes. Ideally, future studies should enhance player tracking data with self-reported information such as problem gambling screens and reason for gambling questionnaires. This would further enhance the quality of the analysis. The present study was also limited to basic statistical analysis and future studies on similar datasets could employ more advanced approaches such as cluster analysis.

5. Conclusion

The analysis of playing behavior of online gamblers from Great Britain, Germany, Spain, Netherlands, Canada and the US reflected significant differences in gambling expenditure patterns. The comparable low regulatory restrictions in the US and Canada (Ontario) may be responsible for higher gambling expenditure among its players. The strictest regulations in the Netherlands and Germany may have contributed to the lowest gambling expenditure among players. Also, in the US and Canada (Ontario), revenues were more reliant on a very small proportion of highly intense players whereas in the Netherlands and Germany, the distribution of gambling expenditure was more equal across the entire player base (but still highly skewed showing that a minority of players account for the majority of gambling expenditure). The present study clearly identified inverse correlations between regulatory strictness and gambling intensity. Because there is no worldwide regulatory framework for gambling player protection, countries' requirements cannot be compared easily. However, the present study's findings suggest that less restrictive regulation is associated with higher gambling expenditure, and that very strict regulation is associated with lower gambling expenditure. However, strict regulation might force players to gamble in the black market which usually does not offer any player protection measures.

CRediT authorship contribution statement

Michael Auer: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Mark D. Griffiths:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Informed consent

Not applicable. Secondary data analysis.

Ethics

The study paper involved the analysis of deidentified secondary data and was considered negligible risk under ethical guidelines of the British Psychological Society.

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Declaration of competing interest

The second author's university has received funding from *Norsk Tipping* (the gambling operator owned by the Norwegian Government). The second author has received funding for a number of research projects in the area of gambling education for young people, social responsibility in gambling and gambling treatment from *Gamble Aware* (formerly the *Responsibility in Gambling Trust*), a charitable body which funds its research program based on donations from the gambling industry. Both authors undertake consultancy for various gaming companies in the area of social responsibility in gambling.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.actpsy.2026.106864.

Data availability

The datasets are not publicly available due to the commercial sensitivity of the data.

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