

# Internet Retailing and Pricing Decisions: An Examination in the Italian Gambling Market

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## Abstract

The rapid growth of e-commerce over the last few years has sparked a stream of research that analyzed the impact of Internet retailing on market prices. It has been theorized that the low entry and transaction costs associated with electronic commerce should lead to a reduction in prices, especially for homogeneous products. Some scholars have verified, through empirical research, whether the prices of specific products and services sold through the electronic distribution channel are, as hypothesized, lower than those practiced in brick and mortar stores. The results of this research, even if they mostly confirm the greater price efficiency of e-commerce compared to the physical sales network, are however not univocal. This paper intends to offer an original contribution in this field of study, examining a particular industry that in recent years has been affected by an exponential increase in online sales, that of gambling. The aim of this work is to analyze whether in the Italian sports betting market, in line with theoretical hypotheses, online prices are lower than offline prices and whether the development of Internet sales has been accompanied by greater market efficiency and, therefore, a generalized reduction in prices. From a methodological point of view, the study was developed by collecting and processing the official market data of the regulated sports betting sector in Italy provided by the Agency of Customs and Monopoly, for the years ranging from 2011 to 2019, thus carrying out a longitudinal analysis on price levels and related changes over time. The results of the analysis have shown that in the period analyzed in the Italian regulated sports betting market the average prices paid for the betting products offered by the gambling websites remained lower, in a range going from 38 to 48 percent, as compared to those practiced by betting shops. It also emerged that there was a general reduction in the average price levels of betting products equal to almost 50 percent. These results have interesting managerial implications for gambling operators and provide some indications for state institutions that are responsible for gambling policy and legislative changes.

**Keywords:** internet retailing, price strategy, market efficiency, internet gambling, sports betting industry, Italy

## 1. Introduction

The rapid development of e-commerce over the last decade has led to significant changes in the relationship between companies and customers. The accelerated growth of online sales was facilitated by the advantages perceived by consumers in the purchasing process via the Internet, especially concerning the reduction in the costs of accessing products and searching for information. As noted (Lal & Sarvary, 1999), the use of an electronic direct sales channel to replace or supplement the traditional physical one and a simpler and cheaper process of selecting and purchasing products and services by the consumer, should intensify market efficiency and, therefore, price competition, following the economic models of perfect competition. It has therefore been theorized that the low entry and transaction costs associated with electronic commerce should lead to a reduction in prices at the level of marginal costs, for perfectly homogeneous products, and to a reduction in prices, for heterogeneous products (Bakos, 1997; Alba et al., 1997).

On this aspect, various economic studies have been conducted over time that has tried to verify the impact of the Internet on market prices, in various industrial and service sectors. The topic is also relevant for management scholars, as companies need to know if and to what extent in the sector in which they operate, the increase in transparency of the markets due to the use of the Internet and the development of electronic commerce can push

towards a competition based more on price, with obvious implications on the marketing choices to be adopted. Furthermore, the study of these aspects helps to understand the new competition dynamics linked to the entry into many industries of dot-com companies that often tend to differentiate themselves from other retailers on price dimension (in terms of greater flexibility and lower level of sales prices).

The studies on the subject have mainly verified, through empirical research, whether the prices of specific products and services sold through the electronic distribution channel are, as hypothesized, lower than those practiced in brick and mortar stores, and which would be the impact of Internet retailing on price dispersion.

The results of these searches present non-unique results. In this regard, some scholars (Pan, Ratchford, & Shankar, 2004; Li & Tang, 2011) report that the results of the research that are not in line with theoretical hypotheses – which predict a greater price efficiency of the online sales channel compared to retail market – may be conditioned by the incomplete maturity of the markets analyzed and/or by a reduced degree of homogeneity of the products examined. As noted the presumed reduction in prices should be greater for homogeneous products, for which the choice is not normally conditioned by product differentiation factors, and lower for heterogeneous products (Bakos, 1997); as well as the effect of greater market efficiency should manifest itself in mature and consolidated electronic markets, as the stage of development of Internet retailing has a significant influence on the pricing behavior of the retailers (Li & Tang, 2011). Furthermore, it should be noted that the alleged reduction in prices should be greater in the markets involving products whose attributes are ‘digital’, in the sense that they can be more easily communicated and verified through the Internet (Lal & Sarvary, 1999). Therefore, further research works appear useful that analyze the relationship between the development of e-commerce and price competition in markets that intermediate homogeneous products and services, whose distinctive attributes are digital and in which the use of electronic commerce is now well established. The present research work aims to offer an original contribution in this direction.

The general objective of the work is to examine in a specific industry, that of sports betting in Italy, whether, in line with theoretical hypotheses, online prices are lower than offline prices and whether the development of Internet sales has been accompanied by greater market efficiency and, therefore, a generalized reduction in prices.

The choice of the industry appears particularly significant concerning the research objectives, if we consider: 1) the characteristics of relative homogeneity that characterize gambling products and services (the type of bets and sporting events on which the consumer can bet are in great prevalence the same for each gambling operator); 2) the digital attributes of the betting products, which make it possible to manage all the phases of the information and sales process to the customer through the Internet; 3) the high market maturity achieved in the sports betting sector in Italy. In this regard, the sales data provided by the Italian Agency of Customs and Monopoly (2013, 2021) show that in the regulated sports betting sector in Italy the total amount wagered via the Internet in 2019 exceeded 9 billion euros, almost tenfold the levels of sales achieved 10 years earlier.

## 2. Literature Review

As highlighted, the increase in the use of the Internet as a means of direct distribution of products and services to the consumer has prompted researchers to analyze its implications on consumer behavior. One of the specific aspects investigated concerned in particular the price dimension. In Internet shopping, price and product information can be obtained with a simple online search, and therefore the search costs associated with Internet shopping should be lower than with conventional retail channels (Alba et al., 1997). In addition, the Internet provides lower entry costs for companies because entry is simplified by the creation of a Web site (Brynjolfsson & Smith, 2000).

It has therefore been hypothesized that such reductions in costs should lead to greater market efficiency which would be understood as a reduction in prices at the level of marginal costs, especially for perfectly homogeneous products (Bakos, 1997; Alba et al., 1997; Pereira, 2005). Thus, a body of literature focus has developed over time on verifying the greater efficiency of the e-commerce market compared to the conventional brick and mortar (land based) market. These empirical studies used various indicators to compare this level of efficiency: the price dispersion, defined as the distribution of prices (such as range and standard deviation) of an item with the same measured characteristics across sellers of the item at a given point in time (Pan, Ratchford, & Shankar, 2004); the price updates, understood as the number of price changes in a specific period; the price level, intended as the average price level for a specific sales channel (Sabate, Cañabate, Cobo, & García, 2009).

By focusing attention – in line with the aims of this work – on the third general indicator of market efficiency just indicated, the price level, it is possible to note that the results of the empirical studies do not entirely agree.

The attention of the researchers has largely focused on the analysis of relatively homogeneous products, such as books and CDs, for which the growth in online sales has been particularly significant. For these products, the analyzes by Brynijolfsson and Smith (2000), Friberg, Ganslandt and Sandström (2000), Lee and Gosain (2000), Tang and Xing (2001) showed, in line with the theoretical hypotheses, that the prices charged on average through the online distribution channel they are lower than those adopted in physical sales networks.

The studies of Bailey (1998), Clay, Krishnan, Wolff and Fernandes (2002), Ancarani and Shankar (2004), Sabate Cañabate, Cobo and García (2009), have instead found that online prices of the book and/or CDs analyzed on average are higher or are at least at the same level as those that are practiced by the physical retailers.

Other studies have been conducted on different types of products and services. In the car sales services industry, some researchers (Morton, Zettelmeier, & Silva-Risso, 2001; Zettelmeier, Morton, & Silva-Risso, 2006) have found lower online prices, as reported for products related to life insurance (Brown & Goolsbee, 2002). Even a study (Fu, 2019) conducted on different product categories in the consumer electronics (TV, Mobile phone, Computer) and household appliances (Washing machine and Refrigerator) sectors found online average prices lower than those off line for all product categories analyzed. For vitamin products, on the other hand, the study conducted by Erevelles, Rolland and Srinivasan (2001) found higher prices on the Internet, while for some electronic products and personal digital assistants the analyzes by Pan, Ratchford and Shankar (2002) found similar prices one line and off-line.

The results shown, even if they mostly confirm the greater price efficiency of electronic commerce compared to the physical sales network, are however not univocal. It was therefore reported (Pan, Ratchford, & Shankar, 2004; Li & Tang, 2011) the usefulness of further research works that analyze this issue in markets that intermediate homogeneous products and services, in which the use of electronic commerce is now consolidated. In this regard, if we look at the various sectoral areas in which the researchers examined the price differences between online and offline sales, it emerges that the lack of an analysis of this type for a particular category of products that in recent years has been affected by an exponential increase in online sales, i.e. gambling products. The study of the differences between online and offline prices in this area is particularly interesting precisely because it allows us to examine these differences for relatively homogeneous products, as well as characterized by a high level of digitization, and as such potentially affected by high effects in terms of increased market efficiency resulting from the development of e-commerce (Lal & Sarvary, 1999). For this type of product, the analysis on the size of the price mainly focused on understanding the impact of online gambling on the growth of sales (Forrest, 2010), also to provide data on the relevant issue of gambling addiction related to the growth of Internet gambling (Effertz et al., 2018; Gainsbury, Russell, Hing, Wood, & Blaszczynski, 2013; Griffiths & Parke, 2010; Griffiths, 1999). Only more recently some research works (Franck, Verbeek, & Nüesch, 2010; Flepp, Nüesch, & Franck, 2017) investigated the price dynamics for a specific online gambling typology, that of the Betting Exchange which, as described below, has particular structural game characteristics that do not allow the results to be generalized to other betting products.

To my knowledge, also considering the more recently literature review on technology in gambling (Lawn et al., 2020), this is the first paper to attempt to systematically analyze, in a specific regulated gambling market and over a long period, the difference between the price level of the betting products sold through the Internet and the price level of the betting products sold through conventional sales channels, i.e. betting shops, also allowing for the examination of these differences over time.

### **3. Aims and Methodology**

As already highlighted, the general aim of the work is to examine whether, in line with theoretical assumptions, in the regulated sports betting sector in Italy online prices are lower than offline prices and whether the development of Internet sales has been accompanied by greater market efficiency and, therefore, a reduction in price levels.

The choice to analyze the issue within the Italian regulated market appears significant, as this market, as detailed in the course of the work, is one of the most developed and consolidated in the world. Over time, in fact, regulatory, technological, and market factors have favored a continuous shift of the purchase of gambling products from the traditional channel represented by betting shops, to the digital one. By elaborating the market data provided by the Italian Agency of Customs and Monopoly, it is possible to highlight that starting from 2017 the online total amount wagered of sports betting in Italy has exceeded that made through the more than 6,000 authorized physical points of sale, and that in the following three years the incidence of online gambling has continued to grow.

In this work, the evaluation of the relationship between the development of e-commerce and the efficiency of the sports betting market, as well as the measurement of the differences between average prices charged through the online distribution channel and the conventional physical channel, is carried out concerning a significant period, to obtain consolidated information on the change in the price level over time.

The specific aims of the work are therefore the following:

- Measure, in the Italian regulated sport betting market, the difference over time between the average prices of bets on sporting events made through authorized gambling websites and the average prices of sports bets made in betting shops;
- Measure how the average prices of sports bets in Italy have changed over time (considering both online and betting shops overall), to verify whether the development of Internet sales was accompanied by greater market efficiency and, therefore, by a generalized reduction in price levels.

From a methodological point of view, this work was developed by collecting and processing the official market data of the regulated sports betting sector in Italy provided by the Agency of Customs and Monopoly – a government agency that performs the role of management and control of the gambling market – for the years from 2011 to 2020 (Agency of Customs and Monopoly, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021).

To make the analysis operational, it was first defined what is meant by the price of a sports bet. Unlike traditional products and services, there is no equivalent concept of price for gambling products. In sports betting, the player usually chooses to bet a certain amount linked to the outcome of one or more sporting events. In the event of a win, for the ‘Fixed-odds sports bets’ the gambling operator pays an amount equal to the stake multiplied by the odds combined with the results of the selected sporting events, fixed at the time of the bet; as regards the type of ‘Totalizator sports betting’, the gambling operator pays a sum deriving from the division of the total prize pool, net of taxes due to the State and the proceeds of the concessionaires and retailers, between all those who have bet on the winning prediction. A criterion already used in literature was therefore adopted to establish an indicator of the price of a sports bet (Pandimiglio, Spallone, 2012; Gandolfo, De Bonis, 2013, Simmonds & Sharp, 1987) which considers the standard bet unit equivalent to a unit of currency, defining the price as the part of the bet that is not destined to be returned to bettors in the form of winnings (also called pay-out). As noted (Gandolfo & De Bonis, 2013, p. 15) players are informed in advance that, on average, when making a paid sports bet they will suffer a loss (equal to the difference between the amount played and the pay-out), but since it is a recreational activity for them “the expected loss is the price that the player is willing to pay to carry it out (or to acquire the right to delude himself into being able to win, until the moment in which he does not know the official outcome of the game or bet)”. It should be noted in this regard that in the Italian regulated market the average loss on each type of game is always known by the player before the bet, as under the ‘Balduzzi decree’ of 2012 gambling operators must communicate the percentage of winning odds that the player has for his bet.

In summary, the price of the bet includes the so-called commission, i.e. that part intended for the remuneration of the sales network, the taxes due to the Treasury, and the remuneration of the gambling concessionaire. In our definition, therefore, the percentage of the total amounts wagered in a specific period (one year) and not redistributed in winnings was considered an indicator of the average percentage price of sports bets, also called the take-out rate.

In conclusion, the following indicators were calculated to achieve the aims of the study:

- The percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based), for each of the legal types of sports betting in Italy (Sports-based games, Horse betting, Virtual bets), as well as for the Sports betting market considered in its entirety;
- The average percentage price (take-out ratio) by type of sales channel (Betting shops/Online), for each of the legal types of sports betting in Italy (Sports-based games, Horse betting, Virtual bets), as well as for the Sports betting market considered in its entirety;
- The average percentage price (take-out ratio) of the Sports Betting market in Italy and by betting types (Sports-based games, Horse betting, Virtual bets, Betting Exchange);
- The correlation coefficient  $r$  of Pearson between the average percentage price (take-out ratio) and the percentage incidence of the online amount wagered in respect to the total amount wagered (online and land-based) for each of the legal types of sports betting in Italy (Sports-based games, Horse betting, Virtual bets), as well as for the Sports betting market considered in its entirety.

These indicators were calculated for each of the years falling within the period 2011-2019. It was decided not to consider the data relating to 2020 as they were strongly influenced, as described in more detail in the data processing phase, by a contingent phenomenon, the Covid pandemic. This has caused the closure of physical sales points for long periods, favoring an anomalous development of the online gambling.

#### 4. Results and Discussion

##### 4.1 The Italian Regulated Sports Betting Market: Regulatory System, Betting Typologies, and Online Betting

In recent years in Italian gambling industry, there has been a sort of liberalization/privatization process which made it possible to open up the legal market both in terms of types of betting and of access to private gambling operators. The regulatory model underlying this process, however, is based on a system of licenses issued to a still rather limited number of operators, both public and private, by the Agency of Customs and Monopoly, internal agency of the Ministry of Finance which plays the role of management and control in the Italian gambling market. The regulatory model adopted in Italy is therefore still based on strong public control, both in the phase preceding the entry of private operators into the market, and in the subsequent phase, by a contractual relationship that specifies the obligations of the counterparties (Sirianni, 2012). The concessionary model, therefore, allows the State, represented by the Agency of Customs and Monopoly, to control the gambling market, and the concessionaire to exercise a prerogative of the State (Mataluni, 2013).

If we look specifically at the gambling segment investigated in this paper, that of sports betting, the affirmation of a more open regulatory system is the consequence of a regulatory process initiated in the nineties of the last century and intensified starting from the early years of the new millennium. One of the results of this process is that the type of legally salable sports betting has been progressively expanding. Table 1 describes the main categories of legal bets linked to sporting events available in 2021 on the Italian market.

Table 1. The betting types in the Italian regulated sports gambling market

##### Sports-based games

Two different bet subtypes fall into this game category:

- Totalizator sports betting. These bets are those for which, at the time of betting on a sporting event, it is not possible to know the amount of any winnings. The prize pool, in fact, at the end of the event is divided, net of taxes due to the State and the proceeds of the gambling operators, among all those who have bet on the winning forecast. Specifically, the following types of games are part of this betting category: Totocalcio and 'il 9', Totogol and Big Match;
- Fixed-odds sports betting. Such bets are those for which the players are aware of the amount of the win already at the time of the bet. It is predefined at the time of purchase by multiplying the amount wagered by the odds combined with the predicted sporting event decided by the gaming operator (hence the denomination of the fixed odds bet)

##### Horse betting

Bets on horse racing events fall into this category. Specifically, the types of bets legal in Italy are called 'National horse racing' and 'V7'. This type of gambling includes both totalizator bets, which consist in identifying the order of arrival of the running horses to share a part of the price pool; and fixed-odds bets, which also include the possibility of placing bets on multiple races in combination with each other. In this case, the potential payout is equal to the product of the odds offered for the individual events wagered for each race.

##### Virtual bets

This type of betting is based on computer-simulated events that reconstruct the salient moments of sporting events. One of the main differences between classic sports bets and virtual bets is the duration of the sporting event, a computer-simulated sporting event lasting a few minutes. This type of bet is of the 'fixed odds' type. Odds are assigned by a certified computer system and are created so that competitors with a higher probability of being drawn have lower odds and vice versa.

##### Betting exchange

It is defined by the Agency of Customs and Monopoly as a fixed-odds sports betting method where players can play the role of bettor or banker and the dealer acts as an intermediary, limiting himself to putting in contact, through the digital platform and anonymously, the individual bettors (for this reason they are also called 'direct interaction bets between individual players'). Therefore the players themselves establish the odds and the concessionaire who acts as an intermediary by bringing together supply and demand retains, as a commission, a margin from the amount of the winnings. The Betting exchange represents an important innovation in the field of gambling in Italy since this is a form of betting peer to peer that replaces the traditional collection based on betting shops, instead with online direct interaction between players. The concessionaire thus modifies his risk profile since he gets rid of the so-called bank risk, assumed by one of the two players, simply remaining in charge of creating the right conditions and favoring the meeting between players with mirror positions.

Source: Agency of Customs and Monopoly; Cestari, 2013; Pandimiglio and Spallone, 2012.

As mentioned, the current regulatory framework in this betting sector is the result of a series of interventions by the national legislator that have been stratified over time. In this regard, it should be noted that totalizator sports betting represented for decades the only type of legal bet in the context of the so-called ‘sports-based games’, and one of the main ones in terms of collections in the Italian gambling industry. Only in 1998 were fixed odds bets legalized in Italy. The intervention was aimed both at increasing tax revenues deriving from sports games, concerning a period of decline in the proceeds of traditional totalizator bets, and at countering the phenomenon of clandestine betting and the related risks of money laundering (Sirianni, 2012). The legalization of fixed-odds betting represented a first important phase of a liberalization process. This developed further with the issue of the ‘Bersani decree’ of 2006, which legalized Virtual bets and the Betting exchange, typologies of bets for which it was necessary to wait for 2013 and 2014 respectively to start the betting collection, by some implementing measures issued by the Agency of Customs and Monopoly.

The liberalization process has had a very significant effect on the size of the sports betting market in Italy. Figure 1 graphically shows the data relating to the total amount wagered of the four types of games described, as well as the amount wagered of the Sports betting market considered in its entirety, for the period 2011-2020.

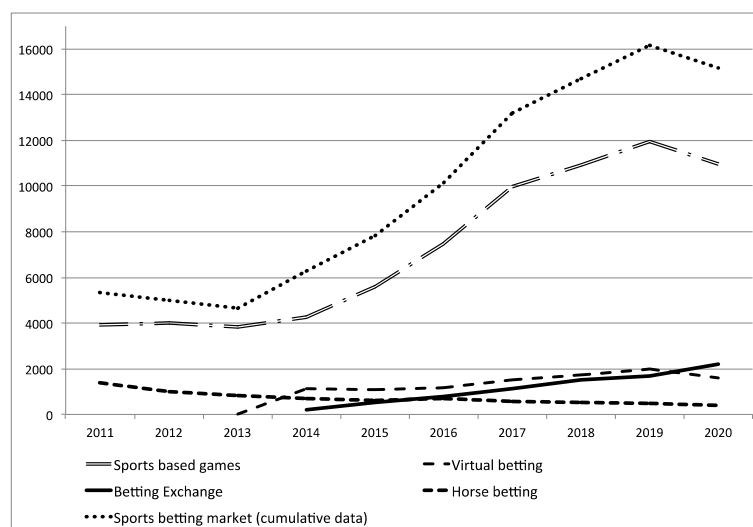


Figure 1. The total amount wagered by betting types and of the Sports Betting market (cumulative data) Years 2011-2020. Italian regulated gambling market (millions of euros)

Source: our processing of data from the Agency of Customs and Monopoly

From Figure 1 it emerges how the total amount wagered in the sports betting market in Italy has tripled in the decade analyzed, with a reduction that occurred in 2020, however, due to the effects of the Covid pandemic, which resulted in long periods of closure of betting shops. The growth was fueled decisively by the increase in sales of the so-called ‘Sports-based games’, consisting mainly of fixed-odds bets on sporting events related to soccer, and supported by the introduction in 2013 and 2014 of new forms of sports betting (Virtual bets and Exchange betting).

The liberalization process accelerated by the Bersani decree has also had a profound impact on the sales channels of sports betting. This decree has legalized Internet gambling in a systematic way. In fact, in Italy, as noted (Mataluni, 2013, pp. 131-132), at the beginning of the new millennium “the specific characteristics of online gambling, which make it possible to provide remote bet, they had therefore contributed to the development of an unauthorized cross-border market, both because of the tolerance of the state authorities and the lack of effective application of existing regulatory systems”. The Bersani decree has solved many of the coordination problems between the EU and national legislation in the field of online gambling, creating a sort of regulated opening of the remote gambling market. The new regulatory provisions have facilitated the entry into the legal Italian gambling market of new foreign operators specialized in the online sports betting segment. These operators have exploited the potential of the web to replicate, after obtaining a license issued by the Agency of Customs and

Monopoly, the type of betting already provided in other countries, without having to bear the huge investments necessary for the management of land-based gambling (Ansalone & Cestari, 2013).

The legalization of online gambling has had a significant impact on market dynamics in the sports betting sector in Italy, as it has made it possible to provide all the types of games described above also through the websites of the operators authorized by the Agency of Customs and Monopoly. In particular, for the Betting Exchange, considering the nature and functioning of this type of betting, the online sites represent the exclusive channel of access to this bet. The sales data in the last decade, broken down by type of distribution channel, clearly testify to the strong appreciation of consumers in the use of e-commerce for access to sports betting in the Italian market.

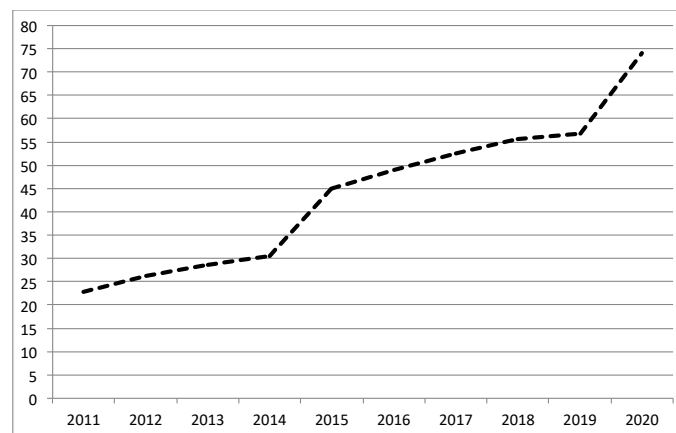


Figure 2. Sports Betting market (cumulative data). Percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based). Years 2011-2020 (Italian regulated gambling market)

Source: our processing of data from the Agency of Customs and Monopoly

Figure 2 graphically shows the trend in the weight of online amount wagered on the overall wagered (online and land-based) in the Sports Betting market in Italy in the period 2011-2020. The graph shows that in a few years we have gone from an incidence of an online collection of just over 20 percent in 2011, to almost 75 percent in 2020. It is good to reiterate in this regard that the 2020 data is anomalous, as strongly influenced by the Covid pandemic which, having determined long periods of closure of betting shops, and favored the passage of many bets from the physical to the electronic distribution network. Beyond this contingent data, it emerges that starting from 2017 the overall sales made through authorized gaming websites, have become higher than those made through betting shops, exceeding 55 percent in 2019 in terms of the incidence of overall wagers.

#### 4.2 The Price Levels in Italian Regulated Sports Betting Market: The Differences between Betting Shops and Internet Gambling

The description of the types of legal sports bets in Italy and the analysis of the development of online gambling in the sports betting market, opens to the study of the first specific aim of this research. More precisely, an analysis work was carried out to:

- 1) measure, for each of the types of bets related to sport in Italy, the difference over time between the average prices of bets on sporting events made through authorized gambling websites and the average prices of sports bets made at betting shops;
- 2) measure, for the Italian regulated sport betting market considered in its entirety, the difference over time between the average prices of bets on sporting events made through authorized gambling websites and the average prices of sports bets made at betting shops.

As an introduction, it should be remembered that – as explained in more detail in the description of the work methodology – in our analysis the price of a sports bet is equal to the percentage of the total sums wagered in a specific period (one year) and not redistributed in winnings, also called take-out rate.

The analysis was carried out for the period 2011-2019. It was decided not to consider the data relating to 2020 as they were strongly influenced, as evidenced, by a contingent phenomenon, the Covid pandemic, which, having

caused the closure of physical sales points for long periods, has favored an anomalous development of the online gambling.

Starting from the main type of bets in terms of the total amount wagered, that of ‘sports-based games’, Figure 3 graphically shows the percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based) for the period under analysis. The figure highlights a continuous growth in the use of the digital channel for access to this type of bet. In 2019, in fact, through the authorized websites, almost 60 percent of bets on sporting events were collected. For this type of bet, there has therefore been a constant and significant transfer of the bets from the betting shops to the online distribution channel.

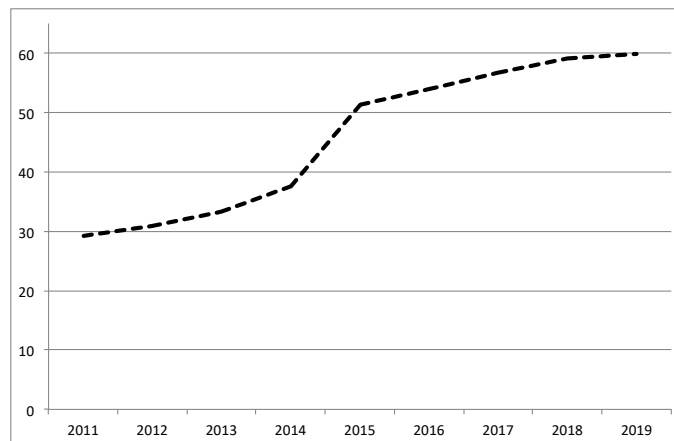


Figure 3. Type of betting: Sports-based games. Percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based). Years 2011-2019 (Italian regulated gambling market)

Source: our processing of data from the Agency of Customs and Monopoly

By processing the data relating to pay-out and take-out, it emerged that in the period examined, as graphically represented in Figure 4, for this type of bet the average percentage prices paid through the online sales distribution channel (the take-out ratio) remained about 10 percentage points lower in absolute terms and 40 percentage points in relative terms, compared to those of the gambling products sold through traditional physical distribution points. It should also be noted that for both sales channels there was an almost continuous decrease in the average percentage sales prices.

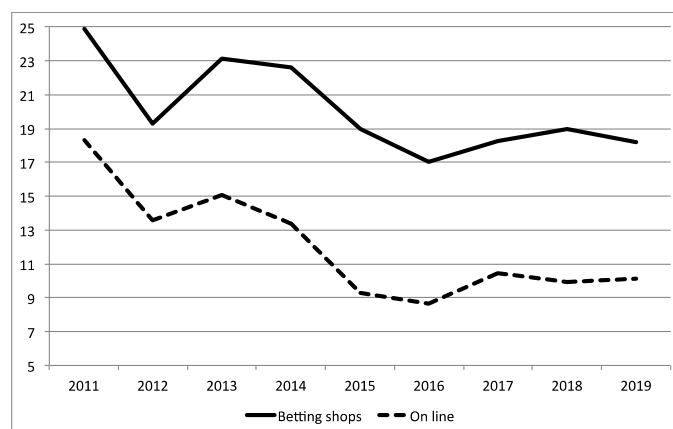


Figure 4. Type of betting: Sports-based games. Average percentage price (take-out ratio) by type of sales channel (Betting shops/Online). Years 2011-2019 (Italian regulated gambling market)

Source: our processing of data from the Agency of Customs and Monopoly



As regards the second type of bets in terms of the amount wagered in 2019, that of Virtual bets, the data relating to the percentage of incidence of the online amount wagered in respect to the total amount wagered (online and land-based) starting from 2014 (the first complete year of collection of this type of bet), a still very limited recourse to the online channel emerges (Figure 5). In 2019, the year in which the greatest incidence of online gaming was recorded, just over 10 percent of bets were made via the Internet, thereby highlighting the highly predominant role of betting shops as a channel for access to this type of game.

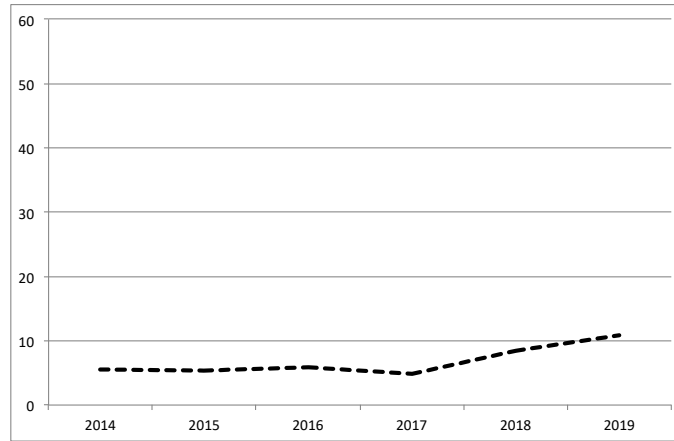


Figure 5. Type of gambling: Virtual bets. Percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based). Years 2014-2019 (Italian regulated gambling market)

Source: our processing of data from the Agency of Customs and Monopoly

This limited incidence of online purchases corresponds to a different situation, concerning the bet category previously analyzed, between average percentage prices charged through the electronic distribution channel and prices of gaming products sold through betting shops. Figure 6 shows the higher average cost-effectiveness of the online sales channel compared to the physical ones in 4 out of 6 years. In 2014 and 2017 the average sales price of betting shops was, however, lower than that of bets made online. Furthermore, the difference between prices remained very limited, being contained in the period analyzed in a range between 1 and 2 percent in absolute terms. The figure also shows that for both sales channels there has been a decrease in the average percentage sales prices over time, but this reduction appears to be limited.

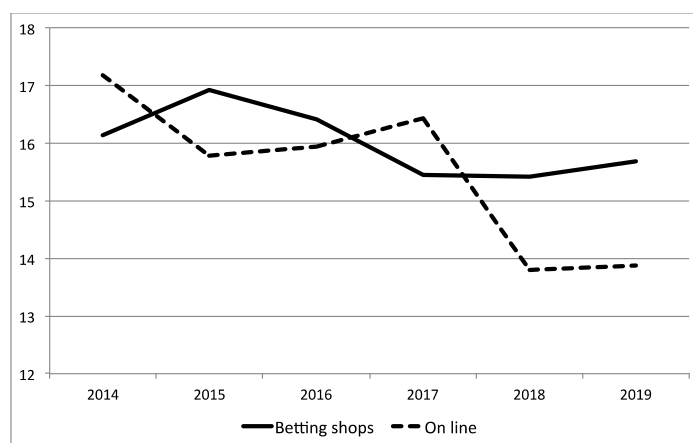


Figure 6. Type of betting: Virtual betting. Average percentage price (take-out ratio) by type of sales channel (Betting shops/Online). Years 2014-2019 (Italian regulated gambling market).

Source: our processing of data from the Agency of Customs and Monopoly

Moving on to analyze the sales data for the Horse betting category, as shown in Figure 7, the percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based) signals that the use of the e-commerce is still quite contained, but which has gradually increased, going from just over 5 percent in 2011 to almost 20 percent in 2019.

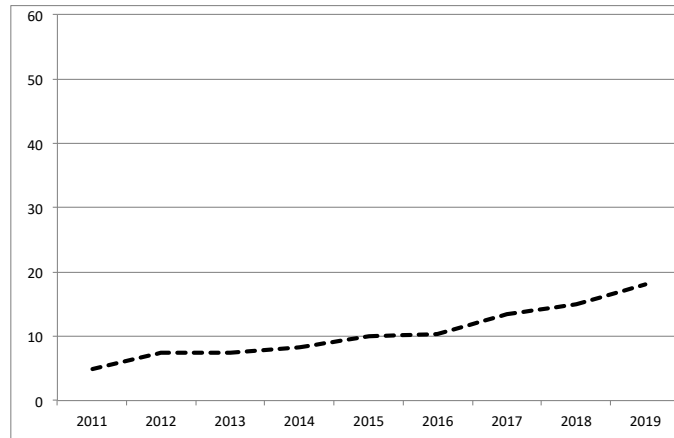


Figure 7. Type of betting: Horse racing. Percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based). Years 2011-2019 (Italian regulated gambling market).

Source: our processing of data from the Agency of Customs and Monopoly

For this type of bet, the in-depth analysis makes it possible to highlight, as shown in Figure 8, that the average percentage prices charged through the electronic distribution channel remained constantly lower than those of the gambling products sold through the betting shops. The difference, in this case, remains in a lower range than in the category of ‘sports-based games’. However, this difference has been increasing from a minimum of about 1 percentage point, in absolute terms, in 2011, to 6 percentage points in absolute terms (and about 23 percent in relative terms) in 2019 (with a maximum difference of 8 points, in absolute terms, revealed in 2012). Finally, from reading the graph it emerges that even for this type of bet there was a decrease in the average percentage sales prices for both sales channels, more pronounced for the electronic channel.

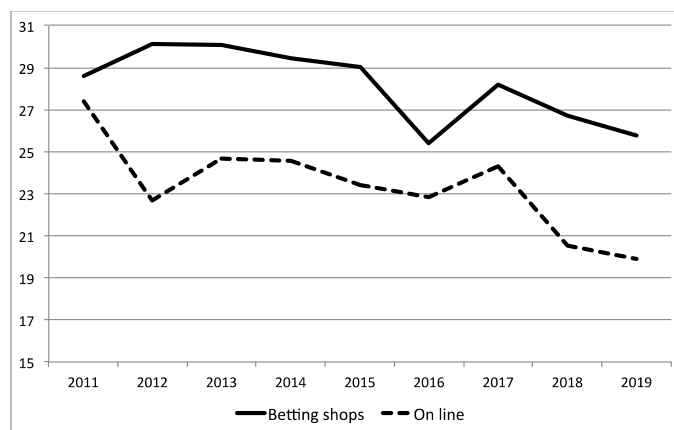


Figure 8. Type of betting: Horse racing. Average percentage price (take-out ratio) by type of sales channel (Betting shops/Online). Years 2011-2019 (Italian regulated gambling market).

Source: our processing of data from the Agency of Customs and Monopoly

Concerning the Betting exchange, no comparison was made between betting shops and the online sales since, as already highlighted, this type of bet by its nature can only be provided via the Internet and, therefore, the data of collection refer exclusively to online sales.

The results described above, if considered as a whole, make it possible to carry out some summary considerations regarding the price level differences between e-commerce and betting shops relating to the Italian regulated sport betting market considered in its entirety.

In this direction, in Figure 9 the cumulative data relating to the four types of bets that make up the sports betting sector in Italy (Sports-based games, Virtual bets, Horse betting, and Betting Exchange) have been graphically processed. The average price of these bets (always expressed in terms of percentage take-out) were calculated both in regard to those provided through the gambling websites authorized in Italy, and through the physical distribution network.

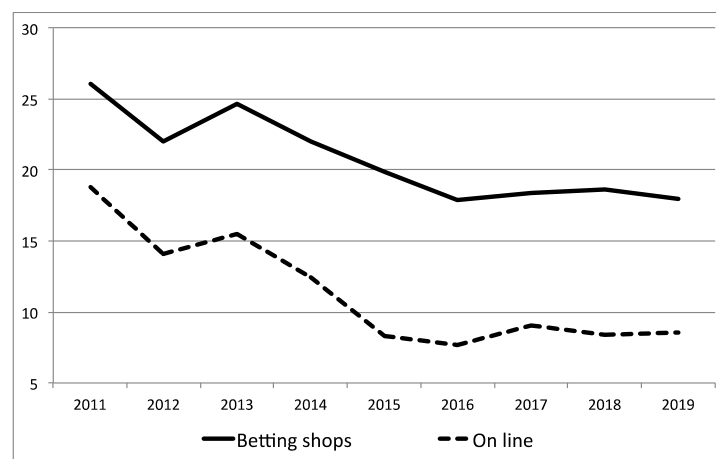


Figure 9. Sports Betting market (cumulative data). Average percentage price (take-out ratio) by type of sales channel (Betting shops/Online). Years 2011-2019 (Italian regulated gambling market).

Source: our processing of data from the Agency of Customs and Monopoly

From the analysis of the data, it emerges that the average percentage prices paid to access the electronic distribution channel remained 8-10 percentage points lower in absolute terms and between 38 and 48 percentage points in relative terms, compared to those of gambling products sold through betting shops. It should also be noted that for both sales channels there was a significant and almost constant decrease in the average percentage sales prices, more accentuated for the online channel.

#### 4.2 E-commerce and Price Levels in the Italian Regulated Sports Betting Market

The results described above open and connect to the second specific objective of the work – to measure how the average prices of sports bets in Italy have changed over time (considering both online and betting shops overall), to verify whether the development of Internet sales was accompanied by greater market efficiency and, therefore, by a generalized reduction in prices.

The figure graphically describes the trends of average percentage prices (expressed in terms of take-out ratio) of the four types of legal bets in Italy and of the Sports betting market considered in its entirety (by accumulating the data of the four types of bets that make it up).

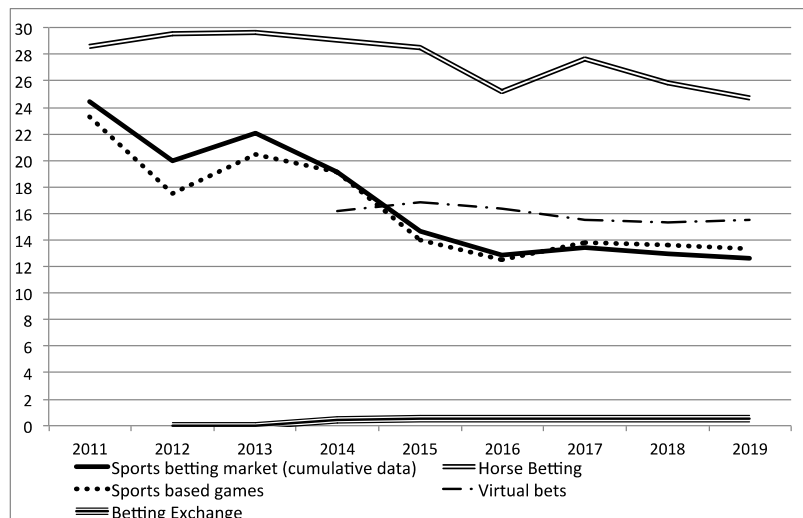


Figure 10. Average percentage price (take-out ratio) of Sports Betting market (cumulative data) and by betting types. Years 2011-2019 (Italian regulated gambling market)

Source: our processing of data from the Agency of Customs and Monopoly

From the analysis of the data, it emerges that the average percentage price of the gambling products offered in the Italian sports betting market considered in the broad sense fell considerably in the period examined. The cumulative data show that this reduction was equal to almost 50 percent in relative terms (from 24.5 percent in 2011 to around 12.5 percent in 2019). It, therefore, emerges that the development of the sale of online gambling products has been accompanied by a continuous increase in market efficiency.

Also from Figure 10, it emerges that this average reduction is the result of different levels of reduction in the average prices of the bets that characterized the various bet categories.

For Virtual Bets, in particular, there does not seem to have been a significant reduction, as the average price went from a peak of almost 17 percent in 2015 to a low of just over 15 percent in 2018, with a reduction in the period considered in relative terms which remained below 10 percent.

On the other hand, a more significant reduction in prices occurred for horse betting, whose average price went from almost 29 percent in 2011 to just under 25 percent in 2019, with a reduction in percentage terms of almost 14 percent.

It is for the Sports based games category that the reduction was particularly significant. As can be seen from the graph, the average price has gone from an average price of just over 23 percent in 2011 to around 13.5 percent in 2019, with a reduction in relative percentage terms of 42 percent.

Finally, the data relating to the categories of Exchange Betting shows an average price that has remained constant at extremely lower values compared to other sports bets. This price is maintained at around 0.5 percent. This is linked to the role of pure online intermediary played by the concessionaire, which means that the pay-out of this game is the highest among the legal forms of gambling in Italy. Naturally, this data contributed to the reduction of the overall price figure recorded for the entire Sports Betting market.

The different levels of price reduction for the different bet categories analyzed seem to be linked to the different levels of incidence of the use of the digital channel as a means of accessing bets. As previously highlighted through the analysis of the data of the individual bet categories, online gambling has become the main betting method for the 'sports-based games' category, precisely the one for which the largest price reduction was determined. Cross-reading the data allows you to better examine the relationship between e-commerce development and market efficiency from a price point of view.

First, it is possible to analyze graphically the relationship between the average percentage price of gambling products and the percentage incidence of the online amount wagered in respect to the total amount wagered (online and land-based) in the whole Italian sports betting market. The data relating to these two quantities, shown in Figure 11, describe a clear inverse relationship. In fact, as the percentage incidence of the online

amount wagered in respect to the total amount wagered increases, there is an increase in the reduction of the average percentage price of gambling products.

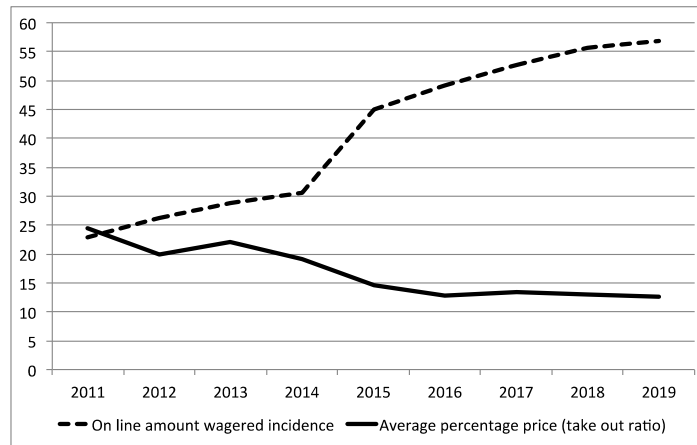


Figure 11. Sports Betting market (cumulative data). Average percentage price (take-out ratio) and Percentage incidence of the online amount wagered in respect to the total amount wagered (on-line and land-based) Years 2011-2019 (Italian regulated gambling market)

Source: our processing of data from the Agency of Customs and Monopoly

To investigate this aspect, for the period analyzed, the correlation coefficient  $r$  of Pearson was calculated between the average percentage price (take-out ratio) and the percentage incidence of the online amount wagered in respect to the total amount wagered (online and land-based) for the different types of bets, as well as for the Sports betting market considered in its entirety.

Table 2. Correlation between average percentage price (take-out ratio) and percentage incidence of the on-line amount wagered in respect to the total amount wagered (on-line and land based). Years 2011-2019 (Italian regulated gambling market).

Type of betting	Correlation Coefficient ( $r$ )	$p$ value
Sports Betting market (cumulative data)	-0,96	< 0,001
Sports based games	-0,91	< 0,001
Virtual bets	-0,06	0,8853
Horse betting	-0,78	0,0124

Source: our processing of data from Agency of Customs and Monopoly

From table 2, which shows the results of this analysis, a very high inverse correlation emerges ( $r$  values equal to -0.96 and -0.91) and statistically significant ( $p$  values <0.001), both for the Sports Betting market considered in its entirety, as for the Sports based games typology. A high and significant inverse correlation between the two variables investigated also emerges about horse racing bets ( $r$  equal to -0.78,  $p = 0.0124$ ). Only for the Virtual bets, as it had indirectly emerged from the analysis of the graphical trend of the data, the two variables are not significantly correlated ( $r$  equal to -0.06,  $p = 0.8853$ ).

These results, while not allowing us to state with certainty the cause and effect relationship between the two investigated phenomena, suggest in summary that e-commerce may have contributed to a decrease in price levels in the regulated Italian market for sports betting.

## 5. Conclusions, Managerial Implications, and Future Research Directions

The analysis carried out makes it possible to make some summary considerations on the relationship between e-commerce development and firms' pricing decisions and, more generally, on the efficiency of the gambling market in Italy.

The first contribution of the work is part of the line of studies that have examined the differences in price levels between online sales and sales made through conventional physical distribution channels. In line with the theoretical hypotheses, it emerged that in the Italian regulated sports betting market, for the period analyzed, the average prices paid for the betting products offered by the gambling websites remained lower, in a range going from 38 to 48 percent, as compared to those practiced by betting shops. It was also found that the differences between online and offline prices occurred with different intensities for the various gaming sub-categories analyzed and that this seems to be related to the different levels of incidence of online sales on the overall sales made by each of such bet categories. In this regard, it may be useful to carry out some considerations on the factors that seem to have contributed to determining this average price difference between the two types of sales channels, online and offline. Firstly, the direct sale of gambling services to the final consumer, without the intermediation of betting shops, allows online gambling operators to benefit from cost savings that can be partly 'passed' on to the customer in the form of better winning odds, by increasing the average pay-out of bets and therefore reducing the relative take-out rate. Secondly, the difference seems to be linked to a very aggressive pricing policy adopted by some foreign companies specialized in online sales (Internet pure players) that entered the Italian market only starting from 2006, the year in which they were authorized, behind the issue of a specific license for the collection of sports bets on the Italian regulated market. These companies, to quickly conquer positions in terms of market sales, have offered very high winning odds and therefore the most competitive online betting prices.

A second contribution from the work relates to the study of the relationship between Internet gambling development and market efficiency. From the analysis of the data, it emerged that the increase of the percentage incidence of the online amount wagered in respect to the total amount wagered (online and land-based), corresponds to a continuous reduction in the average percentage price of betting products. More precisely, this reduction in the period 2011-2019 was equal to almost 50 percent. In line with theoretical hypotheses, therefore, in the Italian regulated sports betting market, the development of the sale of online gambling products was accompanied by an increase in market efficiency. This result also indirectly provides a contribution for understanding the effects of the legalization policies of online gambling in Italy. The decrease in the average sales prices of gambling products measured in the last 10 years, hand in hand with the growth in online sales, has contributed to the high increase in gambling demand which, as found by studies on the subject (Forrest, 2010), is usually quite elastic for these types of products. This could have led to an increase in demand even by dysfunctional players. This confirms, as observed (Effertz et al., 2018; Chalaguine, 2018; Chóliz, 2016), that the state institutions responsible for gambling policies and legislative changes must carefully consider the effects on the growth of gambling demand caused by a more open regulation to Internet gambling and to the entry of new private gambling operators. If it is true that this growth allows a substantial increase in tax revenues deriving from gambling, it is also true that such higher revenues must be carefully compared with the potential social and economic costs of the problem and pathological gambling linked to the greater amount of bets carried out.

The results just described also have interesting managerial implications. The changes noted suggest that companies operating in the Italian betting market continually make the appropriate adjustments in pricing strategies that take into account also the new competitive dynamics triggered by the affirmation of websites authorized to broker sports betting. These pricing strategies, although always aimed at safeguarding profit margins as far as possible, should be consistent with the different characteristics of the different distribution channels used for the sale of products and of the different types of companies active in the sector. In other words, there are evident differences in terms of pricing strategies put in place by 'multi-channel' companies – that is, those that operate both through the traditional physical sales channel and online gambling sites – compared to those adopted by operators focused exclusively on the sale of gambling products via the Internet. Multi-channel companies can exploit different types of synergies deriving from the joint management of the two types of sale channels and because of this, the pricing decisions must therefore be included in a broader framework of choices of their clients compared to companies that collect bets only through the Internet. The latter, in turn, can benefit from an overall less rigid and costly distribution channel structure which, normally, operate in several national markets and, therefore, are more oriented towards volume strategies and low prices.

These considerations open future in-depth research in the field of study analyzing the relationship between e-commerce and company pricing strategies. Indeed, it may be interesting to examine the difference in the sales

price levels of Internet Pure Players, i.e. gambling operators who offer gambling products only through authorized websites, and multi-channel companies that use both distribution methods. This would deepen the study of factors that determine this difference.

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