

# The Market for Online Poker

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## Abstract

The recent events of the “Black Friday” – the biggest online poker networks in the USA were shut down – demonstrated the necessity to make decisions about the regulation of online poker. But although online poker is a gold mine of data, until now nobody knows where the players and their money come from. It seems that the knowledge about the online poker market has not been able to keep up with the speed of its evolution in the past years. This paper is the first to shed light on this matter. We use data of 4,591,298 poker identities from the Online Poker Database of the University of Hamburg (OPD-UHH) collected over a six months period from 09/2009 to 03/2010. We find that the worldwide 6 million players paid 3.61 billion US\$ rake to the operators in 2010. USA is still by far the biggest market with 1,429,943 active players and 973.3 million US\$ net revenues in 2010. With regard to the number of internet users in a country, Hungary is the biggest relative market: One out of 50 Hungarians with internet access plays online poker for real money. The two main drivers of the relative market size in a country are GDP per capita and culture. Using the data from the OPD-UHH, future research will be able to break down the market also on a regional level within countries and to examine inter and intra country differences in the playing habits of online poker players.

**Keywords:** online, poker, market, gambling, data, habits.

## Introduction

Online gambling and online poker in particular is a relatively new phenomenon nearly nonexistent in 2003. During the past years it has grown extraordinarily so that it is now an important factor in the whole gambling market. However, even today it is often neglected by the old industry, the legislators and the researchers as an unwelcome black market just as if denying would cease its existence. But the economic reality is different. Online gambling has tremendous cost advantages due to electronic instead of brick and mortar operation and, even more important, its operators do not have to pay (high) taxes and license fees. In the case of poker, large player pools and the corresponding network effects have also helped the game to grow to a size not to be matched in the offline world.

From an academic perspective, most research in the field of poker has focused on playing strategy (e.g. Chen & Ankenman, 2006) and especially the question whether poker is a game of skill or a game of chance (see e.g. Dreef et al. 2003, Cabot & Hannum 2005, Dedonno & Detterman 2008, or Turner 2008 and for an empirical point of view see Fiedler & Rock 2009). The answer to this question is especially important from a legal perspective as most jurisdictions legalize games of skill while they regulate games of chance. However, the skill/chance debate has not yet come to an end, and also skill does not seem to be the best criterion for the distinction between harmful and non-harmful games (Rock & Fiedler 2008).

The recent events of the “Black Friday” – the biggest online poker networks in the USA were shut down – demonstrated the necessity to make decisions about the regulation of online poker. Should it be prohibited? If so, what are the best instruments to enforce a prohibition? Or should online poker be legalized like Italy and France have chosen lately? If so, what is the optimal tax and how could player protection be implemented? Before answering these questions it may be worthwhile to gather more information about the national markets as information about them is practically non-

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existent.

We use data from the Online Poker Database of the University of Hamburg (OPD-UHH), a database including information on the origin and playing habits of 4,591,298 poker identities over a six months period. Before describing the data in the OPD-UHH we analyze the worldwide online poker market and the market shares of the various poker operators. We then present the results about the size of the whole market and for the ten biggest markets in dollar terms. Afterwards we analyze the prevalence of online poker in absolute terms in relation to the internet users. We also identify the main drivers of the relative market size of a country. Both sections provide new and important insights into the online gambling market especially for legislators. We continue by highlighting the limitations of this study before we summarize the results and give an outlook on further research in the last section.

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### Market Size and Market Shares by Operators

With the exception of an analysis of poker markets in the European Union (Fiedler & Wilcke 2012) academic research on the prevalence and size of online poker markets is still missing. However, due to the observation of the industry by PokerScout which tracks the active players at the different operators at any given moment the market shares of the operators are known. Table 1 shows the market shares for the nine biggest poker sites in 2008, 2009 and 2010 (until August). The market shares are computed in relation to the monthly average players of the total market: 53,121 in 2008, 68,483 in 2009 and 71,441 in 2010. Note that a player is not counted in this statistic unless he is playing at the moment of the scan by PokerScout. The average number accounts for all differences in active players per daytime, week days and months.

Table 1

*Market shares in the online poker industry in 2008, 2009, and 2010*

Site/Network	2008	2009	2010 <sup>a</sup>	Data recorded for OPD-UHH
	Market share	Market share	Market share	
Pokerstars	30.53%	36.05%	40.96%	Yes
Full Tilt Poker	14.65%	19.45%	21.73%	Yes
iPoker Network	9.82%	8.40%	5.77%	No
Party Poker	8.72%	7.22%	6.12%	No
Cereus Network <sup>b</sup>	2.35%	3.40%	3.03%	No
Everest Poker	4.85%	3.36%	1.80%	Yes
Microgaming <sup>c</sup>	1.84%	2.71%	2.66%	No
IPN (Boss Media) <sup>d</sup>	2.81%	2.80%	2.88%	Yes
Cake Poker Network	2.18%	2.45%	1.97%	Yes
Ongame (bwin) <sup>e</sup>	6.86%	3.96%	3.55%	No
Other	15.39%	10.20%	9.53%	No

<sup>a</sup>: 2010 includes only data from January to August.

<sup>b</sup>: Cereus merged with Ultimate Bet in 12/2008.

<sup>c</sup>: Microgaming merged with Ladbrokes in 03/2009.

<sup>d</sup>: IPN (Boss Media) merged with Cryptologic 04/2009.

<sup>e</sup>: Ongame (bwin) merged with Betfair in 08/2010.

The online poker industry is highly dominated by the two biggest providers: Pokerstars and Full Tilt Poker, and their importance has increased over the past years. In 2008 they had a combined market share of 45.18% while in 2010 they already accounted for nearly two thirds (62.69%) of the whole playing volume in the market. Correspondingly, the smaller operators lost significance and dwindled not only in relative

size but also in absolute size. While in 2008 on the average 29,121 players were actively playing on smaller networks at any given moment, the number decreased to 26,655 in 2010.

This development shows the power of positive network effects in the online poker market. The bigger the player pool, the more players are attracted to it just by its mere size. As a player, you will more likely find (weak) opponents on a large network for your favorite game type, betting structure and limit. This is even more true for players who play multiple tables at the same time (“multitabling”) and therefore generate significantly more traffic than players who only play at one table. Another important factor reason for the large and increasing market share of PokerStars is the price of the product in form of the rake structure, which is cheapest for the players at Pokerstars. But this only applies to the gross costs without considering rakeback or promotions which are used to set incentives for players to play more often and stick to one site. Rakeback and bonuses effectively reduce the costs for the players and are, hence, also an important factor which drives market shares. Other factors include the quality of the software, security, reputation, ease of deposits and withdrawals, and also interactions between the online site and offline casinos (e.g. satellites into live events like the World Series of Poker).

Knowing the market shares of the different operators, the next step is to look at the revenue which is generated in the market. The gambling consultant company H2GC estimated the size of the online poker market in 2009 to be 2.4 billion US\$ (H2GC 2009). Another way to determine the revenues is to look at the revenues stated in financial reports of stock listed companies and extrapolate it in relation to its market share. For example, PartyGaming reported to have earned together with its subsidiary PartyPoker, 196.7 million US\$ net revenues in 2009 (Partygaming 2010). Extrapolated with the 7.22% average market share of PartyPoker in 2009, the total market for online poker was 2.7 billion US\$, close to the estimate of H2GC.

But these figures are only estimates. They also do not answer where the money comes from and which the biggest national markets with the most players are. What was the size of the US-market before the Black Friday? Was it still the largest market although the legislator tried to enforce a prohibition of online gambling with the Unlawful Internet Gambling Enforcement Act (UIGEA) since 2006? These are questions we address with the data from the OPD-UHH which we describe next.

### **The Online Poker Database of the University of Hamburg (OPD-UHH)**

Online poker is a goldmine of data as all operators show in their lobby a lot of information about the people playing at their tables. It is easy to observe the origin of a player (city or country), the game type, betting structure and limit of the table they play at, and, of course, the date and time. Financed by the city of Hamburg, the Institute of Law & Economics at the University of Hamburg collected these data in collaboration with the independent market spectator PokerScout in the OPD-UHH. A software electronically gathered the data of the players for the following poker networks: Pokerstars, Full Tilt Poker, Everest Poker, IPN (Boss Media) and Cake Poker. This software scanned each cash game table of the mentioned poker sites and wrote the displayed information into a SQL database.

The data collection was conducted for each poker site during a period of six months. It took about ten minutes to scan all tables of an operator and collect the information about the players sitting at the tables. This implies about 6 data points per hour or 25,920 in the course of six months and allows not only to determine the session lengths of the players but also to analyze differences in time. The main period of the data collection

<sup>1</sup> The gross revenue was 250.9 million US\$. 54.2 million US\$ were paid in bonuses to the players (so called “rakeback”), meaning that the players got an average effective discount on the price of 21.6%.

<sup>2</sup> Note that the extrapolation assumes that the revenues per player of PartyPoker are representative for the industry.

<sup>3</sup> As the UIGEA applies to the definition of remote gambling in the Wire Act it does not necessarily include poker.

took place during September 2009 and March 2010. Table 2 depicts the exact starting and ending points for each site. Note that the period of data collection had to be extended due to technical problems such as downs of the server, software updates and disconnections.

Table 2

*Starting and ending points of the data collection for each site*

Poker site	Start	End
PokerStars	09/10/2009	03/11/2010
Full Tilt Poker	09/06/2009	03/11/2010
Everest Poker	08/13/2009	03/11/2010
IPN (Boss Media)	07/27/2009	02/02/2010
Cake Poker	11/01/2009	07/02/2010

In the 6 months of the data collection we obtained data for 4,591,298 poker identities including their country of origin and their playing habits. Regarding the market shares of the observed poker sites these are 64.72% of all poker players worldwide (88.27% of the US-players and 57.4% of the players from all other countries) who were playing during the period of the data collection. If this number is extrapolated to the total market, we get a number of 7,094,095 different player identities. Note that one real person can have multiple player identities if he opens accounts with more than one operator and many players have tried out more than one poker site and therefore have multiple accounts. However, to be counted multiple times in the OPD-UHH he has to have played with these accounts actively during the data collection period. This may be true for three groups of players: 1) High volume players (professional and addicted gamblers), 2) Players on the high limits as they may need more than one site to find opponents and 3) People trying out different sites to see which one suits them best. The high volume players have a huge incentive to play at just one network as the bonuses/rebates they can get increase with their playing volume. Players on high limits are quite rare (which is the reason why they may have to switch sites to find enough competition). The data reveals that for example only 0.36% of the No Limit Holdem players are on high stakes (see table 11 in the appendix). We therefore reason that most people with multiple player identities in our sample come from the third group. We estimate that for 100 player identities about 85 real players exist. This results in 6,029,980 people with a 6-months prevalence rate of participating in online poker cash games for real money.

### **Results: Market Sizes, Prevalence, and Drivers of Online Poker**

The data in the OPD-UHH allows us to specify how many players in each country in the world play online poker for real money and how much rake they paid to the operators while playing. Using these data we determined the market sizes of the different countries in dollar terms and also the absolute and relative prevalence of online poker in a country.

#### **Market Sizes**

The OPD-UHH covers how often and how long a poker player played and if he played multiple tables at the same time. We linked this information to data about the average US\$ rake paid per player, hour, and table for the different poker variants and stakes. This allowed us to determine how much US\$ rake a player paid to the operator over the course of 6 months. As we also obtained the origin of the players, we could aggregate the rake paid for all observed players of each country. We then extrapolated

<sup>4</sup> The poker sites Full Tilt Poker, Everest Poker and IPN (Boss Media) quote the country of origin while Poker Stars and Cake Poker specify the city of origin of the player.

<sup>5</sup> Play money tables have not been taken into consideration.

<sup>6</sup> For a more detailed description regarding the technical approach of the data collection see Sakai/Haruyoshi 2005.

*Despite the prohibition of online gambling and the introduction of the Unlawful Internet Gambling Enforcement Act (UIGEA) in 2006 the US was still by far the biggest market with 973.3 million US\$ in 2010.*

this data to the whole market of each country by considering the market share of the observed operators in each country (88.4% in the USA, 57.4% in all other countries, resulting in 64.72% of the whole market). Multiplied by 2 we got the market size for online poker cash games for each country in 2010. Given that the operators earn about 70% of their revenues with cash games and 30% with tournaments we further extrapolated the market size to include the tournament revenues. The resulting gross market size is the rake paid by all online poker players in a given country. This is not

identical with the players' net losses: 1) Players get about 25-30% of their rake back in form of rakeback deals or bonuses and 2) players can win and lose money from other players, a cash flow we did not observe. To obtain the net losses, it is only necessary to account for the former point, which can be easily done by deducting 30% of the gross market size. The latter point does not matter much for whole countries, because cash flows between the players converge to zero if the observed player pool are large (without rake, poker is a zero sum game).

Table 3 shows the ten biggest poker markets in the world in dollar terms of their gross market size and their share of the total market.

Despite the prohibition of online gambling and the introduction of the Unlawful Internet Gambling Enforcement Act (UIGEA) in 2006 the US was still by far the biggest market with 973.3 million US\$ in 2010. After the Black Friday, when the US sites of Pokerstars, Full Tilt Poker Absolute Poker and Ultimate Bet were shut down, the US market size has dropped dramatically. The remaining operators like Cake Poker or Bodog Poker which still accept US-players had a market share of less than 10% before the Black Friday. It will be interesting to see if these operators now rise and which level the US market will settle on.

The second largest market is Germany with a market size of 392 million US\$. Other big markets are France, Russia, Canada and Great Britain. Although the French market may now look different after online poker was legalized, licensed, taxed, and insulated from the other markets in 2010. In total, the players paid 3.6 billion US\$ rake to the operators in 2010 or 599 US\$ per player.

Table 3

*Number of active online poker players, market share and market size per country*

Rank	Country	Gross Market size 2010	
		Size in mil. US\$ per year	Share
1	USA	973.30	26.95%
2	Germany	391.94	10.85%
3	Russia	235.12	6.51%
4	Canada	219.63	6.08%
5	France	187.35	5.19%
6	Great Britain	159.72	4.42%
7	Netherlands	152.80	4.23%
8	Spain	117.07	3.24%
9	Sweden	99.25	2.75%
10	Finland	80.93	2.24%
Total		3,611.59	100%

<sup>10</sup> For a more detailed description of this procedure, see main report of the research project: Fiedler/Wilcke, 2011.

<sup>11</sup> Our data were from 09/09 to 03/10, but we assumed that these data are representative for 2010. Probably the market grew a little in this time, but we neglected this and conservatively decided that it did not so we can give a number for the whole year 2010.

<sup>12</sup> According to PokerScout, the revenue of a poker site approximately consists of 70% cash games and 30% poker tournaments.

<sup>13</sup> This assumes that the share of revenues of the operators is 70% in every country.

<sup>14</sup> The exact amount differs from operator to operator and also depends on the playing volume of the player. The higher the playing volume, the higher the rakeback.

## Prevalence of Online Poker

Besides the market size the prevalence of online poker is a key figure for describing the market for online poker in a country. Prevalence can be measured in absolute terms (how many people play poker in a country) and in relative terms (how many people play poker in relation to, for example, the population).

We derived the number of poker players in a country as follows: First, we used the country data for the observed player identities and added the non identifiable identities proportionally. Then, we extrapolated the number by the market share of the observed sites during the data collection period. In a last step we calculated the number of active players by assuming that per 100 player identities 85 real persons exist (see reasoning above). The market shares are derived from the players in a country in relation to the total number of players.

Table 4 lists the number of active poker players for the ten countries with the most online poker players and their share of all players in the world. Concerning the market size the USA is by far the biggest market. More than 1.4 million people played online poker for real money during our data collection period from 09/09 to 03/10. Nearly every fourth poker player is an American (23.71%). On the second place is the German market with 581 thousand players, or 9.64% of all players worldwide. On the next ranks follow France (445,860 players, 7.39%), Russia (401,701 players, 6.66%) and Canada (401,701 players, 5.74%). Together, the ten countries with the highest number of poker players account for 73.92% of all players worldwide.

Table 4

*10 countries with the highest number of active poker players*

Rank	Country	Active players	Share
1	USA	1,429,943	23.71%
2	Germany	581,350	9.64%
3	France	445,860	7.39%
4	Russia	401,701	6.66%
5	Canada	345,971	5.74%
6	Great Britain	269,247	4.47%
7	Spain	253,043	4.20%
8	Netherlands	239,700	3.98%
9	Brazil	153,889	2.55%
10	Australia	129,714	2.15%
	Other	1,571,389	26.06%
	TOTAL	5,490,908	100%

The absolute prevalence of online poker disregards the information of the size of a country. To know how large the proportion of online poker players is in a given country, the number of players has to be related to the population of the country. But as not everybody has access to the internet, it is more meaningful to relate the number to the number of internet users in a country. Table 5 depicts the proportion of online poker players in a country per internet users. 0.307% (1 out of 326) of all people worldwide with internet access have played online poker for real money during the 6 months of

<sup>15</sup> For the players on Pokerstars and Cake Poker we obtained the city of origin. We used the city data base „World Cities“ from MaxMind to assign these players to countries.

<sup>16</sup> For 11.38% of all observed player identities we could not determine their country of origin. Adding them proportionally to the observed player identities of each country implies that they are equally distributed among all countries. This may not be true as people from countries with stricter laws against online gambling have a higher incentive to hide their identity.

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the data collection. Accounting for the information of the internet users in a country changes the ranking of the countries. Among the countries with more than 100,000 internet users the proportion of online poker players is highest for Hungary with 1.983%. One out of 50 Hungarians with internet access plays online poker for real money. For the USA, it is striking that it is by far the biggest market in absolute terms, but rank only 36th considering the number of internet users in a country. 0.596% of all American internet users (1 out of 168) are online poker players. On the one hand that means that the restrictions of the UIGEA were effective to some extent even before the Black Friday. On the other hand that means that there is a huge growth potential of the US market should online poker be legalized.

Table 5

*10 countries with the highest proportion of online poker players per internet users (only countries with more than 100,000 internet users) in 2010*

Rank	Country	Active players	Internet user	Players/internet user
1	Hungary	122,482	6,176,400	1.983%
2	Estonia	19,212	969,700	1.981%
3	Portugal	100,075	5,168,800	1.936%
4	Denmark	90,532	4,750,500	1.906%
5	Iceland	4,996	301,600	1.657%
6	Netherlands	239,700	14,872,200	1.612%
7	Finland	71,543	4,480,900	1.597%
8	Cyprus	6,445	433,800	1.486%
9	Norway	64,535	4,431,100	1.456%
10	Slovenia	18,899	1,298,500	1.455%
...	...	...	...	...
36	USA	1,429,943	239,893,600	0.596%
...	...	...	...	...
TOTAL		6,029,930	1,965,162,316	0.307%

Source internet user: Internet World Stats, for June 2010.

### Drivers of the prevalence of Online Poker

To understand the drivers of the market for online poker, it is most useful to analyze the relative size of the markets because the absolute numbers mostly depend on the size of a country. We focused on the relative prevalence of online poker and identified that the two main drivers for this number are GDP per capita and culture. A simple regression model with the proportion of poker players per internet users per country and its GDP per capita yielded a significant influence: If the GDP per capita rises by 1,000 US\$, the proportion of online poker players increases by 0.009 percentage points ( $t=5.786$ ,  $p<.001$ ).

Table 6

*Results of a simple linear regression regarding the influence of GDP per capita on the relative prevalence of online poker*

Sample (n=161)			
Variable	Regression coefficient	t-value	Significance
Constant	.192	4.123	.000
GDP per capita in 1000 US\$	.009	5.786	.000
Goodness of fit	$R^2 = .177$ ; adjusted $R^2 = .171$ ; F-value= 33.477 ( $p<.000$ )		

<sup>17</sup> See appendix for the operationalization of the simple linear regression.

We were also able to find evidence that the culture has a significant influence on the proportion of poker players per internet users in a country. An analysis of variance (ANOVA) with a F-Value of 14.114 ( $p < .001$ ) confirmed that there are significant differences in the mean-values of each cultural group (see table 7). We controlled the effect for GDP per capita by using it as a covariate ( $F = 12.753$ ,  $p < .001$ ). GDP per capita and culture explain  $R^2 = 50.4\%$  of the variation between the relative poker prevalence in the countries.

Table 7

*Results of the ANOVA regarding the influence of culture on the relative prevalence of online poker*

Sample (n=161)					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.974	8	2.247	19.324	.000
Constant	2.136	1	2.136	18.375	.000
GDP per capita	1.483	1	1.483	12.753	.000
Cultural group	11.512	7	1.645	14.114	.000
Within Groups	17.673	152	.116		
TOTAL	35.647	161			

Fit of the model  $R^2 = .504$ ; adjusted  $R^2 = .478$

The results imply that online poker is only a factor in western and orthodox countries. With the exception of the countries from Latin America, the markets in all other countries are negligible (see table 8). That can either mean that these markets have an enormous growth potential or that people of these cultural groups are not interested in online poker at all. The directions of these results could be confirmed in a Turkey-test which compares the mean values (for detailed information see table 12 in the appendix).

Table 8

*Descriptive statistics of the ANOVA regarding the influence of culture on the relative prevalence of online poker*

Sample (n=161)						
Culture	N	Mean	Standard deviation	Standard error	95%-confidence interval	
					Lower bound	Upper bound
Western	47	.638	.452	.040	.558	.718
Orthodox	13	.450	.326	.077	.348	.651
Islamic	41	.076	.108	.043	-.009	.161
African	23	.079	.059	.058	-.035	.193
Latin American	20	.185	.100	.062	.063	.308
Sinic	6	.019	.018	.113	-.204	.242
Hindu	5	.112	.196	.124	-.132	.356
Buddhist	6	.128	.157	.113	-.095	.351
TOTAL	161	.289	.369			

<sup>18</sup> We operationalized culture according to the classification of Huntington 1996: 1=Western, 2=Orthodox, 3=Islamic, 4=African, 5= Latin American, 6=Sinic, 7=Hindu, 8=Buddhist, 0=Others; see appendix.



An analysis of the influence of the law on the prevalence on online poker yielded no significant results. But as law and the enforcement of law are hard to quantify this result may not be taken for full value. In our eyes it mainly says that law which prohibits online poker was not enforced at the time of the data collection.

### **Limitations**

Although the study yields many findings there are some limitations. First, we only collected data about cash games, poker tournaments have not been taken into consideration. As mentioned in footnote 12 the revenue of a poker site approximately consists of 70% cash games and 30% poker tournaments. The market size calculations of this study assume that this relation is identical for every operator, which might not be true as the tournaments require a larger player pool and the smaller poker networks probably earn a lesser percentage with them. The OPD-UHH also excludes pure tournament players and, hence, the numbers of poker players in the different countries we derived in this study underestimate the true value. However, it is reasonable that there are just a very few players playing only tournaments and whom we do not have any data on.

Second, the data on the origin is self reported by the players. It is therefore possible that not all players stated their correct country. But as withdrawing funds is only possible if the correct personal data are submitted, we reason that the cases of wrong information are rare.

Third, as PokerStars and Cake Poker do not give information about the country of a player but only of their city. To assign the players to countries we used the city database “World Cities” by Maxmind. In doing so we faced two general challenges: 1) Many city names in the world exist multiple times. 2) The city data base only lists cities having a population of at least 50,000. To solve these issues we developed an algorithm to assign player identities to countries by taking the size of the cities into consideration. In the end, we were able to successfully assign 92% of the poker players stating a city of origin to their country of origin. 8% remained as not assignable.

Finally, we faced the problem that one player can have more than one poker identity by registering at multiple sites. It may also be possible that more than one person use the same player identity (for example family members). Considering different qualitative arguments (see footnote 8), we estimate that for 100 poker identities 85 real persons exist. We admit this number is not an exact empirical value but an estimation and therefore open to subjective interpretation.

### **Summary and Perspectives**

The online poker market has grown rapidly in the past years. But until now there have only been estimates about the total market size and nobody knew how where the players and their money come from, which countries are the biggest markets, and where the proportion of people gambling online on poker games in relation to the internet users is highest. We were first to answer these questions by using data from the Online Poker Database of the University of Hamburg (OPD-UHH) which includes information about approximately 4.6 million online poker players and their countries of origin.

This study is able to shed light on the online poker market. It is the first time that the market can be broken down to countries which provides important insights for local legislators who, for example, want to evaluate their regulation of online gambling. We first gave an overview of the structure of the online poker and the market shares of the different poker sites in the years 2008-2010. We then described the data in the OPD-UHH and the methodology of gathering it. We were able to identify 4,591,298 poker identities and extrapolated this number to 6,029,980 different players who paid 3.6 billion US\$ rake to the operators in 2010 (on average 599 US\$ per player). Hence, online poker has evolved to become a huge market. This is especially true for western and

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<sup>19</sup> For further information about this database see: <http://www.maxmind.com/app/worldcities>.

orthodox countries where most of the business takes place – even when controlling for GDP – per capita.

We also assigned the observed poker identities to their country of origin and derived the market size of the most important poker countries: Even though the USA had been the biggest market with 1.4 million players paying 973 million US\$ rake in 2010 (before Black Friday), there are 35 countries with a higher prevalence of online poker in relation to the number of internet users in that country. For example, Hungary has the highest proportion of online poker players in relation to the number of internet users (1.98%). The relatively low prevalence of players in the USA could be seen as evidence that the regulation of online poker and the UIGEA deterred at least some of the potential players even before Black Friday. On the other hand this comparison with the prevalence of online poker in other countries means that there is a lot of potential in the American online poker market. However, these numbers are mostly generated from totally free (black) markets. However, a regulated market will probably not yield the full potential of the market. One reason is taxes, which increase the rake, make the product more expensive, and lead to reduced demand. Another reason might be player protection which helps addicted gamblers to stay away from the game as addicts tend to play longer sessions, more often and more intensely than non-addicts (e.g. see Productivity Commission 2010) and, hence, are an important source of revenue (Williams & Wood 2004). But the most important cause for a regulated market being a smaller market is a fenced market, which excludes non-residents from the player pool (e.g. Italy or France). This sharply reduces the player pools and, hence, the positive network effects of large player pools where it is possible to find enough people to play with for every game type, every limit and at any daytime.

The results presented in this paper did not include information on the market after the Black Friday when the most important poker operators in the USA were shut down. Further research has to determine the effects of this event and clarify if the players from the USA stopped playing, switched to other operators still accepting US players, or even avoid the country identification and log in to Pokerstars or Full Tilt Poker with a proxy-IP and deposit with an international credit card.

This study only scratches on the surface of the possibilities the detailed data in the ODP-UHH allow. It is possible not only to break down the market on a national level but also to regions within countries. Future studies will also be able to analyze the playing habits and to determine for example the session lengths and the playing frequency of a player and which limits and how many tables the player plays simultaneously. This information can then be used for further analyses regarding inter and intra country differences. By conducting time series analyses it is also possible to identify how many players tend to play more often and more intensely over time and how many decrease the intensity of play and what kind of factors may give a hint at which group a player belongs to. This may not only be interesting for the industry but also from the viewpoint of excessive and compulsive gambling.

*But the most important cause for a regulated market being a smaller market is a fenced market, which excludes non-residents from the player pool (e.g. Italy or France).*

## Measurement Appendix

Table 9

*Operationalization of variables of the simple linear regression regarding relative market size and GDP per capita*

Variable	Description
GDP per Capita	independent variable in thousand US-Dollar
Proportion of poker players	dependent variable proportion of poker players in a country per internet users in percentage

Table 10

*Operationalization of variables of ANOVA*

Variable	Description
Proportion of poker players	dependent variable proportion of poker players in a country per internet users in percentage
Cultural group	factor 1=Western, 2=Orthodox, 3=Islamic, 4=African, 5= Latin American, 6=Sinic, 7=Hindu, 8=Buddhist, 0=Others
GDP per capita	Covariate In thousand US-Dollar

Table 11

*Players per Stake for No Limit Holdem*

Limit (Small Blind/Big Blind in \$)	Stakes	% of players
0,01/0,02-0,05/0,10	Micro	48.43%
0,10/0,20- 0,5/1	Low	41.24%
0,75/1,50-5/10	Mid	9.97%
8/16-500/1000	High	0.36%

Table 12

*Influence of Culture – Results of Turkey-Test*

		Sample (n=161)				
Culture (I)	Culture (J)	Average difference (I-J)	Standard error	p-value	95%-confidence interval	
					Lower bound	Upper bound
Western	Orthodox	.176	.111	.760	-.165	.516
	Islamic	.717*	.076	.000	.484	.949
	African	.713*	.090	.000	.436	.990
	Latin American	.577*	.094	.000	.287	.867
	Sinic	.789*	.153	.000	.318	1.261
	Hindu	.670*	.166	.002	.159	1.182
	Buddhist	.649*	.153	.001	.178	1.121
Orthodox	Western	-.176	.111	.759	-.516	.165
	Islamic	.541*	.113	.000	.195	.887
	African	.538*	.123	.001	.160	.915
	Latin American	.401*	.126	.037	.014	.789
	Sinic	.614*	.175	.013	.077	1.150
	Hindu	.495	.186	.144	-.077	1.067
	Buddhist	.474	.175	.127	-.063	1.011
Islamic	Western	-.717*	.076	.000	-.949	-.484
	Orthodox	-.541*	.113	.000	-.887	-.195
	African	-.003	.092	1.000	-.287	.280
	Latin American	-.140	.097	.833	-.436	.157
	Sinic	.073	.155	1.000	-.403	.548
	Hindu	-.046	.168	1.000	-.561	.469
	Buddhist	-.067	.155	1.000	-.542	.408
African	Western	-.713*	.090	.000	-.990	-.436
	Orthodox	-.538*	.123	.001	-.915	-.160
	Islamic	.003	.092	1.000	-.280	.287
	Latin American	-.136	.108	.912	-.469	.196
	Sinic	.076	.162	1.000	-.423	.574
	Hindu	-.043	.175	1.000	-.579	.494
	Buddhist	-.064	.162	1.000	-.562	.435
Latin-American	Western	-.577*	.094	.000	-.867	-.287
	Orthodox	-.401*	.126	.037	-.789	-.014
	Islamic	.140	.097	.833	-.157	.436
	African	.136	.108	.912	-.196	.469
	Sinic	.212	.165	.902	-.294	.718
	Hindu	.094	.177	.999	-.450	.637
	Buddhist	.073	.165	1.000	-.434	.579
Sinic	Western	-.789*	.153	.000	-1.261	-.318
	Orthodox	-.614*	.175	.013	-1.150	-.077
	Islamic	-.073	.155	1.000	-.548	.403
	African	-.076	.162	1.000	-.574	.423
	Latin American	-.212	.165	.902	-.718	.294
	Hindu	-.119	.214	.999	-.777	.540
	Buddhist	-.140	.204	.997	-.768	.488
Hindu	Western	-.670*	.166	.002	-1.182	-.159
	Orthodox	-.495	.186	.144	-1.067	.077
	Islamic	.046	.168	1.000	-.469	.561
	African	.043	.175	1.000	-.494	.579
	Latin American	-.094	.177	.999	-.637	.450
	Sinic	.119	.214	.999	-.540	.777
	Buddhist	-.021	.214	1.000	-.679	.638
Buddhist	Western	-.649*	.153	.001	-1.121	-.178
	Orthodox	-.474	.175	.127	-1.011	.063
	Islamic	.067	.155	1.000	-.408	.542
	African	.064	.162	1.000	-.435	.562
	Latin American	-.073	.165	1.000	-.579	.434
	Sinic	.140	.204	.997	-.488	.768
	Hindu	.021	.214	1.000	-.638	.679

Table 12: Results of Turkey-Test.

\*: p < .05.

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