Online poker

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

Ingo Fiedler

Thanks to: Ann-Christin Wilcke

Presentation for
Quebec‘s Working Group on Online Gambling

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University of Hamburg
Institute of Law & Economics
Division on Gambling

Agenda

- Introduction
- Video from an intense poker player
- Results from the OPD-UHH: The Market for online poker
- Breakdown of the North American Onlinepoker market
- Results: Playing habits of online poker players worldwide, total sample
- Results: Playing habits of online poker players worldwide, intense players
- Results: Playing habits of online poker players in UK, Germany, USA and Canada
- Results: Playing habits of Regulars, Newcomers, and Dropouts
- Conclusions and perspective

Introduction

University of Hamburg
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Division on Gambling

Introducing Germany

Introducing the Institute of Law & Economics

- Chair: Professor Adams
- Research focus: Using laws to solve social problems
  - Tobacco control, reducing smoking rates
  - Alcohol → law on alcopops (tax increase to kill the market for juvenile drinking)
  - CEO-payments
  - Marketing to children
  - Obesity, coca cola and other soft drinks
  - Problem gambling and its social costs
- Changing the environment (law) to give people the right incentives

Introducing my research

- Research interests: Onlinepoker, gambling, social costs, Law Economics, antitrust, money laundering, learning in games
- PhD thesis „Empirical studies on online poker“
- Post-Doc thesis „Gambling. A health economic analysis“
- Since 2008: research associate at the University of Hamburg
- 2010: Semester in Berkeley
- Since 2012: member of the „Task Force: Behavioral Addictions“
- Background: Economics

Excurs: What is Economics

- Economics is all about optimizing and efficiency
  → maximizing and minimizing
- What is to be optimized is up to the user!
  - Profits
  - Green energy
  - Utility
  - Usually: Social welfare (increasing social benefits, reducing social costs)
- Economics is a toolbox, using theoretical models and statistics
- What we do: Finding optimal solutions, comparing them to reality, and finding ways to bring reality closer to the optimum by setting incentives with laws

Introducing my person

- 28 years old (this, of course, still holds true in ten years)
- Interested in card, board and later computer games since I can think → mostly complex strategy games
- At least somewhat addicted to games
- Addicted to the internet and emails/Blackberry
- Other interests include
  - Influence Consciousness vs. Subconsiousness
  - Deception and Self-Deception
  - Strategic interactions
  - The influence of variance in life (from evolution to financial markets)

Introducing Gambling research in Hamburg

- Background: German gambling treaty
  - Regulates gambling in Germany (except slot machines)
  - Mostly a state monopoly
  - Internet gambling prohibited (06/2012 sports betting will be legal)
  - Forces states to finance gambling research
  - Independent circle of experts to be consulted, so called „Fachbeirat“ → Prof. Adams is a member
- Diploma thesis „The social costs of gambling“
  - Determined rangorder of harmfulness to society of different gambling products
  - Allowed to set priorities

Introducing poker research in Hamburg

- The beginning: 2007 at the conference of the German conference for gambling addiction someone said: „Poker is a game of chance because it is a bet on cards“
- Obviously, there is an influence of skill in poker – but how much? → Answer is crucial for legal status!
- Research project to answer this question yielded:
  - Skill adds up, chance cancels out
  - In mixed games the question is when it does become a game of skill rather than if it is a game of skill
  - This point is called „Critical Repetition Frequency“ (CRF)
  - Empirical evidence for poker: average player reaches CRF after 1,000 hands or 13 playing hours online
  - Average player plays only 4.88 hours → poker is a game of chance
  - For social costs it does not matter whether skill has an influence

Video

The Market for Online Poker

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Before OPD-UHH: What we knew about the online poker market

Poker site	2009[a]		2010[b]		Data collection?
	Players (Ø 7 days)	Market share	Players (Ø 7 days)	Market share	
Pokerstars	22,000	35.07%	29,200	40.20%	Yes
Full Tilt Poker	12,000	19.13%	14,600	20.10%	Yes
iPoker Network	5,900	9.41%	5,900	5.99%	No
Party Poker	5,300	8.45%	4,400	6.06%	No
Cereus Network	2,300	3.67%	1,960	3.67%	No
Everest Poker	2,050	3.27%	2,100	2.89%	Yes
Microgaming	1,980	3.16%	2,000	2.75%	No
IPN (Boss Media)	1,920	3.06%	2,250	3.10%	Yes
Cake Poker	1,580	2.52%	1,300	1.79%	Yes
Ongame (bwin)	1,260	2.01%	2,650	3.65%	No
Others	6,450	10.25%	7,250	9.80%	No
Total	62,720	100%	73,610	100%	

[a]: 18th June 2009, www.pokerscout.com.
[b]: 11th May 2010, www.pokerscout.com.

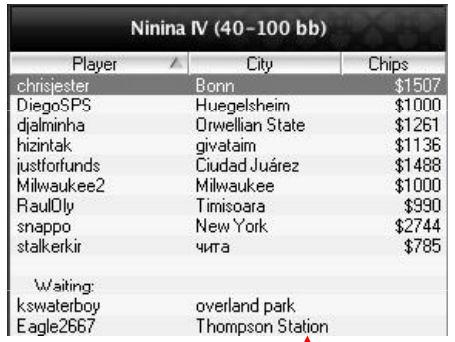
Before OPD-UHH: What we did not know

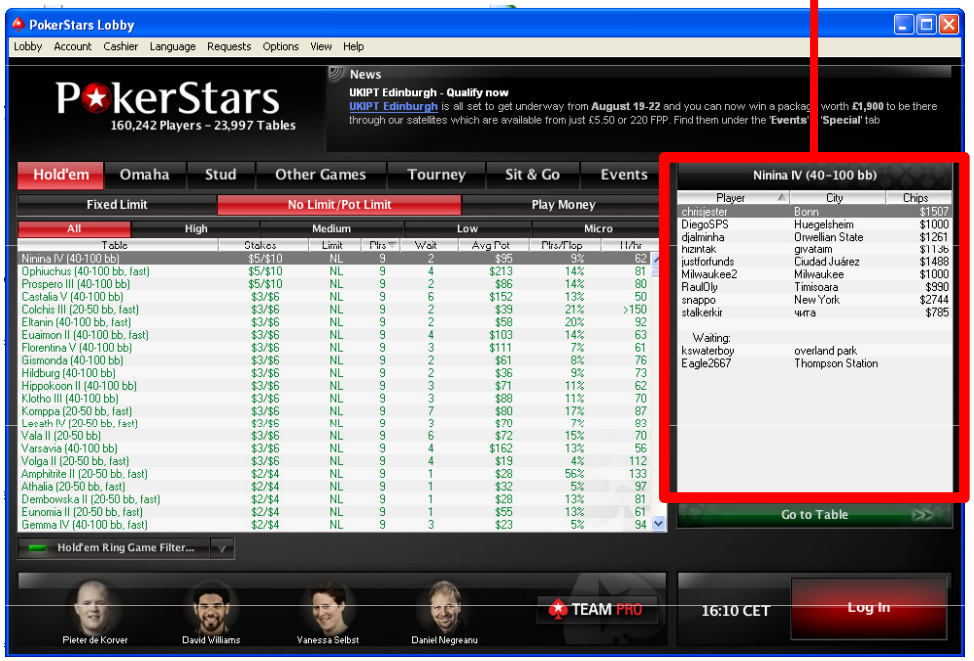
- Online poker market operates (mostly) in a gray area
- There were a lot of unsettled questions:
  - Total market size? Market size per country?
  - How many active players?
  - Do inter- and intra-country differences exist?
  - What are the parameters influencing the market size?
  - What are the playing habits of poker players?

→ City of Hamburg financed the research project

Data Set of the OPD-UHH

- Data collection in corporation with PokerScout (independent market investigator)
  - 6 months
  - 5 poker sites (65% market share)
  - 4.6 million player identities observed
  - Origion (country or city)
  - Limits played
  - Session length
  - Number of tables





Starting and ending points of the data collection

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

Limitations of the Data Set

- Only cash games (no tournaments)
- Not all sites accept US-players
- Non-identified origin of some player identities
- Potential false information
- 92% successful assignement of cities to regions and countries
- One player identity ≠ one player (multiple accounts)

Players per Country

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%**

Players per Internet User

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%**

Drivers of the prevalence of online poker: GDP per capita

- Simple linear regression
- GDP per capita as independent variable
- Players/Internet users as dependent variable
- Only countries with more than 100,000 internet users

Sample (n=161)			
Variable	**Regression coefficient**	**t-value**	**Significance**
Constant	0.192	4.123	0.000
GDP per capita in 1000 US$	0.009	5.786	0.000
Goodness of fit	R^2=0,177; adjusted R^2=0,171; F-value=33,477 (p=0.000)		

- Player fraction per internet users +0.009 percentage points if GDP per capita +1,000 USD.

Drivers of the prevalence of online poker: Culture, Operationalization

Variable	Operationalization
	dependent variable
Proportion of poker players	Propotion of poker players in a country per internet users Percentage factor
Cultural group	1=Western, 2=Orthodox, 3=Islamic, 4=African, 5= Latin American, 6=Sinic, 7=Hindu, 8=Buddhist, 0=Others
	covariate
GDP per capita	in thousand US$

Factors Influencing the Player Fraction in a Population: Culture, Results

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	0.116		
Total	35.647	161			
Fit of the model	R^2=0.504; adjusted R^2=0.478				

Factors Influencing the Player Fraction in a Population: Culture, Results #2

- Only countries with more than 100,000 internet users
- GDP per capita to control effect of culture
- R^2= 50.06%
- F-Value Culture 14.229 ($p<0.001$), F-Value GPD per capita 12.987 ($p<0.001$)

Sample (n=161)			
Culture	**N**	**Mean**	**Standard deviation**
Western	47	0.638	0.452
Orthodox	13	0.450	0.326
Islamic	41	0.076	0.108
African	23	0.079	0.059
Latin American	20	0.185	0.100
Sinic	6	0.019	0.018
Hindu	5	0.112	0.196
Buddhist	6	0.128	0.157
Total	161	0.289	0.369

- Direction of effect confirmed by Turkey-Test (compares mean values)

Factors Influencing the Player Fraction in a Population: Law & Order

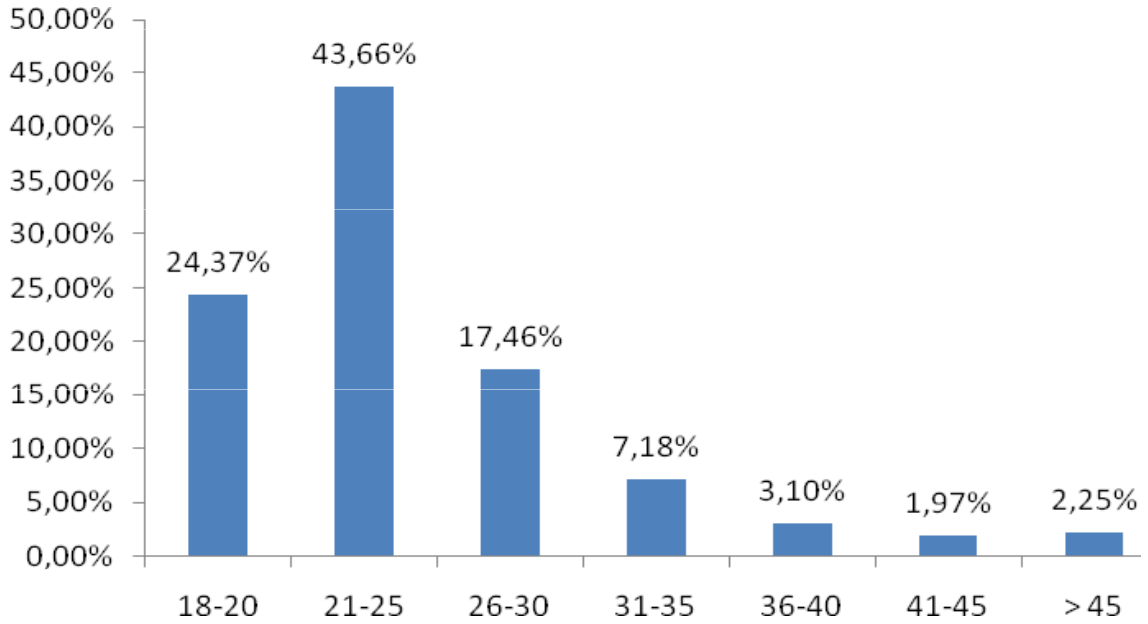
- Regression Analysis 1:
  - 15 Countries
  - GDP per capita to control effect of legislation
  - Prohibition of online poker = 0
  - Online poker unprohibited = 1

→ No significant effect of legislation

- Interpretation: Presently, prohibition of online poker is not enforced

Factors Influencing the Player Fraction in a Population: Age structure?

- Most players are between 18 and 35 years old
  - From a non-representative survey among pokerstrategy.deusers
  - Used as an indicator?

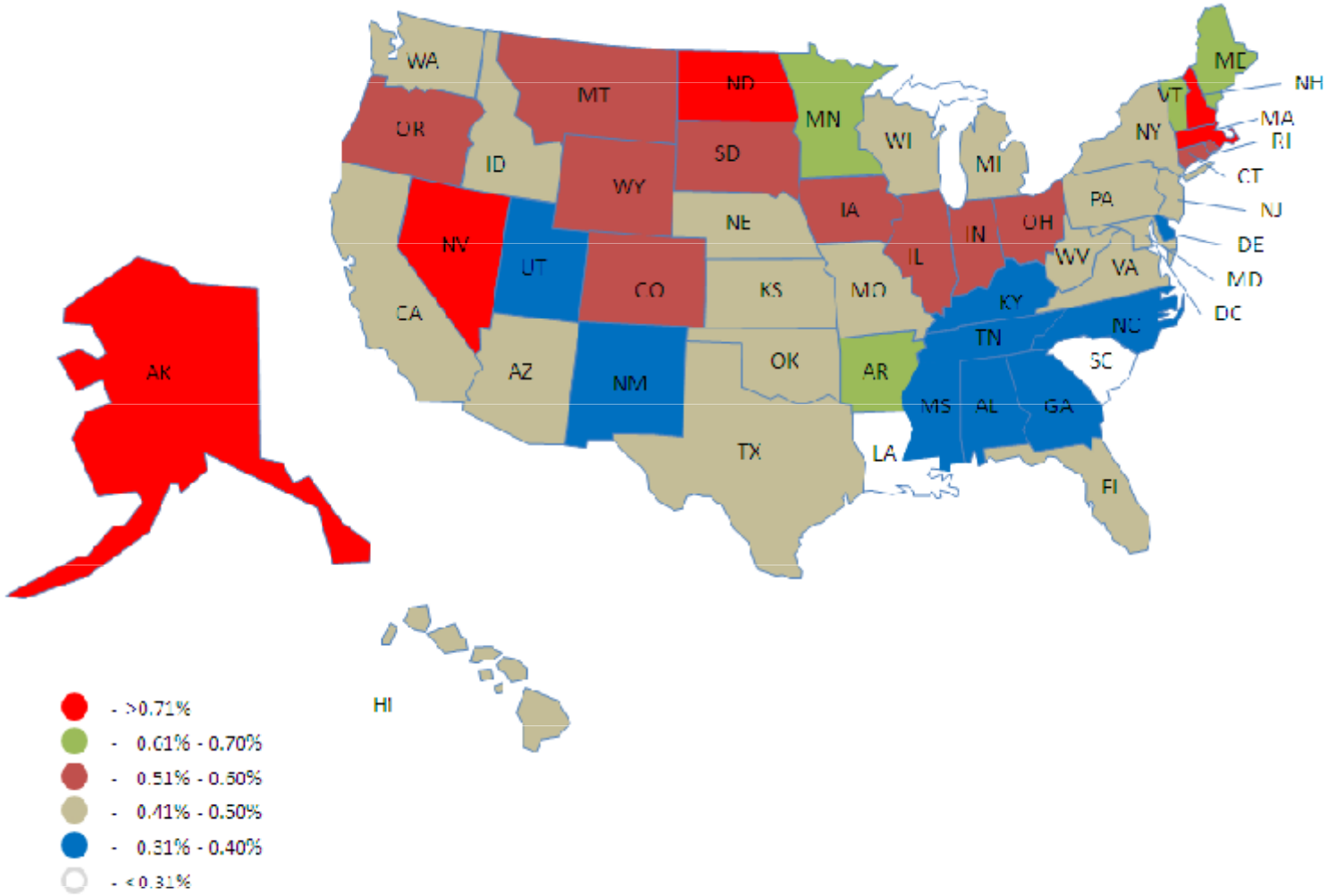


- Player fraction in relation to 18-35 year olds?

Market Size

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%**

Player Fraction in the Federal States of the USA



The online poker market in the USA #1

Rank	State	Population	Players[8]	Prevalence population	Prevalence region/country	Revenue in mil. U.S.$	Market shar
	U.S. Total	**310.973.838**	**1,429,943**	**0,46%**	**1.00**	**981.01**	**100%**
1	California	36,961,664	178,350	.48%	1.05	154.59	15.88%
2	New York	19,541,453	82,824	.42%	.92	71.52	7.35%
3	Texas	24,782,302	107,746	.43%	.95	62.36	6.41%
4	Illinois	12,910,409	68,210	.53%	1.15	56.21	5.78%
5	Florida	18,537,969	80,289	.43%	.94	47.57	4.89%
6	Nevada	2,643,085	25,484	.96%	2.10	37.58	3.86%
7	Massachusetts	6,593,587	47,425	.72%	1.56	35.62	3.66%
8	Pennsylvania	12,604,767	51,880	.41%	.90	32.72	3.36%
9	Ohio	11,542,645	60,558	.52%	1.14	32.11	3.30%
10	New Jersey	8,707,739	38,095	.44%	.95	29.13	2.99%
11	Michigan	9,969,727	47,512	.48%	1.04	26.88	2.76%
12	Virginia	7,882,590	34,229	.43%	.94	23.90	2.46%
13	Minnesota	5,266,214	32,726	.62%	1.35	22.87	2.35%
14	Maryland	5,699,478	26,573	.47%	1.01	21.60	2.22%
15	Georgia	9,829,211	34,985	.36%	.77	21.38	2.20%
16	North Carolina	9,380,884	33,496	.36%	.78	20.49	2.11%
17	Washington	6,664,195	27,604	.41%	.90	20.37	2.09%
18	Wisconsin	5,654,774	26,798	.47%	1.03	19.99	2.05%
19	Colorado	5,024,748	29,674	.59%	1.28	17.98	1.85%
20	Arizona	6,595,778	28,651	.43%	.94	17.50	1.80%
21	Missouri	5,987,580	26,908	.45%	.98	16.76	1.72%
22	Indiana	6,423,113	33,074	.51%	1.12	16.34	1.68%
23	Oregon	3,825,657	21,183	.55%	1.20	14.76	1.52%
24	Connecticut	3,518,288	19,189	.55%	1.19	11.58	1,19%
25	Tennessee	6,296,254	22,262	.35%	.77	10.51	1.08%
26	Arkansas	2,889,450	18,135	.63%	1.36	9.15	.94%

The online poker market in the USA #2

Rank	State	Population	Players[8]	Prevalence population	Prevalence region/country	Revenue in mil. U.S.$	Market share
	U.S. Total	**310.973.838**	**1,429,943**	**0,46%**	**1.00**	**981.01**	**100%**
27	Kentucky	4,314,113	16,467	.38%	.83	8.81	.90%
28	Iowa	3,007,856	15,986	.53%	1.16	8.46	.87%
29	Alabama	4,708,708	17,030	.36%	.79	8.40	.86%
30	South Carolina	4,561,242	13,104	.29%	.62	7.06	.73%
31	Oklahoma	3,687,050	15,297	.41%	.90	6.29	.69%
32	Kansas	2,818,747	13,516	.48%	1.04	6.34	.65%
33	New Hampshire	1,324,575	12,785	.97%	2.10	6.24	.64%
34	Maine	1,318,301	9,116	.69%	1.50	5.54	.61%
35	West Virginia	1,819,777	8,203	.45%	.98	5.58	.57%
36	Nebraska	1,796,619	8,812	.49%	1.07	5.52	.57%
37	North Dakota	646,844	5,002	.77%	1.68	4.98	.51%
38	Mississippi	2,951,996	9,969	.34%	.73	4.96	.51%
39	Louisiana	4,492,076	13,369	.30%	.65	4.92	.51%
40	Alaska	698,473	5,522	.79%	1.72	4.90	.50%
41	New Mexico	2,009,671	7,118	.35%	.77	4.53	.47%
42	Hawaii	1,295,178	6,017	.46%	1.01	4.51	.46%
43	Montana	974,989	5,570	.57%	1.24	3.68	.38%
44	Idaho	1,545,801	7,398	.48%	1.04	3.67	.38%
45	Utah	2,784,572	8,640	.31%	.67	3.46	.36%
46	Rhode Island	1,053,209	6,149	.58%	1.27	3.38	.35%
47	District of Columbia	599,657	2,454	.41%	.89	2.51	.26%
48	South Dakota	812,383	4,590	.57%	1.23	2.13	.22%
49	Vermont	621,760	3,870	.62%	1.35	1.93	.20%
50	Delaware	885,122	3,501	.40%	.86	1.44	.15%
51	Puerto Rico	3,967,288	2,509	.06%	.14	.99	.10%
52	Wyoming	544,270	2,990	.55%	1.19	.85	.09%
	n.a.[9]	1,095					

The online poker market in Canada

Rank	Region	Population	Players[10]	Prevalence population	Prevalence region/country	Revenue in mil. US$	Market share
	Canada Total	**34,108,800**	**306,596**	**0,90%**	**1.00**	**219.63**	**100%**
1	Ontario	13,210,700	110,159	.83%	.92	84.15	37.72%
2	Quebec	7,907,400	66,912	.85%	.94	41.66	18.67%
3	British Columbia	4,531,000	42,299	.93%	1.03	38.67	17.33%
4	Alberta	3,720,900	40,918	1.10%	1.22	36.47	16.35%
5	Manitoba	1,235,400	13,356	1.08%	1.20	7.17	3.22%
6	Saskatchewan	1,045,600	12,303	1.18%	1.31	6.74	3.02%
7	New Brunswick	751,800	6,859	.91%	1.01	2.74	1.23%
8	Nova Scotia	942,500	6,373	.68%	.76	2.63	1.18%
9	Newfoundland and Labrador	509,700	3,045	0.60%	.67	1.38	.62%
10	Prince Edward Island	142,300	1,990	1.40%	1.56	0.74	.33%
11	Yukon Territory	34,500	647	1.88%	2.09	0.31	.14%
12	Northwest Territories	43,800	1,075	2.45%	2.72	0.26	.12%
13	Nunavut	33,200	660	1.99%	2.21	0.16	.07%

Source: population data: Statistics Canada, CANSIM, Population by year, by province and territory, 2010.

Playing habits of online poker players (worldwide, total sample)

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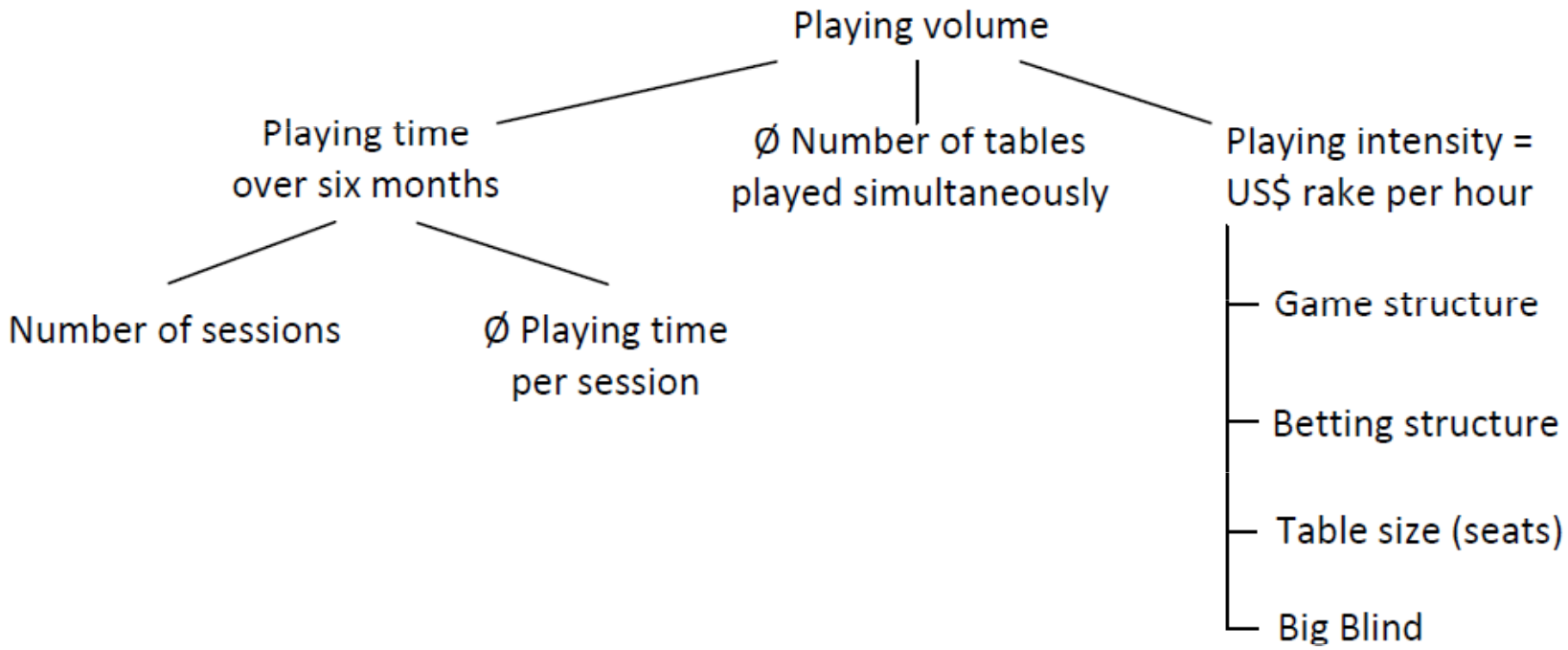
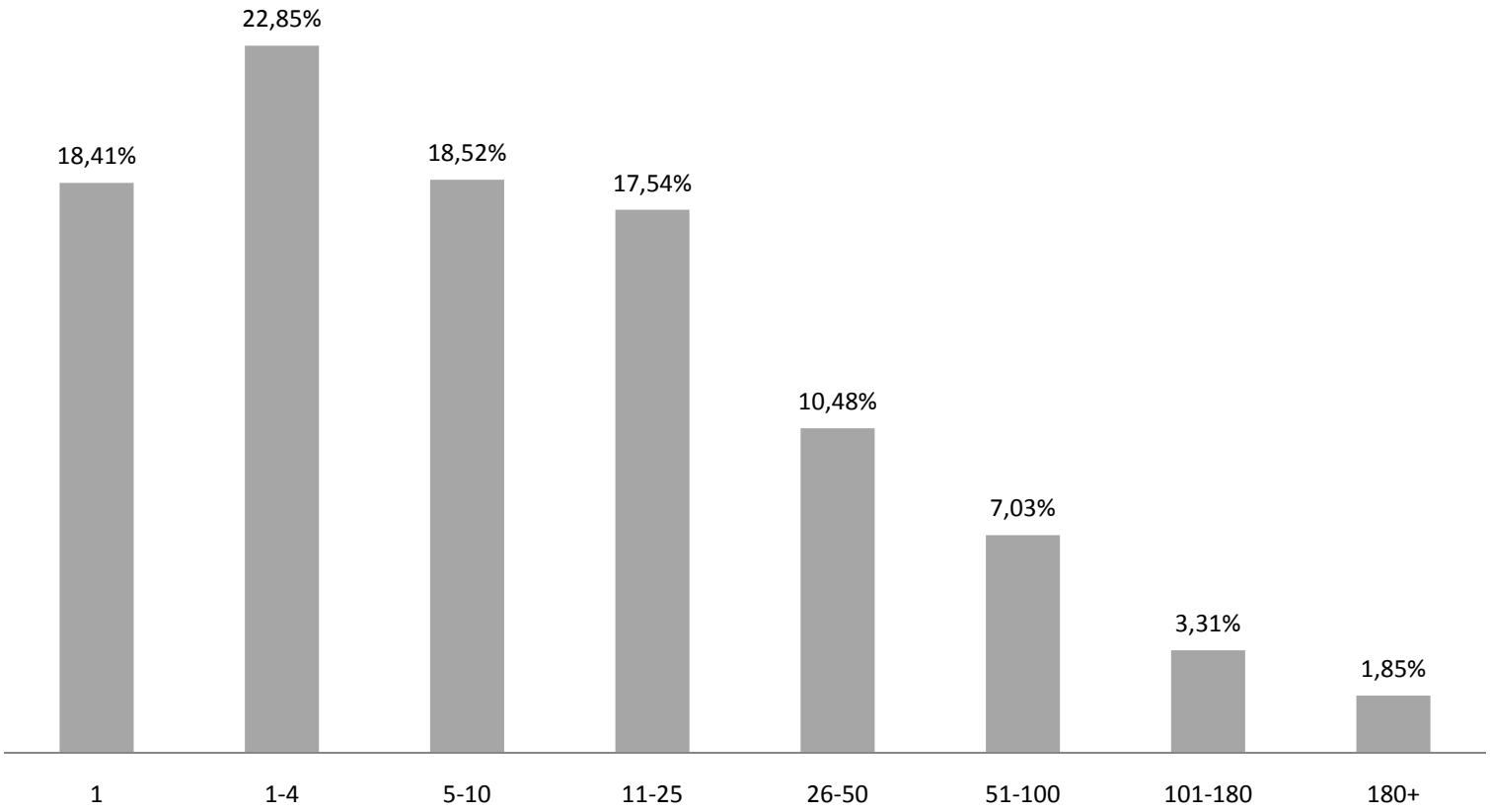
Operationalization of playing habits



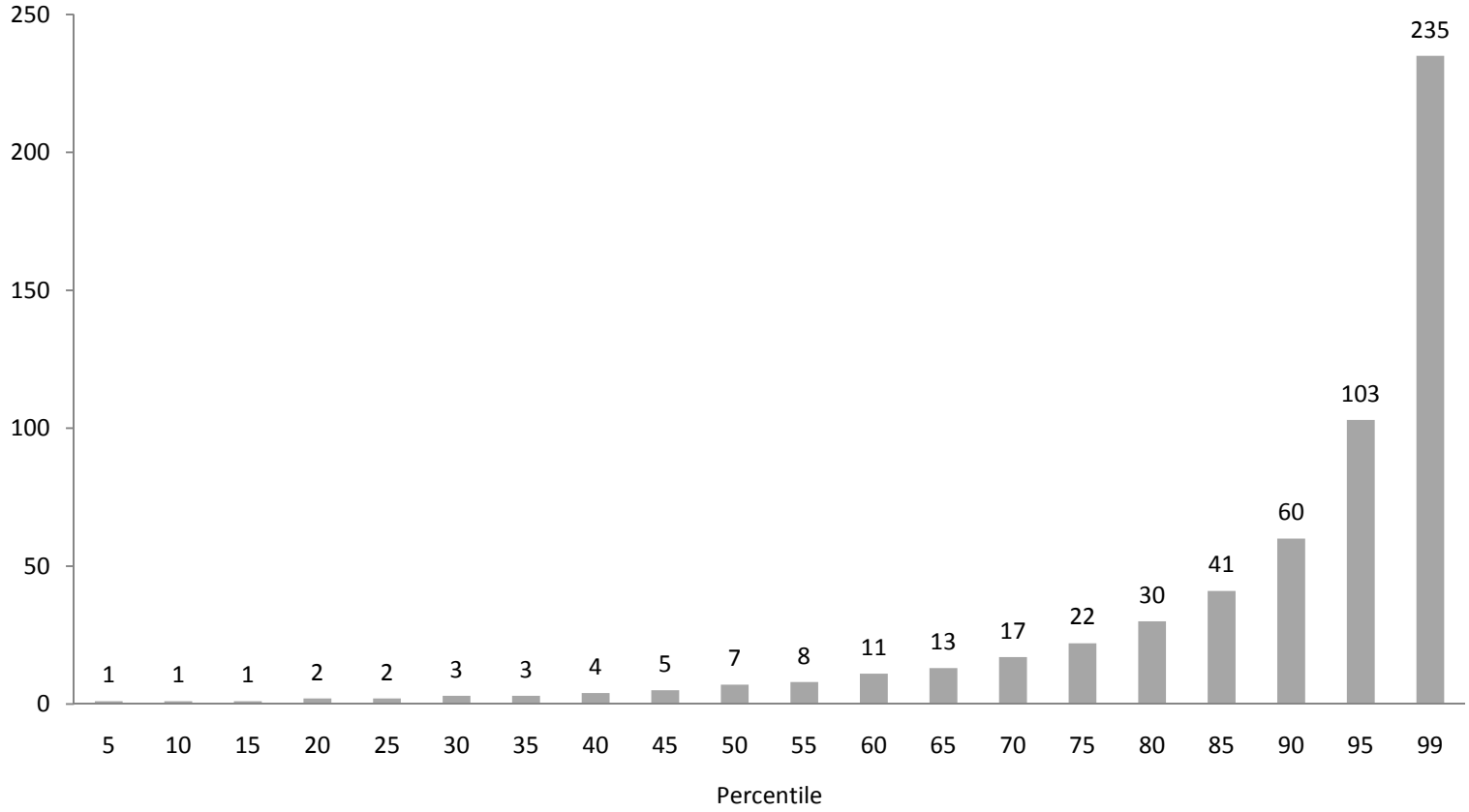
Number of sessions

Operator	Playing identities	Number of sessions	Ø sessions	Median sessions	σ sessions
IPN (Boss Media)	258,962	5,025,076	19.40	5	42.80
Everest Poker	270,823	6,099,113	22.52	6	47.94
Cake Poker	231,355	4,055,062	17.53	6	36.38
Full Tilt Poker	1,380,691	33,013,567	23.91	8	45.51
Pokerstars	2,411,745	57,667,398	23.91	7	49.02
Gesamt	**4,553,576**	**105,860,216**	**23.25**	**7**	**47.03**

Number of sessions #2



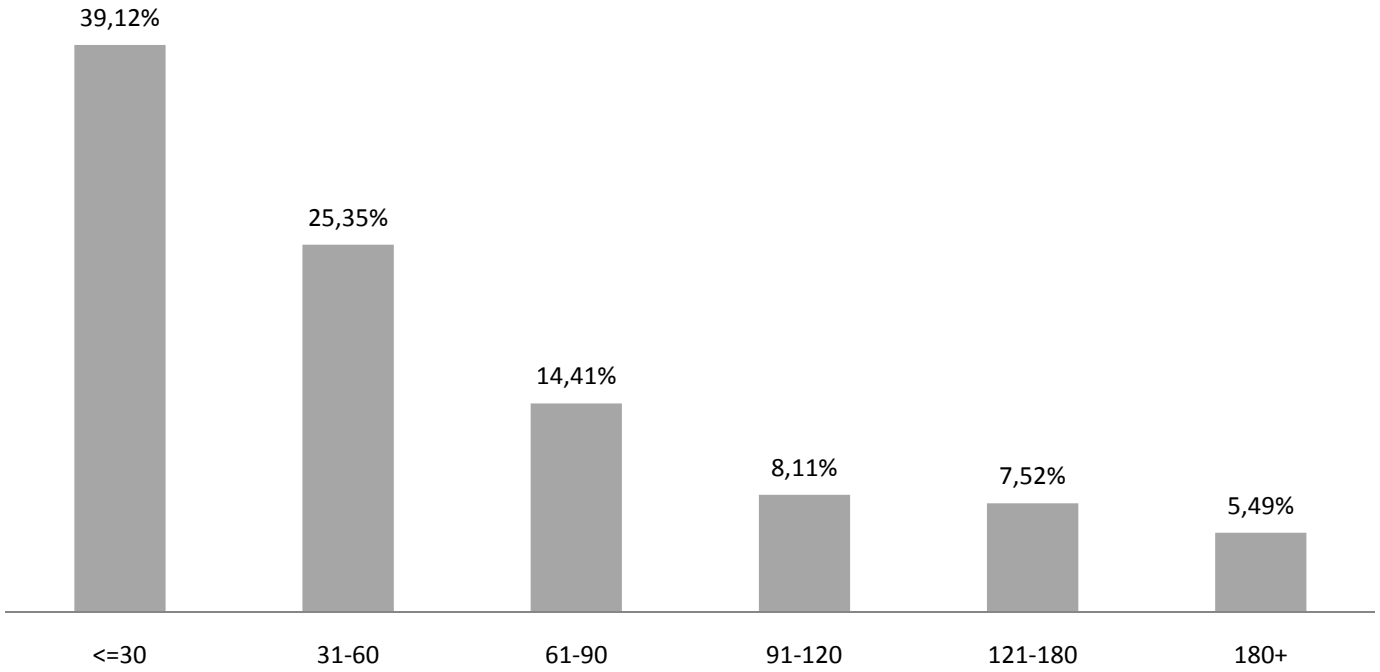
Number of sessions #3



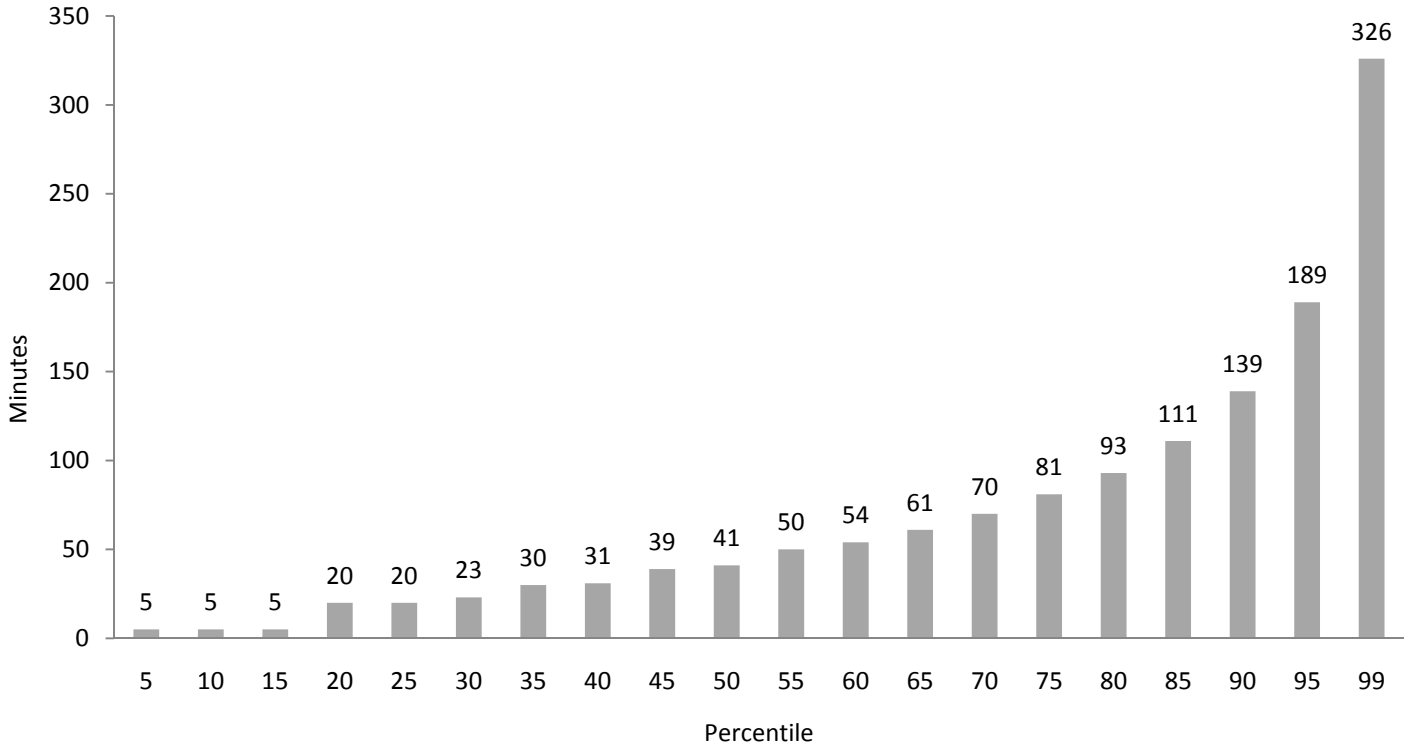
Session length in minutes

Operator	Ø-session length of the Ø player	Ø-session length of the median player	σ of the Ø-session length
IPN (Boss Media)	47.52	40.00	36.72
Everest Poker	45.48	37.56	37.76
Cake Poker	45.76	39.00	39.53
Full Tilt Poker	51.21	42.42	39.57
Pokerstars	50.27	42.00	37.76
Total	**49.85**	**41.50**	**38.46**

Session length in minutes #2



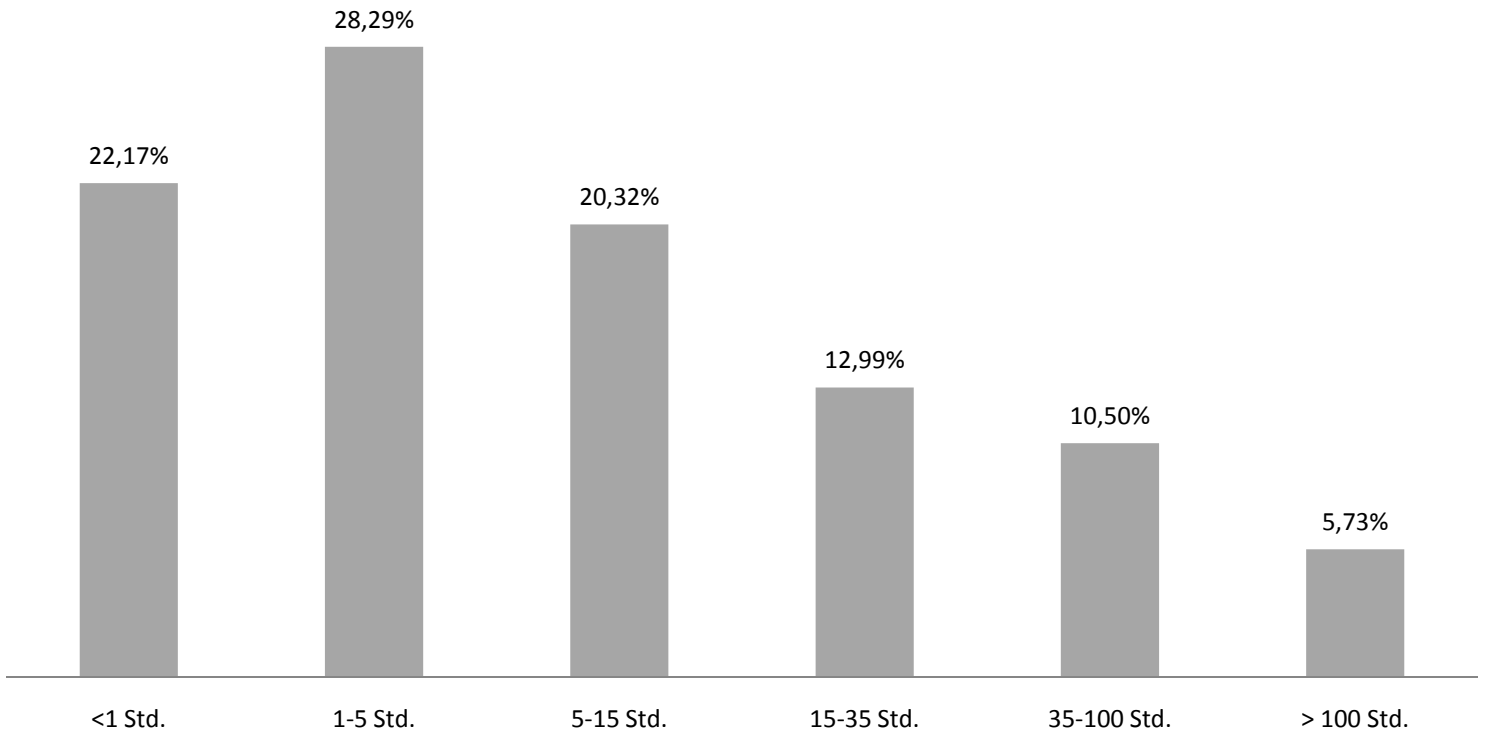
Session length #3



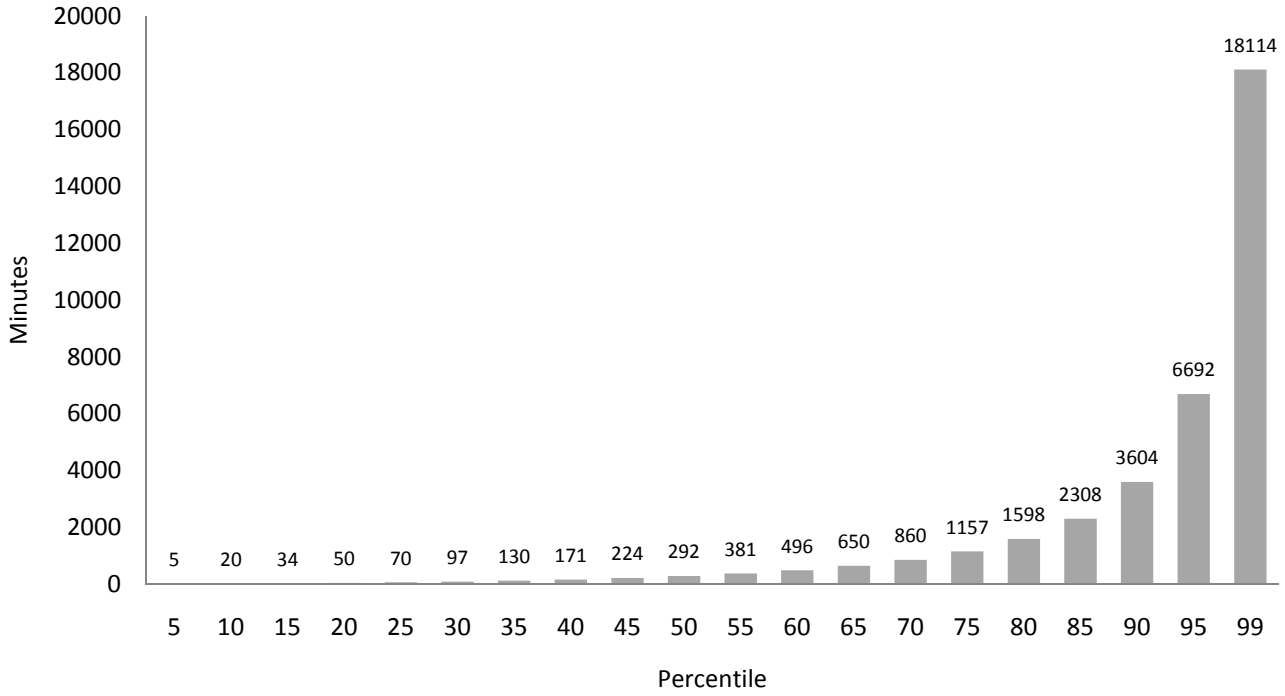
Playing time over 6 months

Operator	Player Identities	Playing time in hours	Ø playing time in hours	Median playing time in hours	σ playing time in hours
IPN (Boss Media)	258,962	5,155,933	19.91	3.10	57.10
Everest Poker	270,823	6,524,126	24.09	3.82	66.85
Cake Poker	231,355	4,032,517	17.43	3.97	46.21
Full Tilt Poker	1,380,691	34,172,102	24.75	5.67	59.45
Pokerstars	2,411,745	60,510,682	25.09	4.89	64.81
Total	**4,553,576**	**110,395,360**	**24.24**	**4.87**	**62.13**

Playing time over 6 months in hours



Playing time over 6 months in hours #2



Extrapolation: Playing time 1 year

Operator	Hours	Days	Years	Human Lives	Share
IPN (Boss Media)	10,311,866	429,661	1,177	15.70	3.02%
Everest Poker	13,048,252	543,677	1,490	19.86	3.82%
Cake Poker	8,065,034	336,043	921	12.28	2.36%
Full Tilt Poker	68,344,204	2,847,675	7,802	104.02	20.03%
Pokerstars	121,021,364	5,042,557	13,815	184.20	35.47%
Other	120,356,870	4,953,638	13,572	181	35.28%
Total	**341,147,590**	**14,153,251**	**38,776**	**517**	**100,00%**

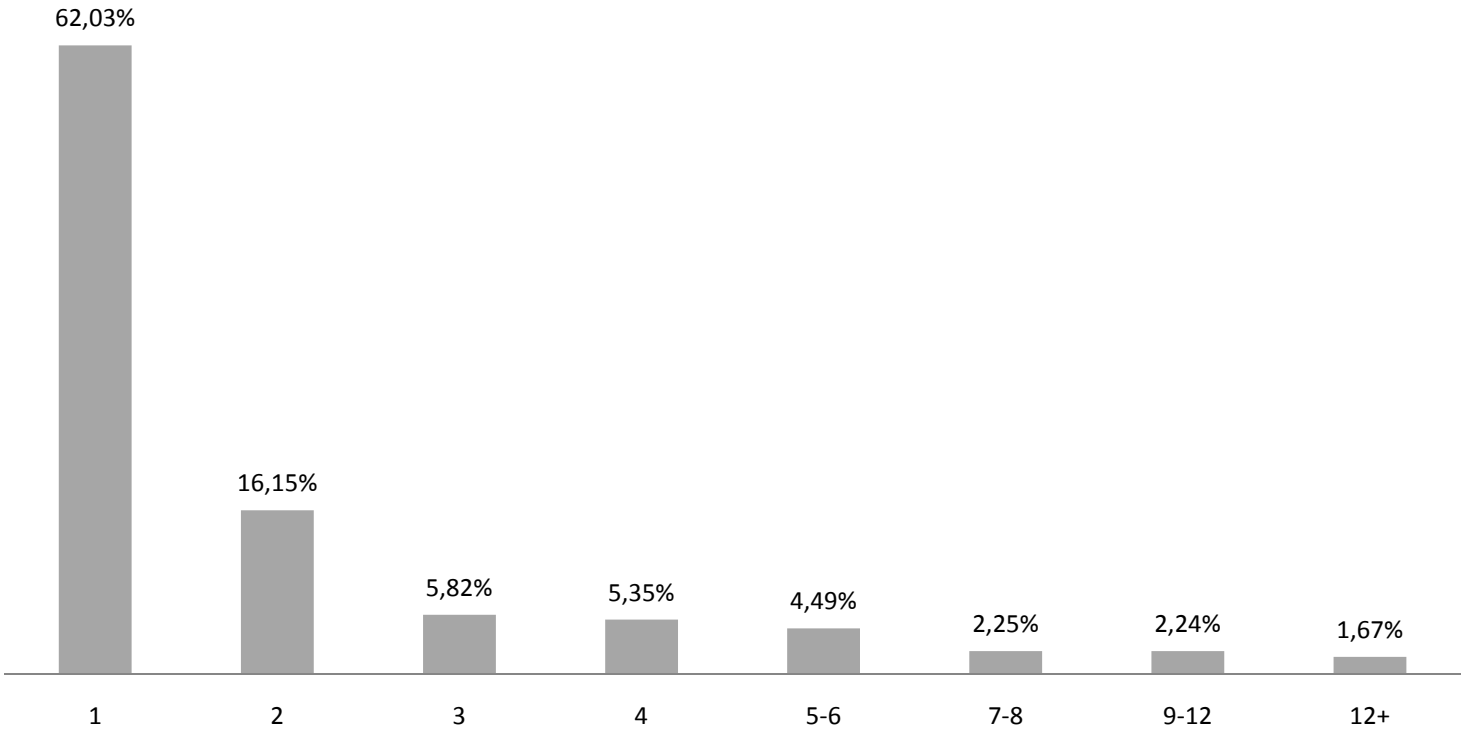
Total playing time, session length and number of sessions: increase per percentile

Perzcntile	Total playing time	Increase in %	Session length	Increase in %	Number of sessions	Increase in %
5	5	-	5	-	1	-
10	20	300,0%	5	0,0%	1	0,0%
15	34	70,0%	5	0,0%	1	0,0%
20	50	47,1%	20	300,0%	2	100,0%
25	70	40,0%	20	0,0%	2	0,0%
30	97	38,6%	23	15,0%	3	50,0%
35	130	34,0%	30	30,4%	3	0,0%
40	171	31,5%	31	3,3%	4	33,3%
45	224	31,0%	39	25,8%	5	25,0%
50	292	30,4%	41	5,1%	7	40,0%
55	381	30,5%	50	22,0%	8	14,3%
60	496	30,2%	54	8,0%	11	37,5%
65	650	31,0%	61	13,0%	13	18,2%
70	860	32,3%	70	14,8%	17	30,8%
75	1157	34,5%	81	15,7%	22	29,4%
80	1598	38,1%	93	14,8%	30	36,4%
85	2308	44,4%	111	19,4%	41	36,7%
90	3604	56,2%	139	25,2%	60	46,3%
95	6692	85,7%	189	36,0%	103	71,7%
99	18114	170,7%	326	72,5%	235	128,2%

Multitabling

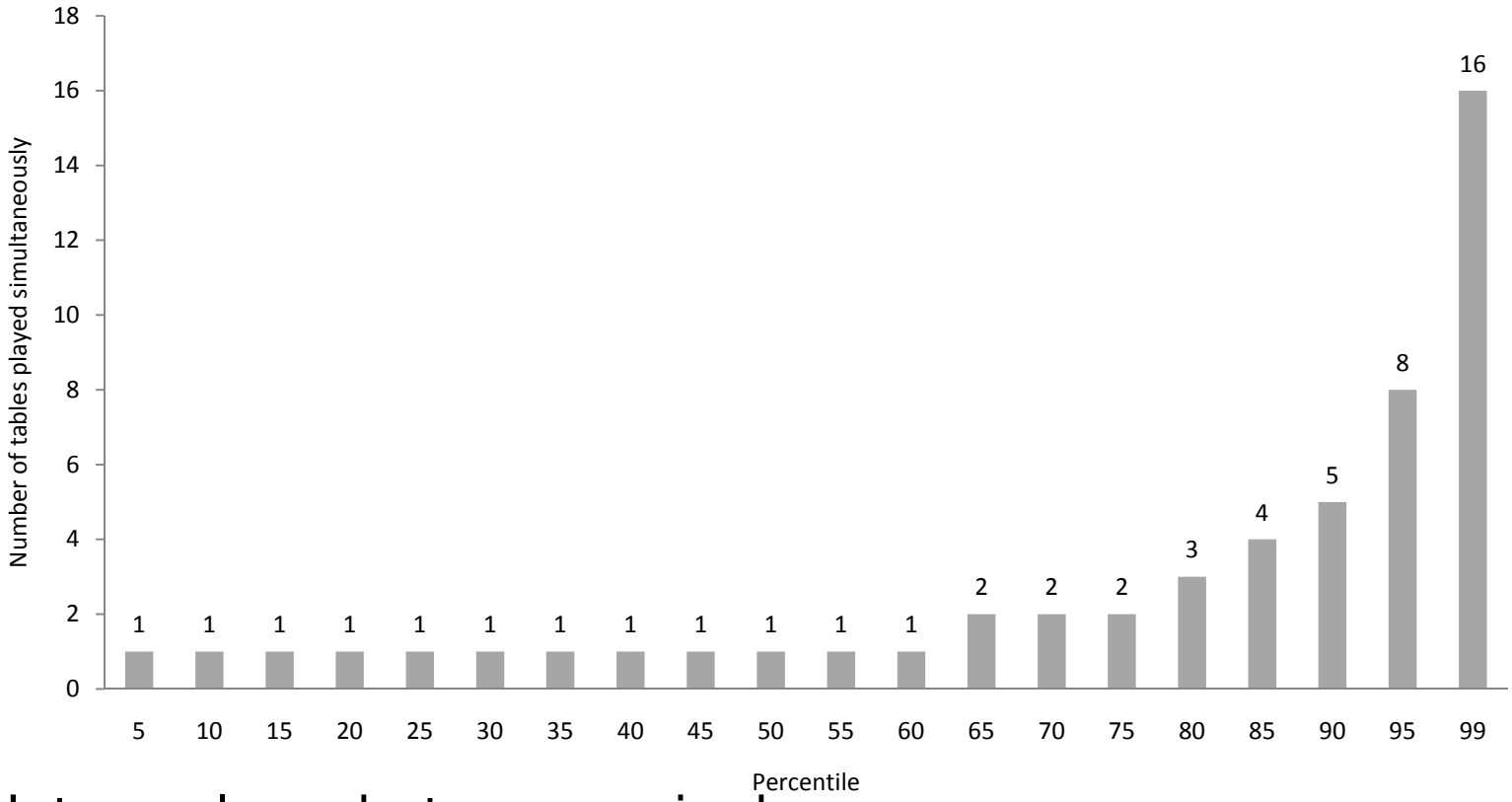
Operator	Ø tables	Median tables	σ tables
IPN (Boss Media)	1.22	1.01	0.70
Everest Poker	1.25	1.02	0.73
Cake Poker	1.44	1.03	1.21
Full Tilt Poker	1.35	1.05	0.89
Pokerstars	1.31	1.05	1.04
Total	**1.32**	**1.04**	**0.97**

Multitabling #2



- Not per player but per session!

Multitabling #3



- Not per player but per session!

Game types and limits, definition for No Limit Holdem

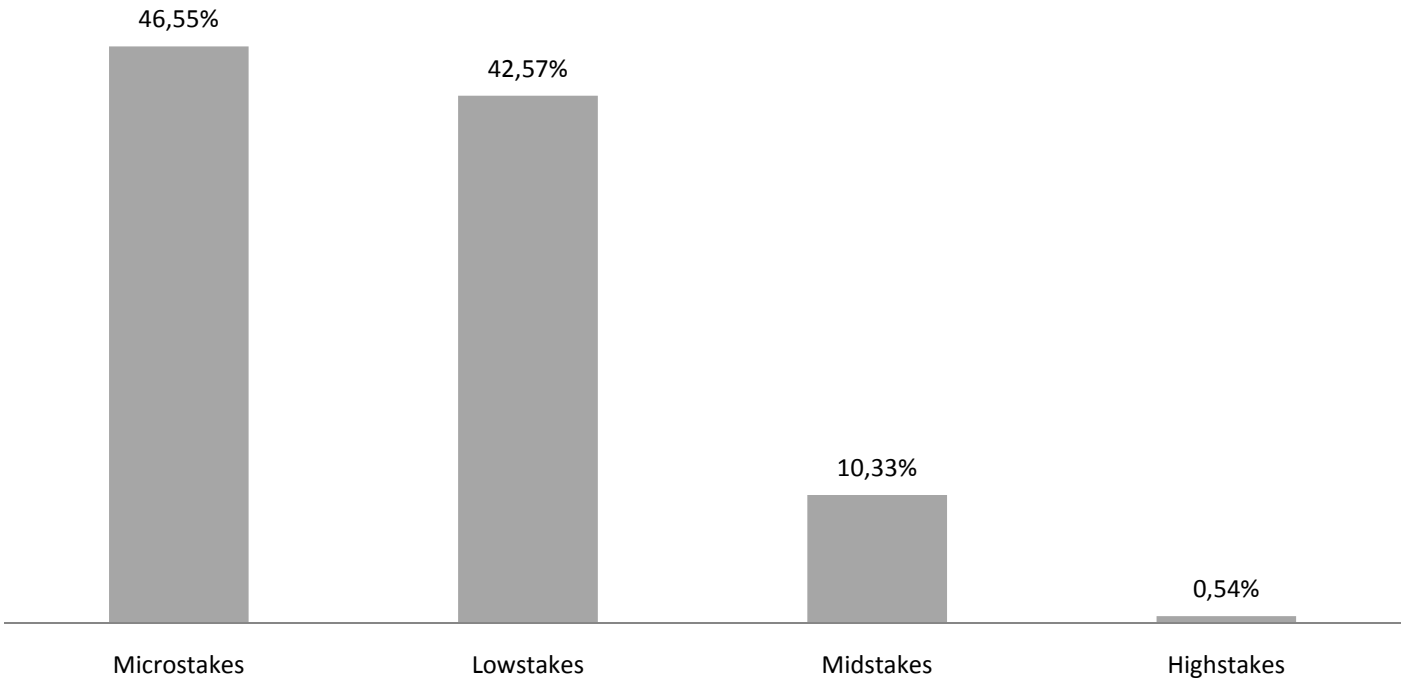
Limit (Small Blind/Big Blind)	Stakes
0,01/0,02-0,05/0,10	Micro
0,10/0,20- 0,5/1	Low
0,75/1,50-5/10	Mid
8/16-500/1000	High

Players per poker variant and stake

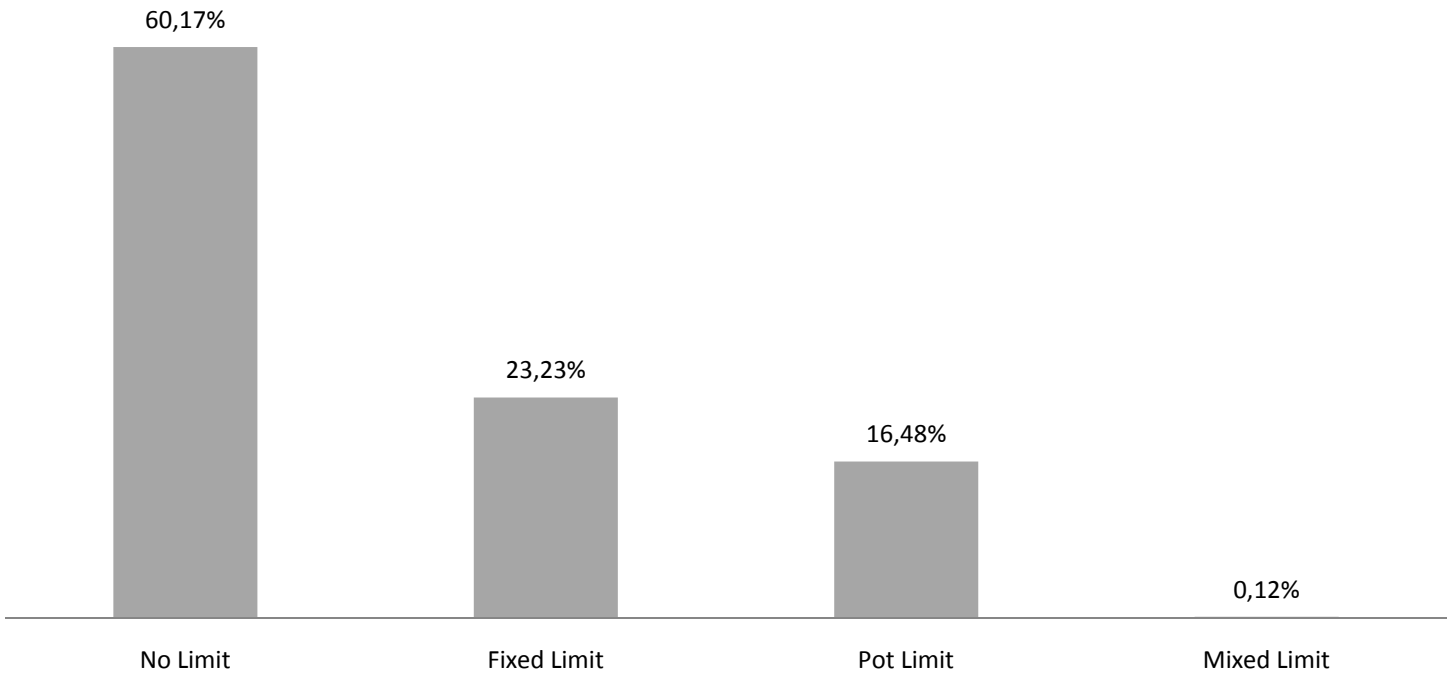
Pokervariant*	Microstakes			Lowstakes			Midstakes			Highstakes			Total	
	Players	% Var	% Tot	Players	% Var	% Tot	Players	% Var	% Tot	Players	% Var	% Tot	Absolut	% Tot
Texas Holdem NL	3015319	48,4%	28,4%	2567389	41,2%	24,22%	621010	9,97%	5,86%	22404	0,36%	0,21%	6226122	58,73%
Texas Holdem FL	936269	52,6%	8,83%	674773	37,9%	6,37%	158451	8,89%	1,49%	12334	0,69%	0,12%	1781827	16,81%
Texas Holdem PL	178560	33,2%	1,68%	335521	62,3%	3,17%	24329	4,52%	0,23%	170	0,03%	0,00%	538580	5,08%
Texas Holdem ML	8.943	68,81%	0,08%	3.913	30,11%	0,04%	93	0,72%	0,00%	47	0,36%	0,00%	12.996	0,12%
Omaha NL	652	56,99%	0,01%	313	27,36%	0,00%	155	13,55%	0,00%	24	2,10%	0,00%	1.144	0,01%
Omaha FL	15.657	54,97%	0,15%	7.730	27,14%	0,07%	5.073	17,81%	0,05%	21	0,07%	0,00%	28.481	0,27%
Omaha PL	404516	41,1%	3,82%	404347	41,0%	3,81%	162.187	16,5%	1,53%	14203	1,44%	0,13%	985253	9,29%
Omaha Hi/Lo NL	31.771	24,61%	0,30%	74.929	58,04%	0,71%	22.190	17,19%	0,21%	200	0,15%	0,00%	129.090	1,22%
Omaha Hi/Lo FL	50.068	33,54%	0,47%	67.797	45,41%	0,64%	28.307	18,96%	0,27%	3.120	2,09%	0,03%	149.292	1,41%
Omaha Hi/Lo PL	79.438	48,29%	0,75%	69.120	42,02%	0,65%	15.736	9,57%	0,15%	209	0,13%	0,00%	164.503	1,55%
Omaha Hi/Lo ML	16	44,44%	0,00%	20	55,56%	0,00%	0	0,00%	0,00%	0	0,00%	0,00%	36	0,00%
7 Card Stud NL	9	52,94%	0,00%	3	17,65%	0,00%	5	29,41%	0,00%	0	0,00%	0,00%	17	0,00%
7 Card Stud FL	70.155	44,41%	0,66%	72.992	46,21%	0,69%	13.889	8,79%	0,13%	929	0,59%	0,01%	157.965	1,49%
7 Card Stud PL	37	48,05%	0,00%	38	49,35%	0,00%	2	2,60%	0,00%	0	0,00%	0,00%	77	0,00%
7 Card Stud Hi/Lo FL	29.303	39,07%	0,28%	35.860	47,82%	0,34%	8.930	11,91%	0,08%	903	1,20%	0,01%	74.996	0,71%
5 Card Stud FL	0	0,00%	0,00%	251	100,00%	0,00%	0	0,00%	0,00%	0	0,00%	0,00%	251	0,00%
5 Card Draw NL	0	100,00%	0,15%	15.382	100,00%	0,15%	0	0,00%	0,00%	0	0,00%	0,00%	15.382	0,15%
5 Card Draw FL	43.448	50,27%	0,41%	38.356	44,38%	0,36%	4.569	5,29%	0,04%	49	0,06%	0,00%	86.422	0,82%
5 Card Draw PL	4.513	14,76%	0,04%	17.279	56,52%	0,16%	8.727	28,55%	0,08%	52	0,17%	0,00%	30.571	0,29%
5 Card 7-A Draw FL	5.512	26,98%	0,05%	13.085	64,05%	0,12%	1.831	8,96%	0,02%	0	0,00%	0,00%	20.428	0,19%
5 Card 7-A Draw PL	12.348	45,89%	0,12%	14.561	54,11%	0,14%	0	0,00%	0,00%	0	0,00%	0,00%	26.909	0,25%
Triple Draw Lowball 2-7 NL	0	0,00%	0,00%	2.102	100,00%	0,02%	0	0,00%	0,00%	0	0,00%	0,00%	2.102	0,02%
Triple Draw Lowball 2-7 FL	8.738	39,34%	0,08%	9.613	43,28%	0,09%	3.059	13,77%	0,03%	799	3,60%	0,01%	22.209	0,21%
Triple Draw Lowball 2-7 PL	0	0,00%	0,00%	791	100,00%	0,01%	0	0,00%	0,00%	0	0,00%	0,00%	791	0,01%
Single Lowball 2-7 NL	0	0,00%	0,00%	4.242	88,30%	0,04%	552	11,49%	0,01%	10	0,21%	0,00%	4.804	0,05%
Razz FL	29.375	41,13%	0,28%	32.027	44,85%	0,30%	9.372	13,12%	0,09%	643	0,90%	0,01%	71.417	0,67%
Soko FL	0	0,00%	0,00%	1.865	100,00%	0,02%	0	0,00%	0,00%	0	0,00%	0,00%	1.865	0,02%
Badugi FL	0	0,00%	0,00%	18.395	87,19%	0,17%	2.339	11,09%	0,02%	363	1,72%	0,00%	21.097	0,20%
HORSE/HEROS FL	8.589	42,04%	0,08%	10.676	52,25%	0,10%	1.127	5,52%	0,01%	40	0,20%	0,00%	20.432	0,19%
HOSE FL	360	72,43%	0,00%	111	22,33%	0,00%	24	4,83%	0,00%	2	0,40%	0,00%	497	0,00%
8-Game FL	0	0,00%	0,00%	19.189	82,39%	0,18%	2.881	12,37%	0,03%	1.221	5,24%	0,01%	23.291	0,22%
Other Mixed Games FL	1.480	71,64%	0,01%	574	27,78%	0,01%	10	0,48%	0,00%	2	0,10%	0,00%	2.066	0,02%
SUMME	4.935.076		46,55%	4.513.244		42,57%	1.094.848		10,33%	57.745		0,54%	10.600.913	100,00%

*NL = No Limit, FL = Fixed Limit, PL = Pot Limit, ML = Mixed Limit.

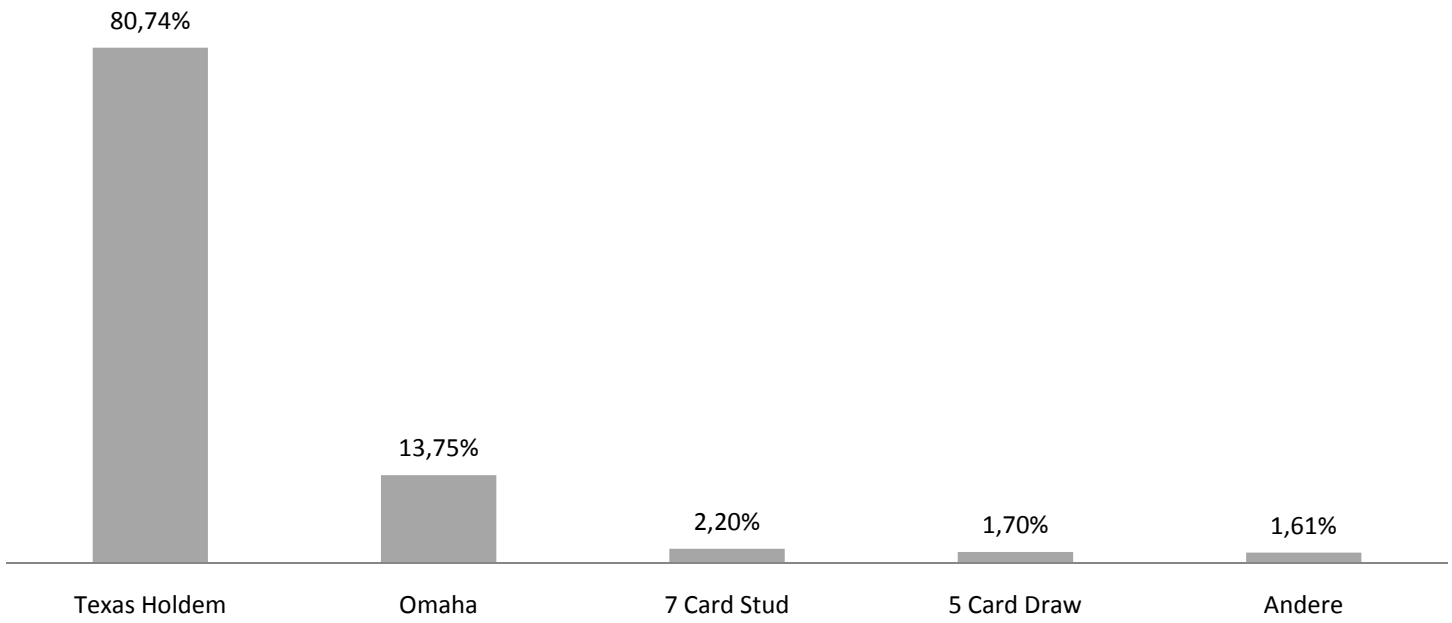
Players per stake



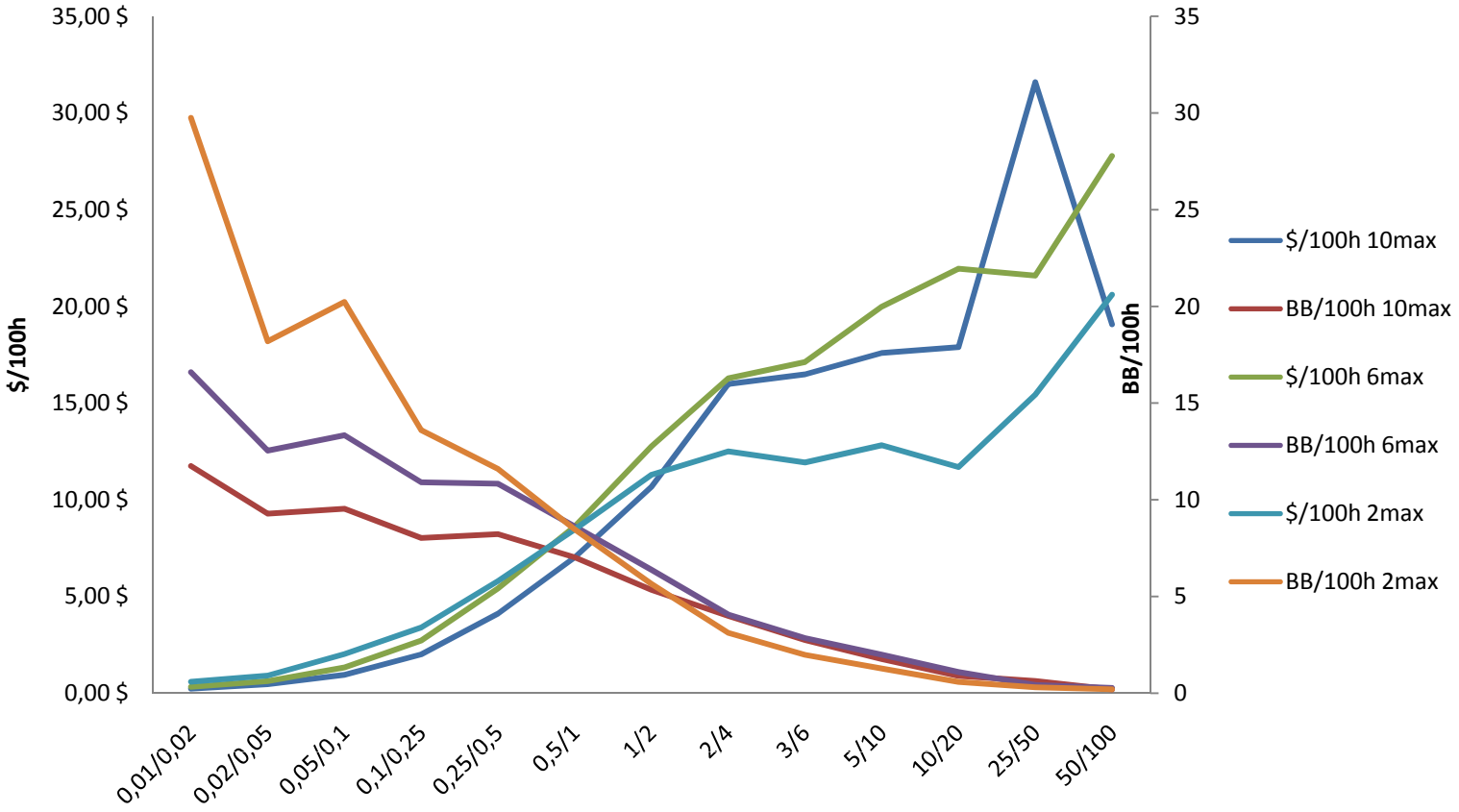
Players per betting structure



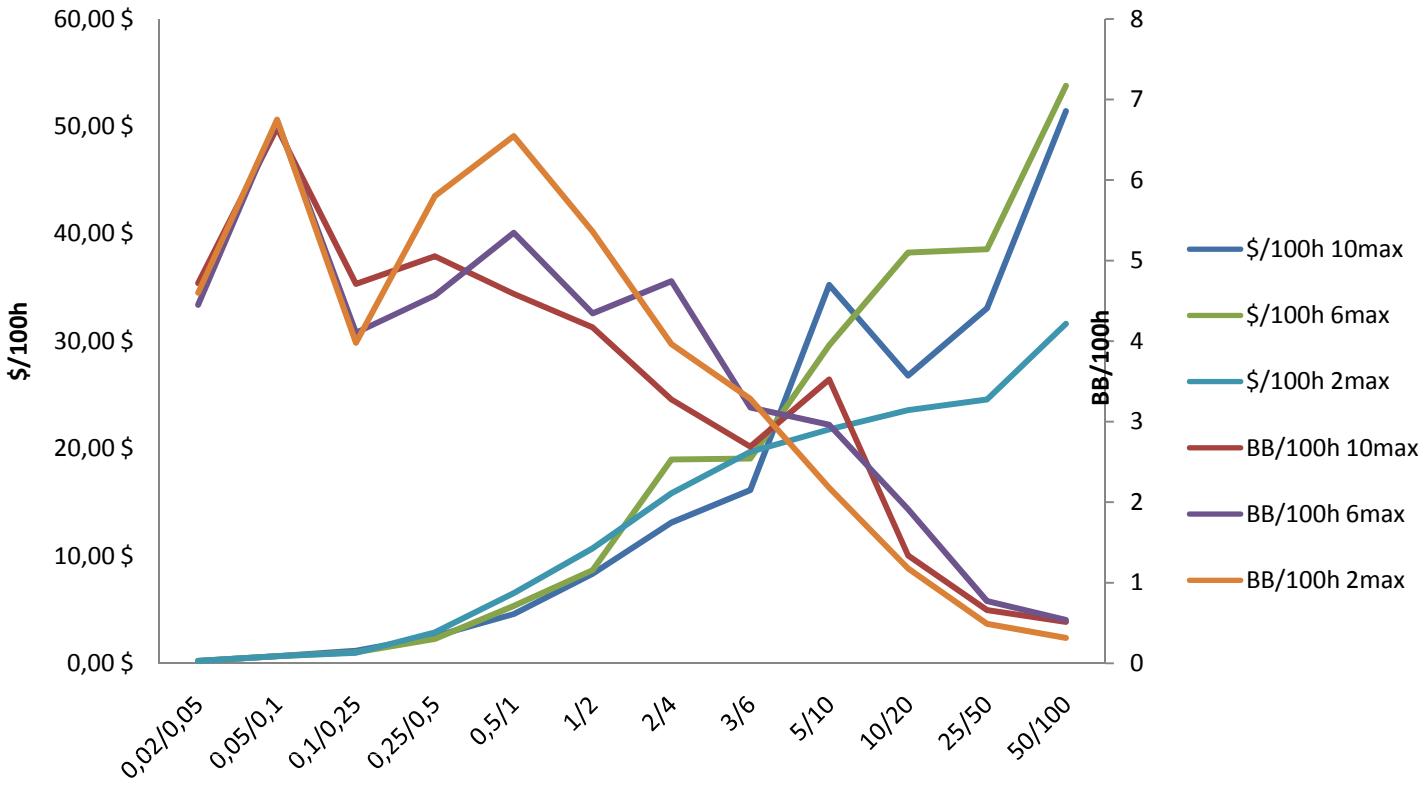
Players per game type



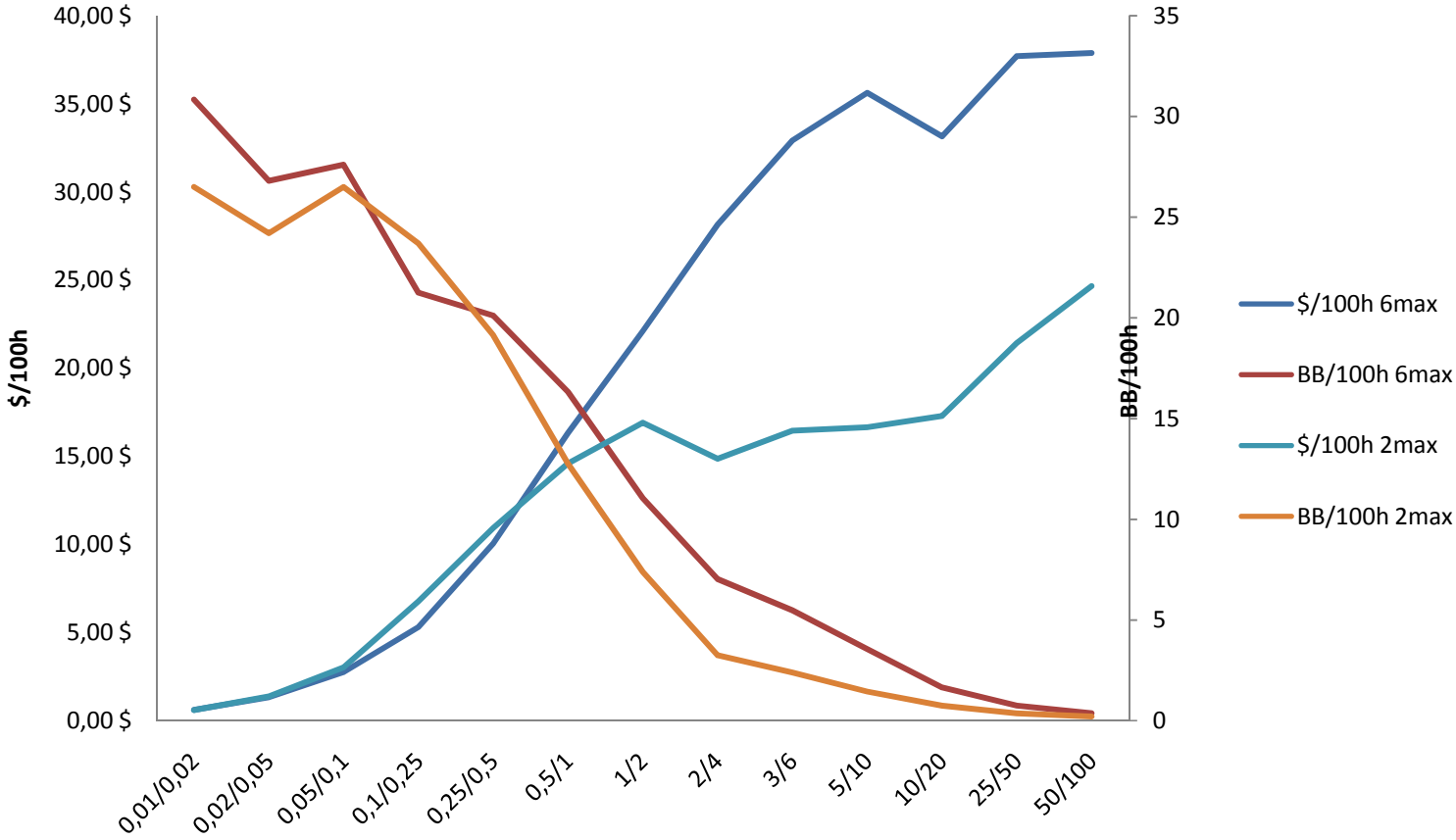
Rake per 100 hands: No Limit Texas Holdem (industry average)



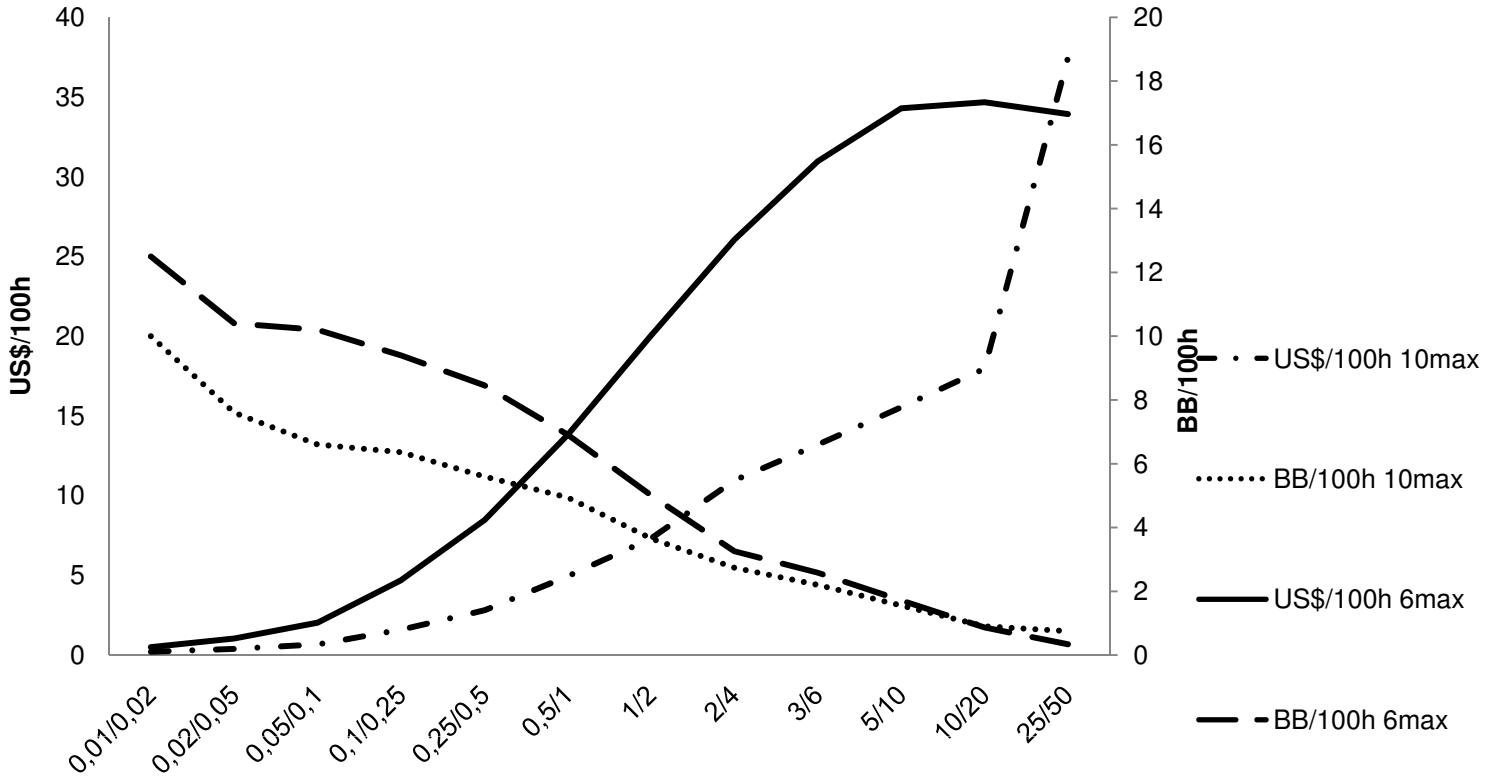
Rake per 100 hands: Fixed Limit Texas Holdem (industry average)



Rake per 100 hands: Pot Limit Omaha (industry average)



Playing intensity: $ Rake per **hour** (industry average)

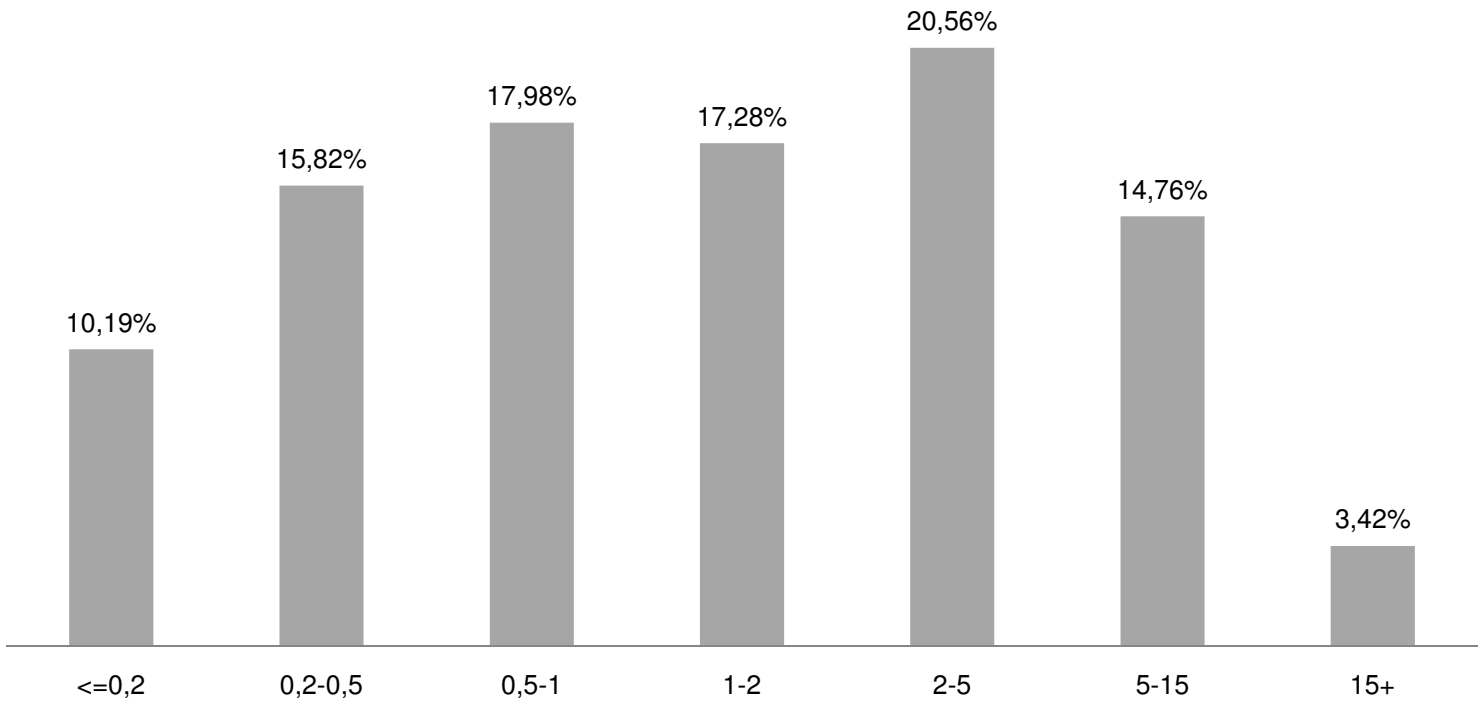


- ~2,400 combinations for the different operators, game types, betting structures, number of players, and limits

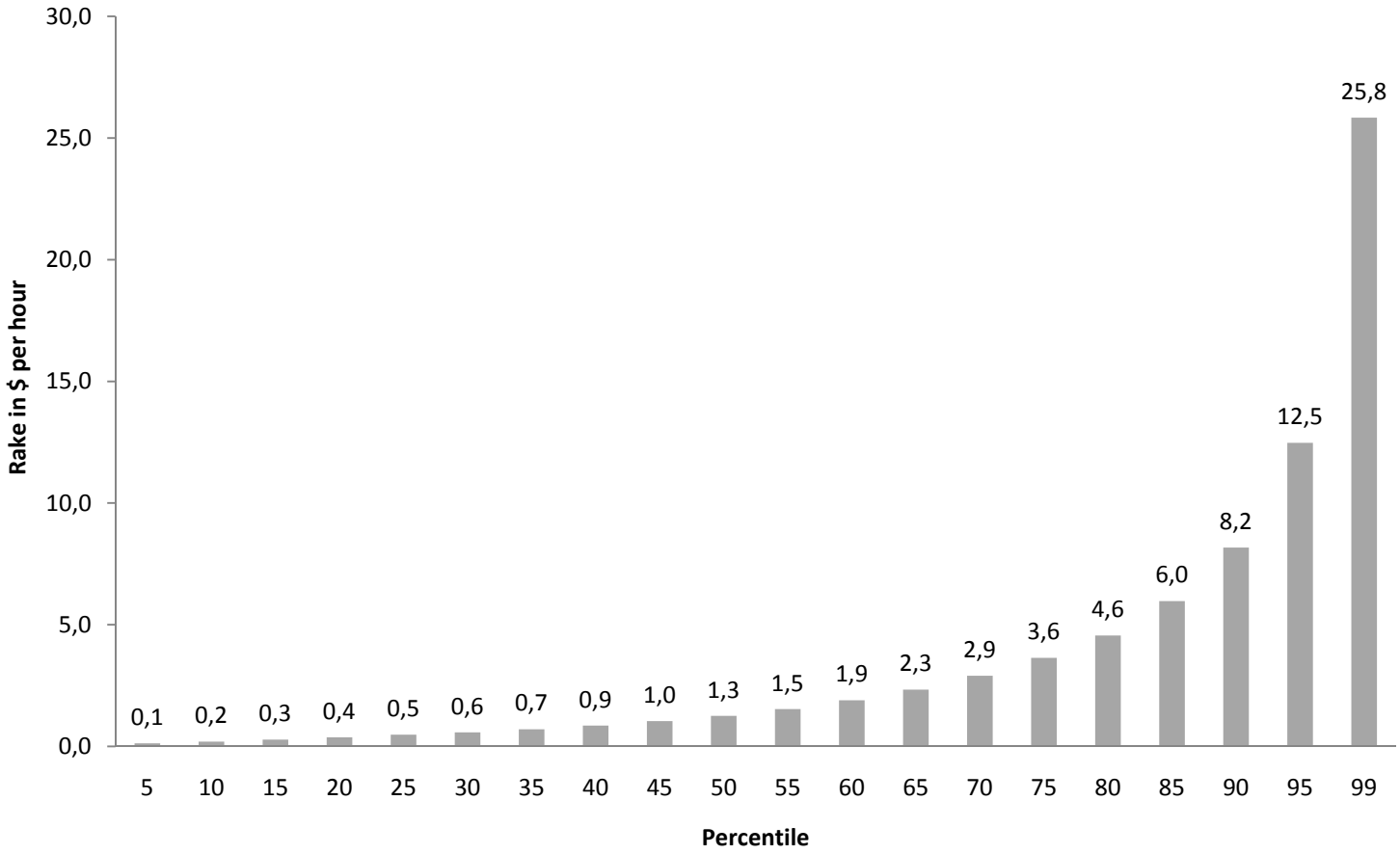
Playing intensity: $ Rake per hour

Operator	Ø Rake/h in $	Median Rake/h in $	σ Rake/h in $
IPN (Boss Media)	4.70	1.94	8.51
Everest Poker	3.82	1,56	6.44
Cake Poker	4.57	1.99	6.80
Full Tilt Poker	3.82	1.72	5.84
Pokerstars	2.40	0.87	4.46
Total	**3.20**	**1.25**	**5.58**

Playing intensity: $ Rake per hour #2



Playing intensity: $ Rake per hour #3

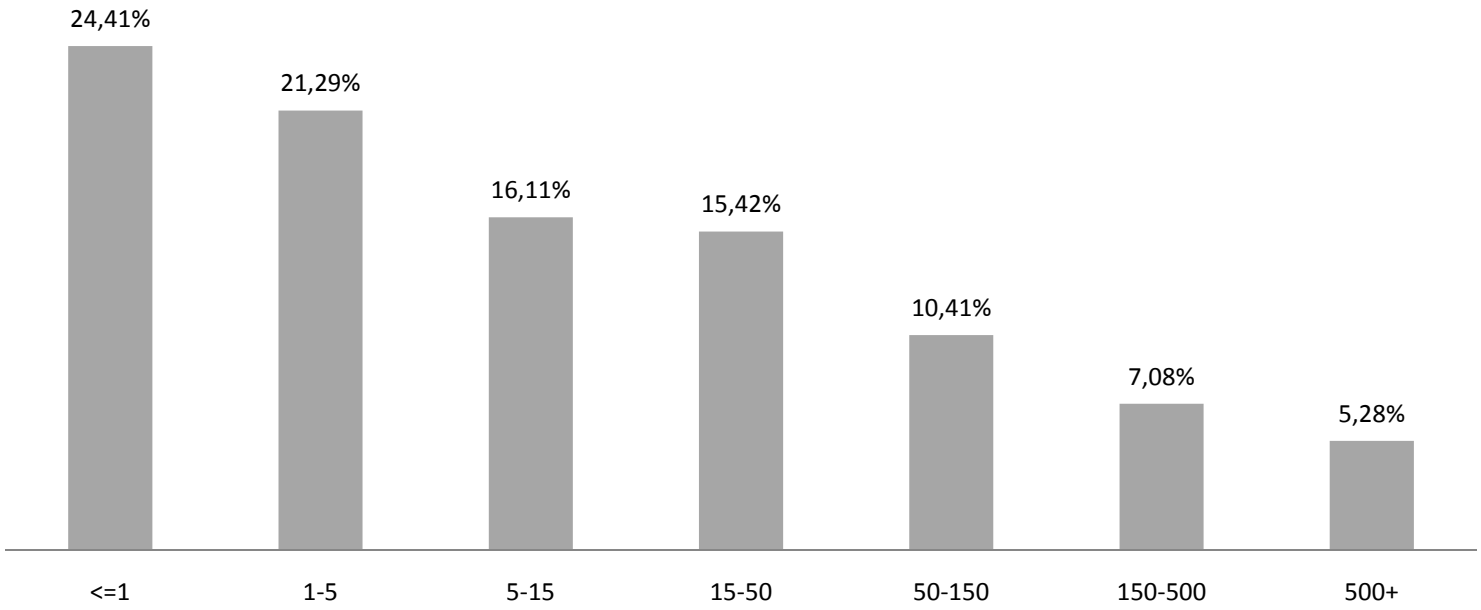


Key figure: Playing volume ($ rake over 6 months)

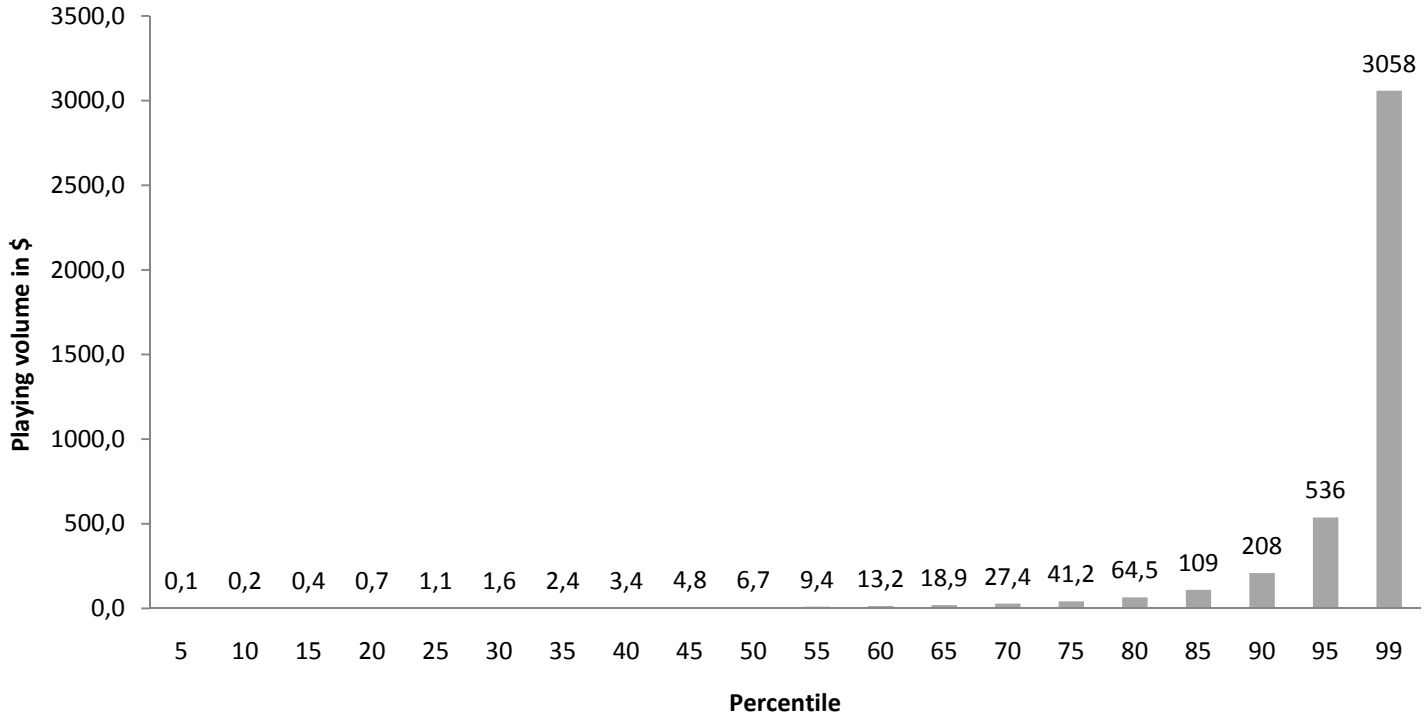
Operator	Plaing volume in $	Ø Rake in $	Median Rake in $	σ Rake $
Pokerstars	419,211,026	172.57	4.71	2,231.30
Full Tilt Poker	301,490,088	217.13	11.25	1,546.00
Everest Poker	55,235,725	200.47	5,75	1,771.25
IPN (Boss Media)	48,963,418	185.20	6.13	1,434.60
Cake Poker	38,010,623	162.74	9.12	963,17
Total	**862,910,881**	**187.95**	**6.69**	**1,926.61**

Playing volume = players‘ losses = industry‘s profits = market size

Playing volume ($ rake over 6 months) #2



Playing volume ($ rake over 6 months) #3



Nonparametric Spearman correlations among the variables of the gambling habits (n=2,127,887)

	Sessions	Session Length	Playing Time	Tables	Playing Intensity	Playing Volume	Playing Duration	Sessions /Day	Time /Day	Rake /Day
Sessions	-	.360**	.939**	.534**	.160**	.793**	.831**	-.171**	.139**	.264**
Session Length		-	.644**	.428**	.031**	.527**	.235**	.049**	.612**	.483**
Playing Time			-	.587**	.141**	.836**	.749**	-.100**	.345**	.399**
Tables				-	.113**	.564**	.416**	-.037**	.246**	.357**
Playing Intensity					-	.633**	.187**	-.106**	-.078**	.674**
Playing Volume						-	.667**	-.130**	.243**	.689**
Playing Duration							-	-.607**	-.290**	-.029**
Sessions/Day								-	.771**	.448**
Time/Day									-	.642**
Rake/Day										-

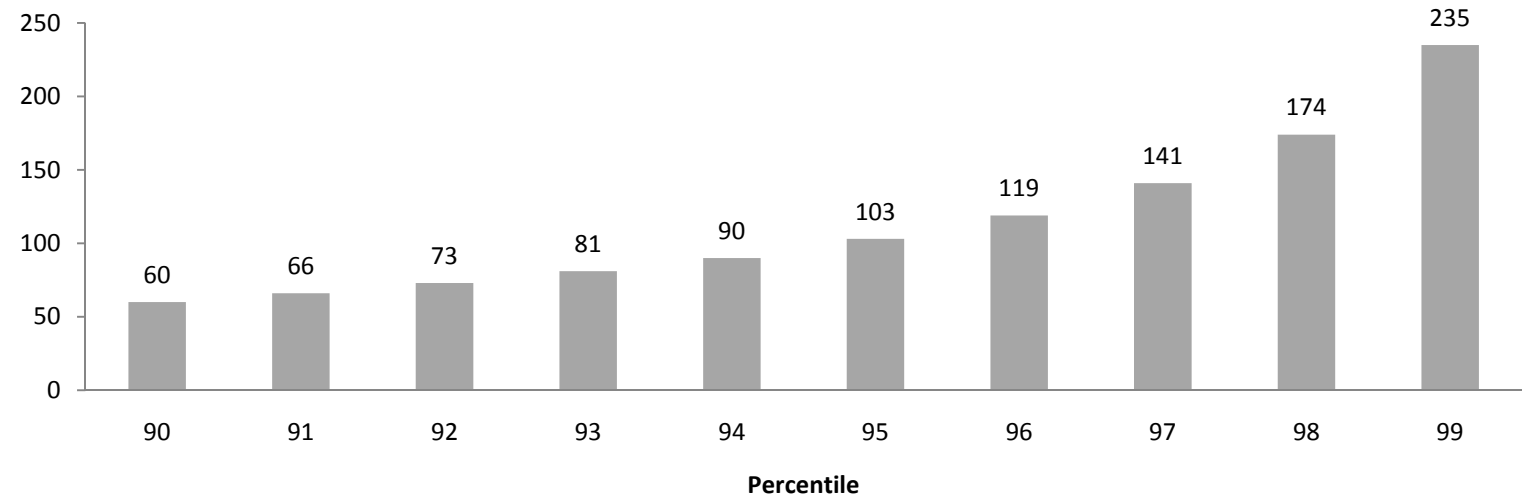
** Correlation significant at p<.01.

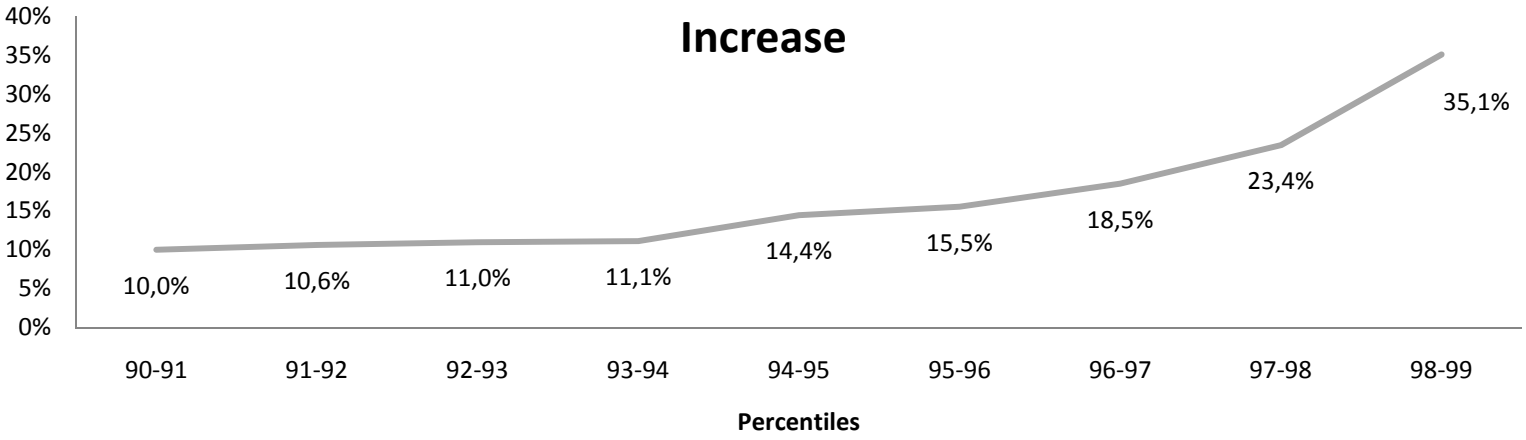
- Playing habits reinforce each other
- Only playing frequency is a moderator to gambling involvement

Playing habits of intensse players (worldwide)

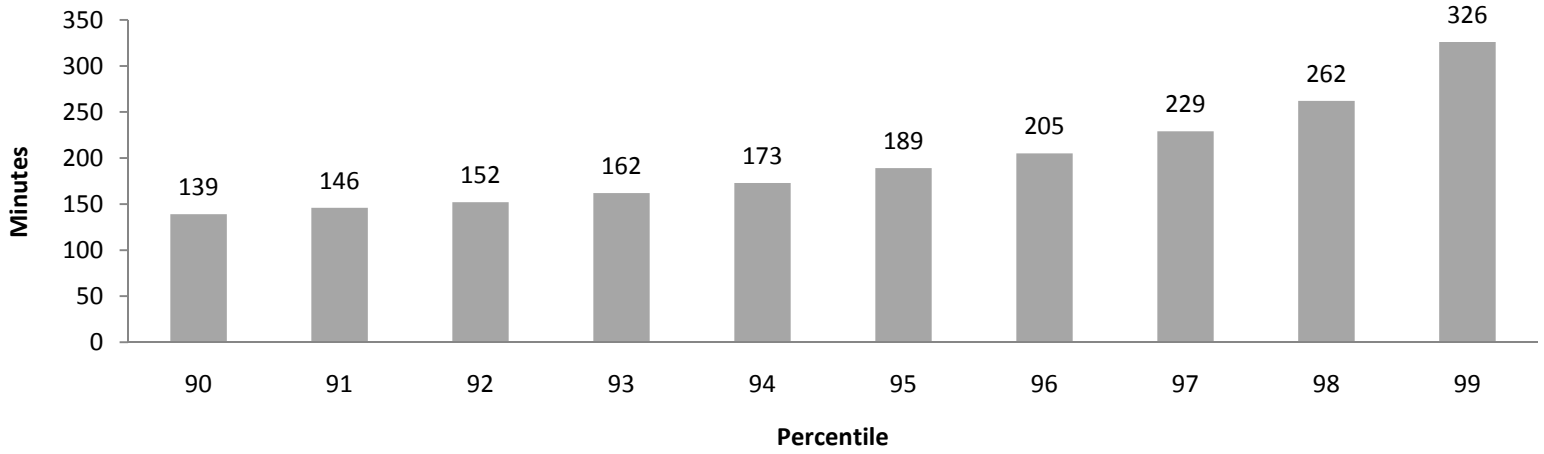
University of Hamburg
Institute of Law & Economics
Division on Gambling

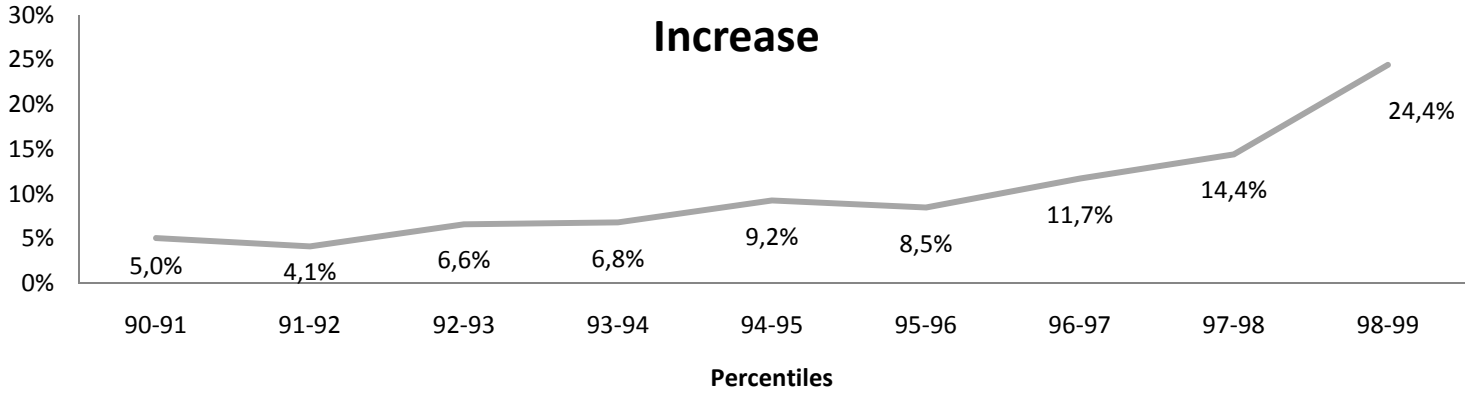
Number of sessions, intense players



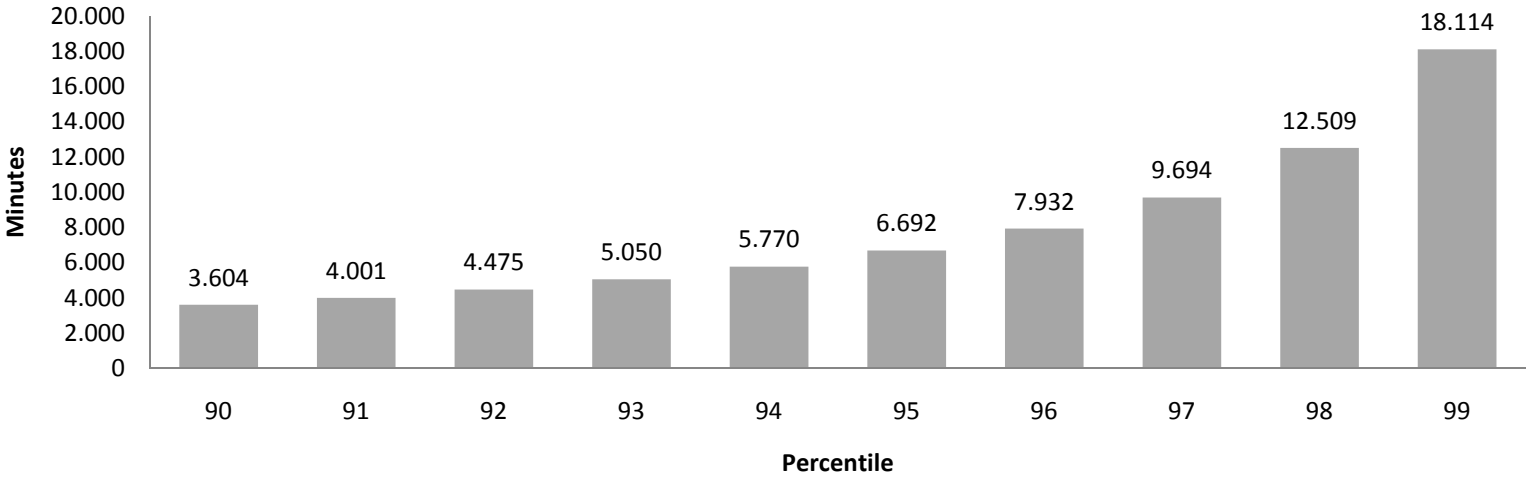


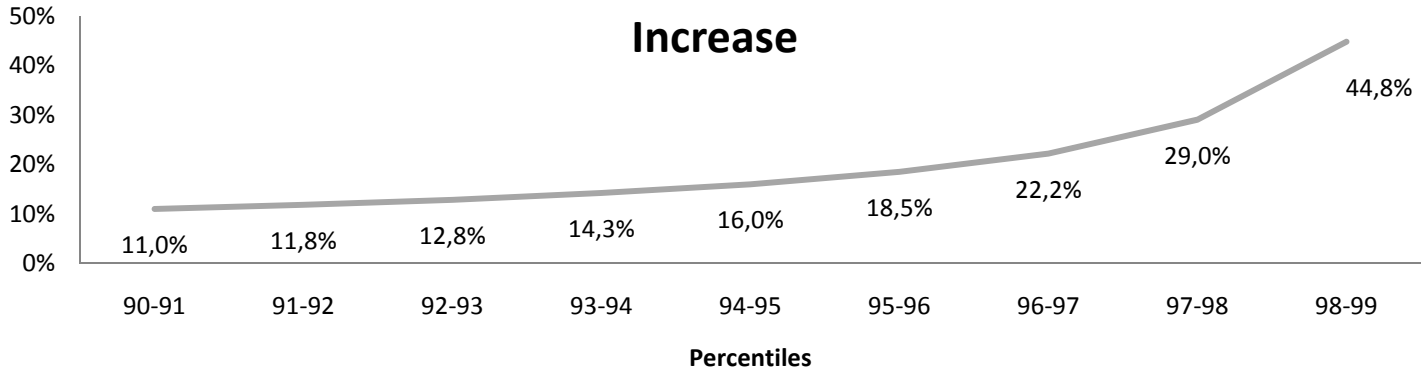
Session length, intense players





Total playing time in minutes, intense players





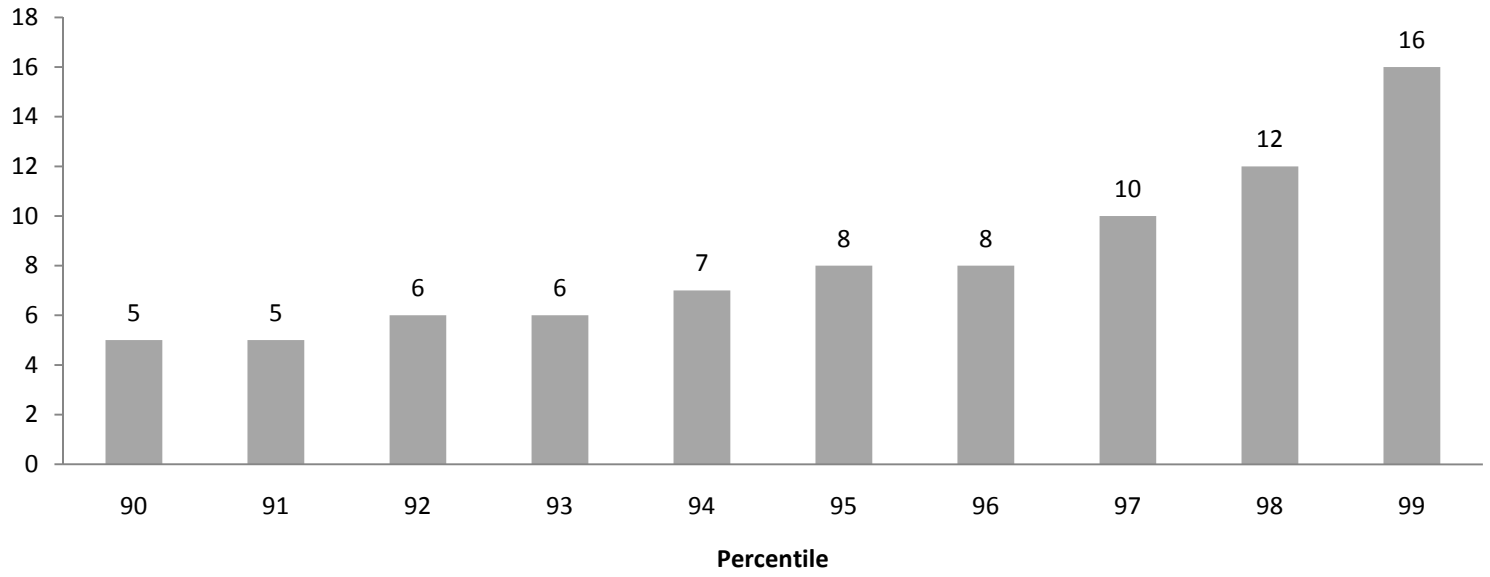
Aggregate playing time, intense players

Group	Hours	Share of total hours
Top 1%	21,364,306	19.35%
Top 5%	53,185,320	48.18%
Top 10%	71,696,232	64.94%

Playing time of intense players compared to median player

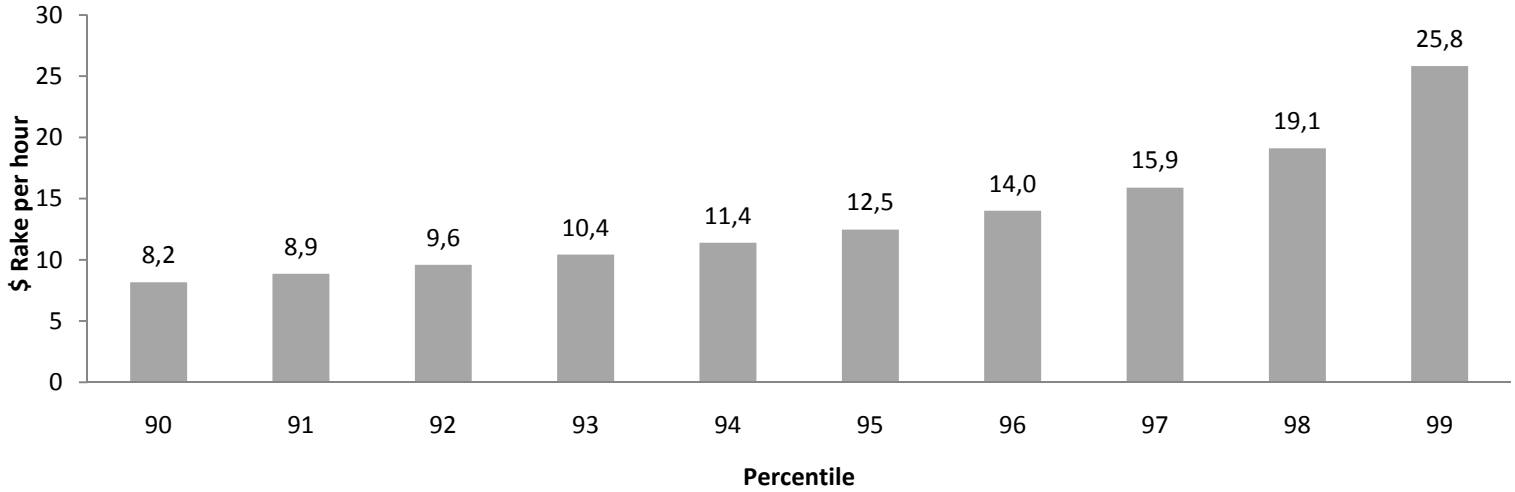
Percentile	Compared to the median player
90	12,34
91	13,70
92	15,33
93	17,29
94	19,76
95	22,92
96	27,16
97	33,20
98	42,84
99	62,03

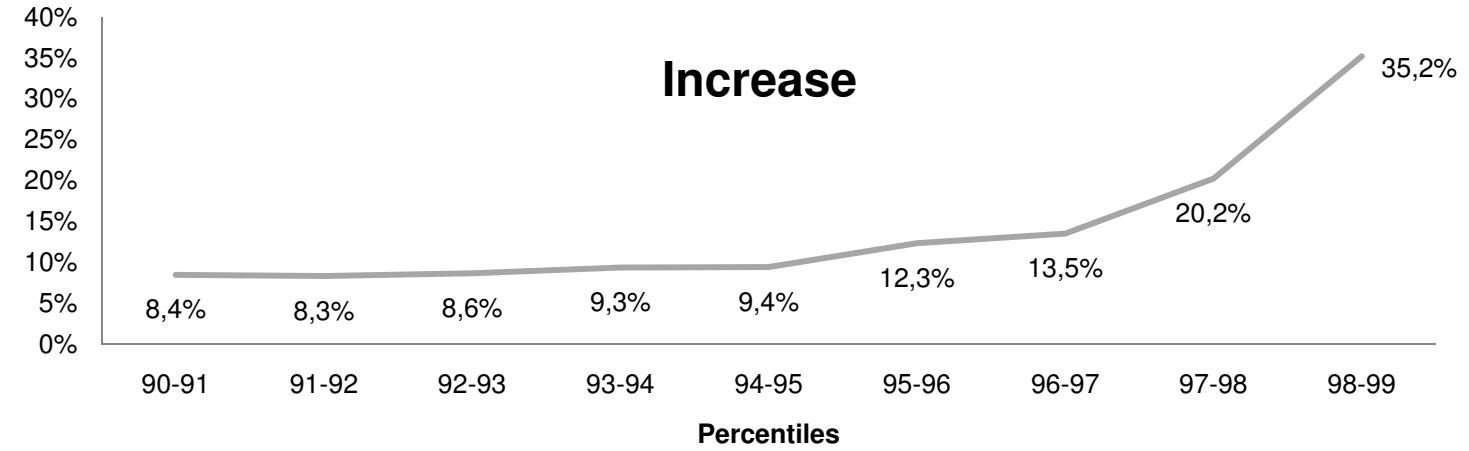
Multitabling, intense players



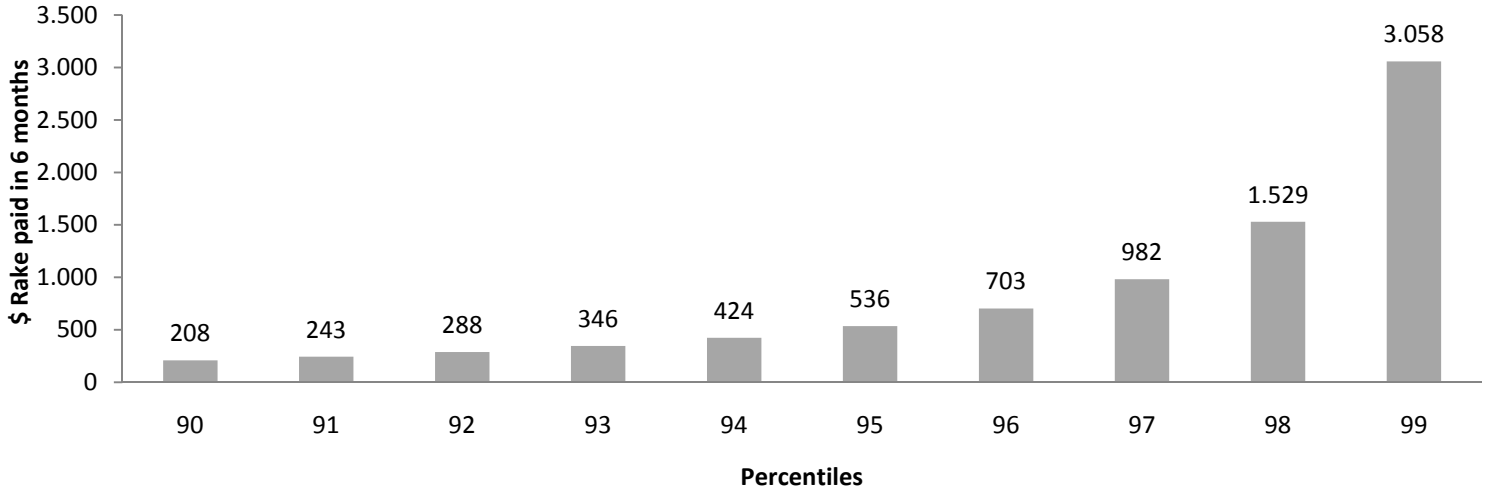
- Not per player but per session!

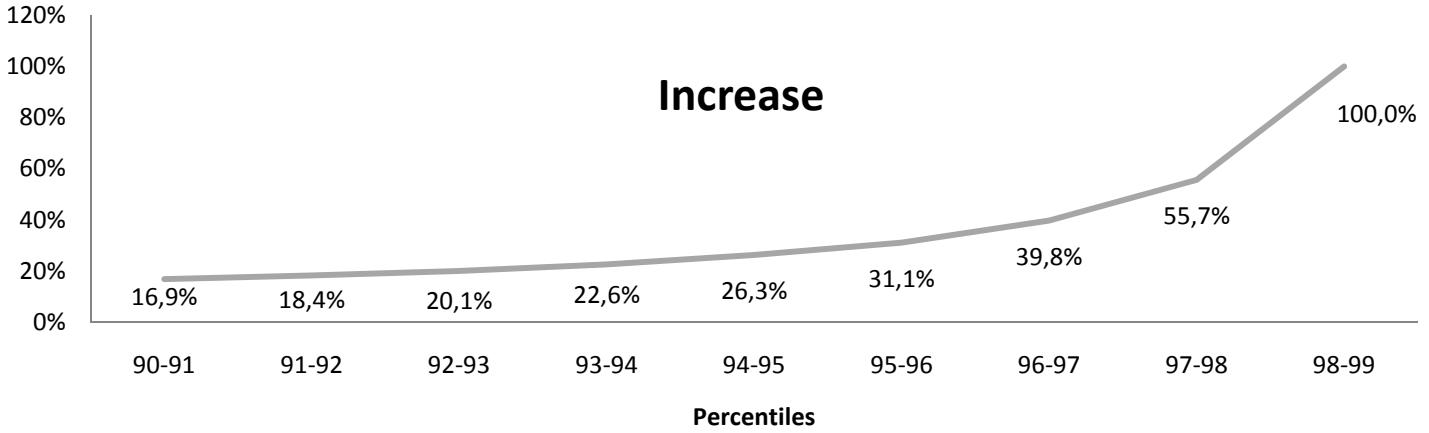
Playing intensity, intense players





Key figure: Playing volume, intense players





Playing volume of intense players compared to median player

Percentile	Compared to the median player
90	31,12
91	36,38
92	43,06
93	51,70
94	63,40
95	80,09
96	105,03
97	146,82
98	228,56
99	457,06

Share of total playing volume, intense players

Group	$ Rake	Share of total Rake
Top 1%	448,939,210	54.88%
Top 5%	658,081,834	80.44%
Top 10%	731,079,221	89.36%

Are intense players at risk of becoming pathological gamblers?

- Poker can be played with positive expected value
- There are (semi-)professionals in the player pool
- (Semi-)professionals hafe the financial incentive to play intensely → they are in the group of intense players
- Intense players do not necessarily have gambling problems
- Distinguishing professionals froom pathological gamblers: Impulsivity (Weinstock & Petry 2009)
- No answer – yet.

Results of the playing habits: Overview

	Ø	Median	σ	Top 10%	Top 5%	Top 1%	Total
Number of sessions	24.03	7	49.30	63	108	247	51,141,167
Session length in min.	50.27	42.0	37.76	94.78	118.6	182.3	-
Total playing time in h	25.28	4.88	65.21	62.78	117.6	318.0	53,785,011
Number of tables	1.31	1.05	1.04	1.65	2.36	6.03	-
Playing intensity (US$ rake/h)	2.40	0.87	4.46	6.12	9.90	19.75	-
Playing volume in US$	177.5	4.86	1,935	173.9	460.1	2,685	377,714,269
Playing duration	55.32	27	60.83	160	175	182	-
Sessions/day	0.74	0.60	.66	1.50	2	3	-
Playing time/day	38.70	20.00	53.62	98.34	142.03	259.00	-
Playing volume in US$/day	2.48	.27	14.45	4.42	9.15	35.42	-

Attention: Overview for all Pokerstars players, not total sample!

Playing habits of Regulars, Newcomers and Dropouts

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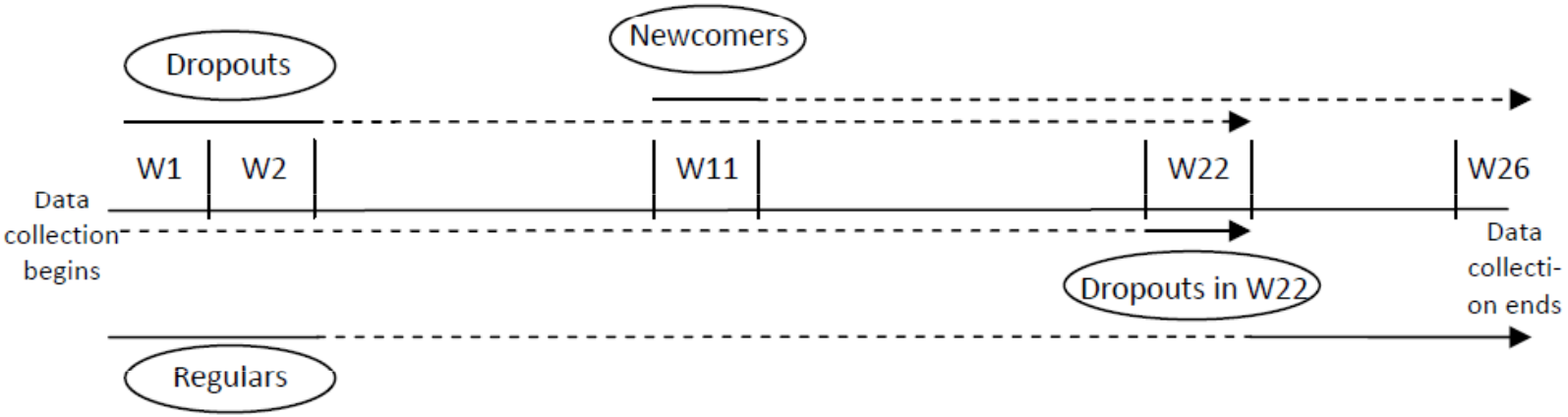
Definition of Regulars, Newcomers, and Dropouts (W=Week)



Hypotheses about gambling behavior

- *H_0: Regulars do not show a different playing volume to non-regulars.*
- *H_1: Newcomers do not show a different playing volume to non-newcomers*
- *H_2: Dropouts do not show a different playing volume to non-dropouts*
- *H_3: Dropouts do not show a different playing volume to newcomers.*
- *H_4: The variables of playing behavior do not reinforce each other.*
- *H_5: Playing behavior of regulars does not change over time.*
- *H_7: Playing behavior of dropouts does not change over time.*
- *H_6: Playing behavior of newcomers does not change over time.*

Overview: Playing habits of Regulars, Newcomers, and Dropouts

		Regulars	Non-Regulars	Newcomers	Non-Newcomers	Dropouts	Non-Dropouts	Total Sample
	n	228332	1899555	69734	2058153	321568	1799957	2127887
Number of Sessions	ø	92.44	15.81	16.53	24.29	17.73	25.09	24.03
	Median	59	5.00	5	7.00	7	7.00	7
	σ	99.72	29.96	31.35	49.78	30.58	51.84	49.30
Avg. Session Length in Min.	ø	57.90	49.35	49.51	50.30	47.17	50.82	50.27
	Median	50.53	40.94	41.10	42.00	40.00	42.54	42.00
	σ	33.27	38.16	37.72	37.76	35.06	38.21	37.76
Total Playing Time in h	ø	101.21	16.15	17.14	25.55	17.59	26.58	25.28
	Median	49.52	3.77	3.75	4.92	4.43	4.93	4.88
	σ	142.16	39.47	42.32	65.83	40.01	68.62	65.21
AvgTables	ø	1.73	1.26	1.24	1.32	1.31	1.31	1.31
	Median	1.13	1.04	1.03	1.05	1.05	1.05	1.05
	σ	1.82	.89	.82	1.05	1.02	1.05	1.04
Avg Playing Intensity in US$	ø	3.03	2.32	2.30	2.40	2.27	2.42	2.40
	Median	1.50	.81	.80	0.88	.78	.89	.87
	σ	4.03	4.50	4.64	4.45	4.12	4.52	4.46
Total Rake in US$	ø	998.29	78.85	73.01	181.05	109.02	189.33	177.51
	Median	92.83	3.50	3.52	4.92	4.04	4.97	4.86
	σ	5,387.68	783.47	610.56	1,964.05	1,017.54	2,056.52	1,934.86

Overview: Playing habits of Regulars, Newcomers, and Dropouts #2

		Regulars	Non-Regulars	Newcomers	Non-Newcomers	Dropouts	Non-Dropouts	Total Sample
	n	228332	1899555	69734	2058153	321568	1799957	2127887
Playing Duration in Days	**ø**	171.34	41.37	42.67	55.75	52.10	55.56	55.32
	Median	174	17.00	23	27.00	36	25.00	27
	σ	9.25	48.19	43.57	61.29	50.33	62.37	60.83
Sessions per Day	**ø**	.53	.76	.72	0.74	.66	.75	.74
	Median	.34	.67	.59	0.60	.47	.63	.60
	σ	.55	.67	.65	0.66	.63	.67	.66
Time per Day in Min.	**ø**	34.58	39.20	36.63	38.77	32.10	39.95	38.70
	Median	17.35	20.00	19.50	20.00	15.70	20.00	20.00
	σ	47.55	54.29	50.79	53.71	46.76	54.73	53.62
Rake per Day in US$	**ø**	5.63	2.10	1.83	2.50	2.12	2.55	2.48
	Median	.54	.25	.23	.28	.19	.29	.27
	σ	29.97	11.16	9.38	14.59	12.72	14.74	14.45

Mann-Whitney-Test shows that for all variables, the two groups do not have the same population (p<.001)

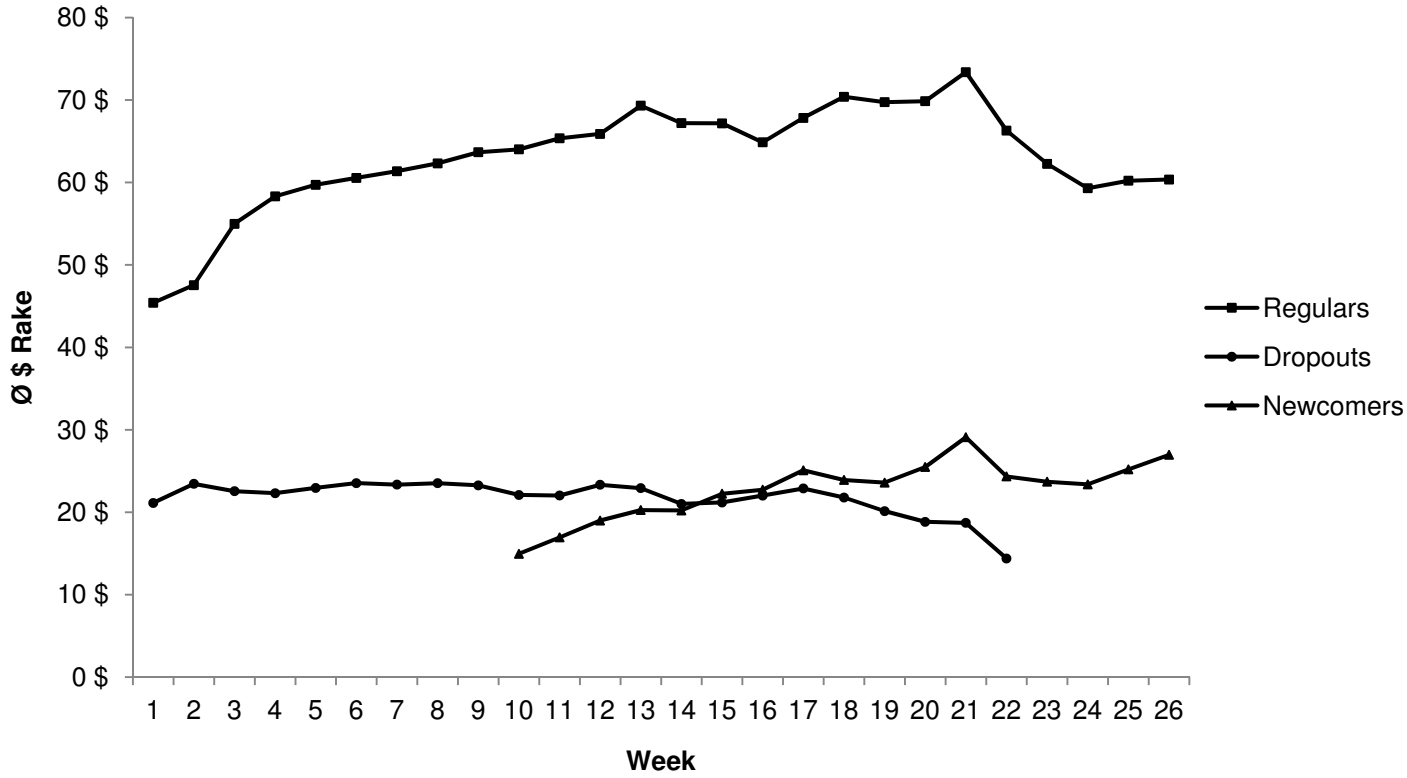
		Sessions	Session Length	Playing Time	Tables	Playing Intensity	Playing Volume	Days	Sessions /Day	Playing Time/Day	Rake /Day
Regulars vs. Non-Regulars	M-W-U	5.1E+10	1.7E+11	6.2E+10	1.3E+11	1.7E+11	7.4E+10	1.4E+09	1.7E+11	2.1E+11	1.8E+11
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Newcomers vs. Non-Newcomers	M-W-U	6.6E+10	7.1E+10	6.6E+10	6.8E+10	6.9E+10	6.7E+10	6.5E+10	7.1E+10	7.0E+10	6.8E+10
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Dropouts vs. Non-Dropouts	M-W-U	2.9E+11	2.8E+11	2.9E+11	3.0E+11	2.8E+11	2.8E+11	2.9E+11	2.6E+11	2.6E+11	2.6E+11
	p	<.001	<.001	<.001	.719	<.001	<.001	<.001	<.001	<.001	<.001
Newcomers vs. Dropouts	M-W-U	1.1E+10	1.1E+10	1.1E+10	1.1E+10	1.1E+10	1.1E+10	1.0E+10	1.1E+10	1.1E+10	1.1E+10
	p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001

H_0 - H_3 can be rejected
Nonparametric Spearman-Correlations show that H_4 can be rejected

Absolute and Relative Total Playing Volume per Group

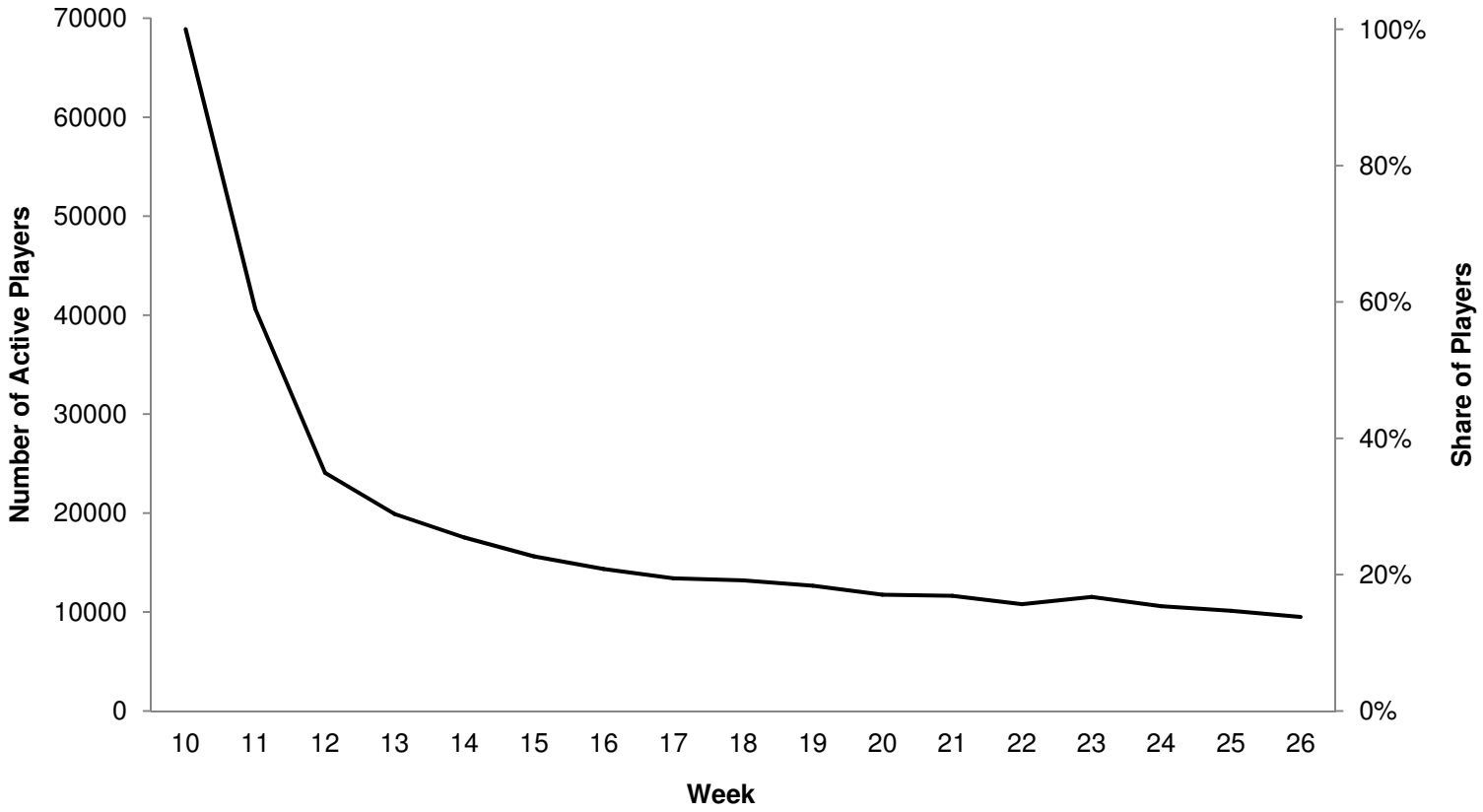
Sample	Number of Players	Share of Players	Playing Volume in US$	Share of Playing Volume
Regulars	228,332	10.73%	227,940,442	60.35%
Newcomers	69,734	3.28%	5,091,308	1.35%
Dropouts	327,930	15.41%	36,933,685	9.78%
Total Sample	2,127,887	100.00%	377,714,269	100.00%

Average playing volume of Regulars, Dropouts, and Newcomers over Time

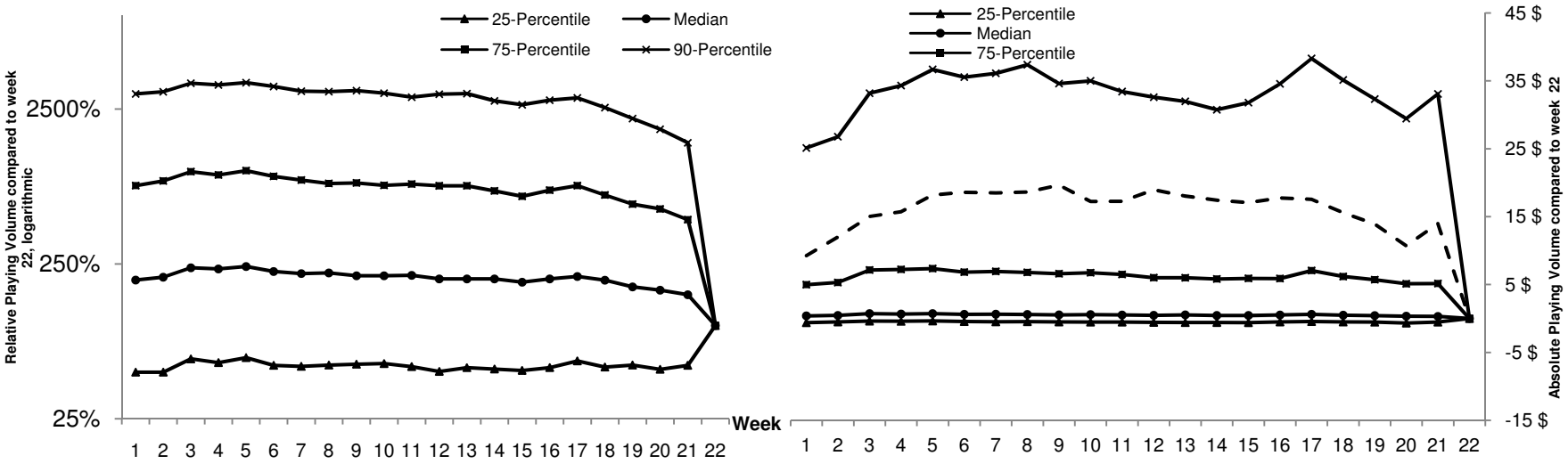


- Sufficient to reject H_5 (playing volume of regulars does not increase over time)
- Not sufficient to reject H_5 and H_6 (averages are biased as players did not play the whole observation period)

Player Retention of Newcomers

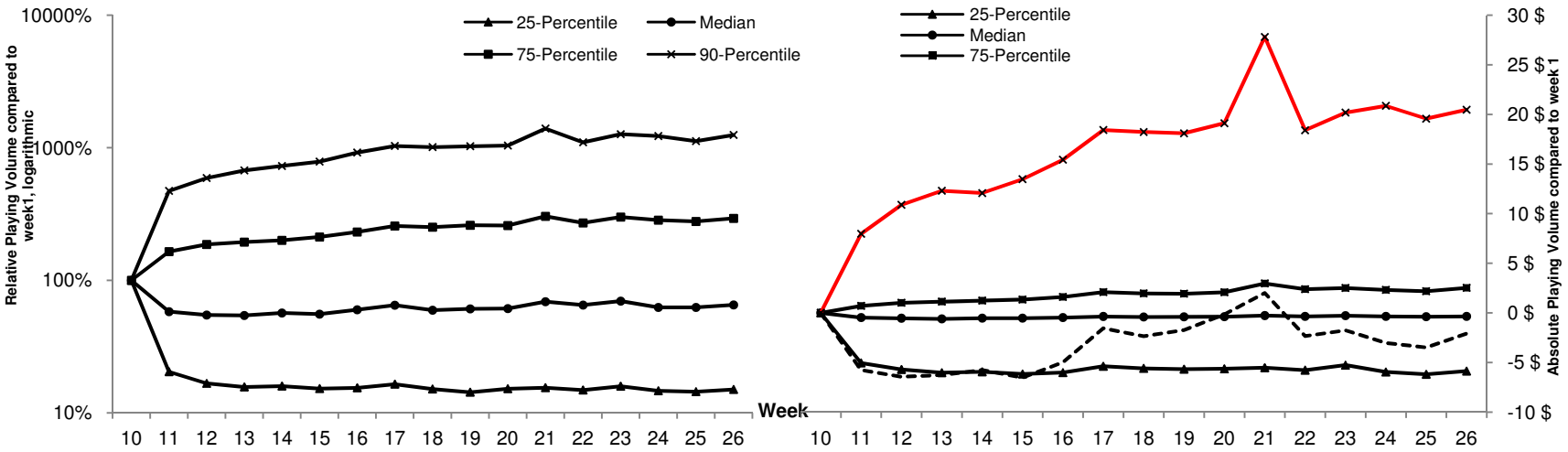


Analysis as a dynamic panel: Playing habits over time, dropouts



- H_6 can be rejected

Analysis as a dynamic panel: Playing habits over time, newcomers



- H_7 can only partly be rejected: There is a group of Newcomers that increases its playing volume dramatically
- This group is interesting for the industry as well as the prevention of problem gambling

Playing habits in UK, Germany, USA and Canada

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Number of Sessions

Country	ø Sessions	Median Sessions	σ Sessions
Canada	24.89	8	49.4
USA	24.92	7	50.8
Germany	27.43	9	50.5
Great Britain	21.47	6	44.3
World	23.25	7	47.0

Session length

Country	ø Session length in minutes	Median session length in minutes	σ session length in minutes
Canada	49.49	41	37.28
USA	50.46	42	37.81
Germany	50.91	43	37.36
Great Britain	49.75	41	38.66
World	49.85	42	38.46

Total playing time

Country	ø playing time in hours	Median playing time in hours	σ playing time in hours
Canada	25.12	5.43	62.69
USA	25.18	5.37	63.13
Germany	29.23	6.40	67.90
Great Britain	22.54	4.33	59.63
World	24.23	4.87	62.13

Multitabling

Country	ø tables	Median tables	σ tables
Canada	1.21	1.00	0.70
USA	1.04	1.00	0.80
Germany	1.47	1.07	1.27
Great Britain	1.27	1.03	0.86
World	1.32	1.04	0.97

Playing intensity

Country	ø $ rake per hour	Median $ rake per hour	σ $ rake per hour
Canada	4.48	1.85	7.84
USA	3.76	1.76	5.76
Germany	2.68	1.08	5.04
Great Britain	4.55	1.96	7.88
World	3.20	1.25	5.58

Playing volume

Country	ø $ rake 6 months	Median $ rake 6 months	σ $ rake 6 months
Canada	213.12	9.57	1,894.34
USA	214.09	10.20	2,023.22
Germany	226.35	8.06	1,691.31
Great Britain	199.16	7.87	1,811.53
World	187.95	6.69	1,926.61

Conclusions and Perspective

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Conclusions

- Huge data set gathered
- First time the poker market can be broken down to countries and regions
- Many possibilities for data analysis
- GDP and culture have a huge impact on the fraction of active online poker players in a population
- Enforcement of poker prohibition is not strong enough to yield a significant effect
- Some people play excessively, most do not
- 90% of the revenue comes from 10% of the players, 55% from 1% of the players
- Everybody – prevention and industry – is interested in the intense gamblers

Perspective

- It is necessary to distinguish between professional and pathological players
- The way to do this is by looking at their betting patterns
- If these patterns suggest chasing, impulsivity, or irrationality the player may be at risk
- Current research project compares the betting patterns of clinically diagnosed pathological poker players with the total player pool
- This may allow to put a red flag on everybody who is a probable pathological gambler

Thank you for your kind attention!

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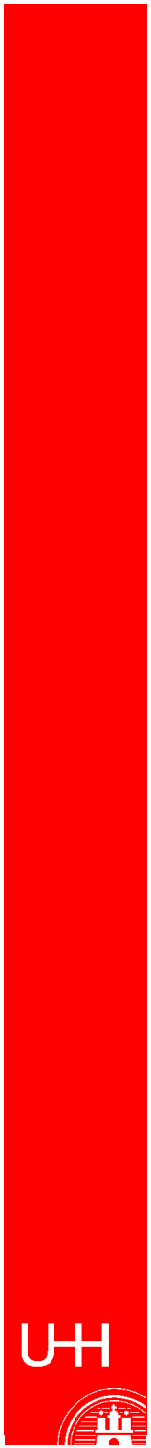

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