A TIME SERIES ANALYSIS ON THE EFFECTS OF DEREGULATION ON ONLINE GAMES: A CASE OF SOCIAL CASINO IN KOREA

BK Lee, Gachon University
Seongmin Jeon, Gachon University
Moonkyoung Jang, Seoul National University
Byungjoon Yoo, Seoul National University

ABSTRACT

Online games including web board games have been known to contribute to fostering entrepreneurship in information technology; a number of big online corporations such as portal sites and mobile messengers have roots in game start-ups. A lot of tactics and format used to play games is also used to teach entrepreneurship and more. In 2013, the Korean government imposed strict rules to web board games and to the genuine online games framing it with a highly negative social perception. The regulation brought the fall of industry and in early 2016, the Korean government has relieved some of its regulations in attempt to revitalize the industry. The objective of this research is to investigate the outcomes of deregulation on a specific online game field, the web board game industry. According to previous research, government regulation is proven to have high relationship to how the industry and individual consumers form a consumption pattern. Literature shows that the regulations may result in devaluating the industry, followed by a sharp decrease in the market itself. This research provides empirical and quantifiable evidence of the deregulation results using VAR (Vector Auto Regression) and Granger causality test. The results show that the deregulation had no impact in reviving the industry. Using the framework of gambling theory, TAM (Technology Acceptance Model) and consumer perception, the study tries to explain the reasons for such results. More and more policy review research is concentrating in using quantifying methods. By providing an comparison of industry before and after the regulation/deregulation, this research also aligns to provide further evidence and guidance in evaluating government policies using quantifiable measurements.

Keywords: Web Board Games, Deregulation, VAR, Time Series Analysis, Gambling Theory.

INTRODUCTION

Web board games in Korea had a significant influence in building the internet environment, including web base services and infrastructure. When first introduced in 1990s, web board game services were a huge hit. Alexa webpage ranking of year 2000 showed Hangame (www.hangame.com), one of the first web board game service providers in Korea, as 1st place among all online game service providing pages followed by Gamesville (www.gamesville.com) and Yahoo Games (games.yahoo.com). After its first introduction in

1999, Hangame received 1 million new registrations every month, having average 7.6 million regular players and 30 million daily page views during its 1st year of service. Having this massive input of users and capital, the web board games played as a quality source of revenue for investing in R&D, launching of many different online services including search engines, fin-tech, online community services and boosting   start-ups in the related area.

However, in the beginning of 2013, an issue was raised in concern of the addictive characteristic of web board games. It was claimed that the negative societal influence of web board games was equivalent to drugs. A strict set of regulations were imposed to control addictiveness (Table 1). As a result of this regulation, the industry experienced 70% decrease in total user playing time and a massive loss in revenue. (Yoo and Jeon, 2014; Jang, et al., 2015). The industry suffered a minus growth rate. Compared to the growth rate of 10% or more each year starting from 2008, this was a huge downfall of the industry. (White paper on Korean games, 2014)

The genuine online game in Korea has a negative social image due to the addiction it may cause and the web board game has a worse reputation due to its gambling characteristic. However, there are many research and field practice using the format of web board game to educate (Protopsaltis et al., 2013; Kapp, 2012; Markey et al., 2008). Online game is actively used to promote entrepreneurship and business (Book, 2005; Mummalaneni and Sivakumar, 2008). Also, most of the web based platforms and commerce were built with the capital raised with online games (Hu and Sørensen, 2008), many start-ups and entrepreneurial activities are made with the concept of web board games (Yoo et al., 2012; Reeves and Wittenburg, 2015; Huebscher and Lendner, 2012) In general, the online games hold a very controversial position and is being strongly regulated based on the opinion of the majority.

Regulating industries with 'genuinely negative societal perception by the majority but has arguments saying otherwise' is common among variety of fields. In US, the fast food industry is accused of being the main reason of child obesity. The US government is under procedure of regulating the industry by making all fast foods explicitly show their total Calories. The government expects that this new notation will guide consumers to self-regulate the total amount Calories they intake. By doing so, the possibility of suffering from obesity will be controlled.

Table 1 REGULATION ON WEB BOARD GAMES, 2013	
Direct regulation	a) 300,000KRW (approx. 300USD) cap for individual game money purchase b) 30,000KRW (approx. 30USD) cap for individual game money spend per game c) User access limit for 24hours for loss over 100,000KRW (approx. 100USD)
Indirect regulation	d) Selective matching prohibited e) Auto betting prohibited f) Self-verification on quarterly basis
	Source: Presidential Decree No. 27043 Attachment 2 No. 8

Violent media contents are also suspected of having a negative influence in forming children's personality. Related media commissions try to control the exposure rate of violent contents to children. As the field of media is expanding due to introduction of smartphones, the commissions are moving to expand their regulations to cover up these new media. Some fields on the other hand, are being de-regulated as the field is being acknowledged as a new industry and a blue ocean. The field of telemedicine, combined with new high technology now enables more accurate diagnose and therefore is now being acknowledged as de-regulated and new guidelines are being made to guarantee safe telemedicine a new industry. As given above, the certain level of deregulation may have positive influence in growing the industry. Because Korean government has experienced industrial downfall after the regulation, they have decided to relieve some of regulations in attempt to revitalize the web board game industry (Table 2).

This research, as a follow up research of Yoo and Jeon (2014), will use the same method as it was in the previous research. By doing so, the study will provide an accurate comparison of industry before and after the regulation.

Table 2 DE-REGULATION ON WEB BOARD GAMES, 2016	
Direct regulation	a) 500,000KRW (approx. 300USD) cap for individual game money purchase b) 50,000KRW (approx. 30USD) cap for individual game money spend per game c) User access limit for 24hours for loss over 100,000KRW (approx. 100USD)
Indirect regulation	d) Selective matching approved for limited number of games e) Auto betting prohibited f) Self-verification on annual basis
	Source: Presidential Decree No. 27043 Attachment 2 No. 8

LITERATURE REVIEW AND HYPOTHESES

This study is closely related with the research in the area of gambling theory, technology acceptance model, and consumer social perception.

Gambling Theory

In order to understand why the web board game became a substance of addiction, it is important to understand the characteristics of gambling, which most of the web board games are based on. Gamble, by definition is 1) to play a game for money or property 2) to bet on an uncertain outcome (Merriam-Webster: Dictionary and Thesaurus) Involving gain and loss according to the results of a game, the field of gambling and the human behaviour towards it has long been an interest to many researchers by many different perspectives. (Ma et al., 2014; Thaler and Johnson, 1990).

The Prospect theory (Kahneman and Tversky, 1979) and the work of Thaler and Johnson (1990) have a close relationship with understanding human behaviour in gambling. The prospect theory provides evidence that people make decision based on expected prospects (Kahneman and Tversky, 1979). Thaler and Johnson (1990) extended the prospect theory to also include a person's past experience in making a decision. In their findings, the "House-money effect" and the "break-even effect", are combined and together is named as gambling theory.

The research of Keasey and Moon (1996), Massa and Simonov (2005), Rachlin (1990) and Odean (1998) also give empirical evidence that in a gambling situation, past experience of gain or loss have effect on future selection based on the gambling theory.

Ma, Kim and Kim (2014) states that based on the gambling theory, both cumulative gain and loss will have a positive effect on future gambling decision. They also state that immediate game results will have effect on subsequent online gambling. But, what is most significant with their research is that they give empirical evidence that the gambling behaviour is repetitive. All together with other evidence, and the fact that online gambling has much more accessibility, it is more likely that the gambling behaviour will be accelerated as the repetition continues. If no exterior break is provided, people who play gambling has high possibility of being a frequent player in the future, giving ground to have public policy to regulate the number of possible games available and artificially pause the repetitive behaviour. Even though this regulation has been loosened to some extent, it still exists and acts as a stopper in the repetitive behaviour.

We suggest that regardless of the level of regulation, if this repetitive behaviour is paused at any point, it will have a negative effect in decision of further gambling behaviour, in other words, will not spend as much as expected in games. Therefore,

> *H1:*   *The still remaining regulation to pause the game playing behaviour, will result in no actual change in total user usage time of web board games*

Technology Acceptance Model (TAM)

The TAM is a widely-accepted model in measuring person's adaptation to a new technology based on perceived usefulness and perceived ease of use (Davis, 1989). In the model, perceived usefulness is understood to be the more critical factor in adopting a new technology. The ease of use comes after, moderating the decision, given that the perceived usefulness is same among all possible options.

The technology acceptance model (TAM) is used in many other researches providing empirical evidence of an introduction and adaptation of a new technology (Liu et al. 2005; Fathema et al. 2015; Durodolu, 2016).

Further research was conducted to further understand what composed the perceived usefulness and ease of use. The research of Venkatesh (2000) suggests that internal/external control, intrinsic motivation and emotion facilitates as main factors in forming perceived usefulness. Rose and Fogarty (2006) found that subjective norms, personal contact, perceived risk, technology discomfort and perceived self-efficacy are the factors that influence perceived usefulness.

Applying these factors to web board games which involve gambling, perceived usefulness may be related to a few aspects of game. In this research, we will use the outcome or the reward after playing the game (motivation) and the game type concentrating on game rules (technology discomfort level) as factors influencing perceived usefulness. For factors influencing perceived ease of use, the level of difficulty and complexity the player feels and game accessibility will be used. The level of difficulty and complexity of a game are not a fixed constant. they are subject to change depending on the number of repeat of the game. The more one plays, the easier the process and the rules become due to learning by experience. (Anzai and Simon, 1979; Anderson, 2000)

The types of web board games examined in this research are poker, 7poker, high-low and low baduki. According to 'Online poker 2011' and 'Teaching poker 2012', two rule books of various card games state that poker and 7poker are easier games compared to other games. They also recommend that a player be well accustomed to the easier games before moving on to the next level.

Given that the perceived usefulness is same for playing web board games, the easier games will have more players. If the advanced games wish to attract users, it should have an incentive that would result in higher perceived usefulness. Because the rules cannot be altered, the direct influencing factor would be the reward. Usually, games with complex rules allow higher betting and higher return in case of winning, although the winning ratio is relatively low, and therefore, attract users to play.

However, by the regulation imposed, higher betting will result in decreasing number of possible games sets because the cap of monthly spending availability still exists. Now, players face a situation where they can lose more money by playing a complex game and get to play lesser number of games. Also, because games of different levels are provided by the same service provider the users have to decide which game to play in the limited budget they have. This would have both negative effect on both perceived usefulness and ease of use. Therefore,

H2:   *The negative effect to perceived usefulness and ease of use caused by the regulation will make players stay with the easier games and not further advance to complex games.*

Consumer Social Perception

The relationship of social perception and consumer's perspective of the product to the actual purchase behavior has long been an interest in the area of marketing. A perception that leads to consumer's purchase is built based on the level of exposure, attention, interpretation and several other factors (Sherif, 1955; Held, 1961). More and more companies are investing heavily to have a good brand image; they strength their CSR operations and highlight their activities to attract consumer interest. Also, consumers are now being more sensitive to these kinds of information when making a purchase decision (Du et al., 2010)

In 2013 the first notation of labeling web board games as drug like addiction source was claimed, many people, especially parents of young teenagers who feared their children would be addicted, became more and more concerned, forming much more negative perception. The strong regulation following thereafter, framed online games to have a negative social perspective. The web board games with gambling characteristics suffered from even more stricter regulations.

The perception formed by the majority of the society members tends to influence the decision of the members of the group. Sherif (1955) in his research provided empirical evidence that even though the individual might not agree to the societal agreement, they will select whatever is decided according to the social agreement. The web board games faced a similar situation. The perception formed and the regulation imposed functioned greatly in decreasing the total user time of games and their revenue. Even though there have been some deregulations, because there were not any proper actions to alter the negative perspective built over the past couple of years, it will not be enough to generate more revenue. Consumers will still avoid selecting what is 'socially un-proper'. The fact it has been deregulated will be information known only to the group who plays the game. Therefore, we hypothesize the following.

H3:   *The negative perception toward web board games will have a negative relationship to increasing player total usage time of web board games.*

DATA AND METHODS

For both data collection and analysis, we referred the previous research (Yoo and Jeon, 2014; Jang, et al., 2015) so that it would gain consistency in comparing the situation between after regulation and after deregulation. For the analysis, the data was retrieved from http://gametrix.com. This web page collects and provides game usage date from all PC bangs or Internet café in Korea. The data provide by this company is used for related research, forecasting and other relevant activities by both the industry and the academia and so has high credibility. For our research, the user usage time of top 5 poker games (Table 3) were collected between the period of Oct. 1st, 2015 to June 9th ,2016, The top 5 games consist about 80% of the whole

market share and were used to analyze the effect of regulation in the previous research (Yoo and Jeon, 2014; Jang et al., 2015). The deregulation was in act by March 1st of 2016 respectively.

Table 3 TOP 5 POKER GAMES IN KOREA		
Game Name	**Service Provider**	**Market Share**
Hangame Low Baduki	NHN Entertainment	36.65%
Netmarble Poker	CJ E&M	12.49%
Hangame High low	NHN Entertainment	14.94%
Hangame 7poker	NHN Entertainment	6.81%
Pimang Low Baduki	Neowiz	8.31%
total		79.20%

The data collected was then analysed in weekly basis. Analysing in weekly allows us to capture routine behaviours, usually associated with enjoying entertainment (e.g. people watching a TV series aired weekly, enjoy hobbies in a specific time frame during the week, etc.). (Ma et al. 2014)

With the analysed data, first we did a time series analysis and VAR (Vector Auto Regression). Cooley and Dwyer (1998) provide evidence of using this econometric approach it a situation without the characteristics of an economic theory, therefore, making it applicable in our analysis. Among various VAR models, we specified in using the Granger causality test approach first presented by Granger (1969). The granger causality test is a widely-used method to check what relationships each variable has over each other over a period of time with much more convenience compared to other methods (Enders, 2008). A lot of researches reviewing policy effects are built based on this model (Freeman, 1983; Nelson, 1979; Amirkhalkhali et al., 1996). For our research, this approach was applied to better discover H2, which is the user movement between 2 different levels of web board games.

Before actual analysis using VAR, we had to alter so the data was stationary. Non-stationary data may be subject to cointegration and has the possibilities to make the faulty results (Hoover, 2003). The ADF (Augmented Dickey-Fuller) unit root test was conducted and by the results, we selected to use 1 level difference in our analysis so it fits the minimum properties required. Also, to select the adequate time lag for granger causality analysis, FPE (Final Prediction Error), AIC (Akaike Information Criterion), SC (Schwarz Information Criterion) and HQ (Hannan-Quinn information criterion) was performed. Among the results, we followed lag 2, proven to be significant in FPE and AIC. Although SC and HQ say otherwise, since the lag selected in the previous research was by FPE and AIC (Jang et al., 2015), we decided to select the result yielded by the same test.

Table 4 LAG SELECTION				
Lag	FPE	AIC	SC	HQ
0	4.98E+33	91.7806	92.00962*	91.85652*
1	4.65E+33	91.68858	93.06271	92.14406
2	3.00E+33*	91.12712*	93.64635	91.96217

RESULTS

The immediate time series analysis results shown on Figure 1 confirm that there was no significant difference before and after the de-regulation (H1). This is due to the still existing regulation banning players from the game for 24 hours if a loss greater than 100,000KRW occurs. Even though the cap limit has risen up to 170%, Players will still be banned playing and using the same amount of game money as they did before the deregulation. The only difference would be that they are now able to play a day or two more during a month. The fact that they are still being banned forcefully pauses the formation of repetition. The repetitive behaviour and further spending in gambling is primarily based on cumulative and immediate gain or loss as noted in Ma, Kim and Kim (2014).
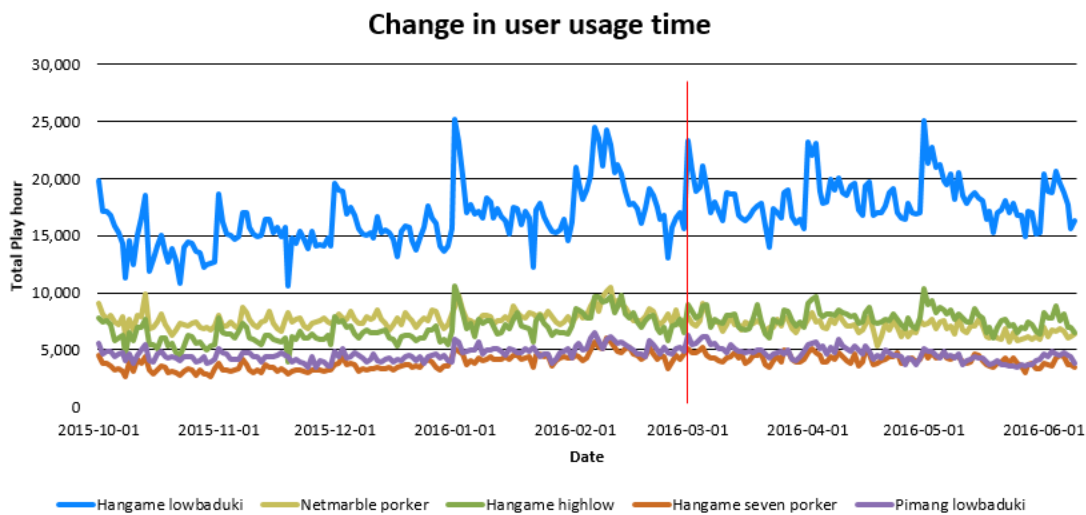

FIGURE 1
CHANGE IN USER USAGE TIME
* indicates p < 0.05

The automatic stop occurred by the system will have a negative influence in persisting the behaviour. The effect of immediate and cumulative loss which are both associated with positive influence in subsequent gambling behaviour (Ma et al., 2014)) will be voided because once the player reaches the daily loss limit, or their monthly available limit they will be banned from further playing regardless of their will.

Also, from the given figure, we may also assume that the social perception still remains to deter further increase in user usage time. The usage time may be affected by 2 different reasons; one, the players who used to play were allowed to play for a longer time, and two, there was a lot of inflow of new users that the usage time increases even though each individual have limits to available play time.

Because from H1 we know that subsequent increase in single user usage time is still impossible, so the remaining factor of increase in total user time is the inflow of new players. However, the figure that shows no difference before and after the deregulation implies that the still remaining negative social perception is functioning (H3) even after the deregulation.

As for user movement between different game levels, the granger causality analysis show that there are no changes in the situation before and after the deregulation (Table 5). To fully interpret the finding of this result, the result of the prior research also needs to be examined

Table 5 RESULTS OF GRANGER CAUSALITY						
	Affected Games	**Affecting games**				
		Hangame Low Baduki	**Netmarble Poker**	**Hangame High-low**	**Hangame 7poker**	**Pimang Low Baduki**
Before deregulation	Hangame Low Baduki		0.4504	0.6077	0.0571	0.5802
	Netmarble Poker	0.0235*		0.013*	0.0175*	0.2795
	Hangame High-low	0.8655	0.2745		0.0298*	0.7999
	Hangame 7poker	0.1584	0.1224	0.0712		0.208
	Pimang Low Baduki	0.3011	0.9378	0.4851	0.0556	
After deregulation	Hangame Low Baduki		0.7044	0.8695	0.6245	0.8262
	Netmarble Poker	0.107		0.1855	0.7843	0.7243
	Hangame High-low	0.5143	0.5078		0.3639	0.7578
	Hangame 7poker	0.0251*	0.0069*	0.0745		0.1669
	Pimang Low Baduki	0.1043	0.128	0.1079	0.9825	

(Figure 2). From the previous research by Yoo and Jeon (2014) and Jang et al.(2015), the situations between before and after the regulation are significantly different.

CONCLUSIONS AND DISCUSSIONS

Since the government has announced the deregulation policy, the industry was under debate whether or not this policy would be effective. In the beginning of the year, when the deregulation was fixed, a lot of financial analysis predicted that there would be a significant growth in market due to the deregulation and the industry predicted that it will not be as effective as expected. The actual sales result show that NHN had a 5% increase in the 2nd quarter of the year while Neowiz experienced 1.7% decrease compared to previous year. The results may not be a direct reflection of the deregulation due to many other services provided but does have an implication that the deregulation did not affect the shape of the revenue. The findings of this research also align with this and provide an empirical evidence of the results of the deregulation that it was ineffective and shed light to the reasons why it was ineffective.

Well know web board games such as poker, high low, low baduki, which are characterized to have a gambling concept, should be subjected to more cautious approach when regulating or deregulating. This specific field does indeed have aspects related with addiction and compulsion (Blanco et al., 2001) unlike other online or mobile games. The concerns for individual addiction and compulsion regarding it are reasonable but because at the same time, the concerns of industry wide also needs to be considered. The sales of these games are highly effected by user usage time; more people playing the game for a longer time mostly has direct effect in generating sales, so controlling aspects that have effect in user pattern should be carefully dealt.

The well-being of the web board game industry is important because the revenue of this industry serves as seed money in further developing other online services. The Korea's biggest portal 'NAVER' owned by NHN first started as a web board game service provider. With the large revenue earned by the web board game, it could invest more activities; that now consist and maintain what they are now. A certain field or a product acting as a seed money source is common among industries. Broadcasting stations sell TV advertisements, and Samsung sells electronics to maintain their company, for online services, web board games was the main source of the revenue.

The results of this research may further be used to better address the regulations and deregulations of web board games in Korea and also can be used to serve as a reference point when implementing regulations to web board games or to games with gambling characteristics.

At the same time, this research also stresses the importance of social perception towards a specific field in revitalizing an industry. For an industry to survive there needs to be a supply-demand relationship. In forming such relationship, the attitude plays an important role to the consumers when they make a purchase decision. The web board game industry still holds a negative social perspective as an addictive substance, so the deregulation could not invoke additional consumer inflow nor generate more consumption from users they already have. For a deregulation to be effective, a social agreement for a positive image should be made beforehand. The web board games unfortunately did not have this positive image making procedure so

consumers still take it as a substance to avoid. Therefore, there still is a possibility that a campaign or actions to build positive image on web board games may bring industrial growth without further deregulating the current regulations.

As entrepreneurship is being promoted world-wide as a new source of economic growth (Stangler and Konczal, 2013; Audretsch and Fritsch, 2010), educating people to be an entrepreneur has become a task to many local governments. Using the method of games both on and off line, it is possible to educate people about entrepreneurship (Protopsaltis et al., 2014; Protopsaltis et al, 2013; Kuratko, 2005). However, this will not be effective if the society takes games as a substance to avoid rather than taking it as a material to learn from and enjoy. There definitely is a need to better frame the image of games in Korea so it can be acknowledged as a effective tool.

However, during the research, we have faced several limitations. First, because the analysis was based on usage hour of PC bangs, it does not take in account of individual users playing in places other than the PC bang. The research would have been much more concrete if the actual sales data of each web board games were used, but the data was private to the company and was unable to reveal. Another research opportunity would be the using the game usage time in individual level. By doing so, we may be able to investigate the actual play time difference of an individual before and after the deregulation. Other exterior factors such as corporate level promotions that might also have affect were not taken into account.

For further research, including such omitted factor may provide more concrete evidence along with the results of this study. Also, a qualitative approach using the frameworks used above and using other possible frameworks is recommended. It may provide deeper understanding in why the deregulation was ineffective and serve as a basis for further altering the deregulation items.

Appendix -1 DESCRIPTIVE STATISTICS Before Deregulation					
	Hangame Lowbaduki	Netmarble Poker	Hangame Highlow	Hangame 7poker	Pimang Highlow
Average	113064.8	54234.2	47020.45	26627.35	32284.9
Std. Error	3348.517417	792.4900451	1481.983158	966.8910494	708.7922675
Median	110181	54093.5	45838.5	25750	31483.5
Std. deviation	14975.02514	3544.123225	6627.630167	4324.068227	3169.815384
Variance	224251377.9	12560809.43	43925481.63	18697566.03	10047729.57
Min	91293	48809	37754	20986	27148
Max	153911	65619	64508	36954	40142
Total	2261296	1084684	940409	532547	645698
Observation	20	20	20	20	20

	Hangame Lowbaduki	Netmarble Poker	Hangame Highlow	Hangame 7poker	Pimang Highlow
Appendix -2					
DESCRIPTIVE STATISTICS					
After Deregulation					
Average	126615.6	49437.66667	53944.26667	29544.2	32902.26667
Std. Error	2460.322348	870.1255392	953.3458298	513.2033311	996.2039496
Median	125722	50510	54571	29551	33117
Std. deviation	9528.787479	3369.981722	3692.292522	1987.627955	3858.281306
Variance	90797790.83	11356776.81	13633024.07	3950664.886	14886334.64
Min	114443	42941	48654	26055	25275
Max	150383	54642	62275	33813	39636
Total	1899234	741565	809164	443163	493534
Observation	15	15	15	15	15

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