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An empirical study on the economic effect of the Internet freedom

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An empirical study on the economic effect of the Internet freedom

1. Introduction

As information and communication technology developed, online sphere connected with Internet network appeared. That is, many elements of the existing offline sphere have moved to online without time and space restrictions. For example, various activities ranging from simple communication with others to business, schooling, consumption are carried out on the network.

The media industry has also faced these changes. Newspapers, TV, and magazines, which had strong influence in the past, are already called traditional media. The advancement of the “Digital First” strategy such as online movements of newspapers emphasized by the New York Times and advancement of OTT services such as online movements of TV show that these traditional media are also moving to online networks.

Many researchers have searched for factors affecting the use of the Internet or online markets in order to analyze these changes and various theoretical perspectives and issues have been suggested. While the development of the online media markets promotes economic growth and social development, and the optimistic outlook that positively influences individual thinking, behavior, and communication is spreading. On the other hand, in low-level countries, it may also indicate a tendency to be taken or subordinated to the global online media market competition.

This level of politics come from the policies, regulations and laws of the country. China’s online censorship and the rejection of foreign Internet service providers have already become widely known. In the case of Iran, the government has implemented polices that allow its

citizens to access their own autonomous systems when accessing the Internet (Singh et al., 2016). In addition, since the “Arab Spring”, a democratization movement through social media, the government has tracked revolutionaries and watched other citizens through Facebook (Morozov, 2012).

In this context, Internet freedom needs to be emphasized. The political, economic and social implications of freedom on the Internet are related specifically to transparency, openness, and inequality (Charron, 2008; Dias & Moreira, 2008; Freille et al., 2007). In addition, the results of previous studies have shown that national transparency, openness, and inequality affect the economic growth of the country (Aissaoui, 2017; Bertot et al., 2010; Crenshaw & Robinson, 2006; Ostry et al., 2014).

In particular, Charron (2008) found that the degree of political and social openness has a positive impact on press freedom and that increased freedom of press improves the level of transparency. Freille et al (2007) also showed that press freedom increases transparency, while Dias and Moreira (2008) suggests that ICT development enhances transparency by increasing informed citizen, political decision, and public access. Bertot et al (2010) found that ICT can lead to transparency, civic engagement and political involvement, ultimately positively affecting economic growth.

Also, Crenshaw and Robison (2006) showed that the degree of openness of the country had a direct positive effect on Internet growth, and Ostry et al (2014) found that the level of national inequality had a negative on economic growth. Furthermore, Aissaoui (2017) explored the impact of national inequality levels on the spread of Internet broadband and economic growth. As a result, in countries where economic inequalities exist, economic growth has been reduced by the digital divide.

Based on these arguments, we concluded that freedom on the Internet would have a

significant impact on economic growth because it is related to non-economic factors such as transparency, openness, and inequality. However, research on the Internet freedom is still insufficient. Ultimately, in this study, we try to examine how the size of online media markets is affected by the Internet freedom.

2. Literature Review

2.1. The impact factors of online media markets

The purpose of this study is to identify and measure the effects of the major determinants of the size of online media markets at the country level. The online media markets have enabled offline media enterprises such as newspapers, magazines, radio, and television to produce their products and services at very low cost to the audience through the Internet diffusion.

First, in previous studies, the main factor of online media markets is interactivity. The interactive media markets have grown through the interaction and have differentiated from the existing media (Rogers, 1995). Interactivity can be defined as the nature of the media that coordinates and controls the mediated experience of online media users. This study focuses on the interactivity factors of online media markets and online infringement such as access disruption, content restriction, and user rights infringement as a means of suppressing interaction between online media users. We examined how these factors affects the size of online media markets.

Second, this study examined that how Internet penetration influence the size of online media markets. Temple & Johnson (1998) proposes the concept of 'social capability' by analyzing the economic growth effects of the social institutional aspects. They showed that among the various social variables, the degree of communication, especially newspapers and

radio penetration, has the most significant effect on economic growth among many variables. Based on this, it can be inferred that Internet penetration influence economic growth and the size of online media markets at present time when the Internet is becoming widespread and the media environment is becoming diverse.

Third, several factors which influence on Internet penetration have been identified in previous literature. The most common of these is per capita income (GNPP). Previous research has shown that countries whose people are better off economically tend to have higher Internet penetration and larger size of online media markets (Arum & Coonti, 1998; Hargittai, 1999; Maherzi, 1997). Maherzi (1997) showed that richer countries have more telecommunications networks and higher media penetration overall. And other factors include social structural factors such as IT infrastructure (Guillen & Suarez, 2006), non-economic factors such as social capital factors and transparency (Beilock and Dibitrova, 2003).

Also, non-economic factors, such as religion, customs, art, literature, music, ethics, and institutions may affect Internet penetration rates. Consistent data across countries on such variables is limited. Moreover, the proper specification can be moot for variables related to such factors such as customs, art, religion. As the Internet facilitates access to vast and essentially uncontrollable quantities and varieties of information, data, and opinions, the degree of openness of a society is likely to be important. To capture this, Freedom House's index (FREEDOM) of the level of civil liberties in a country is employed in this study. This determine the degree to which people within a society are able and encouraged to access and use new ideas and information from various sources.

Moreover, the study of Guillen and Suarez (2005) emphasizes political factors such as regulation, politics and democracy. The democratic political system enables the rapid growth of the Internet market compared to the authoritarian or totalitarian regime that controls

economic development and income. In particular, the efforts of national regulators to control the Internet through various cases (1) restricting access by controlling networks and instituting registration requirements; (2) restricting content by the filtering information. Blocking of forbidden sites, disciplinary actions, and even virus attacks on banned sites; and (3) credibly threatening to arrest or imprison those who have access to unauthorized information or use the Internet to organize and mobilize politically and demonstrate that the internet usage is high in democratic countries without such regulations. Examples from China, the Middle East, and Latin America show that these regulations still exist and have a negative impact (Cham, 2016; Seo & Thorson, 2017).

2.2. Internet freedom

In the past, the emergence of new media such as radio and TV has brought about changes in the way information is transmitted, but the Internet has shown particularity that it has also changed the subject of information production. In the past media environment, if only a few such as reporters and editors were able to process and supply information in a form that could be transmitted, everyone in the Internet could become the subject of production and delivery. That is, the ‘citizen journalism’ by numerous bloggers has emerged. As a result, the Internet freedom, which had been discussed previously, was raised to the need to adapt to the new environment (Karlekar & Radsch, 2012).

The US non-governmental organization Freedom House has shown the addition of digital-related indices to the Freedom on the Press Index they have been providing. The index measures the freedom of the press in each country from various perspectives such as legal, political, and economic freedom. However, with the ongoing debate on the Internet freedom,

Freedom House suggests a new indicator of Freedom on the Net, which is different from freedom of the press. The Index, consisting of three sub-dimensions: obstacles to access, limits on contents, and violations of user rights, is an important example of how the Internet has different characteristics from traditional media can see.

In other words, regulations appear as Freedom on the Net. Internet freedom is not yet clearly defined. Researchers and industry workers use it in different ways, and politicians are referring to freedom of the Internet in many ways because it is closely related to regulation. Powell (2004) emphasized that when these freedoms are followed, industry and technology can develop as consumers' rights are maintained. There are also attempts to view the Freedom of expression or the Freedom of speech and Freedom of the press. These three freedoms tend to be mixed in the same use or different use, depending on the study (Barendt, 2005; Barron & Dienes, 2008). Specifically, Dutta & Roy (2016) empirically tested this need and argued that the influence of freedom of speech is closely related to the Internet. This raises the need for Internet freedom to be considered in existing discussions that the Internet will bring positive effects such as the development of democracy.

Freedom House publishes the Freedom Index online every year. It measures 65 countries by establishing Internet access, content restrictions, and user rights violations online. Using this data, Pepper and colleagues (2016) found a relationship between the value that the digital economy can create and the online freedom index. As a result, countries with high levels of online freedom have shown a high likelihood of profiting from the potential economic value of the digital market. In other words, innovation and growth may be hampered by countries and businesses that are constraining the open online environment. In addition, over-strict regulations on online data flow will create trade barriers between countries and have a negative impact on business models. With these studies in mind, we expected to be able to examine that

excessive regulation can hinder business transactions by increasing costs and hindering the market supply of online services.

Our particular aspect of online media market that has been explored by several scholars recently concerns what we may call “autonomy of use”, that is, freedom to use the technology when and where one wants without constraint from others such as lines of library patrons or employer supervision. In our studies, Internet freedom are considered civil liberties, obstacles to access, limits on contents, and violations of user rights.

2.3. Effect of Internet freedom

As the development of information and communication technology, the effect of Internet freedom should be premised on the diffusion of the Internet. As mentioned above, factors influencing Internet diffusion are various such as political, social, economic and cultural factors, but the emphasis is on the importance of political factors above all in terms of freedom. Indeed, the difference in Internet penetration which is called the digital divide, is clearly examined by differences in the political system (democracy v. totalitarianism) (Guillen & Suarez, 2005). A recent study by Seo and Thorson (2017) found that the Internet was generally more popular in countries with high levels of richness, education, and democracy.

However, the relationship between democracy and Internet diffusion is not a one - way relationship. Just as Tocqueville (1969) and many other researchers have argued about the political effects of the development of ICT, technological advances can develop democracy by advancing civil liberties and rights.

Those with this view argue that the Internet can further develop democracy in that it can reduce the costs of information exchange and diffusion, communication, interaction, and attract

new participants. In addition, there has been the opinion that the information that has been monopolized by the state through the Internet has been released to the public, thus increasing the political knowledge and rights of the public and monitoring the government's efforts to protect human rights (Morris, 2000; Rheingold, 2000; Drew & Weaver, 2006; Groshek, 2009, 2011).

On the contrary, there is a pessimistic view that the Internet can strengthen existing power relations, social inequality, and citizen participation behavior. This is because the existing participants mostly have relatively higher economic and educational levels, and are more active in political activities, thus increasing the effect of the Internet and increasing the gap between participants and non-participants (Norris, 2001). This gap can be seen as an information gap not only at the individual level but also at the national level (Guillen & Suarez, 2005). The pessimistic view suggests that offline inequality leads to online inequality. In addition, the development of technology at the national level emphasizes that the government can be a means of censoring information and controlling communication through blocking access, monitoring, censorship, and deleting records (Shirazi et al., 2010; Morozov, 2012; Singh et al., 2016).

Among these perspectives, the study of Dutta & Roy (2016) suggests that media freedom and Internet freedom should be taken into account in examining the relationship between the Internet and democracy. They have verified that corruption has a combined effect of freedom of the press and media reach. As they emphasize, given the fact that corruption is used as a key indicator of economic development and democracy, we can think of the outcome of our study as an extension of democratic development. This means that when the press is free and the reach of the media is well supported, that is, when the freedom of the Internet is guaranteed, the Internet will be able to exert its effect. Indeed, the studies of Nam (2017), Gainous, Wagner

and Gray (2016) have demonstrated empirically this relationship in terms of democracy.

However, in addition to the political effects of the Internet, social, economic, and cultural effects of various effects will need to expand the study. In particular, the concept of corruption in the work of Dutta and Roy (2016) is expected to be related to economic factors, since the concept of corruption is used as a key indicator of economic development in relation to transparency. As mentioned earlier, the online media market is most relevant to the Internet among various markets, so it is considered to be most suitable for verifying the influence of Internet freedom.

3. Empirical Model

This study was designed to analyze the economic impacts of Freedom on the Net and Civil Liberties on the development of the Internet. Especially, we examined the influence of the freedom discussed in the Internet space on the internet-based online industry, especially the media online market. In a situation where aggregate data collection is limited for all forms of market formed on-line, the media is itself a platform that is influenced by two different groups: the enterprise (the advertiser) and the individual (the consumer) Because it is a representative two-sided market (Evans & Schmalensee, 2008), it is expected to be suitable for analyzing the industrial structure compared to other online markets such as publishing and games. In order to analyze empirically the relationship between the variables, we first set the following model.

$$\begin{aligned}
& \text{Online_Market}_{it} \\
& = \beta_1 \text{Civil_Liberties}_{it} + \beta_2 \text{Obstacles_to_access}_{it} \\
& + \beta_3 \text{Limits_on_Contents}_{it} \\
& + \beta_4 \text{Violations_of_User_Rights}_{it} + \beta_5 I_{it} + \beta_6 X_{it} + \alpha_i + \mu_t + \varepsilon_{it}
\end{aligned}$$

where $\text{Online_Market}_{it}$ indicates the size of the online market in country i in year t , which may be affected by the dimensions of civil liberties ($\text{Civil_Liberties}_{it}$); structural and economic barriers to access ($\text{Obstacles_to_access}_{it}$); legal regulations on contents ($\text{Limits_on_Contents}_{it}$); Avenge against surveillance and action ($\text{Violations_of_User_Rights}_{it}$); and other country-specific and time-variant control variables (X_{it}). α_i represents unobservable country-specific factors, such as a country's culture; μ_t is an unobservable time-specific effect that reflects a time-variant but constant from country to country. ε_{it} is the idiosyncratic error term, independent of the control variables and identically distributed for each country and year.

A system generalized method of moments(GMM) procedure is employed in the present study to allay such concerns regarding consistency and objectivity. In doing so, the study follows those of Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (2000) in its methodology. The merits of the system GMM estimator are that it allows us to generate internal instruments in order to solve endogenous problems and enables us to control for past trends in an online content market, thus reflecting the market's dynamic aspects (see Cameron and Trivedi (2009), and Roodman (2006) for applications of the GMM estimator).

4. Data

The Global Entertainment and Media Outlook 2014-2018 Report published by PricewaterhouseCoopers(PwC) (PricewaterhouseCoopers, 2014) was used as the main data source for this study. The PwC report provides data encompassing online and offline content spending in media markets across 26 countries over a five-year period from 2012 to 2016. Other data were collected from compilations by the Freedom on the Net(FotN), Freedom House, World Bank. These volumes contain country data respectively from 2012 to 2016.

4.1. Definition of the size of online media markets

First, we used data from PwC (PricewaterhouseCoopers), a global consulting organization, to measure the online market size of media used as a dependent variable. The data provides the content market size and growth prospects for each of the 26 countries in the world from 2012 to 2016. Each market segment is divided into advertising costs and content costs. In this study, to reflect the characteristics of the two-sided market of the media, the online market of newspapers, magazines, TV, internet, book, music, game, and etc was defined as the online market of the media. However, due to the different economies of scale in each country, it was feared that using the combined figures directly would make it less feasible. In order to compensate for this, the online market of the media was divided into the Gross Domestic Product (GDP) provided by the World Economy Outlook 2017 provided by the IMF.

4.2. Definition of civil liberties and Internet freedom

The following is a summary of the results of a survey conducted by Freedom House, an

American non-governmental organization working for democracy, freedom and human rights, to collect data on civil liberties and Internet freedom. We used the data which is reported ‘Country and Territory Ratings and Statuses (1972-2016)’ and ‘Freedom on the Net (2012-2016)’. The closer to 0, the more freedom each country have, and the larger the number, the more freedom is limited. The dimensions used to measure the variables are:

- ① Civil Liberties: The four dimensions of freedom of expression and belief, freedom of association, rule of law, private freedom (education, travel, private property, etc.) are measured by detailed items.
- ② Obstacles to Access: 21 sub-questions were constructed to measure the structural and economic barriers to Internet access, the legal ownership and control of Internet providers, and the independence of regulators.
- ③ Limits on Contents: 33 sub-items were constructed to analyze legal regulations on content, filtering and blocking websites, external or self-censorship, diversity of online news media, and use of digital technology for civic action.
- ④ Violations of User Rights: Citizens’ personal information, privacy, and 34 questions to measure the effects of online remarks and actions, such as imprisonment, unlawful harassment, and cyberattacks.

Specially, the Freedom House provides data for civil liberties. The country scores range from 1 to 7 where a ranking of 1 refers to a country considered “Free” while a rating of 7 denotes “Not Free” countries. Freedom House index is based on a 14-item checklist, which includes freedom of expression and belief, freedom of association and organizational rights,

rule of law and human rights, and personal autonomy and economic rights.

4.3. *Other control variables*

Finally, in addition to the set of independent variables, we also set up control variables that are thought to affect the dependent variables. First, as shown in the Ji and Waterman (2014), the penetration rate of the Internet is expected to affect the online market size. Accordingly, the Internet penetration rate data provided by the PwC is used.

Table 1. Descriptive Statistics

Variable	Definition	M	SD	Data Source
Online market size	Online market total amount / GDP	0.508	0.252	PwC
Civil liberties	Expression, belief, assembly, private liberty	3.210	1.821	FIW
Obstacles to access	Structural obstacles of Internet access	9.240	4.548	FotN
Limits on contents	Censorship, restriction, and diversity	12.720	8.205	FotN
Violations of user rights	Avenge against surveillance and action	20.130	9.364	FotN
Internet penetration	Number of Internet users per 100	52.134	20.851	PwC
Education	Gross enrolment ratio in tertiary level institutions multiplied by 100	49.301	25.162	WB

5. Empirical Results

5.1. Results from System GMM models

In our effort to estimate the coefficients of the time-invariant control variables (the key variables in question), as well as to control for the endogeneity of a few of the control variables and the past trends in online content markets, a one-year lag of the dependent variable was included among the other control variables.

We also used internal instruments (found internally in the data set) generated from a system GMM estimation procedure. The internal instruments employed were the one-year lagged values of the endogenous covariates and the one-year lagged value of the dependent variable. Arellano and Bond (1991) reported serious bias in their robust two-step standard error; accordingly, the bias-corrected robust estimator proposed by Windmeijer (2005) was used to estimate the standard error in this study.

Considering that the empirical study of search engine effects represents a relatively new research area, we estimated the four different system GMM specifications step-by-step from baseline models to full models and compared the estimates. The effects of Internet freedom are not only statistically significant but also large in magnitude. And Internet penetration is also significant variables. However, GDP and education doesn't show significant results.

The first column, Model (1) of Table 3, shows the results from the positive effects of civil liberties. The coefficient of *civil liberties* was positive and significant at the .05 level, thus preliminarily confirming the positive effect of civil liberties. And as we expected, Internet penetration was variables which is significantly and positively linked with the size of online media markets. However, GDP has a negative impact on the size of online media markets.

In Model (2), which examined the effects of obstacles to access, the sign of the coefficient of Internet penetration and GDP was not remained significantly. Also obstacles to access was not significant value. In Model (3), limits on contents are negatively linked with the size of the online media markets. And the effects of Internet penetration and GDP was estimated again as same as Model (1). In Model (4), we examined the effects of violations of user rights. The coefficient of violations of user rights was negative and significant at the .05 level, thus preliminary confirming the negative effect of regulations of freedom.

Interestingly, GDP was significant, indicating the negative effect on the size of online media markets. Much previous researches have shown that countries whose people are better off economically tend to have higher Internet penetration (Hargittai, 1999) or media penetration (Maherzi, 1997). However, as their models were not multivariate and there is a high correlation between infrastructure and income, the separate effects of infrastructure and income on Internet penetration remain unclear.

Notably, the coefficients of the Internet freedom across four different specifications were examined, and three of them were statistically significant. These results were partly consistent with the hypothesis, in that the existence of Internet freedom was found to increase the size of the online media markets. In other words, countries which guarantee civil liberties and which have low obstacles of access and limits on contents have larger size of online media markets.

Table 2. Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Size of the online media markets	1							
(2) Civil Liberties	0.34**	1						
(3) Obstacles to Access	-0.60***	-0.73***	1					
(4) Limits on Contents	-0.19**	-0.79***	0.72***	1				
(5) Violation of User Rights	-0.18**	-0.79***	0.73***	0.90***	1			
(6) Internet penetration	0.74***	0.22**	-0.57***	-0.08	-0.12	1		
(7) GDP	0.63***	0.46***	-0.70***	-0.43***	-0.39***	0.79***	1	
(8) Education	0.26**	0.06	-0.20**	0.04	0.01	0.45***	0.26**	1

Note: ***, **, * indicate significantly different from zero at the 0.01, 0.05, and 0.10 levels, respectively

Table 3. Empirical results (System GMM models)

D.V. = size of the online media markets	(1) GMM	(2) GMM	(3) GMM	(4) GMM	(5) GMM
Civil Liberties	0.133* (1.71)	0.153** (1.98)			
Obstacles to Access	-0.201*** (-4.48)		-0.038 (-1.14)		
Limits on Contents	0.021 (0.61)			-0.074*** (-2.75)	
Violation of User Rights	0.070*** (2.90)				-0.061** (-2.32)
Internet Penetration	0.038*** (3.04)	0.021** (2.25)	0.008 (1.33)	0.033*** (2.84)	0.030** (2.48)
GDP	0.000 (0.17)	-0.000* (-1.69)	-0.000 (-0.66)	-0.000** (-2.42)	-0.000** (-1.96)
Education	-0.052 (-0.65)	0.005 (0.28)	0.011 (0.65)	0.003 (0.16)	0.009 (0.45)
Years Controlled	Yes	Yes	Yes	Yes	Yes
Observation	125	100	100	100	100
R2	0.668				

Notes: Variables in italics are instrumented through the GMM procedure following Arellano and Bover (1995); z-statistics calculated from Windmeijer (2005) robust standard error * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Conclusion

This study investigated the effect of Internet freedom on the size of online media markets. It was hypothesized that an increase in an online media markets would occur when the country guarantees the freedom of domestic Internet users. Research model was developed and estimated to explain global inter-country differences of the size of online media markets according to Internet freedom.

First, consistent with previous work, Internet penetration was found to be the significant determinant. Taking the results from research model, we see that the size of online media markets in a country is, on average, 2.1%(2), 3.3%(4), 3.0%(5) larger in terms of Internet penetration. Thus, Internet penetration could be said to significant factor by boosting the online media markets.

Second, particular interest in the study was exploration of whether and to what extent non-economic factors such as Internet freedom impact. The results clearly demonstrated that the country which guarantee Internet freedom, as measured by the breath and the qualities of civil liberties enjoyed by its people is an important determinant. For verifying of Internet freedom, four categories were classified to explore the influence on the online media markets. The results were significantly positive at the civil liberties (15.3%), limits on contents (7.4%), violations of user rights (6.1%).

At the country level, our results are largely consistent with prior literature Seo et al (2017). The degree of country's Internet freedom and Internet penetration do matter for the size of online media markets with more Internet penetration and more Internet freedom countries typically showing a larger size of online media markets than do less Internet penetration and less Internet freedom countries. So, we can conclude that citizens in countries with high civil

liberties and easy access to Internet have the capacity to generate ideas in greater numbers thus driving economic growth such as the size of online media markets.

Future research should look more deeply into Internet policies and regulations of each countries over time as well as content filtering and censorship. This will help provide deeper understanding of correlation between structural access to the global Internet and domestic Internet regulations policies and relationships of those factors with democratic level.

There are some limitations to this study. First, the available PwC data include major countries over a five-year period; however, such a simple may not be a random sample, as only those countries for which detailed media revenue data was available were select. Second, there are still limitations on the specific on specific types of online contents, such as fees for some online membership websites. These limitations may have biased the parameter of the size of the online media markets variable that the models in this study predicted.

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