

# The Designation Criteria of Eligible Areas of Universal Service Subsidy\*

Hoon Jung\*\*

In the age of monopoly telecommunications market, monopoly operators would provided universal service through cross subsidy. But from the early 2000s the privatization and competition are introduced in telecommunications market and monopoly operators did not exist any more from that time. Thus universal service regime is introduced to provide basic communication services. Hasbi(2015) argues that universal service is one of the cores of the liberalization of the telecommunications industry.

This study explores the process of PNLA(Potential Net Loss Area) delegation. Specifically, this study investigates the delegation criteria of eligible area of universal service subsidy. The results of this study contribute to improve the universal service regime and to suggest the way which can provide users for the stable and sustainable universal service. This study has differentiations which suggest the improved alternative of universal service and use the actual data of universal service area.

The results of the analysis are as follows. First, profit per line and cost ratio are negatively related consistently for sample period. Second, profit per line and cost per line are negatively related consistently for sample period. Third, profit per line and the number of lines are positively related only in 2007. For the rest of sample year, profit per line and the number of lines are not related. Finally, profit per line and population density are positively related in 2007 and 2008. For the rest of sample year, profit per line and population density are not related.

Conclusively, cost ratio and cost per line are still the effective criteria of PNLA designation. but the number of lines and population density are not the effective criteria of PNLA designation.

Key Words: universal service, universal service subsidy, PNLA(Potential Net Loss Area)

## 1. Introduction

In the age of monopoly telecommunications market, monopoly operators would provided universal service through cross subsidy. But

from the early 2000s the privatization and competition are introduced in telecommunications market and monopoly operators did not exist any more from that time. Thus universal service regime is introduced to provide basic communication services. Hasbi(2015) argues that

논문접수일: 2017. 01. 09.      게재확정일: 2017. 01. 17.

\* This paper is revised and supplemented based on "Korea Information Society Development Institute(2014), A study on the reforming universal service regime corresponding to the change of welfare regime".

\*\* Korea Information Society Development Institute, Dept. of Telecommunications & Spectrum Research, Associate Fellow(guyhoon@empas.com)

universal service is one of the cores of the liberalization of the telecommunications industry. Berg S.V. et al(2011) argue that the universal service high cost loop program has been a key component of the Federal Communications Commission's Universal Service Fund program to promote telephone access in rural, high cost areas. Mitomo & Nobuyuki(2010) insists that ensuring the provision of universal service is an important policy issue in the telecommunications field. In many countries, the governments have long made efforts to ensure that their citizens, including those living in high-cost and low-demand areas, can have access to basic telephone service at any time and any place as well as at an affordable price Telecommunications Business Act Article 2 defines "universal service is basic telecommunications services which any user may use at affordable prices, regardless of time and place." Enforcement Decree of The Telecommunications Business Act Article 2 defines detailed universal services include fixed telephone services, telephone services for emergency communications, reduction of or exemption from charges for the disabled and the low-income bracket, etc. EC(2011) argue that "universal service acts as a social safety net where market forces alone do not deliver affordable access to basic services for consumers, particularly those living in remote areas or having low incomes or disabilities."

Universal service policy should have the principle of competitive neutrality and the principle of technological neutrality(Oh, 2006;

Noam, 1994). The principle of competitive neutrality means that universal service support mechanisms and rules neither unfairly advantage nor disadvantage one provider over another, and neither unfairly favor nor disfavor one technology over another (FCC, 1997), Universal service obligation which has competitive neutrality means that all network operators should bear the burden of universal service fairly(Lee and Lee, 2015). The principle of technological neutrality means that universal service support should not be biased toward any particular technologies(FCC, 1997; Korea Information Society Development Institute, 2009). Technological neutrality will allow the marketplace to direct the advancement of technology and all citizens to benefit from such development(FCC, 1997).

The key universal service of Korea is fixed local telephone service. But since the growth of mobile telephone service market, the revenue of fixed local phone service market is now decreasing. Although the revenue of fixed local phone service market is decreasing, universal service subsidy is decreasing. To maintain the stable operation of universal service, the reasonable level of universal subsidy is needed. Turner-Lee et al.(2016) argues that the lack of transparency of the costs associated with Lifeline program administration highlight the need to reform in certain processes, such as eligibility verification. This means that eligibility verification of universal service subsidy is important.

This study explores the process of PNLA

(Potential Net Loss Area) delegation. Specifically, this study investigates the delegation criteria of eligible area of universal service subsidy. The results of this study contribute to improve the universal service regime and to suggest the way which can provide users for the stable and sustainable universal service. This study has differentiations which suggest the improved alternative of universal service and use the actual data of universal service area.

The remainder of this paper is structured as follows. Section 2 provides a brief theoretical discussion on the universal service obligation and the background of this study and the hypotheses. Section 3 introduces the econometric model and variables. Section 4 presents the empirical results. Finally Section 5 suggests the conclusion of this paper.

## II. Background and Hypotheses

### 2.1 Background

#### 2.1.1 Universal service theory

Cremer et al.(1998) argue that there are 4 rationales of universal service obligation. They are network externality, redistribution, public good and regional policy.

According to Cremer et al.(1998), network externality arises when the benefits from using a network depend on the number of individuals who are connected to the network.

In telecommunication services, the number of subscribers determines the number of individuals any particular user can communicate with. Hong and Park(2009) argue that operators with more subscribers can take more favorable status than operators with less subscribers because of network externality.

Thus, any individual's decision to subscribe or not to subscribe directly affects the utility of other individuals. Such network externality may lead to an inefficient outcome in an unregulated market. These inefficiency will be eliminated through regulatory method aimed at providing access to the network at subsidized area or rates.

The universal service obligation will be a special case of redistributive pricing. That is a policy to affect redistribution through prices instead of income taxation or direct transfers (Cremer et al., 1998).

A uniform and universal communications have the character of a public good. Cremer et al.(1998) presents public goods have characters as follows. It binds the nation together. It is essential for the functioning of a democracy. For ethical reason, society can not accept that anyone be excluded from communications service.

The universal service can be an instrument of regional policies(Cremer et al. 1998). Uniform pricing can be a way to subsidize rural customers. Maintaining basic telecommunications services in rural areas can contribute to preventing the decline of rural areas(Cremer et al. 1998).

### 2.1.2 Existing framework of universal service in Korea

The definition and selection criteria of universal service were similar to those of other developed countries. The developed countries emphasize not only equal basic access but also market efficiency. And they reflect the evolution of technology, social and economic situations (Kim 2008).

The Korean government regarded the social objective of USOs as their primary objective (Kim 2008). In Korea, USOs were originally introduced without legal provisions. The Korean government introduced universal service in Telecommunications Business Act in 1998. The legal action ensured that competition in the market and achievement of USOs were not in conflict. The Korean government made an effort to keep the concept of competitive neutrality. The concept of competitive neutrality is preserved until now. Thus the loss of PSTN is subsidized only for PNLA.

Similar to the situation in many other countries, universal service in Korea is considered as a basic telephone service. The provision of universal service is legally guaranteed in Telecommunications Business Act. Telecommunications Business Act, which regulates the telecommunications industry in Korea, defines basic telecommunications

service as essential telecommunication services which must be provided at just, reasonable and affordable rates of users at any time and place.

Under the Telecommunications Business Act, MSIP designates the following services over the PSTN as the universal service: (a) Voice Telephony Service; (b) Emergency Telephony Service; (c) Fare Reduction for Low Income and Disability. Voice Telephony Service is including local telephony which includes remote areas and island coverage, public payphone for local call services. Emergency Telephony Service is including maritime wireless communication services and emergency call with designated numbers. Fare Reduction for Low Income and Disability Support is including Local and long distance telephony, VoIP, phone directory service and mobile, high-speed internet and WiBro.

## 2.2 The calculation of universal service subsidy

### 2.2.1 The calculation of subsidy of universal fixed local call service<sup>1)</sup>

Fixed local call service is a key universal service. Fixed local call service and public payphone service is subsidized by network operators and telecommunications service providers. That subsidy is calculated by Decree

1) MSIP (Ministry of Science, ICT and Future Planning), Public notification of the calculation method of universal service subsidy, MSIP directive 2015-115, Article

of The Telecommunications Business Act.

Universal service subsidy of fixed local call service is based on PNLA(Potential Net Loss Area). The loss of PNLA which is designated by certain standards is subsidized. In detail, the fixed local call service loss of PNLA minus intangible benefit which is 10% of the fixed local call service loss of PNLA is PNLA loss. subsidizable loss. PNLA loss times 70% is the subsidizable loss.

o **The universal service subsidy of fixed local call service**

$$= \sum \{ \text{PNLA}(\text{Cost} - \text{Revenue}) \times (1 - \text{Intangible benefit}(10\%)) \times \text{subsidy ratio}(70\%) \}$$

$$= \sum \{ \text{The total loss of PNLA} \times 63\% \}$$

Universal fixed local call service is provided based on 143 area across country. Among high-cost and low-revenue area, regarding profit per line, the number of lines and population density, minister of MSIP designates

PNLA. Universal service loss of designated area is calculated and subsidized.<sup>2)</sup>

2.2.2 The drawback of PNLA system

The designation criteria of PNLA are cost ratio, profit per line, the number of lines, population density. A area which can meet these 4 criteria is eligible for PNLA. These criteria are complex and some criteria is not suitable for the designation of PNLA.(Jung et al., 2014). Especially in universal service provider's position, these 4 criteria are so strict. Although the revenue of fixed local call service is decreasing, the subsidy of universal service for fixed local call service is decreasing. Thus, it is needed that the review of PNLA designation criteria to investigate the reasonableness for the purpose of universal service policy.

<Table 1> shows the trend of universal service subsidy of local call service and local call service revenue. The revenue of local call

<Table 1> Local call service revenue and universal service subsidy of local call service

(scale: hundred million ₩)

Year	2007	2008	2009	2011	2012	2013	2014
universal service subsidy of local call service	312	355	363	177	172	148	165
Local call service revenue	34,407	31,344	27,043	18,803	16,466	14,177	12,239

Source: MSIP media release(2014), MSIP media release(2016), Cho(2011)  
 Korea Information Society Development Institute, 2015 Telecommunications Market Review, 2015.11  
 Korea Information Society Development Institute, 2014 Telecommunications Market Review, 2014.11  
 Korea Information Society Development Institute, 2009 Telecommunications Market Review, 2010.12

2) Universal service of fixed local call service accounts for revenue and cost by each area. Nationwide is divided into 143 areas.

service is decreasing consistently. The universal service subsidy of local call service is showing the trend of decreasing but the trend has increased in 2014.

The decreasing trend of local call service revenue represents the continuous decrease of local call service market. But the size of universal service subsidy is decreasing. This result conflicts the decreasing trend of local call service market. This gap is making it difficult to provide universal service reliably.

### 2.3 Research Hypotheses

As described earlier, The 4 criteria of PNLA designation are very important indicators for securing the universal service subsidy in universal service provider's position. Accordingly these criteria should be highly correlated with the loss of each area. The correlation between criteria of PNLA designation and loss should be high thus these criteria will be highly related with the subsidy of universal service. And this research sets 4 hypotheses about the 4 criteria of PNLA and analyses the validity of 4 criteria empirically. The 4 criteria of PNLA designation should be highly correlated.

In the following, I will explain the 4 criteria of PNLA designation in detail.

First, cost ratio is the cost of each area divided by the revenue of each area. High cost ratio means high compared to revenue, cost is high. If cost ratio exceeds 100%, there will be loss.

Second, cost per line is the cost of each area divided by the number of lines of each area. If the revenue of each area is fixed, as cost per line is high, the probability of loss will be high.

Third, the number of lines means the number of subscriber of each area. As the number of lines is increasing, the probability of high profit per line will be high. Fixed local call service is mechanism industry which requires massive investment in the early stages. Thus as the number of lines is increases, the probability of increasing of profit per line is high. Because of this character, telecommunications industry has the economies of scale.

Fourth, population density is the population of 1km<sup>2</sup>. As more population density, the probability of low cost is high. High population density means that many people live there. Compared with low population density, the probability of positive profit per line will be high.

I specify hypotheses as follows.

H1: Cost ration is negatively correlated with profit per line.

H2: Cost per line is positively correlated with profit per line.

H3: The number of lines is positively correlated with profit per line.

H4: Population density is positively correlated with profit per line.

### III. Research Design

#### 3.1 Sample Selection and Data Collection

This research used the main data on PNLA designation extracted from Jung et al.(2014) and Universal Service Provision Report prepared by universal service provider. The sample consist of the 143 areas from 2007 to 2015. Each area has profit per line, cost ratio, cost per line, the number of line, population density. At the endo of 2015, universal service provider is providing in 143 areas across the country.

#### 3.2 Empirical Model

To test hypotheses, this research set the model which analyze the effect of cost ratio, cost per line, the number of line, population density on profit per line as following formula (1).

$$\text{PROFIT}_{i,t} = \beta_0 + \beta_1 \text{COSTRT}_{0i,t} + \beta_2 \text{COSTL}_{i,t} + \beta_3 \text{LINE}_{i,t} + \beta_4 \text{DENSITY}_{i,t} + \text{YRDUM} + \varepsilon_t \quad (1)$$

$\text{PROFIT}_{i,t}$  = (Revenue per line of universal service area i)-(Cost per line of universal service area i)

$\text{COSTRT}_{i,t}$  = Cost of universal service area i/Revenue of universal service area i

$\text{COSTL}_{i,t}$  = Cost of universal service area I/ Number of service line of universal

service area i  
 $\text{LINE}_{i,t}$  = Number of Lines in universal service area i  
 $\text{DENSITY}_{i,t}$  = Population Density of universal service area i  
 $\text{YRDUM}$  = Year Dummy

### IV. Empirical Results

#### 4.1 Descriptive statistics and Correlation Analyses

Table 2 describes that the yearly distribution of sample. PNLA system is introduced in 2007. The sample includes data for fiscal year 2007-2015. Panel A shows the distribution of sample area by year. Until 2012, universal service is provided in 144 areas across country. From 2013, universa service is provided in 143 areas across country that 3 areas are merged into 1 area and new 1 area is made. At the end of 2015, universal service is provided in 143 areas across country. Based on 143 areas across country, the revenue and cost of universal service fixed local call service are aggregated.

Table 3 displays the descriptive statistics for the main variables. The mean value of PROFIT and COSTL are -74,100 and 193,304, respectively. The mean (median) value of COSTRT is 1.728 (1.648). The mean value of LINE and DENSITY are 145,596 and 680.2.

Table 4 presents the pearson correlations between the variables of interest. As shown

〈Table 2〉 Distribution of the sample

Year	Number of firms	Percentage of the sample
2007	144	11.14
2008	144	11.14
2009	144	11.14
2010	144	11.14
2011	144	11.14
2012	144	11.14
2013	143	11.06
2014	143	11.06
2015	143	11.06
Total	1,293	100

〈Table 3〉 Descriptive statistics for study variables

Variables	mean	sd	p25	p50	p75
PROFIT	-74,100	60,650	-106,731	-67,181	-34,486
COSTRT	1.728	0.6098	1.272	1.648	2.070
COSTL	193,304	69,398	144,636	179,191	224,403
LINE	145,596	483,636	236,78	425,44	102,812
DENSITY	680.2	1,829	69.62	139.1	464.0

$PROFIT_{i,t}$  = (Revenue per line of universal service area i)-(Cost per line of universal service area i)  
 $COSTRT_{i,t}$  = Cost of universal service area i/Revenue of universal service area i  
 $COSTL_{i,t}$  = Cost of universal service area i/Number of service line of universal service area i  
 $LINE_{i,t}$  = Number of Line in universal service area i  
 $DENSITY_{i,t}$  = Population Density of universal service area i  
 YRDUM = Year Dummy

in Table 4, COSTRT and COSTL are negatively correlated with PROFIT. This means as more cost ratio, profit per line is decreasing. LINE and DENSITY are positively correlated with PROFIT. This shows that as the number of lines and population density are increasing, profit per line is increasing. The increase of profit per line means the decrease of loss per line. These results are consistent with Korea Information Society Development Institute (2014).

#### 4.2 Estimation Results

Table 5 presents the relationship between the 4 criteria of PNLA designation and profit per line. The effect of Cost ratio, cost per line, the number of lines and population density on profit per line is presented in Table 5. From 2007 which is the first year of PNLA system to the most recent 2015, profit per line is regressed on Cost ratio, cost per line, the number of lines and population density by year.

<Table 4> Correlations between variables

	PROFIT	COSTRT	COSTL	LINE	DENSITY
PROFIT	1				
COSTRT	-0.863***	1			
COSTL	-0.775***	0.454***	1		
LINE	0.273***	-0.255***	-0.171***	1	
DENSITY	0.358***	-0.329***	-0.249***	0.821***	1

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The coefficients of cost ratio and cost per line were negative and statistically significant consistently from 2007 to 2016. This result means that cost ration and cost per line has a negative effect on profit per line. As cost ration and cost per line are increasing, profit per line is decreasing.

The coefficient of the number of lines was positive and statistically significant in 2007. From 2008 to 2015, the coefficient of the

number of lines was negative but statistically insignificant. This result represents that the positive relation of the number of lines and profit per line was in 2007. Since 2008, the positive relation of the number of lines and profit per line disappeared.

The coefficient of population density was positive and statistically significant in 2007 and 2008. From 2009 to 2015, the coefficient of population density was positive or neg-

<Table 5> Effect of designation criteria of PNLA on profit per line

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	180.087*** (0.0000)	141.466*** (0.0000)	137.021*** (0.0000)	125.266*** (0.0000)	107.763*** (0.0000)	90.342*** (0.0000)	88.147*** (0.0000)	98.950*** (0.0000)	71.041*** (0.0000)
COSTRT	-102.500*** (0.0000)	-103.388*** (0.0000)	-99.034*** (0.0000)	-96.852*** (0.0000)	-85.040*** (0.0000)	-64.147*** (0.0000)	-61.732*** (0.0000)	-64.754*** (0.0000)	-45.684*** (0.0000)
COSTL	-0.4265*** (0.0000)	-0.2563*** (0.0000)	-0.2636*** (0.0000)	-0.2155*** (0.0000)	-0.1987*** (0.0000)	-0.2583*** (0.0000)	-0.2684*** (0.0000)	-0.2997*** (0.0000)	-0.3432*** (0.0000)
LINE	0.0036** (0.0148)	-0.0017 (0.6826)	-0.0026 (0.5416)	-0.0012 (0.6419)	-0.0009 (0.6849)	0.0008 (0.7233)	-0.0000 (0.9939)	0.0006 (0.8858)	-0.0005 (0.8417)
DENSITY	0.7876* (0.0836)	2.4041* (0.0751)	2.0129 (0.1084)	0.6289 (0.4234)	0.6020 (0.3432)	0.1571 (0.8053)	-0.3937 (0.6671)	-1.0072 (0.2984)	-0.0767 (0.8832)
Obs	144	144	144	144	144	144	143	143	143
R-squared	0.9956	0.9657	0.9654	0.9709	0.9789	0.9793	0.9556	0.9379	0.9664

p-value in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

ative but statistically insignificant. This result represents that the positive relation of population density was in 2007 and 2008. Since 2009, the positive relation of population density disappeared.

## V. Conclusion

The purpose of introduction of PNLA system is to maintain stable and sustainable universal service policy. In universal service subsidy contributors and universal service provider's position, they wanted to improve the predictability of universal service subsidy(Korea Information Society Development Institute 2008)

The criteria of PNLA designation are important factors for the calculation of universal service subsidy. This research analyzed the effect of criteria of PNLA designation on profit per line by year. And this research suggested the improvement of calculation of universal service subsidy for universal service provider.

In telecommunications policy authority's position, the review of criteria of PNLA designation is needed to manage stable universal service policy.

From the fiscal year 2007, PNLA system was introduced. In 2007, Cost ration, cost per line, the number of lines and population density had high relation with profit per line. As time goes on, although the revenue of

fixed local telephone service is decreasing, the universal service subsidy is decreasing. This result represents the criteria of PNLA designation does not reflect the market situation which is the decrease of fixed local phone revenue.

In this study, the relationship between the 4 criteria of PNLA designation and profit per line was examined based on data from universal service provider.

The results of the analysis are as follows. First, profit per line and cost ratio are negatively related consistently for sample period. Second, profit per line and cost per line are negatively related consistently for sample period. Third, profit per line and the number of lines are positively related only in 2007. For the rest of sample year, profit per line and the number of lines are not related. Finally, profit per line and population density are positively related in 2007 and 2008. For the rest of sample year, profit per line and population density are not related.

Conclusively, cost ratio and cost per line are still the effective criteria of PNLA designation. But the number of lines and population density are not the effective criteria of PNLA designation.

The contributions of this research are as follows. First, this study attempts to empirically show that the effectiveness and the verification of criteria of PNLA designation. Until now, the empirical research about universal service policy is rare. Even though there are a few survey research like Hasbi(2015), empirical study based on time series data of

Korea is rare. Second, this study suggests the concrete improvement of universal service regime for telecommunications policy authority, universal service provider and universal service subsidy contributors.

When the universal service review of broadband internet and mobile phone service is needed, the results of this study would be helpful for the designation criteria of universal service area.

A limitation of this paper is that although there are another designation criteria of PNLA, this study analyzed only 4 criteria which are used by telecommunications policy authority. If more data about each area across country is available, the advanced research will be possible.

## REFERENCES

- Berg, S. V., Jiang, L., & Lin, C. (2011). "Incentives for cost shifting and misreporting: US rural universal service subsidies, 1991 - 2002". *Information Economics and Policy*, 23(3), 287-295.
- Cho, B. H. (2011), "The policy situation of improvement of Universal service policy", Seoul, *Telecommunications united* 2011 Fall
- Cremer, H., Gasmi, F., Grimaud, A., & Laffont, J. J. (1998). *The economics of universal service: Theory*. The Economic Development Institute of the World Bank.
- EC(2011), *Universal service in e-communications: report on the outcome of the public consultation and the third periodic review of the scope in accordance with Article 15 of Directive 2002/22/EC*, 2011.11.23.
- Enforcement Decree of The Telecommunications Business Act, Presidential Decree No.26683, Nov. 30, 2015 [printed in Korean]
- FCC(1997), *REPORT AND ORDER, FCC97-157*, 1997.5.8
- Hasbi, M.(2015), "Universal service obligations and public payphone use: Is regulation still necessary in the era of mobile telephony?," *Telecommunications Policy*, 39, 421-435
- Jin Hwan Hong, Chan Hi Park(2009), "Market Status and Pricing Policy under Regulatory Environment: Introducing Network Discount Program of SK Telecom", *Korea Business Review*, 13(1), 111-134 [printed in Korean]
- Kim, D. (2008). "Widening universal service in Korea to include broadband and mobile communications," *info*, 10(5/6), 70-82.
- Korea Information Society Development Institute (2014), *A Study on the Reforming Universal service Regime Corresponding to the Change of Welfare Regime*, Seoul, Korea Information Society Development Institute [printed in Korean]
- Korea Information Society Development Institute (2009, May), *The long term communications policy direction responding to convergence environment*, Seoul. [printed in Korean]
- Korea Information Society Development Institute (2008), *Revision of the Universal Service Regime following to the development of VoIP and Bundling Service(1)*, Gyoung-gi, Korea Information Society Development Institute [printed in Korean]
- Korea Information Society Development Institute (2010), *2009 Telecommunications Market Review*, Gyeong-gi, Korea Information Society

Development Institute [printed in Korean]  
 Korea Information Society Development Institute (2014), 2014 Telecommunications Market Review, Chung-buk, Korea Information Society Development Institute [printed in Korean]  
 Korea Information Society Development Institute (2015), 2015 Telecommunications Market Review, Chung-buk, Korea Information Society Development Institute [printed in Korean]  
 Lee, J. Y., & D. Lee(2015), "Expansion of Universal Service into Broadband and Mobile Communications : The Case of Korea," *Journal of Information Technology Applications & Management* 22(1), 61-76  
 Media Release, MSIP, 2012~2013, Estimation of 475billion won of universal service subsidy, MSIP Media Release, Feb. 24, 2014 [printed in Korean]  
 Media Release, MSIP, 2013~2014, Estimation of 485billion won of universal service subsidy, MSIP Media Release, Feb. 12, 2015 [printed in Korean]  
 Media Release, MSIP, 2014~2015, Estimation of 498billion won of universal service subsidy, MSIP Media Release, Jan. 28, 2016 [printed in Korean]  
 Mitomo, H., & Tajiri, N. (2010). "Provision of universal service and access over IP networks in Japan," *Telecommunications Policy*, 34 (1), 98-109.  
 Noam, E. M. (1994). "Beyond liberalization III: Reforming universal service". *Telecommunications Policy*, 18(9), 687-704.  
 Oh, K. J. (2006). "Completing the connection: Achieving universal service through municipal Wi-Fi," *Duke Law & Technology Review*, (1).  
 Public notification on the estimation method of universal service subsidy and other criteria, MSIP(Ministry of Science, ICT and Future

Planning) Public Notification No. 2015-115, Jan. 4, 2016 [printed in Korean]  
 Telecommunications Business Act, Act No. 13823, Jul. 28, 2016 [printed in Korean]  
 Turner-Lee, N. E., Bazelon, C., Ukhaneva, O., & DeVan Hankerson, M. P. P. (2016). *A Lifeline to High-Speed Internet Access: An Economic Analysis of Administrative Costs and the Impact on Consumers*. Washington D.C., MMTC(Multicultural Media, Telecom and Internet Council)

### 국내참고문헌

미래창조과학부(2016), 미래창조과학부 고시 제2015-115호, 보편적역무손실보전금 산정방법등에 관한 기준  
 미래창조과학부(2014), 보도자료: 미래부, '12/13년도 보편적역무 손실보전금 475억원 산정  
 미래창조과학부(2015), 보도자료: 미래부, '13/14년도 보편적역무 손실보전금 485억원 산정  
 미래창조과학부(2016), 보도자료: 미래부, '14/15년도 보편적역무 손실보전금 498억원 산정  
 전기통신사업법(2016)  
 전기통신사업법 시행령(2015)  
 정보통신정책연구원(2014), 복지제도 변화에 대응한 보편적 역무 제도개선 방안 연구  
 정보통신정책연구원(2009), 융합환경하의 중장기 통신정책 방향  
 정보통신정책연구원(2008), 인터넷전화 및 결합판매 활성화에 따른 보편적서비스 제도 개선방안 연구(I)  
 정보통신정책연구원(2009), 2008년도 통신시장 경쟁상황 평가  
 정보통신정책연구원(2014), 통신시장 경쟁상황 평가(2014)  
 정보통신정책연구원(2015), 통신시장 경쟁상황 평가(2015)  
 홍진환, 박찬희. (2009). "규제적 환경에서의 시장지위와 가격정책". *Korea Business Review*, 13(1), 111-134.

## 보편적서비스 손실보전대상 권역 선정 기준에 관한 연구\*

정 훈\*\*

### 요 약

통신시장의 독점시대에는 독점사업자에게 독점사업권을 주고 서비스간 상호보조를 통해서 보편적서비스를 제공하도록 하였다. 그러나 2000년대 초부터 통신 산업에 민영화 및 경쟁체제 도입이 본격화되면서 더 이상 독점사업자는 존재하지 않게 되었다. 따라서 모든 이용자에게 일정 수준의 통신서비스를 제공해 주기 위한 보편적서비스 제도가 도입되었다. Maude Hasbi(2015)는 보편적서비스는 통신 산업 자유화의 핵심 제도 중 하나라고 하였다.

우리나라의 보편적서비스 제도 중 가장 핵심적인 서비스는 시내전화서비스라 할 수 있다. 그러나 이동전화의 성장으로 인하여 시내전화 서비스는 최근 수익이 감소하는 가운데 보편적서비스의 손실보전금도 감소하는 상황이 발생하고 있다. 보편적서비스인 시내전화서비스의 안정적 운영을 위해서는 적정수준의 손실보전금이 산정되도록 할 필요가 있다.

2007년부터 2015년까지 보편적서비스 시내전화 권역별 자료를 대상으로 분석한 결과, 비용률과 회선당 비용이 높을수록 회선당이익이 감소하는 것으로 나타났다. 연도별 회귀분석에서 2007년부터 2015년까지 지속적으로 비용률과 회선당비용이 높을수록 회선당이익이 감소하는 것으로 나타나 만성적 순손실권역의 선정 기준으로서의 타당성이 유지되고 있는 것으로 확인되었다. 그러나 회선수의 경우에는 2007년에만 회선당 이익과의 관련성이 나타났고, 인구밀도의 경우에는 2007년과 2008년에만 회선당이익과의 관련성이 나타났다. 회선수는 2008년부터, 인구밀도는 2009년부터 회선당이익과의 관련성이 없어졌기 때문에 만성적 순손실권역의 선정 기준으로서의 타당성이 사라졌다는 것을 의미한다.

주제어: 보편적서비스, 보편적서비스손실보전금, 잠재적 순손실권역

\* 본 논문은 정보통신정책연구원(2014)의 "복지제도 변화 등에 대응한 보편적 의무 제도개선 방안 연구"를 수정 및 보완하여 작성함.

\*\* 정보통신정책연구원 통신전파연구실, 부연구위원, 제1저자