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December, 2013

Working Paper 13-08

KDI 국제정책대학원
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* We are grateful to the KDI School of Public Policy and Management for providing financial support.

Long-Term Care Insurance and Health Care Financing in South Korea

Jaeun Shin*

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Abstract

This paper is to evaluate how the new element of public health insurance for long-term care services (henceforth, LTCI) financially affects the preexisting National Health Insurance program (NHI). We focus on examining the role of the LTCI benefit in service use and costs of the elderly members in the NHI program. Using longitudinal data of 245 municipalities of South Korea for the period of 2008-2010, we conduct fixed-effects panel estimation of the NHI service use and spending for the elderly and find the statistically significant positive association with the LTCI payment for the elderly. The estimate (0.024, $p<0.01$) indicates additional 2,602 million KRW spending in the NHI account generated by the 1% increase in the LTCI spending on the elderly. Two lessons can be drawn for the directions of health care reforms in Korea: first, any attempt to enhance the generosity of the LTCI program in regard to eligibility and benefit package should take into account its cost-inducing effect on the NHI program. Secondly, the coordinated management of the LTC service and the NHI service delivery should be installed to serve the complex needs of the elderly for long-term care and acute care in a cost-effective way.

Keywords: national health insurance, long-term care insurance, South Korea, population ageing, health care financing

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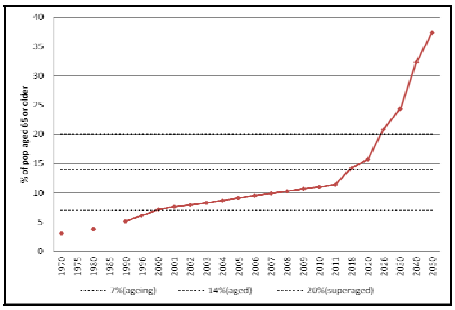
1. Introduction

The Long-Term Care Insurance (LTCI) program of South Korea was launched in 2008 to cover the long-term care services for the elderly. It is one of the major policy responses of the Korean government to the rapid population ageing and the weakening informal care mechanism for the elderly. The National Health Insurance (NHI) program has been the major payer for a comprehensive set of services (outpatient services, inpatients services, pharmaceuticals, and some of the Korean traditional medicines) over three decades. The long-term care benefit, however, was not the part of the NHI coverage package from the start and is still excluded from the NHI benefit which has been continually expanded throughout recent reforms. This paper describes the policy background and institutional details of the LTCI program with a special attention to its financing structure. We carry out a longitudinal analysis on the relationship between the LTCI spending and the NHI spending for the elderly. Evidence shows that the NHI service use and spending for the elderly will augment as the LTCI program takes a larger role in paying for the long-term care service need of the elderly. It offers an important policy advice that the LTCI program should be intimately coordinated with the NHI program in a cost-effective way when delivering long-term care and acute care services to their elderly beneficiaries

Population Ageing and Health Care Costs

Rapid population ageing is a pronounced social and economic challenge in South Korea, in particular, for the universal health insurance system (Tchoe, Nam, 2008; Cho et al. 2004). As shown in Figure 1, the percentage of the elderly (defined aged 65 or more) in the Korean population has steadily increased since 1970. This trend is accelerated over time rendering Korea an ageing society in 2000, an aged society by 2018 and a super-aged society by 2026[1]. This leaves only one decade for the Korean society to prepare for this unprecedented demographic structure it is about to live in.

Figure 1. Trend of Population Ageing in Korea (1970-2050)

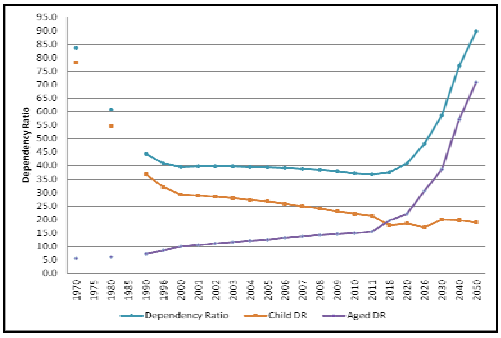


Source: National Statistic Office, Korea, 2011.

[1] The United Nations (UN) categorizes the degree of population ageing in a society based on the percentage of the elderly persons of aged 65 or older in the population as follows: ageing society (over 7%), aged society (over 14%) and super-aged society (over 20%).

Population ageing is especially rapid in Korea as the thick cohort of baby boomers enters retirement age while fertility rates hit virtually the lowest level in the world. Figure 2 is a snapshot of the consequences of these two factors. The child dependency ratio[2] declined from 36.9% in 1990 to 29.4% in 2000 and further 22.2% in 2010. In contrast, the aged dependency ratio was 7.4% in 1990, but rises to 10.1% in 2000 (36.5% increase from 1990), and to 15.0% in 2010 (48.5% increase from 2000). As more baby boomers join the elderly group and fewer new members enter the population, the shape of the age dependency ratio appears dismally steep. This particular age structure poses many economic distortions and policy challenges. Not to mention loss in both quantity and productivity in the labor force, the sustainability of the Korean economic growth is the focal point of policy debate on population ageing.

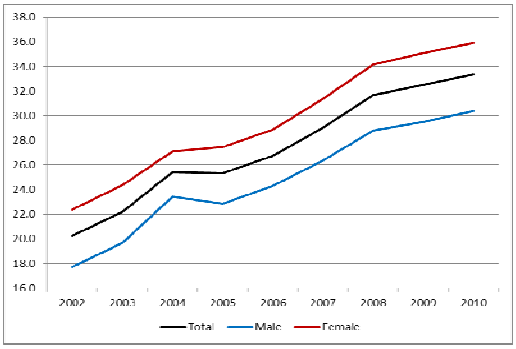
Figure 2. Changes in Dependency Ratio in Korea (1970-2050)



Source: National Statistic Office, Korea, 2011 (Author's calculation)

Figure 3. The NHI benefit payment for the elderly members (Korea, 2002-2010)

[Unit: % of total NHI benefit for all ages]



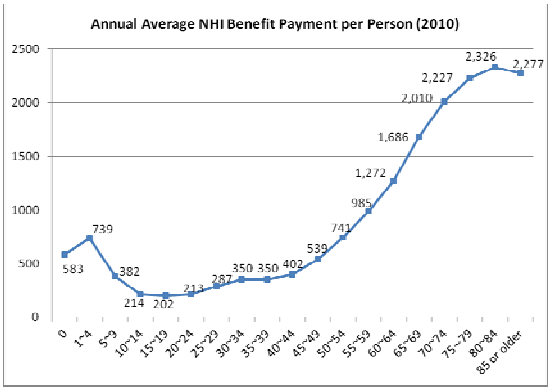
Source: National Health Insurance Corporation (NHIC) Statistical Yearbook, 2002-2010.

Considering the characteristics of the elderly, one of the most pressing policy issues is how to assure sustainability of health care spending to serve this physically and mentally vulnerable group of the

[2] Dependency ratio is the ratio of dependents (either those of aged under 15 or those of aged 65 or more) to the working age population (aged 15-64).

population. As the elderly are retired or partially active in the labor market, their contributions to tax revenue and to social security system are limited (5.1% of total NHI premium revenue in 2012). They, however, are more likely to undergo various and complex health problems, imposing large cost on the NHI system (35.3% of total NHI benefit payment in 2012). Figure 3 illustrates the trend of the NHI benefit payment share for the elderly for the period of 2002-2010. The NHI benefit payment for elderly members was 20.2% of total payments in 2002, but gets as high as 33.4% in 2010. With the persistent increase in the total number of the elderly population, the share of the NHI benefit payment for this group may keep its linear pattern.

Figure 4. NHI Benefit Payment by Age Group (Unit: Thousand KRW)



Source: National Health Insurance Corporation (NHIC) Statistical Yearbook, 2010.

Figure 4 further indicates that with more elderly members in the NHI system, the total health care costs will increase more than proportionally. The elderly population is on average more expensive to finance than the younger age groups. In 2010, the annual average NHI benefit payment per person was KRW 213,445 for the 20-24 age group, but it triples to KRW 740,988 for the 50-54 age group. The figures get exponentially enlarged for the older groups: KRW 1,685,560 for the 65-69 age group and KRW 2,326,361 for the 80-85 age group. Epidemiologically, the elderly population is characterized by the prevalence of non-lethal chronic illness such as diabetes, arthritis, after-stroke disabilities, heart diseases and dementia. These health problems need certain level of care to support the decent living of the elderly but this care will not cure them to return to the labor force. As serving more elderly members, the NHI account adds net cost. Population ageing in Korea is a major threat to the financial security of the NHI system.

The burden of providing necessary care for the elderly is mostly associated with demand for long-term care. It has been a cultural tradition in Korea that informal care by family members, mostly the first-born son (and his spouse) would meet the long-term care needs of their ageing parents. This mechanism,

however, is no longer reliable because of lower fertility, higher female labor force participation, stronger propensity of geographic and social mobility among the young generation, and the fragmentation of the family structure. As a result, the informal care provided by household needs to be complemented by the formal care, the cost of which be shared by the working population as a form of social assistance.

Institutional Overview of the LTCI Program

The LTCI program, the sister element of the public health insurance system in Korea, provides benefits for nursing home cares and home care services for the purpose of supporting the elderly of physical and mental limitations to manage their daily living. While the existing NHI program is for all citizens without eligibility selection, the LTCI benefit is primarily targeted for those over 65.[3] Upon the application for eligibility status, the LTCI administration officer will evaluate the need of long-term care of the applicant based on their physical and cognitive capacities, and any specific demand for nursing or rehabilitation services. The LTCI benefit is available only for those approved through this evaluation process.

Table 1 shows the eligibility structure of the LTCI benefit. During 2008-2011, the number of applications increased from 6.7% to 10.3% of the total elderly population. The approval rate was 59.2% in the first year of the LTCI program but later dropped to 51.8% in 2011. This means that only half of the applicants earn the need score above the threshold (55 points out of 100 points). Total number of the LTCI elderly beneficiaries in 2011 (300,231, 5.3% of total elderly population) is slightly less than the projection of Choi et al. (2010) (377,978). Kim and Kwon (2012) provides a conservative prediction that the figure will reach 375,134 (6.26% of total elderly) in 2012 and 537,661 (6.69% of total elderly) by 2020. Variations in results across studies may be inevitable because of different choice of methods and parameters. It is, however, unquestionable that these studies and experiences of Japan and Germany uniformly suggest a steady expansion in the scale of the LTCI program beneficiaries.[4]

Table 1. Eligibility of the LTCI Benefit, 2008-2011 (for person of aged 65 or more)

	2008	2009	2010	2011
Application (% of all elderly)	338,538 (6.7%)	492,891 (9.3%)	586,449 (10.8%)	579,113 (10.3%)
Approval (% of application) [% annual change]	200,259 (59.2%)	239,489 (48.6%) [19.6]	260,749 (44.5%) [8.9]	300,231 (51.8%) [15.1]

The LTCI program is already criticized for its tight approval process and limited benefit for the elderly who are approved but classified as the lower need group. This obliges the NHIS to improve the

[3] People of age under 65 may be eligible for the LTCI benefit if they are diagnosed of prelisted age-related diseases such as paralysis, dementia, Parkinson's and Alzheimer's, and unable to carry out daily activities without help.

[4] In Japan and Germany, the shares of LTCI beneficiaries were 11.6% and 8.0% at the first year of the program (in 2000 and in 1995), respectively. In 2009, the figure was recorded 16.7% in Japan and 13.4% in Germany.

generosity in eligibility to serve more elderly population and to provide better benefit to all elderly in need. These reforms will raise both the application rate and the approval rate, leading to huge increase in total number of elderly beneficiaries.

Financing of the LTCI program takes a similar format of the NHI program. The fixed contribution rate is applied to payroll of the employed or to the assessed income of the self-employed. Panel 1 of Table 2 shows the structure of the LTCI contribution rate during 2008-2011. Every fiscal year, the NHIC announces the contribution rate for the NHI program and LTCI program separately. The total amount of the LTCI contribution is determined as the LTCI contribution rate multiplied by total NHI contribution. Continual increase in both contribution rates is noted: average monthly contribution per insured was KRW 5,383 in 2011 (66.2% increase from 3,238 KRW in 2009).

Table 2. Financing of the LTCI Program, 2008-2011

Panel 1. Contribution by Members					
		2008	2009	2010	2011
The NHI contribution (% of payroll)		5.08	5.08	5.33	5.64[5]
The LTCI (% of the NHI contribution)		4.05	4.78	6.55	6.55
LTC contribution per month (in KRW)	per employed insured	-	3,238	4,700	5,383
	per self-employed household	-	2,980	4,400	4,712
Panel 2. Revenue – Expenditure State					
		2008	2009	2010	2011
Total LTC contribution (in million KRW)	Imposition	-	1,199,551	1,83,1555	2,142,332
	Collection	-	1,161,242	1,785,925	2,106,938
	Collection rate (%)	-	96.8%	97.5%	98.3%
Total revenue (R) (in million KRW)		868,975	2,084,929	2,877,740	3,263,144
Total contribution (P)		477,011	1,199,551	1,831,555	2,142,332
Total Benefit Payment (B)		431,414	1,746,732	2,415,263	2,602,664
Total Expenditure (E)		554,901	1,908,463	2,589,135	2,787,757
Balance (R–E)		314,074	176,467	288,605	475,387
B/R (%) [Average]		49.9%	84.6%	85.2%	77.6% [79.1%]
B/P (%) [Average]		90.4%	145.6%	131.9%	121.5% [127.4%]
E/R (%) [Average]		63.9%	91.5%	90.0%	82.0% [86.2%]

Notes: Figures not reported for 2008 and 2012 due to data unavailability.

The aggregate fiscal state of the LTCI program is reported in Panel 2 of Table 2. The contribution collection rate improved from 96.8% in 2009 to 98.3% in 2011, implying that this new program has no administrative problem in collecting contributions as the NHIC already established this process through a

[5] In 2012, the rate is set as 5.80%.

decade-long experience. The overall financial status of the LTCI program looks quite strong, providing benefits to the expanding number of beneficiaries shown in Table 1 (49.9% increase from 2008 to 2011) yet still running a surplus in all years from 2008 to 2011. During 2008-2011, the ratio of benefits to total revenue stays on average at 79.1% and the ratio of benefit payment to total contribution marks 127.4% on average. Both figures indicate that the LTCI contribution effectively supports the benefits for the needy elderly, and with subsidies from the general taxation of central and local governments, the LTCI program does not yet face with the financial challenge that the NHI program have suffered (NHIC, 2010). Previous studies, however, herald that the projected LTCI spending will range from 0.28% to 0.52% of GDP in 2030, both of which well exceed the 2012 figure of 0.20% of GDP (Kim, Kwon, 2012; Choi et al., 2010; Park, Song, 2011). Thus, the financing of the LTCI program is expected soon to be at the center of health policy debates in Korea.

LTCI Program and NHI Financing

The LTCI program is designated to improve access to nursing home care and various home care services among the physically dependent elderly population. Although the impending need for social protection of any kind for the aging population was indisputable, this new public health insurance program was an issue of intense political debate in two aspects. First, additional contributions required to fund the LTCI program formed a public discontent among both employers and employees. Similar to the NHI program, the major source of the LTCI financing is the collective and mandatory social insurance contributions by the working population. It generates political tensions not only among groups of different labor market status but also across generations. Secondly, the fiscal sustainability of the LTCI was uncertain. From the population health perspective, it is a desirable public approach to be responsive to the needs of the ageing society. The LTCI program is a way of internalizing the informal unpaid care by family members into the social framework of formal paid care of which costs will be shared by all members of society. It is, however, likely to strain on the financial sustainability of the public health insurance system in Korea. The NHI program has had fought against the rapid increase in total health care spending and this fight seems unlikely to get any less hard in the near future due to population ageing. The LTCI program is barely exempt from the same challenge in its financing.

The LTCI program, unlike the NHI program, operates the eligibility selection process. The benefit of the LTCI is granted only for those applied and approved. The number of applicants has consistently risen since the launch of the LTCI program – 6.5% to 10.3% of all eligible elderly (Table 1). But the approval rate remains about 50%. This hints of the possibility of excluding the marginally needy elderly. As the eligibility criteria are under the control of the National Health Insurance Service (NHIS), the NHIS may

adjust the approval guidelines as a handy tactic to manage the LTCI financing[6]. If the NHIS attempts to use the eligibility assessment process merely for the purpose of avoiding financial deficits, the LTCI program may survive the financial turmoil but fail in properly serving the ageing Korean population. For the LTCI program truly functioning as a social protection, both the generosity in eligibility and the fiscal stability of this program need to be secured and it is an overwhelming economic and political agenda for the NHIS and the Korean government.

Since the NHI has been under heavy pressure to stay financially viable, it was quite controversial whether the Korean society can afford another public health insurance program. Studies consistently warn that the actual spending of the LTCI program will overwhelm what the Korean government and the NHIS are prepared for. In 2010, the LTCI benefit payment (2,415.3 billion KRW) already exceeded the 2007 projection of the Ministry of Health and Welfare (1,499.3 billion KRW) (Yoon, Kwon, 2010). Kim and Kwon (2012) estimate the 2020 LTCI benefit payment as 4,982.4 billion KRW which is more than twice the Ministry's projection of 2,095.2 billion KRW and this trend is high probable to continue.

The fast increase in the LTCI spending can be an alarming condition for the financing of the NHI program since the use of LTC services may be closely related with the services under the NHI program. With the long-term care service provision, health status of the elderly population will be regularly monitored and possibly improved so that the elderly need less intense acute care services than otherwise. This would bring about saving in the NHI payment for the elderly (Lee, 2010; Kim et al., 2010; Kwon, 2011). There are many studies reporting that the availability of nursing home and home care services for hospital-discharged patients helped prevent re-admission, delayed discharge or visits to the emergency room (Fernandez, Forder, 2008; Forder, 2009; Smith, Stevens, 2009; Lichtenberg, 2011). Appropriate provision of primary care is also shown to substitute the long-term care service need (Rummenry, Colemean, 2003).

The opposite consequence is equally possible that the elderly may learn about previously unrecognized health care needs through the LTC providers and develops the motivation to avail more services they are entitled in the NHI program. Kim et al. (2013) finds that LTC service use is positively associated with acute hospital service use and costs. In spite of the eligibility screening process, the LTC benefit is in principle a public subsidy program to the most disadvantaged group of the elderly, allowing them to seek long-term care services. This may stimulate the use of other health care services by giving out medical recommendation or even transferring the elderly to the acute care providers. If prevailing, this

[6] Currently, the minimum score entitling applicants with the LTCI benefit is 53. According to the evaluation score, applicants are classified into Class 1 (95 or higher), Class 2 (75 to 94) or Class 3 (53 to 74). Higher score means severity of LTC needs. If they score less than 53, they are not eligible for any LTCI benefit. Class 3 cut-off is revised from 55 to 53 in July 1, 2012 to grant the marginal elderly with home care benefit. This revision shows that the benefit entitlement approval cut-off score can be arbitrarily adjusted to meet the financial ends.

effect is likely to magnify the financial burden of the working population to pay for the elderly members of the NHI program, which may be politically troublesome.

As the program is virtually new-born, there are few empirical studies on how the LTCI program interplays with the NHI program in paying for health care of the elderly population. Countries with high degree of population ageing like UK, France and Japan may provide insightful lessons on the effect of LTC service spending on total spending on acute care service. However, the structural arrangements of LTC insurance and acute care insurance in Korea are so distinctive that external validity of any lesson drawn from comparative studies is limited. To fill this gap in the literature, this study examines whether the LTCI program alleviates or aggravates the burden of the NHI program in paying for the elderly members. Due to the short history of the LTCI program, the presently available Korean household survey data do not report detailed information on the LTCI such as eligibility, application status, approval status, LTC service use, and LTC out-of-pocket payment. For this reason, this study refers to the aggregate statistics of the LTCI program across 245 municipalities (city, country, and district) for the period of 2008-2010. We conduct the panel estimation on the effects of the LTCI payment for the elderly on the quantity of the NHI service use and the NHI payment for the elderly.

The remainder of this paper is organized as follows. Section 2 presents the estimation methods and section 3 discuses findings. Section 4 concludes with policy implications and suggestions for further studies.

2. Methods

Data

For the empirical analysis, we use data from the National Health Insurance Corporation (NHIC) Statistical Yearbook and the Long-Term Care Insurance Statistical Yearbook for 2008-2010. We merge the aggregate NHI statistics with the LTCI information for 245 municipalities of Korea. The cross-sectional unit is identified according to the administrative divisions of cities (Si), counties (Geun) and districts (Gu). Variable definitions are summarized in Table 3.

Table 3. Variable definitions

Variable	Definition
nhielderly	NHI payment for the elderly
ltc	Total LTCI benefit payment
nelderly	Total number of the elderly residents
premium	Total NHI contribution
nhosp	Total number of medical facilities
ndoc	Total number of medical professionals
npat	Total number of treated elderly patients
nadm	Total number of admissions among the elderly
nhiyoung	NHI payment for the non-elderly

Descriptive Analysis

Figure 5 shows the trend of NHI and LTCI payments for the elderly population during 2008-2010. We observe a steady increase in the NHI payment per elderly from KRW 1.59 million to 1.99 million (annual growth of 11.6% and 11.9%, respectively). The LTC payment per elderly is relatively modest in magnitude (KRW 0.41 million in 2010) but it increases at a much faster rate (33.6% during 2009-2010). Unless the eligibility requirement is adjusted to control the number of LTCI beneficiaries and thus to manage the LTCI expenditure, the LTCI payment is predicted to grow further with population ageing.

Figure 5. Public Insurance Payment for the Elderly, 2008-2010 (Unit: KRW1,000)

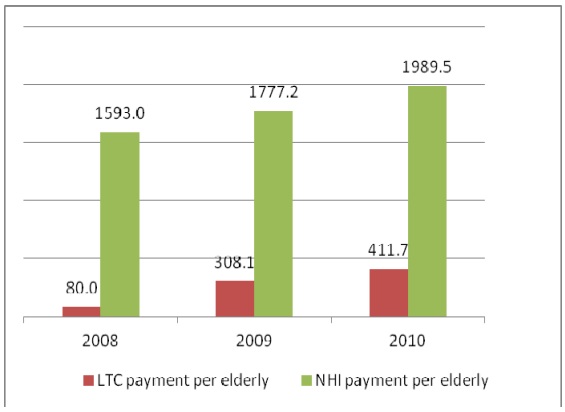


Figure 6. Relationship between NHI and LTCI Payments by Year, Unadjusted (2008-2010)

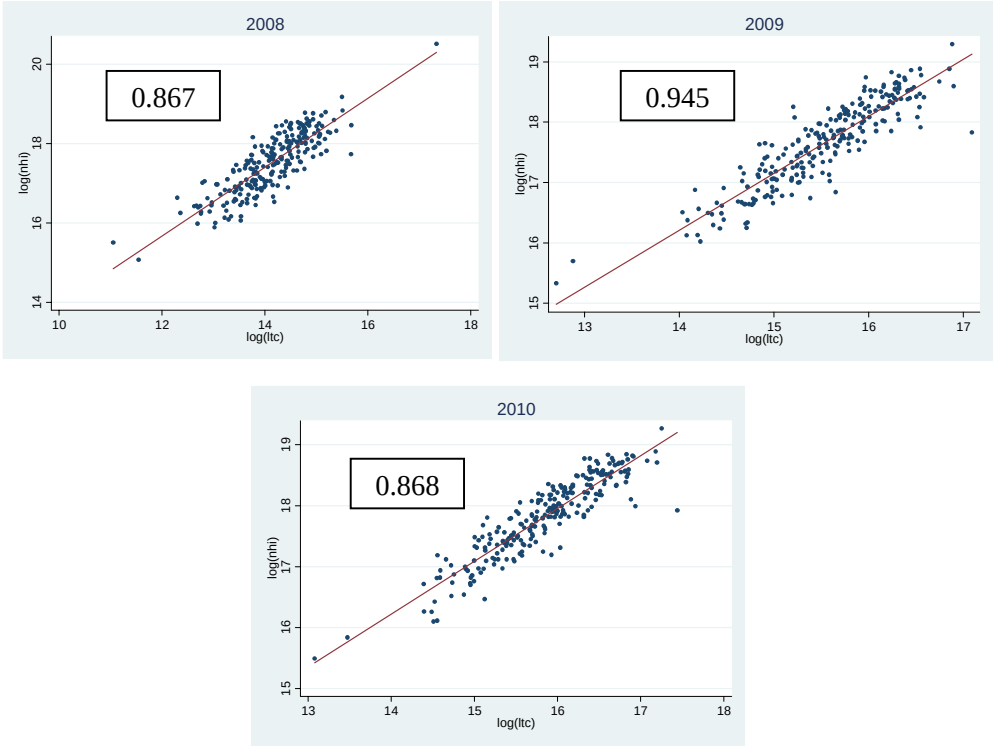
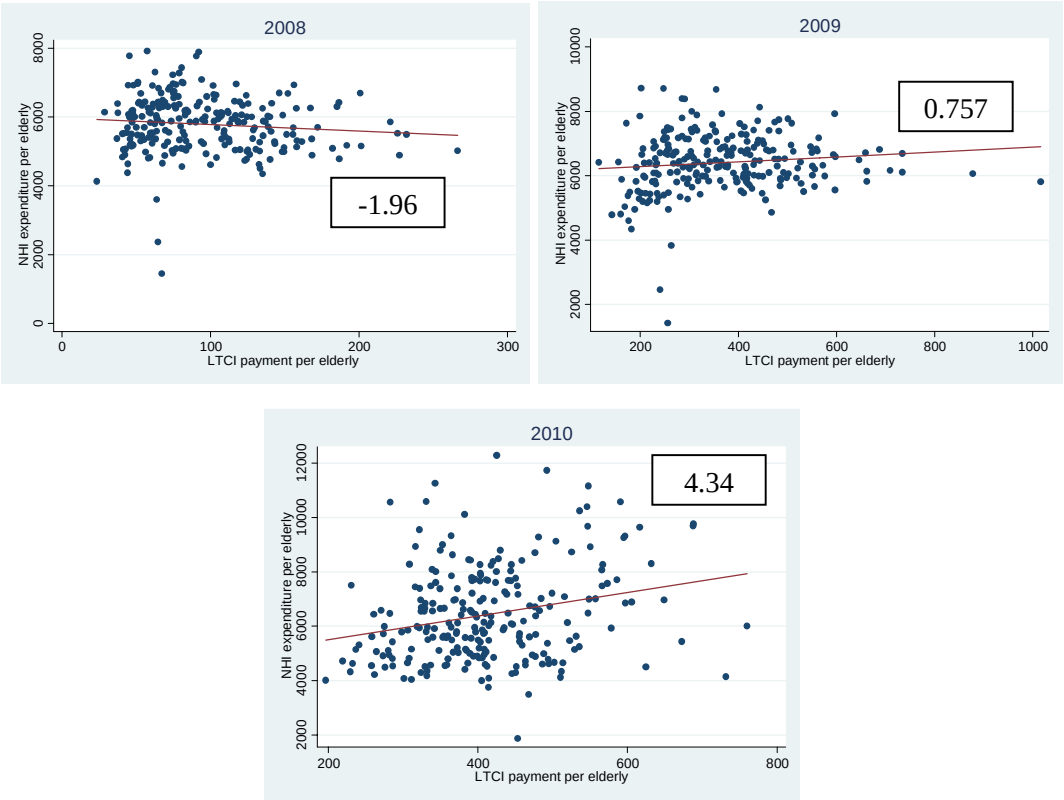


Figure 6 illustrates the simple correlation between NHI expenditure and LTCI payment by year. Strong association between two public insurance payments for the elderly is found throughout the study period. This may reflect the higher health care needs and the larger elderly population size in a region which yield higher spending both in the NHI program and in the LTCI program, thus not necessarily indicate the causation of the LTCI spending on the NHI expenditure. It, yet, is worth to note that since 2008, the observed relationship between two public health spendings has little changed, giving no hint for the offsetting effect in health care financing.

When adjusted for the size of elderly population, the correlation becomes much weaker as shown in Figure 7. In 2008, the coefficient is -1.96 ($p<0.1$) implying the possible cost saving effect of the LTCI payment on the NHI expenditure. But the relationship is positive in 2009 (0.757, $p<0.10$) and strongly statistically significantly positive in 2010 (4.34, $p<0.01$). Provided that the epidemilogical structure, thus health care needs of the eldery given a region may have not changed in any systematic way during 2008-2010, this implies that the NHI program spends more for the elderly since the advent of the LTCI program.

Figure 7. Relationship between NHI and LTCI Payments by Year, Per Elderly (2008-2010)



This is a good news in a sense that the elderly truly benefits from these public health insurance programs, having their health care needs both acture care and long-term care well supported. It, however, rings an alarm that the NHIS and the general population should be prepared for the upcoming financial pressure to uphold these programs. Coordinated and integrated management across outpatient care, inpatient care, and long-term care service can be one option to consider to monitor the service use of consumers and care delivery of providers for cost effectiveness. In the present setting of two programs, there is no procedure or management to trace how much the NHI-covered services are induced or reduced due to the provision of long-term care.

3. Estimation Results

OLS estimation

We conduct the multivariate OLS estimation to investgiate the interplay between the LTCI payment and the NHI spending for the elderly. Our dependent variables are the logarithms of total NHI benefit payment for the elderly(*log(nhi)*), total number of patients whose claims are paid by the NHI program, total number of admissions among the elderly, and total treatment days of the elderly NHI members. The key explanatory variable is the logarithm of total LTCI benefit payment for the elderly (*log(ltc)*). We control medical resource effects using total number of medical professionals and facilities, population effect using total number of the elderly residents, and income effect using total amount NHI premium contributions as a proxy of average income level of a region. Need effect, which is the most important counterfactual to account for the endogenous determination of the NHI spending and the LTCI spending of a region is controlled out by total NHI spending for the nonelderly members assuming that the epidemiological characteristics and health behaviors are not systematically different between the elderly group and the non-elderly group living in a given region.

Table 4. OLS Results: Impact of LTCI payment on NHI expenditure by Year

Variables	Log(nhi)							
	2008		2009		2010		Pooled OLS	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Log(ltc)	**.056****	.020	**.147****	.026	-.014	.041	**.054****	.016
Log(nelderly)	.345*	.173	.171	.164	.681**	.105	.473**	.060
Log(premium)	-.042**	.017	-.053**	.017	-.039	.027	-.052**	.012
Log(nhosp)	.048	.047	.185*	.065	.028	.035	.059*	.028
Log(ndoc)	.026	.022	-.025	.027	.014	.011	.019	.014
Log(nhiyoung)	.424**	.120	.439**	.105	.264**	.088	.331**	.047

Source: NHIC Statistical Yearbook 2008-2010.
Notes: Intercept is included. Cluster-robust standard errors are reported. * and ** indicate 5% and 1% statistical significance, respectively. The pooled OLS includes year dummies and 16 region-specific dummies.

Table 4 shows a statistically significant positive relationship between NHI payment and LTCI payments in 2008 and in 2009, but negative and insignificant in 2010. The magnitude of the effect is modest in both years of 2008 (0.061%, p<0.05) and 2009 (0.147%, p<0.01). This observed variation in the relationship between NHI and LTCI is partly attributed by the partial implementation of LTCI program in 2008 and the continual changes in the program operation in the following years. When pooled over the study period, the OLS estimate of the effect of the LTCI payment is 0.057% (p<.05). In these estimations, we control for the quantity of service use by including total treatment days, thus the obtained positive coefficients should be intepretated with caution: with the LTCI benefit available, the elderly may demand more expensive care under the preexisitng NHI coverage given a visit to hospitals.

Panel Estimation

OLS results in Table 4 are potentially inconsistent due to unobserved region-specific heterogeneity that may simultanesouly influence the NHI and LTCI benefit payments. To deal with this empirical issue, we set up a one-way component panel fixed-effects model estimations to average out the unobserved region-specific effect that we assume time-invariant constant. The regression equation is written as follows:

$$\log(NHI_{it}) = \alpha + \beta \cdot \log(LTCI_{it}) + Z_{it} \cdot \gamma + \mu_i + u_{it}$$

where *i* is the index for regions (I=245) and *t* is time index (T=3). *NHI* and *LTCI* denote the expenditure of each program for the elderly population. The key coefficient β will imply how LTCI benefit financially changes NHI outcomes. *Z* is the set of control variables. μ is the region-specific heterogeneity and *u* is the idiosyncratic error term. We conduct the fixed-effects (FE) because the assumption of no correlation between μ and explanatory variables required for the consistency of the random-effects (RE) estimator is tested invalid (Mundlak, 1978; Wooldridge, 2010).

Table 5 presents results of the panel estimations. In model (1), we allow the quantity of service use to change and find .045% increase in the NHI spending per the 1% increase in the LTCI spending (p<.001). In models (2) and (3), we control the service quantity factors by total number of elderly patient paid by the NHI program and total number of admissions among the elderly patients. The estimate of model (3) is relatively modest in magnitude compared to model (1), but remains statistically significantly positive (.024, p<.01), indicating that after adjusted for the service quantity factor, the LTCI spending is likely to increase the NHI spending. The 1% increase in the LTIC payment is estimated to yield to the 0.024% more of the NHI payment (2,602 million KRW based on the 2010 figures).

Table 5. The Impact of LTCI expenditure on NHI spending on the elderly

Variables	Log(nhi)					
	(1)		(2)		(3)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Log(ltc)	**.045****	.024	**.039****	.003	**.024****	.003
Log(nelderly)	.522**	.021	.012	.031	.002	.037
Log(premium)	-.023	.026	-.020	.010	-.020	.010
Log(nhosp)	-.038*	.033	-.049**	.014	-.044**	.015
Log(ndoc)	.053*	.024	.064**	.016	.063**	.015
Log(nhiyoung)	.561**	.069	.348**	.055	.276**	.050
Log(npat)			.893**	.063	.097	.071
Log(adm)					.803**	.065

Source: NHIC Statistical Yearbook 2008-2010.
Notes: Intercept is included. * and ** indicate 5% and 1% statistical significance, respectively. Standard errors (SE) are calculated robust to clustering. 16 clusters are defined including 7 metropolitan cities (Seoul, Busan, Daegu, Incheon, Gwangju, Daejeon, and Ulsan) and 9 provinces (Gyonggi, Gangwon, Chungcheong-South, Chungcheong-North, Jeonla-South, Jeonla-North, Gyongsang-South, Gyongsang-North, and Jeju)

To further examine the mechanism of this positive relationship of two programs, we run another sets of panel estimations in which the change in the NHI service use due to the LTCI spending for the elderly is assessed. Dependent variables are total number of patients paid of the NHI program, total number of admissions and total treatment days. Findings in Table 6 show that the LTCI payment has a positive significant relationship with the number of admissions, but no statistical effect on total number of patients. It means that the LTI benefit payment may not motivate the non-user elderly to initiate the NHI service use. The user elderly, however, are likely to make a greater number of admissions to medical providers (.025%, $p<.01$). These findings support that the elderly is likely to be educated to pay attention to their health conditions and to avail the necessary service due to the promotion and exposure to the LTCI program, leading to a greater NHI spending. It is inconclusive whether the increase in service use and expenditure in the NHI program contributes to reduce unmet needs and thus to foster better health in their later life.

Table 6. The Impact of LTCI expenditure on the NHI Service Use

Variables	Log(npat)		Log(adm)	
	Coeff.	SE	Coeff.	SE
Log(ltc)	.007	.007	.025**	.007
Log(nelderly)	.571**	.020	.579**	.025
Log(premium)	-.004	.009	-.004	.008
Log(nhosp)	.013	.011	.006	.013
Log(ndoc)	-.012	.016	-.011	.013
Log(nhiyoung)	.238**	.065	.326**	.085

Source: NHIC Statistical Yearbook 2008-2010.
Notes: Intercept is included. * and ** indicate 5% and 1% statistical significance, respectively. Standard errors (SE) are clustering-robust.

4. Discussion

The Long-Term Care Insurance program is a major step that the Korean health care system took in 2008 in order to serve health care needs of the ageing population. The collective contribution revenue is the primary source of financing long-term care for the elderly. With this new public insurance benefit, nursing homes and home care providers are fueled to develop a long-term care service market. This helps facilitate the adequate access to long-term care among the elderly who are in need but lack of informal care support from family members. It, however, raises two questions about the future of the Korean health insurance system: one is how the LTCI program will amend health care financing structure in Korea. In specific, there are two competing expectations on the role of LTCI program in the NHI financing. In one hand, the LTCI benefit can be cost effective for the NHI program by helping the elderly avoid costly inpatient care or emergency services. On the other hand, the LTCI benefit generates a spillover effect on service use under the NHI program similar to the case of Medicare-Medicaid dual eligibles. The promotion of the LTCI program to the elderly population has a function to educate them about their benefit to avail. Motivated by this information, they may newly identify their health care needs and seek for the care. Whether it is a case of unmet needs or of overuse is hard to discern and thus controversial. It is yet unquestionable that the NHI will carry greater financial burden associated with the rollout of the LTCI program.

In this study, we find evidence for positive financing effect of the LTCI program on the NHI program. With more LTCI spending on the elderly, there finds both greater amount of service use, and consequently, larger spending on the elderly in the NHI program. There is no evidence that the LTCI benefit generates the new elderly patients into the NHI service. As both programs are under continual reforms, it is important to keep examining the dynamics of these programs in a perspective of sustainable health care in Korea. Empirical complexity also warrants further research to deal with endogeneity problem due to health status of a region, which will drive the strong positive relationship between two financing but not causal.

A few limitations of this study are noted. This study does not address the delivery mechanism through which the LTCI elderly beneficiaries are facilitated to use more NHI services. The NHIS operates the affiliated care system to facilitate the cooperation between the LTCI providers and the NHI providers in treating elderly patients with complex needs. In 2011, 72.9% of the nursing home service beneficiaries reported to use the NHI service (Lee et al., 2012). The current affiliated care system emphasizes mostly the acute and emergency care provision at the hospital setting. But the LTCI beneficiaries receive the NHI service mainly for their chronic conditions. Responding to this loophole of the present delivery process, the NHIS considers to enhance the affiliated care system to meet these non-emergent chronic care need among the LTCI beneficiaries. If the NHIS is committed to this task, the NHI spending is highly likely to

increase along with the strengthened functioning of the LTCI program to better serve the elderly. Secondly, different types of the LTCI service (nursing home care, home care) may have heterogeneous relationships with different types of the NHI services use and spending (outpatient care, hospital inpatient service, and prescription drug). Kim and Kwon (2013) combined the NHI and LTCI individual claim data but their investigation is focused on acute hospital care and nursing hospital care. Home care may positively influence outpatient care service and prescription drug use by regularly monitoring health conditions of the elderly and giving medical advices. Studies on the detailed interlock between the LTCI service provision with the NHI service use will guide how to design the cost-effective coordination of two programs.

Another area of further studies is the equity performance of the LTCI program. The financing framework of the LTCI program is designed to foster horizontal equity in the long-term care service use (Lee et al., 2011) The equity of the long-term care service use is already challenged by the uneven distribution of long-term care facilities and service providers across regions. As the long-term care providers are private entities and the NHIC has no authority or tools to control over the establishment and operation of private care providers, the reported inequity related with providers in the LTCI program requires a close attention. Further, the LTCI program imposes the means-testing process to receive the benefit which also can be a source of inequity among the marginally unapproved elderly. In 2010, there were 2,643 elderly who applied but did not get approved for the benefit. But their level of long-term care service needs would be only slightly lower than those approved who passed the eligibility threshold.

In near future, the Korean government needs to consider a series of questions regarding the sustainable and adequate long-term care system, such as how private insurance market should be engaged in serving the long-term care needs of the elderly population, whether the increased government subsidy is necessary (in 2010, it is 15% of total LTCI revenue) to fund the LTCI program so that the LTCI premium rates can remain bearable to the working population while including the needy elderly most generously. Public expenditures on the LTC services are forecasted to grow rapidly with the increasing portion of the elderly in the Korean population. At the moment Individuals face dual financial liabilities for their lifetime health care needs: paying higher LTCI premiums while working, and building personal fund for the LTC services when old in case they fail the means-testing. It is not an unprecedented concern: the NHI program and the Medicaid in the U.S. have been striving to find a way through these issues (Brown, Finkelstein, 2011). The NHIS may discover insightful guidance from these references. This research is one of the first attempts to take a close look at the LTCI program in Korea. There are many uncertainties and consequences of the LTCI program in the Korean health care system that this study is unable to fully address and make conclusive statements on policy directions. Further study is

warranted to guide the future of both public insurance programs in Korea for their cost-effective and efficient operations.

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