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Abstract

This paper investigates the structural transition in health care finance in South Korea which may be affected by two major reforms in 2000: integration and separation. Using the OECD Health Data 2009, we longitudinally compare the performance outcomes of OECD countries in financing health care with a special focus on the case of South Korea. We find that total expenditure on health (THE) relative to the gross domestic product (GDP) in Korea has persistently increased over the entire period of study (1980-2006), and a particularly sharp increase has occurred after two major reforms in 2000. The time series analysis revealed that statistically significant increasing trends in THE/GDP and in the ratios of decomposed sources of payment to THE, such as government subsidy, social security scheme, total public health expenditure, and private insurance payment. Meanwhile, the percentage changes in the ratio of out-of-pocket payment to THE showed a decreasing pattern. Findings suggest that the public coverage of our health system has improved over the time with rising portions of government and social security financing out of the total health expenditure.

Key Words: Health care finance; Health reforms in Korea

JEL Classification: I10, I12

I. Introduction

The purpose of the study is to evaluate the current structure of South Korea's health care finance from worldwide perspective and to document recent evidence regarding the effects of two major health care reforms in 2000. We first compare various dimensions of health care financing across countries in order to locate the appropriate balance of financing sources in South Korea (henceforth, Korea). Then, we examine changes in characteristics of Korea's health care finance during the three decades since the beginning era of universal health insurance launched in 1977. Findings from the case of Korea's health finance may provide some insight for world health care systems, which have struggled with the shared tensions and goals of fair contributions, cost control, and quality services (WHO, 2000). Moreover, understanding the effects of Korea's reform in health care may give a reference level for the potential effectiveness of similar reforms in other countries.

II. History of Korean Health Care Reform[1]

The health care system in Korea has developed dramatically over the past three decades. The most remarkable achievement in its evolution is the adoption of the universal health insurance. In 1977, the government mandated compulsory medical insurance for employees and their dependents in large corporations of more than 500 workers. Coverage of the national health insurance (NHI) has continually expanded to include more occupational groups of citizens such as government employees, teachers, workers in smaller firms and the self-employed.

[1] Descriptions here were partially adopted from the previous paper, "Performance of Universal Health Insurance: Lessons from South Korea" in the *World Health and Population* (Moon and Shin, 2007).

Government employees and teachers became beneficiaries of the NHI program in January and those working in corporation with more than 300 employees were joined in July of 1979. Industrial workers working for firms with more than 100 employees started to be covered by the NHI in January of 1981. Finally, the universal health insurance was further extended to industrial workers belonging to small firms with more than 5 employees in 1988. The self-employed and the beneficiaries of the Medical Aid program began to be covered from 1989 (Kwon, 2002).

In order to effectively extend the health insurance coverage to its population, the Korean military regimes strategically separated the working population into employees and the self-employed (Peabody, et al., 1995). Mandating employers to cover their employees has been an effective way to extend coverage from the government's perspective. The notable thing associated with the mandatory expansion of the coverage in South Korea is that "universal health insurance coverage has been accomplished without any major disruption to the overall economy, any apparent harm to specific industries, or any adverse impact on small firms" (Anderson 1989; Kwon, 2002). Ultimately, virtually all Korean citizens were covered through the NHI by 1989.

Until the economic crisis in 1997, the Korean universal health insurance system was stabilized both financially and administratively. Subject to the minimal guidelines imposed by the central government, the decentralized insurance societies, either private-sector initiatives or medical insurance societies, served the covered enrollees (Jeong, 2005). Each independent insurance society had autonomy in managing the scheme for enrollees and set the level of contributions and benefits, collected premiums and co-payments, and reimbursed and monitored providers of medical care services for their enrollees (Peabody, et al., 1995; Kwon, 2002; Jeong, 2005).

Financial feasibility was its own responsibility of each society. However, the inefficiency of operating 350 individual insurance societies and financial inequity across the health insurance societies gradually emerged as serious problems in the administration of the universal health insurance. On top of that, the economy-wide financial crisis in 1997 dramatically increased the overall NHI's financial deficit. Concerns regarding both the inequity in health care financing between employment categories and the chronic deficit of health insurance societies for the self-employed led the Korean government to instigate the *integration* reform in July, 2000, which involved the merger of all health insurance societies into a single insurer, the newly formed government agency of the National Health Insurance Corporation (NHIC) (Lee, 2003; Jeong, 2005; Kwon, et al., 2005). Additional to the *integration* reform for equity and efficiency, the Korean government implemented another major reform in July, 2000: the *separation* of drug prescription by medical doctors and drug dispensing by certified pharmacists in order to improve pharmaceutical specialization and quality care (NHIC, 2005).

In the Korean experience, the rapid expansion of population coverage, however, has resulted in several problems, such as low contribution levels with limited health benefits, little involvement of the public sector in the health care delivery, cost inflation, and financial distress (Kwon, 2003). Although the launching of the National Health Insurance Corporation (NHIC) and thus the *integration* reform was to improve the financial soundness of the health insurance system, and to enhance the efficiency and equity among Korean beneficiaries, limited number of studies has been completed to evaluate the effects of health care reforms in Korea. By critically documenting the process and consequences of two major reforms in Korea, this study may provide useful implications for the prospective health care reforms in countries worldwide (Anderson, 1989; Peabody, et al., 1995).

III. Data and Sample

We used the Organization for Economic Cooperation and Development (OECD) Health Data 2008 and *Statistical Year Books* from the National Health Insurance Corporation (NHIC) for the analysis. The OECD health data 2008 contains rich information on the trends in national expenditures on health, sources of health financing, purpose of health-related payment as well as diversified demographic factors of the thirty OECD countries over the years of 1980-2006. While complete data are available for each country annually, there may be some technical and data collection issues involved in an international comparison. Nonetheless, the data are useful in outlining how well a particular health care system is performing and have been used in many previous studies (Anderson, 1997). In particular, the data allow researchers to evaluate a country's progress of health system in comparison of that of other industrialized countries.

IV. Evaluating Trends in Health Care Finance of Korean NHI

Trends in Annual Balance

During the period 1990-2008, the Korean health care spending rapidly increased at an average annual rate of 14.8%[2], which is the highest growth rate among all 30 OECD countries

[2] South Korea's total health expenditures per capita was $401 in 1990, which grew dramatically to $1,349 in 2006 in terms of the U.S dollars at 2000 purchasing power parity (PPP) rates. The average annual growth rate was computed by driving the growth rate between the two time points of 1990 and 2006 by the number of annual periods equal to 16.

over the period. That was more than 20 time of the median OECD annual growth rate of 3.93 % in Iceland.[3]

Countries like Korea with rapid economic growth tend to be characterized as higher rates of increase in total expenditures on health. The case of Korea clearly demonstrates the combination of relatively low initial per capita health care spending with high growth rate in health costs which is accompanied by dramatic GDP growth and the extension of both insurance coverage and scope of benefits over the three decades. Korea, however, is expected to face with even greater challenge of increasing health care costs due to aging population.

EXHIBIT1
Trends in the Financial Status of Korea's National Health Insurance (NHI), In Billions of Korean Won, 1984-2006

	1984	1985	1989	1990	1991	1992	1993	1994	1995	1996
Revenue	555	639	1,812	2,432	3,269	3,774	4,199	4,711	5,614	6,631
Annual % increase	-	15.1	183.6	34.2	34.4	15.4	11.3	12.2	19.2	18.1
Expenditure	558	647	1,585	2,164	2,487	2,967	3,458	3,968	5,060	6,446
Annual % increase	-	15.9	145.0	36.5	14.9	19.3	16.5	14.7	27.5	27.4
Annual balance	-3	-8	227	268	782	807	741	743	554	188
Accum. Surplus[a]	-[b]	-[b]	-[b]	-[b]	-[b]	-[b]	3,432	3,926	4,120	4,002
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Revenue	7,554	8,230	8,892	9,976	12,049	14,405	17,567	19,535	21,237	23,263
Annual % increase	13.9	8.9	8.0	12.2	20.8	19.6	22.0	11.2	8.7	9.5
Expenditure	7,766	8,775	9,585	10,919	14,244	14,913	16,097	17,474	20,146	22,944
Annual % increase	20.5	13.0	9.2	13.9	30.5	4.7	7.9	8.6	15.3	13.9
Annual balance	-212[c]	-545[c]	-693[c]	-943[c]	-2,195[c]	-508[c]	1,479	2,061	1,091	319
Accum. Surplus[a]	3,785	3,036	2,243	919	-1,811[c]	-2,572[c]	-1,492[c]	76	1,255	1574

[3] As of 2005 evaluated at the U.S dollars at 2000 purchasing power parity (PPP) rates, however, the absolute dollar value of the total health care expenditure per capita in South Korea ($1,200, 26th) was relatively low at less than half the OECD median ($2,662 in Australia). Both of South Korea's total health spending per capita ($1,200, 26th) and as a percent of GDP (6.0%, 29th next to 5.7% of Turkey) were the lowest among the five countries (Greece, New Zealand, Portugal, Spain, and South Korea) with a similar per capita income ranging from $18,000 to $24,000.

Source: National Health Insurance Corporation, *Statistical Yearbook*, various years (Seoul: NHIC)
Notes: Table formats adopted from Yang et al. (2008: 181).
[a]Cash flow surplus was reflected only, which excludes NHIC-holding asset values.
[b]Data not available.
[c]Deficit.

EXHIBIT1 shows the trends in the financial status of Korea's national health insurance. The annual balance of the national health insurance has been gradually deprived since 1992, and suffered from annual deficits from 1997 through 2002, culminating at -2,195 billion KW in 2001. Until 1990, the growth rate of revenue and expenditure stayed parallel, maintaining the annual balance in a good shape. Since 1990, however, the growth rate of expenditure has exceeded that of revenue by at maximum 9.3% point in 1996. This leads to the rapid reduction in annual balance and the balance showed increasing deficits during 1997 ~ 2001.

In response to the financial deficits, the Korean government enacted 'The Special Act of Financial Stabilization of National Health Insurance' in January 2002, which was designated to terminate in 2006. Under this Act, the Ministry of Health and Welfare overhauled the system to balance the revenue and expenditures through a newly established committee for evaluating the overall health system. The government's obligation to subsidize the national health insurance was also inscribed in the Special Act, which guaranteed a stable stream of revenue from government's central account to the NHIC's. The Korean government's efforts to meet the balance in health care achieved the goal in 2003 when the annual balance was recovered to surplus of 1,479 billion KW in 2003 and in 2004, the accumulated surplus was recorded a positive figure of 76 billion KW. High growth in expenditure, however, kept pressuring the financial soundness of the NHI account, driving the persistent decrease in annual balance from 2,061 billion KW in 2004 to 319 billion KW in 2006.

As properly noted in Yoo and Moon (2006), without fundamental changes in the delivery system of medical care, the external intervention of the Korean government to improve the financial healthiness of the national health insurance will be only temporary remedy. In the long-run, concerns are raised repeatedly over the inappropriate and excessive utilization of resources mainly generated by the universal coverage in Korea (Anderson, 1989). Therefore, high coinsurance levels and a wide range of uncovered services have been designated in Korea to reduce the potential over-utilization of health services by patients. This response, however, has not been fully successful as physicians tended to provide more uncovered services with higher margins than covered services with lower margins (Kwon, 2002) and as patients are misled by profit-pursuing physicians to seek the most sophisticated care for modest symptoms (Anderson, 1989). The NHIC's responsibility for cost control in health care got more important through tightening the reviewing process of the utilization of services among beneficiaries. The essential point may be summarized as providing accessibility to quality care at reasonable rates of contribution for consumers and enabling providers to run the business on reasonable margins that allow investment in facility and medical technology development.

Trends in Public Financing

EXHIBIT 2 shows the trends in the percent of the total health expenditure (THE) out of the gross domestic product (GDP) and the percent of the public health expenditure (PBE) out of the total health expenditure (THE) in over the years 1980-2006. As illustrated in FIGURE 1, the ratio of public health expenditure over the total expenditure on health (PBE/THE) increased constantly from 23.2% in 1980 to 55.1% in 2006.

The increase in PBD/THE was particularly dramatic in 1980's, which could be primarily contributed by the gradual expansion of the NHI coverage through the implementation of the

national health insurance as a compulsory insurance plan for all citizens residing in the Korean territory. By the end of 1990, when the national health insurance was fully implemented for the whole population, PBE/THE reached almost 40%. The growth rate of PHE/THE (70.3%) far exceeded that of THE/GDP (17.6%) over the expansion period of the NHI, 1980-1990.

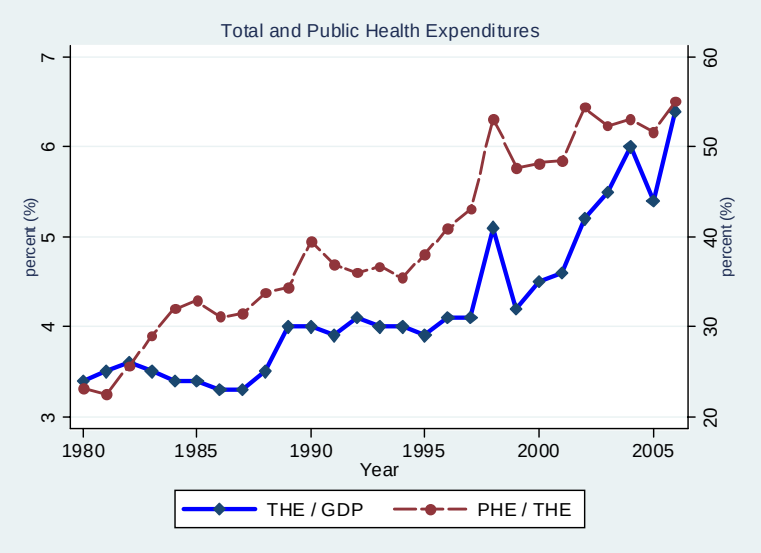
The changes in PBE/THE during 1980~2006 seem to follow the same pattern of the changes in THE/GDP, implying that the public spending takes a primary responsibility of funding total health expenditure.

EXHIBIT2
Trends in Total Health Expenditures and Public Financing of Korea's NHI, Percent, 1980-2006

	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996
THE/GDP[a]	3.4	3.4	4.0	4.0	3.9	4.1	4.0	4.0	3.9	4.1
PBE/THE[b]	23.2	32.9	34.4	39.5	36.9	36	36.7	35.5	38.1	40.9
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
THE/GDP[a]	4.1	5.1	4.2	4.5	4.6	5.2	5.5	6.0	5.4	6.4
PBE/THE[b]	43.1	53	47.7	48.2	48.5	54.5	52.4	53.1	51.7	55.1

Source: *OECD Health Data 2008* (Paris: Organization for Economic Cooperation and Development, 2008)
Notes: [a]Percent of total health expenditures (THE) out of gross domestic product (GDP)
[b]Percent of public health expenditure (PBE) out of total health expenditures (THE)

FIGURE 1



The *quantitative* growth in public health care spending was followed by *qualitative* growth, which was characterized as rising proportion of the covered services out of the total services needed (Moon and Shin, 2007). At the initial stage of the NHI in Korea, policy makers intended to lower the beneficiaries' burden by collecting minimum contributions for then-essential medical and surgical services, maternity care, hospitalization, pharmaceuticals, acupuncture treatment, etc. However, the "low contributions and limited health benefits (Kwon, 2003)" policy in Korea evolved gradually toward larger benefit package with higher contribution of beneficiaries in the following decade 1991-2000. Expansion of the benefit coverage may be associated with the rise in PBE/THE over 1991-2000.[4]

Secondly, the institutional factors have been involved in the rising growth rates of the public health expenditure relative to the total health expenditure. Before the integrated single payer of NHIC was launched in 2000, Korea's national health insurance was operated by 350

[4] It is interesting sometimes urgent services such as vaccinations, ultrasounds, MRIs (Magnetic Resonance Imaging), home care, traditional medications, meals in hospitalization, and even private rooms (rooms with less than six beds) were not covered by the national health insurance in South Korea until 2005.

independent but heavily government-regulated health insurance societies. Each independent insurance society had autonomy in managing the scheme for enrollees: set the level of contributions and benefits, collect premiums and copayments, reimburse and monitor providers of medical care services for their enrollees. Financial feasibility was the responsibility of each society (Peabody et al., 1995, Kwon, 2002, Jeong, 2005). However, inefficiency of operating 350 individual insurance societies and financial inequity across societies has gradually emerged as serious problems in the administration of the universal health insurance. In addition, concerns regarding both the inequity in health care financing between employment categories and the chronic deficit of health insurance society for the self-employed led to the merger of all health insurance societies into a single insurer in 2000 (Lee, 2003; Jeong, 2005; Kwon and Reich, 2005).[5] The big spike in 1997 for the trend in PHE/THE illustrated by FIGURE 1 may be associated with the institutional inefficiencies to deal with a dramatic increase in the overall financial deficit derived by the Asian Financial Crisis.

The growth rate of the trend in the public health expenditure over the total health expenditure (PBE/THE) was lowered down to 13.6% over the years 2001-2006, while the total health expenditure over the gross domestic product (THE/GDP) rose sharply by 39.1% from 2001 to 2006. Private expenditure from complementary private insurance may have played a role for the lowered growth rate in the PHE/THE after 2000 reforms.

From cross-sectional comparative perspective, total health expenditure per capita at the purchasing power parity (PPP) rates in Korea ($1,480) was relatively low at less than half of the OECD median ($2,714). Korea's total health expenditure per capita and as a percentage of GDP

[5] Additional to the *integration* reform for equity and efficiency, the Korean government implemented another major reform in 2000: the *separation* reform for specialization and quality care (NHIC, 2005). By the separation reform, the prescription of drugs was specialized to medical doctors and the dispensing of drugs was supposed to be conducted only by the certified pharmacists.

were the lowest among the five countries with similar per capita GDP: Greece ($2,483), New Zealand ($ 2,448), Portugal ($2,120), Spain ($2,458) and Korea ($1,480).

The ratio of the public health spending over the total health expenditure (PBE/THE) in Korea was 55.1% in 2006, relatively lower than comparable OECD countries such as Canada (70.4%), Italy (76.7%), and Japan (82.7 %, 2005). We found that the public contribution in health care located Korea at the 28rd place from the top, followed by the U.S. (45.8%) and Mexico (44.2%) in 2006. Not surprisingly, the per capita public health expenditure at the purchasing power parity (PPP) rates was also again in Korea ($815), remaining less than half of the OECD median ($1,906 in New Zealand). Korea's public health expenditure was the lowest among the five countries of similar per capita GDP: Greece ($1,528), New Zealand($1,906), Portugal($1,495), Spain($1,751), and Korea($815).

Trends in Financing Structure

EXHIBIT 3 and FIGURE 2 illustrate the structural patterns in the composition of various financing sources for health care spending in Korea. The percent of the social security scheme (SSS) out of the total expenditures on health started from 13.2% in the early stage of the universal health insurance and reached 42.6% in 2006, effectively reducing the percent of the out-of-pocket spending (OOP) relative to total health expenditure. This implies that the role of the social protection toward the medically needy has been strengthened by the national health insurance over time. Relative to the total expenditure on health, the percentage financed by government and social security scheme has constantly increased by 25% and 223% from 1980 to 2006, respectively.

In Korea, the high rate of uncovered or inadequately covered services under the NHI program may have contributed to the rapid growth in the private insurance financing out of the total health expenditure: the percentage financed by the private insurance rose from 0.8% in 1980 to 3.3% in 2006. With increased income and advanced medical technologies, strong tendency for pursuing adequate care through complementary private insurance plan was observed after the health reform in 2000.

The share of consumer payment for received health care services, when measured as per capita out-of-pocket (OOP) spending was high ($492 in 2005) in Korea, fairly above the OECD median ($402 in 2002). Even after controlling for income effects, Korean per capita OOP spending was second highest after Spain among the four countries with similar

EXHIBIT 3
Trends in the Financing Sources of Korean Health Care, Percent, 1980-2006

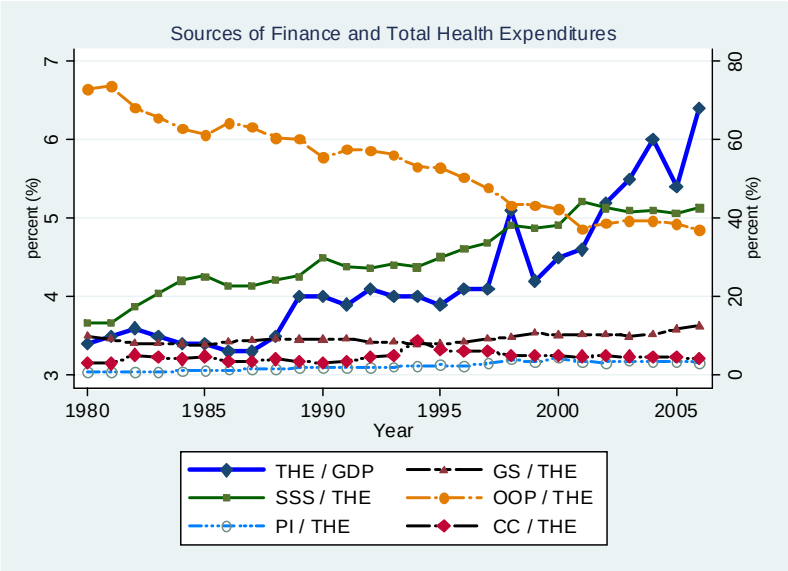
	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996
Gov't subsidy[a]	10.0	7.7	9.1	9.0	9.3	8.6	8.5	8.0	8.0	8.6
Social security[b]	13.2	25.2	25.2	30.0	27.6	27.4	28.2	27.5	30.1	32.2
Oop spending[c]	72.8	61.1	60.2	55.5	57.6	57.2	56.1	53.1	52.9	50.5
Private Insurance[d]	0.8	1.2	1.9	1.9	2.0	2.0	2.2	2.5	2.6	2.5
Corporations[e]	3.2	4.8	3.6	3.1	3.5	4.7	5.0	8.8	6.5	6.1

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Gov't subsidy[a]	9.2	9.6	10.8	10.2	10.3	10.5	9.9	10.4	11.7	12.5
Social security[b]	33.8	38.2	37.5	38.3	44.1	42.6	41.8	42.0	41.4	42.6
Oop spending[c]	47.8	43.4	43.4	42.3	37.3	38.7	39.4	39.2	38.5	36.9
Private Insurance[d]	3.0	4.0	3.4	4.3	3.4	3.3	3.6	3.4	3.4	3.3
Corporations[e]	6.1	5.0	4.9	4.9	4.8	5.0	4.8	4.6	4.6	4.3

Source: *OECD Health Data 2008* (Paris: Organization for Economic Cooperation and Development, 2008)

Notes: [a]Percentage of gov't subsidy (GS) out of total health expenditures (THE)
[b]Percentage of social security scheme (SSS) out of total health expenditures (THE)
[c]Percentage of out-of-pocket (OOP) spending out of total health expenditures (THE)
[d]Percentage of private insurance (PI) spending out of total health expenditures (THE)
[e]Percentage of corporations' contribution (CC) out of total health expenditures (THE)

FIGURE 2



per capita income (ranging from $18,000 to $24,000) : Portugal ($462), Spain ($516), New Zealand ($374). In Germany and Japan, whose health care systems have been the benchmark for molding health care system in Korea, per capita OOP was much smaller ($424 for Germany and $353 for Japan).[6] These findings suggest that the successful expansion of health insurance coverage in Korea has not necessarily guaranteed adequate financial protection against potentially catastrophic medical expenses that a member of NHI plan might be exposed to.

Since the Korean NHI program was born with low contribution rates of insured beneficiaries and the stringent government funding, the range of services like benefit-in-kind was limited, leaving many medically indispensable services excluded from the benefit package. As a result, the wide variety of services commonly received by patients remained uncovered or insufficiently covered by the NHI plan. This may account for the high OOP spending by Korea.

[6] Again, the proportion of total OOP spending to total health care expenditure as of 2005 was 38.5 % [the 3rd highest after Mexico (51.2%) and Greece (n.a.)] in South Korea compared to only 14.5% in Canada, 13.0% in Germany, 14.3% in Japan and 13.1% in the U.S.

On the other hand, the NHI plan imposed high rates of the cost sharing for covered services when it extended the coverage for the entire population concerning that the comprehensive insurance enrollment may lead to moral hazard behavior in utilizing health services. Cost sharing scheme is still an important tool for the NHI program to mitigate the burden of financing health care by encouraging beneficiaries to be price-sensitive in their decision of using health care services. Hypothetically, the cost-sharing rule could improve the financial stability of the NHIC in Korea, but the fairly responsive patients' demand for health care in regard to copayment is the prerequisite to achieve cost saving through cost sharing scheme.

In summary, the completion of the Korean universal coverage within one decade is remarkable, but this achievement should be admired with caution since the range of benefit-in-kind and the financial protection for medical expenses seem to need a continual progress to assure access to necessary care among the NHI beneficiaries.

Trends in Purpose of Payment

EXHIBIT 4 and FIGURE 3 indicates that, after the 2000 reforms, the total expenditures on the administration & insurance sector (A.&I.) relative to the total expenditure on health (THE) decreased significantly on average from 6.1% in the pre-reform years 1991-2000 to 3.9% in the post-reform period 2001-2006. At a glance, we could reasonably argue that the 2000 *integration* reform in Korea's NHI saved the administrative cost of running universal coverage.

Meanwhile, the percentage of total expenditure on medical services (MS) out of the total health expenditures (THE) slightly increased from 54.6% to 59.8% in the pre-reform (1991-2000) and post-reform (2001-2006) years, respectively. The mean equivalent test further

EXHIBIT 4
Trends in the Purpose of Payment in Korea's Health Care System, Percent, 1985-2006

	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996
Administration & Insurance[a]	6.0	5.0	6.1	6.7	6.8	6.7	6.5	6.3	5.8	6.5
Medical Services[b]	47.8	51.4	50.3	53.0	50.7	51.9	52.2	50.4	52.8	53.4
Preventive Pub. Health[c]	3.6	2.4	2.0	2.2	2.0	2.2	2.1	2.0	2.3	2.4
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Administration & Insurance[a]	6.7	6.1	4.8	4.8	3.9	3.9	3.9	3.9	4.0	3.6
Medical Services[b]	55.7	59.4	61.2	58.7	60.7	60.0	59.1	59.3	59.6	60.3
Preventive Pub. Health[c]	2.3	2.4	2.2	2.1	1.8	1.9	1.9	2.0	2.8	3.0

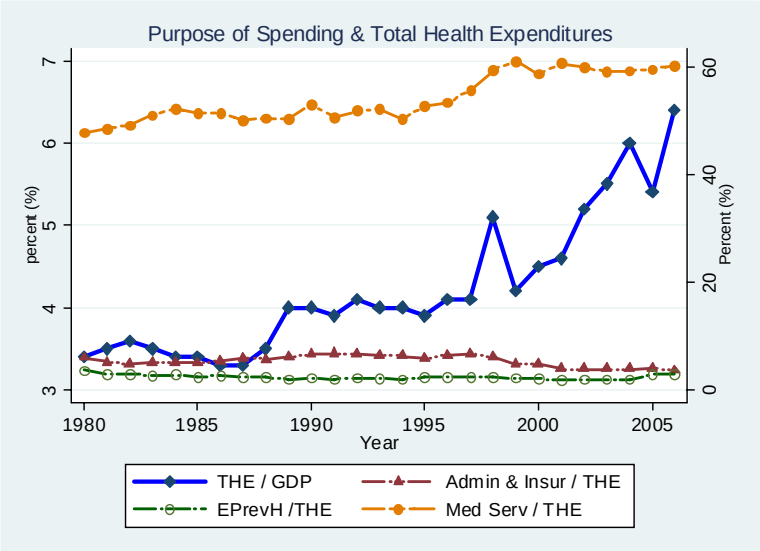
Source: *OECD Health Data 2008* (Paris: Organization for Economic Cooperation and Development, 2008)

Notes: [a]Percent of total spending on administration & insurance out of total health expenditures (A.&I./THE)

[b]Percent of total spending on medical services out of total health expenditures (MS/THE)

[c]Percent of total spending on preventive public health out of total health expenditures (Prev/THE)

FIGURE 3



confirmed that the two sets of the average ratios, A.&I./THE and MS/THE changed significantly from the pre-reform period to the post-reform period($|t|=10.042$, $p<0.01$ for A.&I./THE and $|t|=3.38$, $p<0.05$ for MS/THE). In sum, through the integration of the 350 "quasi-public health

care agencies" (Kwon, 2002: 38), the NHI system in Korea seems to achieve certain savings in administrative costs, but cost savings did not occur in regard to payment for medical services.

It is worthwhile to note that one of the important goals of the integration reform was to enhance preventive care. The segregated insurance societies enrolling a small portion of population could not afford to invest their resources to preventive medicine. With a single payer of supposedly better financial statue, it was expected to pay more attention to prevent health problems which would be a fundamental solution to saving health care costs for curing illness. In EXHIBIT 4, however, we observed no significant change in Prev/THE between the pre- and the post-reform years, which suggests that the Korean government and the NHIC needs to put expedited efforts to facilitate necessary infrastructures for better community health and to deliver preventive medical services through local public hospitals and health centers.

Time-Series Analysis of Structural Change in Health Care Financing

We investigate the impact of 2000 reforms to the structure of the Korean NHI finance using the ARIMA (1,0,1) model, results of which is presented in EXHIBIT 5. In relation to total expenditure on health, the effects of the universal health insurance completion (1980-1989) and of the 2000 reforms (2001-2006) on the sources of finance (upper panel of EXHIBIT 5) and the purpose of payment (lower panel of EXHIBIT 5) was captured by two binary indicators. The first time dummy for implemented universal health insurance was constructed with values equal to 1 for years 1980-1990 and 0 otherwise. Then, the second dummy was designed to indicate the post-reform years (2001-2006) as equal to 1 and 0 otherwise.

The time series analysis revealed that statistically significant increasing trends in GS/THE (0.09 at 5%), SSS/THE (0.75 at 1%), PI/THE (0.16 at 1%), THE/GDP (0.05 at 10%)

and PBE/THE (1.22 at 1%) whereas the decreasing trend is found in OOP/THE (-1.06 at 1%). These results imply that public spending on the health care system has improved over time with rising portions of government and social security financing. The role of private insurance payment to total health expenditure has enlarged during the entire periods of 1980~2006 (0.16) with a slight decline in the post-reform period (-0.87 at 5%). The social security contribution rate (SSS/THE) has risen in the 1990s (-5.35 at 1% for 1980-1989 period) mainly due to the full implementation of the universal health insurance completed by 1990. Total expenditure on health relative to the gross domestic product (THE/GDP) was on rising trend over the whole years (0.05), particularly increasing sharply after the 2000 reforms (0.98 at 1%).

EXHIBIT 5
Structural Changes in Health Care Finance, ARIMA(1, 0, 1) Model, Percent, 1980-2006

Source of Finance	GS/THE[a]	SSS/THE[b]	OOP/THE[c]	PI /THE[d]	CC/THE [e]
Year (trend)	0.09 (1.96)**	0.75 (5.66)***	-1.06 (-3.03)***	0.16 (3.86)***	0.07 (0.57)
1980-1989	0.42 (0.64)	-5.35 (-5.90)***	4.01 (0.74)	0.14 (0.18)	-0.35 (-0.32)
2001-2006	0.82 (1.20)	2.78 (1.51)	-3.67 (-1.64)	-0.87 (-2.66)**	-1.03 (-0.51)
Constant	7.84 (10.6)***	21.0(10.3)***	67.7 (9.58)***	0.23 (0.27)	3.97 (2.28)**
AR Lag 1.	0.39 (1.12)	0.45 (2.15)**	0.53 (2.20)**	0.67 (2.23)**	0.36 (0.32)
MA Lag 1.	1.45 (2.15)**	1.00 (0.00)	0.32 (0.87)	-0.28 (-0.81)	0.06 (004)
Purpose of Payment	THE/GDP[f]	PHE/THE[g]	A.&I./THE[h]	Prev/THE[i]	MS/THE[j]
Year (trend)	0.05 (1.82)*	1.22 (4.75)***	-0.05 (-0.54)	-0.02 (-0.40)	0.25 (0.85)
1980-1989	-0.11 (-0.34)	0.32 (0.12)	-0.69 (-0.59)	-0.17 (-0.13)	-2.95 (-0.90)
2001-2006	0.98 (3.37)***	0.24 (0.07)	-1.34 (-1.13)	-0.22 (-0.39)	2.87 (0.73)
Constant	3.30 (7.22)***	22.3 (6.31)***	6.65 (3.56)***	3.18 (2.23)**	51.0 (90.9)***
AR Lag 1.	0.54 (1.26)	0.26 (0.19)	0.52 (1.32)	0.89 (4.39)***	0.62 (3.09)**
MA Lag 1.	-1.00(-0.00)	0.08 (0.05)	0.45 (1.12)	-0.04(-0.09)	0.35 (1.16)

Source: *OECD Health Data 2008*

Notes: Asymptotic Z-statistics are reported in the bracket. *<0.1, **<0.05, ***<0.01

[a]Percent of government subsidy out of total health expenditures (GS / THE)

[b]Percent of social security scheme out of total health expenditures (SSS / THE)

[c]Percent of out-of-pocket spending out of total health expenditures (OOP / THE)

[d]Percent of private insurance spending out of total health expenditures (PI / THE)

[e]Percent of corporations' contribution out of total health expenditures (CC / THE)

[f]Percent of total health expenditures out of gross domestic product (THE / GDP)

[g]Percent of public health expenditures out of total health expenditures (PHE / THE)

[h]Percent of total spending on administration & insurance out of total health expenditures (A.&I./THE)

[i]Percent of total spending on preventive public health out of total health expenditures (EPrevH / THE)

[j]Percent of total spending on medical services out of total health expenditures (MS / THE)

Determinants of the National Health Expenditure

EXHIBIT 6 presents the estimation results to identify the determining factors of total health expenditure during 1990-2006. Using five alternative models of log-log variables, we attempt to capture the elasticity association of total health expenditure (THE) with various components of THE. To accommodate the serial correlation in residuals, we applied three

EXHIBIT 6
Determinants of Total Health Care Expenditure, 1990-2006 (N=17)

Dep. Var.: lnTHE[a]	Model 1 OLS	Model 2 Newey-West	Model 3 ARIMA(1,1,1)	Model 4 ARIMA(2,1,0)	Model 5 ARIMA(3,1,0)
lnGS[b]	-0.002 (-0.00)	-0.002 (-0.01)	0.34 (0.91)	0.28 (0.48)	0.25 (1.53)
lnSSC[c]	-0.39 (-0.40)	-0.39 (-0.56)	-0.65 (-0.95)	-0.76 (-1.57)	-0.48 (-1.90)*
lnOOP[d]	-1.29 (-1.65)	-1.29 (-2.00)*	-1.38 (-3.05)***	-1.44 (-1.86)*	-1.46 (-13.01)***
lnPI[e]	-0.55 (-0.84)	-0.55 (-1.04)	-0.45 (-0.64)	-0.51 (-0.47)	-0.7 (-2.01)**
lnA.&I.[f]	0.83 (1.57)	0.83 (1.65)	0.9 (3.12)***	0.92 (2.24)**	0.86 (6.41)***
lnPrev[g]	-0.001 (-0.02)	-0.001 (-0.06)	-0.01 (-0.10)	-0.01 (-0.47)	0.004 (0.25)
lnMS[h]	-0.82 (-1.01)	-0.82 (-4.20)***	-1.08 (-2.61)***	-0.9 (-1.76)*	-0.97 (-6.76)***
Year (trend)[i]	0.28 (2.19)*	0.28 (4.04)***	-	-	-
2001-2006[j]	0.25 (0.89)	0.25 (0.321)	0.32 (1.67)*	0.32 (1.34)	0.25 (2.73)***
Constant	26.6 (2.61)**	26.6 (3.44)**	0.28 (3.30)***	0.29 (1.78)*	0.3 (7.38)***
AR Lag 1	-	-	-0.86 (-2.98)***	-1.5 (-6.0)***	-2.23 (-23.27)***
AR Lag 2	-	-	-	-0.84 (-3.45)***	-2.22 (-25.54)***
AR Lag 3	-	-	-	-	-0.97 (-12.18)***
Adj-R^2	0.90	-	-	-	-
F(9,7)	16.2***	377.9***	-	-	-

Wald chi2	-	-	-	-	2782.4***
Log Likelihood	-	-	23.8	23.5	44.0
Durbin's alt. Test	Reject "H0: no serial correl." for all lags (1-10) at 5%				
Breusch-Godfrey Test	Reject "H0: no serial correl." For all lags (1-10) at 5%				

Source: *OECD Health Data 2008* (Paris: Organization for Economic Cooperation and Development, 2008)
Notes: T-statistics, autocorrelation-corrected t-statistics, and asymptotic z-statistics are reported in the brackets for OLS, Newey-West, and ARIMA models, respectively. *<0.1, **<0.05, ***<0.01.
[a]Natural log of total health expenditures (lnTHE); [b]Natural log of gov't subsidy (lnGS);
[c]Natural logof social security scheme (lnSSS); [d]Natural log of out-of-pocket spending (lnOOP);
[e]Natural log of private insurance spending (lnPI); [f]Natural log of total spending on admin. & Insurance (lnA.&I.); [g]Natural log of total spending on preventive public health (ln_Prev); [h]Natural log of total spending on medical services (lnMS); [i]Year-specific time trend regressor; [j]Binary indicator for 1 if year>=2001, 0 otherwise;
[k]Moving Average (MA) correlation coefficient depressed as insignificant.

autocorrelation tests to the standard OLS model (Model 1) such as the standard Durbin-Watson test, the Durbin's alternative test, and the Breusch-Godfrey lagrange multiplier (LM) tests, all of which confirmed the presence of serial correlation at 5% level in the residual distribution for all lags. Thus, the Newey-West autocorrelation-robust OLS model (Model 2) and three ARIMA frameworks are further employed.

The ARIMA models are defined as assuming the differentiated auto-regressive (AR), moving average (MA) process of the disturbance terms. We applied three ARIMA models – (1,0,1), (2,1,0), and (3,1,0) and compared the model fitness by log likelihood scores. We found that ARIMA (3,1,0) exhibited the best fit with the highest log likelihood score of 44.0. The autocorrelation coefficient of the moving average (MA) process was suppressed in ARIMA (1,1,1) (Model 3).

Empirical results in Model 5 imply that out-of-pocket payment (lnOOP) was adversely associated with the total expenditures on health at 1% level of significance (-1.46, $p<0.01$). This outcome was consistent with the results from the Newey-West model (-1.29, $p<0.1$). Social security financing (lnSSS) and private insurance financing (lnPI) were also adversely associated with total health expenditure (-0.48, $p<0.01$ for lnSSS, -0.7, $p<0.05$ for lnPI). The administrative & insurance (lnA.&I.) and the expenditure on medical services (lnMS) were positively (0.86, $p<0.01$) and adversely (-0.97, $p<0.01$) correlated, respectively, with the total health expenditure.

V. Concluding Remarks

Korea's incremental expansion of health insurance coverage from private employees in large firms to public employees and finally to self-employed rural residents was effective as it allowed private-sector manufacturers to smoothly accommodate the cost of providing health plans to their workers. Although the Korean government lacked sufficient funds for universal coverage in 1977, at the commencement of the NHI, it was able to evade the heavy financial burden of supporting the NHI system by collecting contributions from private health insurance societies and by limiting government subsidies only to defaulting societies. Furthermore, the gradual implementation of the universal health plan provided the Korean government with sufficient time to mediate any severe conflicts that might arise among insurance societies with varying financial statuses. In this process, the government successfully merged the insurance societies into a single insurer, the NHIC, while increasing government assistance to a financially challenged group, the self-employed, among NHI beneficiaries.

At the launching of the NHI in Korea, many predicted that it would suffer financial distress, but no significant sign of financial instability was observed in the trends in financial receipts and disbursements during the early 1990s. Clearly, Korea benefited from its rapid economic growth during the 1990s in sustaining the sound health care system (Lee, 2003). However, the economic crisis of late 1997 introduced a severe financial deficit challenge to the Korean NHI and the deficit grew constantly each year (Kwon, 2002; Lee, 2003; Jeong, 2005). The successful completion of universal insurance coverage has resulted in the rapid increase in health care expenditure in Korea from $169 (4.0% of GDP) per capita in 1985 to $1,480 (6.4% of GDP) in 2006, of an average annual growth rate as high as 36.9%.

Since 1998, the cost containment and stabilization of the NHI financial deficit has been a pressing mission for the Korean NHIC. To contain health care spending, two consumer-side schemes have been implemented in Korea: requiring patients to obtain referrals from general practitioners to meet a specialist in general hospitals, and a high co-payment structure as a mechanism for suppressing the use of expensive and medically unnecessary treatments. These strategies, however, have not been regarded as very helpful in reducing health expenditure. Since the 2000 reforms, the total heath expenditure increased greatly from $36.2 billion in 2000, the year of the reform's introduction, to $71.5 billion in 2006 (average annual growth rate of 16%), which was much higher than that of 9.9% from 1995 to 2000. The per capita health expenditure also rose dramatically from $771 in 2000 to $1,480 in 2006 (an average annual growth rate of 15.3%), which was much higher than that of 11.1% from 1995 to 2000.

Lessons from the Korean experience in escalating health care costs is that governmental policies to regulate the supply side of the market are essential to maintain the financial worthiness of the NHI system. The five-year experience after the integration reform in Korea

indicates that government cost containment in the absence of effective monitoring on the supply side can no longer succeed in controlling health care expenditure (Kwon, 2002; Lee, 2003).

The Korean government acknowledged the need to control providers' behavior and conducted several pilot programs of the Diagnosis-Related-Group (DRG) system in the reimbursement scheme. The outcomes of these pilot programs were encouraging: less spending for a specific disease treated under the DRG system than under the fee-for-service system where fees for services provided by hospitals and physicians are set by the government (Kwon, 2002). Unfortunately, the government failed in its attempt to enact the DRG reimbursement system for the entire NHI system due to the fierce opposition of providers, medical professionals and hospitals. Therefore, few cost containment programs have actually been developed in Korea. The fixed fee scheme was the most effective government regulation on providers but was rapidly disrupted when it faced unexpectedly fierce strikes by physicians (Lee 2003; Kwon et al. 2005).

The lack of regulation of the supply side and the expansion of insurance coverage to all citizens led to the rising health care costs (Kim, et al., 2004). Furthermore, the rising health care cost was mostly shifted to consumers as a larger portion of their payrolls is deducted as their contributions. The relatively small portion of private expenditure (about 55% of the total health care expenditure) and the relatively high proportion of cost sharing (13.7%) and out-of-pocket spending (36.9%) by households in receiving health care are consequences of the weak monitoring power of the NHIC.

After all, the rapid increase in health care expenditure remains a burden to policy makers in designing future shape of the NHI. In this regard, precise understanding of provider-side incentive in the health care market is required to construct effective ways to monitor cost-generating behaviors of involved stakeholders. Future health care reforms should pay close

attention to what incentives should be installed for both consumers and providers to become most cost-sensitive. Also, high OOP payment may be reconsidered as a problem, not as a tool for cost control, because people with limited private resources may be alienated from necessary medical care. Enhanced public health programs against adverse health-related behaviors will be helpful for promote healthy life and hence curbing the rapidly growing health care costs in the aging society.

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