Advances in Reforming Universal Health Insurance:

Lessons from South Korea

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<ABSTRACT>

This paper is an updated, follow-up version of our previous work by accommodating time series analysis. We investigated the trends in health care finance that was recently affected by three, i.e., *integration*, *separation*, and *financial* reforms. Using the OECD Health Data 2008, we compared the performance outcomes of OECD countries longitudinally. We found that total expenditures on health relative to the gross domestic product (THE/GDP) rose over the whole years (1980-2006), particularly having increased sharply after the three health care reforms in 2000. The time series analysis revealed that statistically significant increasing trends in the ratios of THE/GDP, GS/THE, SSS/THE, PHE/THE, and PI/THE at10%, 5% and 1%, respectively. Meanwhile, the percentage change of the OOP/THE was on the way of decreasing trend at 1% level of significance. Based on the results, we conclude 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 expenditures. The coverage from the private insurance (PI/THE) has risen as well over the whole 26 years with statistical significance and then dropped slightly in the post-reform period (2001-2006). As expected, the social security financing (SSS/THE) increased in the 1990s as a result of the full implementation of universal health insurance in 1990.

KEY WORDS: Health Care Finance, Health Reform, OECD Country

I. Introduction

The purpose of the study is to examine the current status of South Korea's health care finance from worldwide perspective and to document recent evidence owing to the recent financial reform of the country in 2000. The comparison was focused on the dimension of health finance that has been central in health care debates across countries for years. Our curiosity was concentrated on what was the characteristic trend in South Korea's health care finance during the three decades starting from the beginning of our universal health insurance in 1977. The evidence and findings observed from the South Korea's health finance may provide some insight for world health care systems, which have struggled with the shared tensions and goals among fair contributions, cost control, and quality services (WHO 2000). Moreover, understanding how was the effect of South 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 South Korean health care system has developed dramatically over the past three decades. The most remarkable achievement in its evolution is the adoption of the universal health insurance. Since 1977, when the government mandated compulsory medical insurance for employees and their dependents in large corporations of more than 500 workers, the national health insurance (HNI) coverage has been continually expanding to include more occupational groups of citizens such as government employees, teachers, workers in smaller firms and the self-employed.

To extend the health insurance coverage to its population, the basic strategy adopted by the Korean military regime was to separate the working population into employees and the self-employed (Peadoby et al. 1995). Mandating employers to cover their employees has been an effective way to extend

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[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* (May, 2007), written by the same authors, S. Moon and J. Shin.

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, all of the South Korean citizens were covered through the NHI by 1989.

Until the economic crisis in 1997, the South 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 South 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). The NHIC covered the entire population of the country as beneficiaries to the NHI, i.e., government employees and teachers, the self-employed, and industrial workers.

In the South Korean experience, the rapid expansion to the population coverage, however, has resulted in several problems, such as low contribution levels with limited health benefits, little involvement

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of the public sector in the health care delivery, cost inflation, and financial distress (Kwon 2003: 65). 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 South Korean beneficiaries, limited number of studies has been completed to evaluate the effect of the health care reform in South Korea. The documentation of the process and the assessment of the effects from the South Korean case may suggest some implications for different countries' planned reform in health care worldwide (Anderson 1989; Peabody et al. 1995).

II. 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.

III. Evaluating Trends in Health Care Finance

During the period 1990-2008, the South 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 over the period. That was more than 20 time of the median OECD annual growth rate of 3.93 % in Iceland.[3]

EXHIBIT1
Trends In The Financial Status Of South Korea's National Health Insurance (NHI), In Billions Of Korean Won, 1990-200

	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
Expenditure	558	647	1,585	2,164	2,487	2,967	3,458	3,968	5,060	6,446
Annual balance	-3	-8	227	268	782	807	741	743	554	188
Accumulated 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
Expenditure	7,766	8,775	9,585	10,919	14,244	14,913	16,097	17,474	20,146	22,944
Annual balance	-212[c]	-545[c]	-693[c]	-943[c]	-2,195[c]	-508[c]	1,479	2,061	1,091	319
Accumulated Surplus[a]	3,785	3,036	2,243	919	-1,811[c]	-2,572[c]	-1,492[c]	76	1,255	1574

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.

Countries like South Korea with more rapid economic growth tend to be characterized as higher rates of increase in total expenditures on health. The case of South Korea clearly demonstrates the

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[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 diving the growth rate between the two time points of 1990 and 2006 by the number of annual periods equal to 16.

[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.

combination of relatively low initial per capita spending and high growth rate in health costs accompanied by a dramatic GDP growth and the extension of insurance coverage and scope of benefits over the three decades. South Korea, however, is presumed to be facing a large future challenge in growing health care costs associated with her aging population.

EEHIBIT1 shows the trends in the financial status of South Korea's national health insurance. The annual balance of the national health insurance suffered annual deficits over the period starting from 1997 through 2002, culminating at -943 Billion Won in 2000. The financial crisis in South Korea's national health insurance was particularly aggravated by inefficient structure for paying bills and unintended consequences from the process of the *separation of prescribing and dispensing.*

In response to the financial deficits, Korean government prepared a combined set of policies for financially stabilizing the national health insurance and adequately implementing the *separation of prescribing and dispensing* on May 31, 2001. On top of that, the "Financial Stabilization Act of National Health Insurance" was enacted on January 2002 as a special law, which will be effective from 2003 through 2006. Under the Financial Stabilization of National Health Insurance Act, the Ministry of Health and Welfare overhaul 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 inscribed in the Financial Stabilization of National Health Insurance Act, which guaranteed a stable stream of revenue from government's central account to the NHIC's. The South Korean government's efforts to meet the balance in health care achieved the goal in 2004, two years earlier than expected.

However, some researchers like Yoo and Moon (2006: 267-268) point out that, without fundamental changes in the delivery system of medical care, South Korean government's efforts to improve the financial healthiness of the national health insurance will lead to only short-run effects. In the long-run, concerns were raised repeatedly over the inappropriate and excessive utilization of resources mainly generated by the universal coverage in South Korea (Anderson, 1989: 9). Therefore, high coinsurance levels and a wide range of uncovered services have been designated in South 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: 35) and as patients are misled by profit-pursuing physicians to seek the most

sophisticated care for modest symptoms (Anderson 1989: 9). 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.

EXHIBIT2
Trends In Total Health Expenditures and Public Financing of South Korea's Health Care System, 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
PHE / 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
PHE / 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 (PHE) out of total health expenditures (THE)
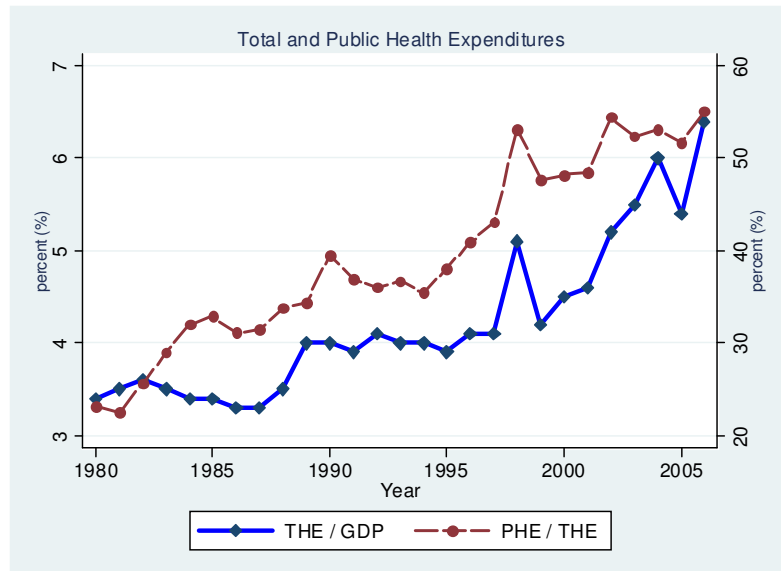
FIGURE 1

EXHIBIT 2 shows the trends in the percent of the total health expenditures out of the gross domestic product (THE / GDP) and the percent of the public health expenditures out of the total health expenditures (PHE / THE) in over the years 1980-2006. As illustrated in FIGURE 1, the ratio of public health expenditures over the total expenditures on health (PHE / THE) increased constantly from 23.2% in 1980 to more than double percentage point of 55.1% in 2006. That could be mostly explained by the gradual expansion of the public insurance coverage owing to the implementation of the national health insurance, which began as government-mandated compulsory medical insurance for employees and their dependents in large corporations of more than 500 workers in 1977. Coverage of the national health insurance was extended to government employees and teachers in January and then to those working in corporation with more than 300 employees 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: 17).

The gradual expansion of the national insurance coverage contributed greatly to the continual increase of the ratio of the public spending over the total health expenditures. The coverage expansion seems to be enough to explain the rapid increase of public expenditures relative to the total expenditures in the years 1980-1990. By the end of 1990, when the national health insurance was fully implemented to cover the whole population, the percentage of the public health expenditures (PHE) out of the total health expenditures (THE) reached almost 40%. The growth rate of the PHE / THE, 70.3%, far exceeded that of the THE / GDP, 17.6%, over the period of implementing the national health insurance in years 1980-1990.

The *quantitative* growth in public health care was followed by *qualitative* growth, which was characterized as rising proportion of the covered services out of the total services needed. Expansion of the benefit coverage surely led to the rise in public expenditures on health relative to the total expenditures on health in 1991-2000. At the initial stage of the national health insurance in South 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: 65)" policy in South Korea evolved gradually toward larger benefit package with higher contribution from the beneficiaries in the following decade 1991-2000. We believe that the increase in PHE / THE of the second decade 1991-2000 should be understood in association with South Korean government's efforts to enlarge the scope of the benefit during that period.[4]

Secondly, the institutional factors have been involved in the rising growth rates of the public health expenditures relative to the total health expenditures. Before the integrated single payer, NHIC, was launched in 2000, South Korea's national health insurance was operated by 350 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 have 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. For worse, it is true that the economy-wide crisis (Asian Financial Crisis) in 1997 caused a dramatic increase in the overall financial deficit and triggered the health cost inflation.

The growth rate of the trend in the public health expenditures over the total health expenditures (PHE / THE) was lowered down to 13.6% over the years 2001-2006, while the total health expenditures over the gross domestic product (THE / GDP) rose sharply by 39.1% from 2001 to 2006. Private

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[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.

[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.

expenditures from complementary private insurance may have played a role for the lowered growth rate in the PHE / THE after the *integration* and *separation* reform.

From cross-sectional comparative perspective, the ratio of the public health spending over the total health expenditures (PHE / THE) was 55.1% in South Korea, 2006, compared to much higher rates in other OECD countries such as Canada (70.4%), Italy (76.7%), Japan (82.7 %, 2005), U.S. (87.3%). We found that South Korea's ratio of the PHE/THE was at the 28rd place from the top, leaving behind the U.S. (45.8%) and Mexico (44.2%) in 2006.

The public health expenditure per capita at the purchasing power parity (PPP) rates was low again in South Korea ($815), remaining less than half of the OECD median ($1,906 in New Zealand). South Korea's public health expenditure was the lowest among the five countries - Greece ($1,528), New Zealand($1,906), Portugal($1,495), Spain($1,751), and South Korea($815) - with a similar GDP per capita.

In terms of total health expenditures, we report that total health expenditure per capita at the purchasing power parity (PPP) rates in South Korea ($1,480) was relatively low at less than half of the OECD median ($2,714). South Korea's total health expenditures per capita and as a percentage of GDP were the lowest among the five countries – Greece ($2,483), New Zealand ($ 2,448), Portugal ($2,120), Spain ($2,458) and South Korea ($1,480) - with similar per capita income. South Korea is presumed to be facing the future challenges in health care costs associated with the aging population.

EXHIBIT 3 and FIGURE 2 illustrate the recent trends in the factors that constitute the total expenditures on health. As desired, the percent of the social security scheme out of the total expenditures on health (SSS / THE) started from 13.2% in the early stage of the universal health insurance to reach 42.6% in 2006, reducing the percent of the out-of-pocket spending relative to total health expenditures (OOP / THE) effectively. 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 expenditures on health, the percentage financed by government and social security scheme has constantly increased by 25% and 223% from 1980 to 2006, respectively. The percentage financed by the private insurance rose from 0.8% in 1980 to 3.3% in 2006 after the *integration* and *separation* reform of the health care.

EXHIBIT 3
Trends In The Financing Sources of South 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

Sources of Finance and Total Health Expenditures
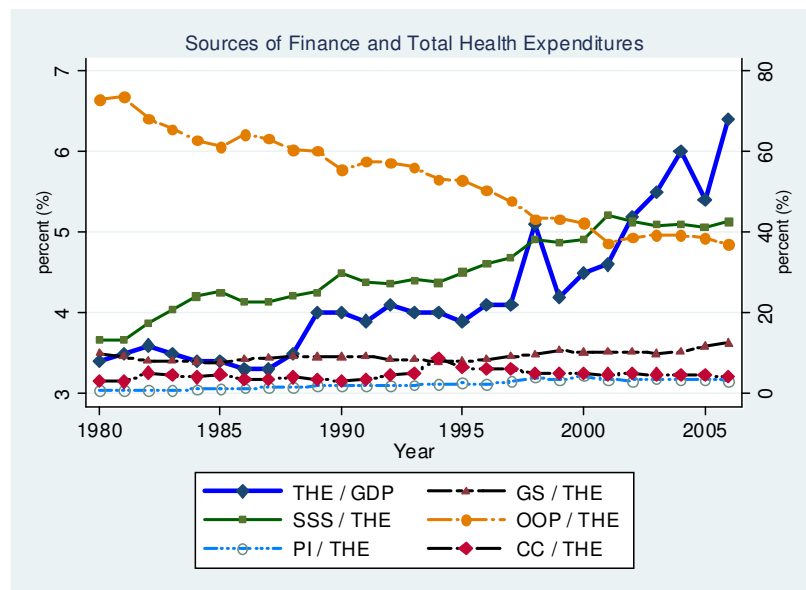
In South Korea, the high rate of uncovered or inadequately covered services seems to have contributed to the rapid growth in the private insurance financing out of the total health expenditures. With increased income and advanced medical technologies, strong tendency for pursuing adequate care through complementary insurance plan was observed after the health reform in 2000.

With less support from the central government, the consumer's share of the health care costs measured by per capita out-of-pocket (OOP) spending was high ($492 in 2005) in South Korea, well above the OECD median ($402 in 2002). Even after controlling for income effects, South Korean per capita OOP spending was second highest after Spain among the five countries with similar income (ranging from $18,000 to $24,000) – Portugal ($462), Spain ($516), New Zealand ($374), Greece (N.A.). In Germany and Japan, whose health care systems have been the benchmark for molding health care financing of the South Korean system, 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 South Korea has not necessarily guaranteed satisfactory financial protection against potentially catastrophic medical expenses that an average South Korean citizen might be exposed to.

Furthermore, the low contribution rates of the insured beneficiaries and the stringent public funding for the health care system have limited the range of services like benefit-in-kind. The wide variety of services commonly received by patients that remain uncovered or inadequately covered by the insurance may account for the high OOP spending by South Korea. On the other hand, the high rates of the cost sharing may play a role in mitigating the previously mentioned moral hazard effect in utilizing health services. Many researchers believe that the introduction of the cost-sharing rule could improve the financial stability of the NHIC in South Korea, which is the only insurer of the Korean NHI that has suffered a continuous deficit from 1997 through 2003.

In summary, the benefits of the Korean universal coverage, though its achievement, and especially so rapidly, is admirable, should not be overemphasized since in practice, the range of the benefit-in-kind contained in the Korean NHI package is insufficient to completely remove the barriers to necessary care among the insured South Korean beneficiaries.

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[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.

EXHIBIT 4
Trends In The Purpose of Payment in South 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 Public 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 Public 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 (Med Serv. / THE)
[c]Percent of total spending on preventive public health out of total health expenditures (EPrevH / THE)
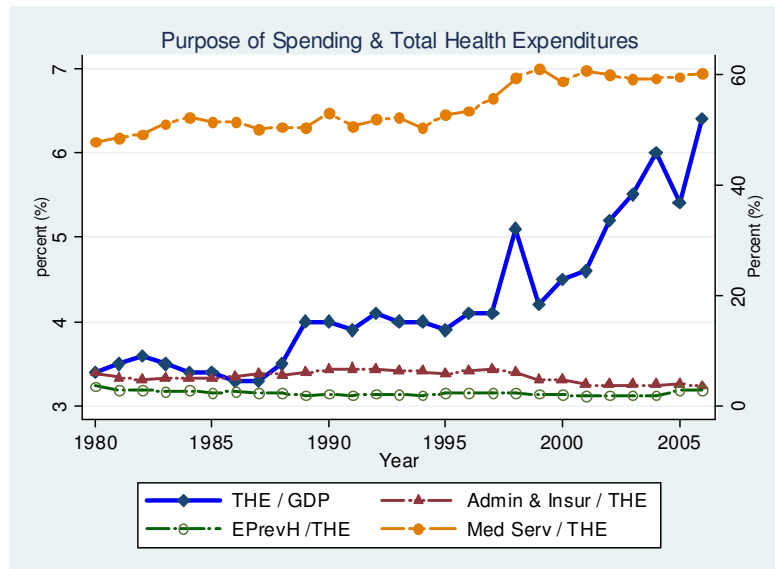
FIGURE 3

EXHIBIT 4 and FIGURE 3 indicates that, after the *integration* and *separation* reform in July, 2000, the total expenditures on the administration & insurance sector relative to the total expenditures on health (A. & I. / 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 *integration* and

separation reform in South Korea's national health insurance saved the administration & insurance costs out of the total expenditures on health. Meanwhile, the percentage of total expenditures on medical services out of the total health expenditures (Med Serv / THE) slightly increased from 54.6% to 59.8% in the pre-reform (1991-2000) and post-reform (2001-2006) years, respectively. The mean comparison t-test statistics confirmed that the two sets of the average ratios - *administration & insurance* over total health expenditures ($|t|=10.042$, P=0.000) and *medical services* over total health expenditures ($|t|=3.38$, P=0.03) - revealed that there was significant difference from 'before' to 'after' the reform.

The average percentage of the total expenditures on preventive public health relative to the total expenditures on health (EPrevH / THE) didn't show any statistically significant difference between 2.2% on average over the pre-reform years (1991-2000) and 2.23% in the post-reform years (2001-2006). Thus, we could say that in conclusion the total expenditures on the 'administration & insurance' as well as those on the 'medical services' increased from before to after the reform, which was characterized as the integration of the 350 "quasi-public health care agencies" (Kwon, 2002: 38) and separating drug prescribing and dispensing in July, 2000. However, the total expenditures on the preventive public health relative to the total health expenditures did not change significantly across the two time periods (before and after the reform).

In recognition of the fact that one of the important and basic philosophies of the *integration* reform was to realize a holistic medicine in South Korea's health system through ambitious expansion of the investment on the a preventive medicine, more expedited efforts need to be endeavored from the Korean government to facilitate necessary infrastructures for better community health and to deliver preventive medical services through local public hospitals.

The impact of the structural changes in the health care system was documented with the ARIMA (1,0, 1) model in EXHIBIT 5. In relation to total expenditures on health, the effects of the universal health insurance and *integration* and *separation* reform on the variables of healthcare finance 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 for other years. Then, the second dummy was designed to indicate the post-reform years (2001-2006) as equal to 1 and 0 for other years.

EXHIBT 5

Impact of Structural Changes of Health Care Reform. ARIMA(1, 0, 1) Model, Percent, 1980-2006

	GS / THE[a]	SSS / THE[b]	OOP / THE[c]	PI / THE[d]	CC / THE[e]
Year (trend)	0.092 (1.96)**	0.747 (5.66)***	-1.060 (-3.03)***	0.160 (3.86)***	0.074 (0.57)
1980-1989	0.417 (0.64)	-5.346 (-5.90)***	4.005 (0.74)	0.141 (0.18)	-0.351 (-0.32)
2001-2006	0.822 (1.20)	2.777 (1.51)	-3.670 (-1.64)	-0.869 (-2.66)**	-1.028 (-0.51)
Constant	7.84 (10.56)***	20.991(10.32)***	67.711 (9.58)***	0.231 (0.27)	3.968 (2.28)**
AR Lag 1.	0.39 (1.12)	0.451 (2.15)**	0.530 (2.20)**	0.670 (2.23)**	0.362 (0.32)
MA Lag 1.	1.449 (2.15)**	0.999 (0.00)	0.323 (0.87)	-0.277 (-0.81)	0.057 (004)

	THE / GDP[f]	PHE / THE[g]	A. & I. / THE[h]	EPrevE / THE[i]	MS / THE[j]
Year (trend)	0.051 (1.82)*	1.220 (4.75)***	-0.052 (-0.54)	-0.022 (-0.40)	0.247 (0.85)
1980-1989	-0.109 (-0.34)	0.324 (0.12)	-0.692 (-0.59)	-0.168 (-0.13)	-2.952 (-0.90)
2001-2006	0.976 (3.37)***	0.235 (0.07)	-1.341 (-1.13)	-0.218 (-0.39)	2.869 (0.73)
Constant	3.300 (7.22)***	22.262 (6.31)***	6.645 (3.56)***	3.180 (2.23)**	51.043 (90.9)***
AR Lag 1.	0.544 (1.26)	0.260 (0.19)	0.515 (1.32)	0.892 (4.39)***	0.621 (3.09)**
MA Lag 1.	-1.000(-0.00)	0.077 (0.05)	0.446 (1.12)	-0.036(-0.09)	0.350 (1.16)

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

The time series analysis revealed that statistically significant increasing trends in the ratios of THE/GDP, GS/THE, SSS/THE, PHE/THE, and PI/THE at10%, 5% and 1%, respectively. Meanwhile, the percentage change of the OOP/THE was on the way of decreasing trend at 1% level of significance. Based on the results, we could say that the public coverage of the health care system has improved over time with rising portions of government and social security financing. The private coverage from the private insurance (PI/THE) has risen as well over the whole 26 years with statistical significance and then dropped

slightly in the post-reform period (2001-2006). As expected, the social security coverage (SSS/THE) has risen in the 1990s as a result of full implementation of the universal health insurance completed by the year 1990. Total expenditures on health relative to the gross domestic product (THE/GDP) was on rising trend over the whole years (1980-2006), particularly increasing sharply after the recent three – *integration*, *separation*, and *financial* - reforms with significant p-values.

The statistical association was examined between a variety of variables in health care finance and total health expenditures in the EXHIBIT 6. To accommodate the residuals' serially correlated distributive nature, we applied five models – two cross sectional and three ARIMA frameworks – to the data composed of eight variables as described in the notes section of the EXHIBIT 6. The standard OLS model followed by three auto-correlation tests - standard Durbin-Watson, Durbin's alternative, and Breusch-Godfrey lagrange multiplier (LM) auto correlation tests – confirmed that there was significant serial correlation at 5% level in the residual distribution for all lags. Thus, the null hypothesis that there was no serial correlation was safely rejected. Column (2) reports the correlation coefficient estimates from the Newey-West OLS model with the autocorrelation-corrected standard errors. Estimated regression coefficients are mostly same as those of the standard OLS results except for autocorrelation-corrected t-statistics in the brackets.

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) - to the data in use, hoping to pick up the best one in terms of the highest model fit indicated by log likelihood scores. Among the three, ARIMA (p=3, I=1, q=0) exhibited the highest fit to the data with log likelihood score equal to 44.02, which was higher than the other two. The auto-correlation coefficient of the moving average (MA) process was suppressed in column (3) of the ARIMA (1,1,1) model. Thus, we get to know the *true* model would not include the MA process as exemplified in column (4) and (5). On top of that, all of the eight variables that were included in the regression analysis were carefully transformed to the natural log forms to be suitably fit to the assumed linear relationship between the regressors and dependent variable. Moreover, the log transformation is supposed to reduce the variances of the dependent variable that are normally assumed as stochastic in regression analysis.

EXHIBT 6

Statistical Association of Sources of Health Care Finance with the National Total Health Expenditures, 1990-2006

Dep. Var.: Ln_THE[a]	Model 1 OLS (1)	Model 2 Newey-West lag_4, (2)	Model 3 ARIMA(1,1,1) (3)	Model 4 ARIMA(2,1,0) (4)	Model 3 ARIMA(3,1,0) (5)
Ln_GS[b]	-0.002 (-0.00)	-0.002 (-0.01)	0.34 (0.91)	0.28 (0.48)	0.25 (1.53)
Ln_SSC[c]	-0.39 (-0.40)	-0.39 (-0.56)	-0.65 (-0.95)	-0.76 (-1.57)	-0.48 (-1.90)*
Ln_OOP[d]	-1.29 (-1.65)	-1.29 (-2.00)*	-1.38 (-3.05)***	-1.44 (-1.86)*	-1.46 (-13.01)***
Ln_Pi[e]	-0.55 (-0.84)	-0.55 (-1.04)	-0.45 (-0.64)	-0.51 (-0.47)	-0.7 (-2.01)**
Ln_A & I[f]	0.83 (1.57)	0.83 (1.65)	0.9 (3.12)***	0.92 (2.24)**	0.86 (6.41)***
Ln_Prev[g]	-0.001 (-0.02)	-0.001 (-0.06)	-0.01 (-0.10)	-0.01 (-0.47)	0.004 (0.25)
Ln_Med Sev[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)**	26.59 (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)***
MA Lag 1	-	-	-1.0 (-)[k]	-	-
/sigma	-	-	0.05 (1.61)	0.05 (2.17)**	0.01 (1.01)
N	17	17	17	17	17
R²	0.95	-	-	-	-
Adj-R²	0.90	-	-	-	-
F(9,7)	16.19	377.86	-	-	-
Prob>F	0.001	0.0000	-	-	-
Wald chi2	-	-	-	-	2782.35
Prob>chi2	-	-	-	-	0.0000
Log Likelihood	-	-	23.75	23.47	44.02
Durbin-Watson	d(10, 17)=2.99	-	-	-	-
Durbin's alt. autocorr. test	Reject "H0: no serial correl." for all lags (1-10) at 5%	-	-	-	-
Breusch-Godfrey LM autocorr. 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 (THE); [b]Natural log of gov't subsidy (Ln_GS);
[c]Natural logof social security scheme (Ln_SSS); [d]Natural log of out-of-pocket spending (Ln-OOP);
[e]Natural log of private insurance spending (Ln_PI); [f]Natural log of total spending on admin. & Insurance (Ln_A & I);
[g]Natural log of total spending on preventive public health (Ln_EprevH); [h]Natural log of total spending on medical services (Ln_Med Serv); [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.

The empirical results imply that out-of-pocket payment was adversely associated with the total expenditures on health at 1% level of significance. This outcome was consistent with the results from other regression models such as Newey-West (column (2) at 10% significance), ARIMA (1,1,1) (column (3) at 1% significance), and ARIMA (2,1,0) (column (4) at 10% significance). Meanwhile, social security financing (Ln_SSS) and private insurance financing (Ln_PI) were adversely associated with the total health expenditures at 10% and 5% level, respectively. But this result was not the case of the other models in columns (1)-(4). Therefore, we conclude that the adverse correlation between the two regressors, Ln_SSS and Ln_PI, and the dependent variable Ln_THE was not robust enough to exist. The administrative & insurance (Ln_A&I) and expenditures on medical services (Ln_Med Serv) were positively and adversely correlated, respectively, with the total health expenditures at the 1% level of significance. This result was consistent with the outcomes from the other ARIMA models for those two regressors (column (3)-(4)) and the Newey-West OLS model for Ln_Med Serv only (column (2)).

VI. Concluding Remarks

South Korea's achievement of universal health insurance within 12 years is remarkable. South 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 South 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 South 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.

19

At the launching of the NHI in South 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, South Korea benefited from its rapid economic growth during the 1990s (Lee 2003). However, the economic crisis of late 1997 introduced a severe financial deficit challenge to South Korea's 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 South Korea from $169 (4.0% of GDP) per capita in 1985 to $1,480 (6.4% of GDP) in 2006; an average annual growth rate of 36.9%.

Since 1998, the cost containment and stabilization of the NHI financial deficit has been a pressing mission for the South Korean NHIC. To contain health care spending, two consumer-side schemes have been implemented in South 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 *separation* reform in pharmaceuticals, 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; an 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.

The lesson to be learned from the South 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 South 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 South 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 the providers, medical professionals and hospitals. Therefore, few cost containment programs have actually been developed in South 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.

Even though South Korea has achieved universal health insurance for all citizens in a very short time and possesses highly advanced medical technologies, the rapid increase in health care expenditure that has been experienced remains a burden to policy makers. In this regard, precisely understanding provider-side incentive, as well as consumers' behavior, in the health care market and constructing effective ways to monitor both consumers and providers are the most urgent and important elements of the policy agenda in South Korea's future health care reform. The portion of the total OOP expenditure relative to total expenditure may need to be reduced so that people with limited private resources are not alienated from necessary medical care. As an example, the expedited provision of coverage for indispensable preventive services like immunization is desirable. In addition, enhanced public health programs against adverse health-related behaviors will be helpful for providing a better healthy life and hence curbing the rapidly growing health care costs in our aging society.

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