All in all, the environment of Northeast Asia is rapidly changing. China has emerged as the second-largest economic power in the world after 30 years of revolution and opening. As such, China has announced strategy plans to develop and open up its Northeast area. Russia is actively implementing its own development of the Far East area, and North Korea is accelerating economic cooperation with China and Russia — via the construction of New Aprok River Bridge with China and maintenance/repair of the Rajin-Hasan Railway with Russia. Amid such activity, issues such as how to cope with the future changes in Northeast Asia and North Korea are emerging. Therefore, there is a need to examine the border areas of North Korea, China, and Russia, where each country’s policy is fully revealed and where the three Northeast Asian countries’ interests are sharply divided.

To identify the current situation and future development possibility in the North Korea · China · Russia (NK · C · R) border regions, development potential considering the basic conditions, e.g. industrial location and transportation infrastructure, should be analyzed once the three countries’ related development and opening plans are identified. Then trans-border collaboration measures can be put into practice among the three countries, along with relevant coping strategies.

To this end, there is a need to clarify the spatial scope of the border areas of the three countries. The target areas of North Korea are North Pyeongan Province (Shinuiju City, Changseong County, etc.) facing China’s DanDong City; JaGang Province and YangGang Province bordering China across Aprok River and Duman River; and Rason City and North Hamgyeong Province bordering China’s Northeast Area and Far East Russia. The target areas of China are DanDong City and BenXi City in LiaoNing Sheng, bordering on North Korea; BaiShan City, TongHua City, and YanBian Korean Autonomous Prefecture in JiLin Sheng, MuDanJian City; and JiXi
City in HeilongJiang Sheng. The target area of Russia is Primorsky (Maritime Province of Siberia), which is located in the far east area of the Russian Federation.

Development Potential in the Border Region

Government commitments to develop China’s Northeast Area and Russia’s Far East Area are being strengthened. In the development of the NK · C · R border region, the South Korean government’s participation needs to be greatly expanded.

To that end, the general status of those areas and each country’s development plans was identified, including population, gross regional product, industrial structure, and infrastructure. Furthermore, plans related to the economic openings of North Korea, China, and Russia were reviewed. They included the development plans of the Hwanggeumpyeong Economic Zone and Rason Special Economic Zone, located on North Korea’s border with China; China’s overall regional development policy and national plans for its northeast area (Northeast Area Promotion Plan, LiaoNing Coastal Area Economic Zone Development Plan, Duman River Area Cooperation Development Plan), provincial plans (LiaoNing Sheng 12/5 Plan, JiLin Sheng 12/5 Plan, HeiLongJiang Sheng 12/5 Plan), and Dijishi Plans (Yanbian Korean Autonomous Prefecture 12/5 Plan); and Russia’s plans of the Far East Development Strategy 2013 and Far East Development Strategy 2025.

Then, the development potential in the border areas of the three countries was identified. Then the areas were divided into geo-economic potential and natural/socioeconomic potential. To analyze development potential, the natural/socioeconomic analysis method was selected. To enhance objectivity of analysis, a GIS spatial analysis technique was used. The analysis data presented GIS formulation results using 9 analysis items (altitude, slope, distance from river, distance from main road, distance from harbor, distance from urbanization promotion district, distance from existing industrial complex, and distance from border). By generalizing the analysis results according to the item, development candidate areas were deduced and subsequently classified into 5 groups (Western border area, Central border area, and Eastern border area between North Korea and China, Russian Maritime Province of Siberia, and Eastern border area between China and Russia). The status and location/infrastructure conditions of these groups, and each country’s relevant development plans were comprehensively analyzed.

Figure 1: Spatial Scope of the NK · C · R Border Region

[Map showing the spatial scope of the NK · C · R Border Region]
Cooperation Tasks in the Border Area

Trans-border collaboration tasks that can be executed in the NK · C · R cross-border region were drawn. The trends of trans-border collaboration and overseas cases and situations of Northeast Asia and the NK · C · R border region were projected. Trans-border collaboration tasks in the region were then drawn by sector, area, and stage.

First, the collaboration tasks for each sector were divided into industrial collaboration tasks and infrastructure development tasks. Concerning industrial collaboration, one of the priorities is to create an industrial link in the border areas through a division of labor — using North Korea’s low-wage labor force in the border areas between North Korea and China on the mid- and long-term bases. A strategic collaboration relationship needs to be established wherein North Korea is in charge of parts manufacturing or final assembly, which requires technological prowess. Infrastructure development tasks can include the expansion and modernization of very minimal transportation networks between borders and integrated management of infrastructure linked with industrial cooperation from the long-term perspective.

Second, collaboration tasks according to area feature a spatial structural development map using Aprok River and Duman River as an environmental ecosystem belt based on four transportation axes, with the Shinuiju-DanDong area and Rason-Hunchun-Hasan area as the two growth poles. Since the Russian Maritime Province of Siberia is likely to be developed quickly under the Russian government’s Far East development strategy, the transportation axis and new economic cooperation stronghold development will be core tasks in maximizing regional potential.

Third, collaboration tasks by stage include the development of the Shinuiju Economic Zone and Rason Economic Zone, which are centered on collaboration of major stronghold cities. In linkage with Hwanggumyeong development implemented by North Korea and China, there is a need to create an international economic cooperation zone in the adjacent area of North Shinuiju via multipartite cooperation among the Koreans and China. From the short- and mid-term perspectives, it may be possible for South Korea to participate in transportation infrastructure development in the Russian Maritime Province of Siberia. From the long-term perspective, the improvement of overall transportation and customs clearance conditions is necessary in the NK · C · R cross-border region.

From the short- and mid-term perspectives, the

![Figure 2: Spatial Development Composition and Development Tasks in the NK · C · R Border Region](image-url)
development and management of the Aprok River and Duman River basins requires a joint project within a bigger framework regarding the improvement of the ecosystem, environment, and social welfare by North Korea, China, Russia, and South Korea.

Countermeasures

In order to create a strategy for the Korean government and its domestic companies to cope with trans-border economic cooperation issues in the NK·C·R cross-border region. It is necessary to adopt a step-by-step approach in which South Korea will play a role in the industrial cooperation process. That is, rather than directly approaching the Shinuiju or Rason area, domestic companies should first participate in developing cities in the border area once they have laid a foundation in the Northeast stronghold areas of China.

From the short- and mid-term perspectives, the Korean government should win international approval on joint development in the NK·C·R cross-border region. This is a matter of urgency so as to foster trans-border cooperation by fully capitalizing on the high-ranking channels at the central government level, e.g. Korea-China-Japan summit talks. Among other needs, a review is required for the tentatively-named “joint environmental improvement pilot project in the Aprok and Duman River basins” during the Korea, China, and Japan Summit Talk and G20 Development Cooperation.

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Advanced Measures for Water Resources Management in the Green Growth and Integration Era

Kim Chong-won, senior research fellow

Experts predict gradually increasing difficulties in procuring financial resources within the public sector as population growth shifts to a stagnant, decreasing trend and as quantitative economic growth reaches its limit. If financial resources in the public sector reaches a limit, securing the cost efficiency of new investments and efficiently retaining and managing existing investments will emerge as important political issues. In this context, the water resources field is no exception. Securing economies of scale is important when it comes to water resources; for this, ensuring adequate demand through a wide-area system is essential. In particular, there are many small-scale local governments, each of which manages their own waterworks and sewer sector. Many of them suffer from financial deficits due to low cost-recovery rates of the waterworks and sewer tariff system.

In Korea, water was supplied by one wide-area water supplier and 164 local water suppliers as of December 2009. The water supply rate was 93.5%. Water suppliers that serve less than 300,000 people accounted for 82% out of the 164 nationwide. Of the 522 water treatment plants nationwide, small water treatment plants with facilities capacity of less than 5,000m³/day accounted for 60%; this implies that those plants aim at merely meeting the drinking water quality standards. Korea’s waterworks are fraught with structural problems because of small-scale and inferior facilities. Generally, water supplies to a larger population lead to lower production costs, resulting in an increase in the economic efficiency. However, small-scale water suppliers in Korea cannot achieve economies of scale.

The waterworks of 164 local governments are operated as divisions, offices, and general local administrative organizations. Local governments are in charge of the overall oversight of waterworks, e.g. master plans, maintenance and expansion of facilities, and tariff systems. A single office or an administrative organization takes charge of the work on behalf of each local government. That stymies the efficient use of limited water resources and financial improvement of the waterworks, and
increases inefficiency due to overlapping investments in water intake/treatment plants of individual local governments.

**Needs to Rationalize Sewer Charge**

The diffusion rate of Korea’s sewer system, as of the end of 2009, was 89.4%. Sewer treatment facilities have steadily increased; the number of public sewer facilities with capacities of more than 500m³/day stood at 438. At least 2,332 facilities have capacity of less than 500m³/day.

As of 2009, debts incurred from sewer facilities amounted to approximately 1.45 trillion won; they have continuously accumulated despite a trend of overall decreasing debt. To address this problem, it is necessary to attempt managerial improvements, including more efficient operations.

As of 2009, the sewer treatment tariff was about 274won/m³, constituting only 38.3% of the nationwide average sewer treatment cost of 715.6won/m³. This implies that cost-recovery rates of the sewer treatment tariff are on the decline. Since 2010, discharged water quality standards have been reinforced for water quality preservation. Thus, sewer treatment cost is expected to rise. In addition, sewer sludge treatment cost is likely to go up due to the prohibition on dumping sewer sludge into the ocean. The need to maintain/repair sewer ducts will increase owing to the torrential rains brought about by climate change, and that also becomes a factor for the increase of sewer treatment tariff.

The cost-recovery rate of Korea’s sewer treatment tariffs is very low at 38.3%, with considerable differences in sewer treatment tariffs according to region. The differences in sewer treatment tariffs among local governments can be attributed to the differences in population size, sewer duct diffusion rate, and financial capability together with the number and size of sewer treatment facilities and topography of each region. Each local government is limited in its ability to reflect the cost increase factors and execute them, since related factors and tariff structures differ by region.

Without a review of the various alternatives, including operation forms within the wide-area system,
waterworks tend to be operated almost uniformly. Since there are no comparisons and reviews of the various business and operation types, fair competition is not ensured in terms of entrustment; waterworks are centered on entrusted public corporations. In fact, local governments rarely take the lead in the current wide-area system and integration projects. Often, Korea’s wide-area waterworks are managed without a proper formulation of an idea or concept of the regulation system from the local government and central government perspectives. The success or failure of waterworks entrustment depends on a proper regulations system. When waterworks are entrusted to the private sector, if there are no regulation systems, the expected efficiency of the business has in the past not been delivered, and side effects such as tariff increases have arisen in many cases.

The government is implementing a measure to reorganize the waterworks market through approximately 5 large-scale waterworks entities ultimately by 2020 — based on the river basin — after integrating 164 waterworks entities into 39 entities nationwide. Specifically, the government plans to create an integrated model by 2011 that targets 3 pilot project regions (southwestern part of South Jeolla Province, eastern part of North Gyeongsang Province, and southern part of Gangwon Province) and 8 regions (southwestern part of South Jeolla Province, eastern & northern parts of North Gyeongsang Province, southern & eastern parts of Gangwon Province, western & southern parts of South Chungcheong Province, and eastern part of North Jeolla Province) and to integrate an additional 2~4 regions each year.

An estimate of the water supply’s cost function, using the translog cost function in South and North Gyeongsang Provinces as case regions, found that the scale economy (SCE) was significant at a 5% level from 1997 to 2009, showing positive values each year during the period. Thus, SCE was confirmed to exist in the waterworks field. In the sewer treatment sector, SCE was significant at a 5% level since 2004, showing positive values each year. This implies that SCE has existed since 2004 in the sewer treatment field as well. The analysis results suggest that efficiency can be enhanced by transforming the waterworks and sewer sectors into a wide-area system (See Table 1).

**Best Practices in Advanced Countries**

Several foreign countries were examined in terms of wide-area systems and integration in the waterworks and sewer field. Britain focused on an
integrated management of water resources beyond simply regions. A total of 29 River Authorities were reorganized into 10 Basin Authorities. Each authority takes charge of waterworks and sewer management, water environment preservation, and waterfront management and regulations as tourism resources taking over from local governments. The British-style extreme privatization model was made possible because the central government’s surveillance and monitoring functions were more centralized and powerful compared to those of other countries. Therefore, in a country where the surveillance and monitoring function is not properly segmented and expertise is not properly secured, the British model is not likely to be successful when applied by only emphasizing the role of the market.

France focused on coordination and joint decision-making between suppliers and administrators in its wide-area mode of waterworks and sewer systems, with existing local governments still maintaining and managing the waterworks and sewer systems. Waterworks and sewer facilities also need the management of wide-area local governments. They, along with large-scale basin authorities and general local governments also must deal with policy coordination or management/regulations. Centered on a “Commune,” or a basic local government, the private companies, Basin Authorities, and the central government are connected in various privatization models for the management of waterworks and sewer system. In the French model, the role of local governments — with powerful decision-making rights and ownership — and the roles of basin authorities that and water companies are important.

In Japan, wide-area waterworks undergo objective reviews that are executed through various measurement indicators. The integration policies are implemented when specific effects can be achieved via local government-led autonomous wide-area waterworks. In Japan, the waterworks integration policy is implemented to consolidate the financial, managerial, and technical bases and to cope with any change in conditions, including the following: water supply earnings reduction according to population decrease; securing waterworks’ transparency and accountability; adapting management according to the enhancement and diversification of demand, and social responsibility as a public service provider. In Japan, the local governments or waterworks entities are mainly the ones that set waterworks integration target areas and select related optimal integration methods. Third parties such as experts (professors, waterworks-related organizations, etc.), and consumers (local companies or consumer organizations, etc.) meet to carry out objective reviews — including the expected effects — according to the status assessment on waterworks and integration.

Considering these cases, the following implications can be drawn:

First, the integrated and wide-area management of all water circulation processes is required to ensure sound operations.

Second, systematic and integrated management is required at the central government level to cope with a crisis in a timely manner; crises include the dry season, water circulation between basins, and water demand change.

Third, the central government’s expanded role and function should be ensured for the stable supply of clean water and preservation and management of basin environments such as ecosystems.

Fourth, wide-area system and integration should be executed to enhance efficiency and transparency of water resources management, taking population decline and demand change into consideration.

Lastly, the implementation of a wide-area system

<table>
<thead>
<tr>
<th>Year</th>
<th>SCE</th>
<th>t-Value</th>
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<tbody>
<tr>
<td>1997</td>
<td>0.068*</td>
<td>4.42</td>
</tr>
<tr>
<td>1998</td>
<td>0.101*</td>
<td>6.09</td>
</tr>
<tr>
<td>1999</td>
<td>0.113*</td>
<td>7.07</td>
</tr>
<tr>
<td>2000</td>
<td>0.123*</td>
<td>7.59</td>
</tr>
<tr>
<td>2001</td>
<td>0.121*</td>
<td>7.23</td>
</tr>
<tr>
<td>2002</td>
<td>0.129*</td>
<td>7.67</td>
</tr>
<tr>
<td>2003</td>
<td>0.136*</td>
<td>8.14</td>
</tr>
<tr>
<td>2004</td>
<td>0.134*</td>
<td>7.76</td>
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<tr>
<td>2005</td>
<td>0.148*</td>
<td>8.59</td>
</tr>
<tr>
<td>2006</td>
<td>0.155*</td>
<td>8.52</td>
</tr>
<tr>
<td>2007</td>
<td>0.158*</td>
<td>9.03</td>
</tr>
<tr>
<td>2008</td>
<td>0.145*</td>
<td>8.04</td>
</tr>
<tr>
<td>2009</td>
<td>0.138*</td>
<td>7.45</td>
</tr>
</tbody>
</table>

Note: ** means that SCE is significant at 1% significance level.
and integration requires new guidelines on the central government level, based on specific and quantitative standards.

Relevant questions include: “How should water-related markets be monitored, supervised, and regulated?” and “How should water quality and amount be managed?” These questions need to be approached as issues of regulation rather than asking: “By whom and how should multiple waterworks and sewer-related business be integrated and made into wide-area systems?” or “How should the waterworks and sewer business be entrusted or transferred to private companies?”

**Survey Results of Local Public Officials**

According to the results of a survey targeting waterworks and local government officials dealing with sewer systems, one of the obstacles in the waterworks field lies in the maintenance difficulties arising from financial difficulty, poor technology and weak management systems. Concerning waterworks integration, which is especially debated in the Ministry of Environment, there is a sharp division of opinions. The positive effects of waterworks can be cost savings and competitiveness fortification. The foremost negative effect can be an increase in tap water tariffs. If integration in the waterworks field is carried out, joint performance and entrustment, including maintenance and collection of water bills from the short-term perspective, were found to be the most preferred choices. In particular, a high number of respondents favored a system in which one local government operates multiple waterworks from the long-term perspective.

In the sewer system field, the improvement of worn-out sewer ducts has been pointed out as the most important pending issue. As for the desirable operation mode of the sewer system, many of the respondents favored expanding ducts and securing large-scale treatment facilities through facility integration within a local government. Regarding integration led by the Ministry of Environment, relatively more local governments are amenable to the idea than they were regarding waterworks. When asked about positive and negative effects of integration, most of the respondents pointed out cost savings and competitiveness fortification as a positive effect, but operation and management that do not consider the local features as a negative one.

Regarding the integration of the sewer system, the respondents pointed out that the highest priority needs to be placed on the integrated operation of sewer treatment facilities and ducts from the short- and long-term perspectives.

**Policy Proposals**

Advanced policy measures to manage the waterworks and sewer systems can be devised in various ways through two axes: waterworks efficiency enhancement in wide areas and enhancement of local waterworks and sewer treatment infrastructure.

To enhance the efficiency of wide-area waterworks, officials can consider a policy of raising the existing facilities’ cost efficiencies and establishing a wide-area system to link the local waterworks and raw water.

To enhance existing facilities’ cost efficiencies and facilitate creation of a wide-area system, officials should consider preventing overlapping investments between local governments and wide-area waterworks entities, and operation cost reductions by improving the usage rates of existing wide-area waterworks facilities. Here, demand expansion can be achieved through the diversification of water resources usage, including the preferential supply of local worn-out waterworks and wide-area waterworks for new consumers and improvements related to environment and water-friendliness.

Officials should consider how to achieve more efficient use of wide-area waterworks through integration and linkage with local waterworks. To achieve of scale, local governments’ water intake/treatment facilities and supply can safely increase through the linkage to the wide-area system.

Regarding a wide-area raw water system, officials should explore expansion of the broad area network of pipes supplying water to the area. Exemplary cities include Sacheon, Tongyeong and Geoje.

To increase cost efficiency and structural integrity of local waterworks and sewer treatment plants, the following policies can be considered: a wide-area system of waterworks and sewer services; adoption of a competitive system, integration of waterworks and sewer system management and subsidies expansion; adoption of approval system for waterworks and sewer facilities expansion; state
It is reasonable to expand state subsidy support for duct replacement and repairs for overall water rate improvement, regardless of the local government’s direct management or entrusted management role.

Regarding the adoption of a waterworks and sewer facilities expansion approval system, it should be confirmed after reviewing the status of the adjacent local government’s idle facilities and the possibility of receiving water from the wide-area waterworks network. In addition, the improvement of legal and administrative systems can be an alternative to enable joint use.

To alleviate concerns regarding water supply tariff hikes following integration, the government should be empowered to adjust the integration-related tariff hikes. In addition, general accounting support addressing the existing state subsidy situation and lack of waterworks finance should be provided based on the same standard, regardless of the integration type.

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SOC Investment Effects during the Economic Fluctuation Period

Kim Min-cheol, associate research fellow

The financial market function has weakened ever since the global financial crisis. As a result, interest in financial policy has increased. Korea is regarded as a good case study in overcoming the global financial crisis early on through active financial injections. SOC (Social Overhead Capital) investment is the most typical among financial policy measures, and has contributed to overcoming the global financial crisis. However, as SOC stock increases, recognition of its negative effects is emerging as well. Also, it has been observed that the long-term demand for SOC investment is decreasing, and financial expenditure is increasing in the welfare sector. In such a situation, there exists a vague recognition that economic activation effects through SOC investment may not be significant. In this context, an objective analysis on SOC investment is required. We will examine whether there have been any positive effects of SOC investment in terms of coping with economic fluctuations with the ultimate goal of analyzing the factors that SOC investment requires from the 3T (Targeted, Timely and Temporary) standpoints, and present future SOC investment policy measures.

SOC Investment Trends

We estimated the size of SOC investments in civil engineering and construction as compared to the GDP ratio. Korea’s civil engineering construction
investment was about 91 trillion won, or 7.8% of the GDP, as of 2010. Out of 299.4 trillion won of central government expenditures in 2010, the SOC sector expenditure was about 24 trillion won, which accounted for 8%. The ratio of SOC investment to GDP and the ratio of SOC sector expenditure budget to central government budget were all consistently at about 8%.

Compared to the levels of European and U.S. transportation facilities investment, Korea’s investment was much higher. Korea’s ratio of transportation facilities investment to GDP was about 3.4%, which is 3.24 times higher than other countries’ averages of 1.05%. Therefore, it can be said that Korea has met the size factor, which is one of the requirements for an SOC investment to serve as a means to help boost the economy.

In the 1990s, the SOC budget rapidly increased due to the adoption of special accounting of transportation facilities. This reflects a policy goal of bolstering national competitiveness by reducing logistics cost. In the 2000s, investments were made to overcome the Asian foreign exchange crisis. After the mid-2000s, when SOC investment began to stagnate, financial expenditures in the welfare sector began to increase.

The typical means of using SOC investments to adjust the economy is the Revised Supplementary Budget (RSB). Concerning the RSB, the years during which the SOC investment-relevant budget was organized were 1998 (1.2 trillion won), 2001 (300 billion won) and 2003 (1.4 trillion won). In 1998, 1.2 trillion won of RSB was additionally allocated so that SOC investments could be made for job creation, in the aftermath of the Asian foreign exchange crisis. In 2001, an additional 300 billion won of RSB was implemented and injected into the private sector to revitalize the economy. In 2003, 180 billion won of RSB was invested for logistics-related construction in Northeast Asia. Projects included Busan New Port, Gwangyang Port and Incheon New Airport’s phase two. Another 1.2 trillion won of RSB was allocated for transportation facilities including expressways, national highways and railways.

After the global financial crisis, there were failed attempts to organize RSB in the SOC sector. Since then, it has not been easy to allocate RSB in the SOC sector for economic activation, despite the economic crisis.

Another type of SOC investment implemented to adjust the economy since the 2000s is early execution of investments in the first half of the year. To identify the status of these early executions, financial injection statistics are necessary. However, this study analyzed mid-year results of civil engineering construction investment, because quarterly financial statistics have not been announced. This study compared civil engineering construction investment ratios in the first half of the 1990s and the 2000s, respectively. The first mid-year ratio of civil engineering construction investment was 41% in the 1990s, but went up 3% to 44% in the 2000s. A test found that it was statistically significant. Therefore, early financial execution in the SOC sector has been realized through investment in civil engineering and construction.

Analysis on SOC Investment Effects

SOC investment effects on economic adjustment were analyzed through both a theoretical and an empirical approach. First, the Dynamic Stochastic General Equilibrium (DSGE) was used for the theoretical approach. The analysis found that the multiplier effect that increases GDP was huge in the short-term, in the case of government consumption expenditure. But the effect is larger in the case of long-term SOC investment, in terms of continuity. The crowding-out effects, like interest rate increases and private sector facility investment decline, were not huge in terms of both SOC investment and government consumption expenditure. Actually, the crowding-out effect was smaller in the case of SOC investment.

A study of the influences on the government’s transfer expenditures regarding the financial sources of welfare spending found that the immediate reduction effect was larger in the government consumption expenditure case, and the influence of SOC investment was larger in terms of duration of reduction. Looking at only SOC investment effectiveness, it seems that the policy measure is more suitable for mid- and long-term economic activation, rather than short-term economic activation.

For the empirical approach, a narrative approach and a Structural Vector Auto Regression (SVAR) analysis were conducted. If SOC investment shock
effects are estimated using the narrative analysis of Ramey and Shapiro (1997), the macroeconomic variables did not show significant statistical responses regarding the three incidents assumed to generate large-scale SOC investment in the Korean economy. Here, the three incidents are the construction of 2 million homes, the Asian financial crisis and the global financial crisis.

However, the analysis results may suffer from methodological limitations in using a single equation that does not consider a dynamic causal relationship between the macroeconomic variables. For this reason, Edelberg, Eichenbaum and Fisher (1999), and Burnside, Eichenbaum and Fisher (2003) used the SVAR model, which analyzes the SOC investment effects by identifying exogenous shock. The narrative analysis identifies exogenous shock through events, or types of incidents, while the SVAR model brings about restrictive conditions using economic theory that is, to identify less-visible structural parameters one by one.

In this study, the recently developed sign

<table>
<thead>
<tr>
<th>Table 1: Sign Restrictions to Identify SOC Investment Shock</th>
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<tbody>
<tr>
<td><strong>Civil engineering investment</strong></td>
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<tr>
<td>Assumption 1</td>
</tr>
<tr>
<td>Assumption 2</td>
</tr>
</tbody>
</table>

Figure 1: Shock Response Function on SOC Investment Shock

Note: The shock duration period is six quarters.
restriction mode is used in lieu of the common recursive identification method, which uses short- and long-term equality constraints.

Also, the effects of unexpected SOC investment in the Korean economy have been analyzed through the SVAR model. The shock response function was examined after identifying SOC investment shock effects using the sign restriction identification method. Notably, the existing studies show conflicting analysis results on the crowding-out effects that are brought about by government expenditure shock. Thus, this study has used two identification conditions to check the status of the crowding-out effects.

It was difficult to check statistical significance of the pattern in which unexpected SOC investment shock caused a crowding-out effect and reduced investment generated by the multiplier effects in the Korean economy. Consequently, it was confirmed that SOC investment can spur economic stimulation by multiplier effects through generating jobs. Particularly, the dynamic response path of private sector investment, GDP and private consumption were closely linked with employment increase. Moreover, the effects of SOC investment increase are considered to be larger, since the ripple effect of employment creation is larger and its continuity is higher.

**Foreign Examples of SOC Investment**

There are some cases in which advanced countries including the U.S. tried to stimulate economy through large-scale SOC investment in the face of economic and financial crisis. For instance, during the Great Depression, the U.S. built 26 large-scale dams in the Tennessee River basin through the Tennessee Valley Authority (TVA) project, and constructed roads, airports and schools centered on the Work Projects Administration (WPA).

Following the crisis of 2008, countries have attempted various interventions, including policies to stimulate the economy, the support of non-performing financial institutions and protective actions for industries. The average budget to stimulate economies of G20 countries was at 4% of their GDPs. The central banks of the U.S., the U.K. and the Euro zone conducted ultra-low interest rate policies, lowering the benchmark interest rates to 0-0.5%.

The U.S. passed the American Recovery and Reinvestment Act (ARRA) of 2009, which injected a total of 787 billion dollars; 47.64 billion dollars of the total amount was invested in transportation. ARRA funds supported the modernization of national infrastructure, alternative energy sources, expansion of educational facilities and increase in public health services by procuring financial sources through tax breaks (288 billion dollars), federal government budget (224 billion dollars) and loans (275 billion dollars).

A 47.64 billion dollars budget was set aside for the U.S. Department of Transportation to improve expressways, public transportation, railways, aviation and other sectors. Agencies that received ARRA funds are supposed to report quarterly budget execution results and the number of employed people, to ensure transparent and proper budget execution. On the homepage (recovery.gov), the transparency of budget execution is enhanced by disclosing the project status in each state, number of employed and project results of each agency.

Japan actually invested in SOC to stimulate its economy, but failed. Thus it serves a case study in deteriorated financial soundness. The reason why Japan’s investment in SOC failed is that the multiplier effects were offset, and debt burden was accumulated as SOC investment in the inefficient sectors continued. Another reason for the failure is that the Japanese government could not actively ease the financial market’s instability, which is a fundamental cause of economic recession. In other words, Japan did not properly combine the policy to actively reform financial market with its SOC investment policy. When recession has occurred due to financial crisis, it is recommended to reform the financial system first, and use macroeconomic policies like SOC investment only when the crisis in the financial sector spreads to the business and household sectors.

**Policy Measures**

In summary, Korea’s SOC investment size maintains a sufficient level to stimulate the economy. The analysis, using the SVAR model via sign restriction identification, found that the SOC investment did stimulate the macro-economy. In the case of annual execution of the budget in the first half of a year, the period of budget execution may
A new trend of “culturenomics” has recently emerged. Consequently, cultural activities are being recognized as a growth engine that can stimulate an urban economy. An active effort to implement culture at the policy level is happening as well. Many cities are implementing so-called urban cultural strategies as core strategies for urban development. World capitals like London, New York and Paris have bolstered policy support for cultural competitiveness. Small and medium-sized cities are trying to utilize culturenomics with different strategies, such as setting up large-scale cultural facilities, holding cultural festivals and utilizing local cultural resources.

Korea is not an exception. The Korean central and local governments are implementing a policy to introduce culture as a new urban development strategy and create cultural clusters. At the central government level, Gwangju is being promoted as an Asian cultural hub city, while Gyeongju, Buyeo, Gongju and Iksan are being promoted as historical and cultural cities. In Gunsan and Daegu, cultural and arts creation belts are being shaped. Also, areas such Insa-dong and Daehak-ro in Seoul, Hei-ri in Gyeonggi Province and the Incheon Open Port area are designated and managed as cultural districts. In addition, traditional market activation through cultural activities is carried out nationwide. At local government levels, urban cultural strategies have become the core of urban development. There are over 100 areas hosting cultural festivals nationwide.

Despite the increase of related policies, basic studies on how artists’ communities contribute to urban revitalization are greatly insufficient. What is the core of cultural clusters and under what conditions do they grow and decline? What can cultural clusters contribute to urban revitalization and how can the effect be maximized? What are the methods for local governments to minimize the negative effects of policies and achieve their purposes?

Korea’s cultural clusters can be divided into three forms: spontaneous, privately-led and policy-supported. A spontaneous cultural cluster is an area that has been naturally shaped by artists for a long time. The spontaneous cultural clusters are generally located in the city centers, and their members are young and dynamic. Young artists tend to congregate in order to collaborate with other artists and create support facilities. They also prefer

To enhance the SOC investment effects, the following policy response measures should be implemented.

Intensive budgeting should be expanded. For SOC investment to be effective, the duration of SOC stock to be used as a production factor needs to be reduced. To this end, there is a need to intensify investment in the current budgeting system, in order to complete construction.

There is a need to expand investment ratios in the sectors with high employment effects and add value enhancement effect in terms of SOC investment. As seen from the SVAR analysis result, the core path contributing to the production expansion of SOC investment is through employment creation. Consequently, there is a need to increase investment ratios in the sectors with high employment effects, and to avoid simple labor-focused employment creation. As seen in the U.S. case, there is a need to enhance public trust by transparently disclosing the execution process of SOC investment. Devising and revising policy measures for SOC investment to cope with crises becomes easier as the transparency of investment improves.

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Cultural Cluster Strategy as a Tool for Urban Revitalization

Park Se-hoon, research fellow
city centers with better transportation, since they are likely to have supplementary jobs to make a living. The spontaneous cultural clusters offer spaces in which those young artists can live, work, learn, and develop. However, many of those clusters face the risks of commercialization and redevelopment, due to high development pressure caused by their central city locations.

The privately-led cluster is shaped by the focused efforts of artists, including utilizing vacant facilities. Most of these cultural clusters are located in the suburban areas, far from city centers, and are mainly led by more veteran, established artists. The space types of the privately-led cultural clusters can be classified as either an idle facility-use type or a complex shape type. Regarding the former type, the artists typically move into empty rural schoolhouses, empty factories or industrial facilities, and form communities. As for the latter, artists build settlements by purchasing land through concerted efforts. The privately-led cultural clusters are typically small and difficult to operate. They are inferior to the spontaneous cultural clusters in terms of the density and dynamism of the network, and in relationships with local residents, because they are formed in rural areas where there is little density.

The policy-supported cultural cluster is formed when central or local governments endow creative spaces to artists to revitalize declining areas. There are various spatial types including city centers, empty schools, traditional markets, idle industrial facilities and historical resources. Although the involved artists may be greatly diverse, they all agree generally with the policy objectives. However, often the artists’ community does not have long-term stability, because many artists mainly depend on residencies. Nonetheless, this type of cultural cluster can serve as a model for pursuing both community culture stimulation and urban revitalization by setting up artists in areas with poor cultural bases.

To sum up, Korea’s cultural clusters are marked by privately-led or policy-supported types; the number of spontaneous type clusters is very small. The spontaneous cultural cluster types are mostly located in the city centers, e.g., the areas of Hongik University and Munrae-dong in Seoul, and Dongmun Intersection in Jeonju. There are not many nationwide despite its relatively long history. The private sector and policy-supported types have mostly emerged after 2000, and most utilize idle facilities in the city centers and rural villages (e.g. closed schools and industrial facilities). The fact that the number of spontaneous cultural clusters is small indicates a weakness of culturally spontaneous bases. Although they are very important social assets, they are on the verge of disappearing due to redevelopment and commercialization. Many spontaneous cultural clusters with a long history are mostly located in the city centers. The spaces may become redeveloped or rapidly commercialized, according to city center expansion plans and function change. The Hongik University area and Munrae-dong in Seoul are typical examples.

The following policy measures are needed for the support and nurturing of cultural clusters:

First, when forming a cultural cluster with the aim of urban revitalization, a certain number of artists in
a group (20 or more) should be committed to stay for a long-term period (more than 3 years). Many governmental policies offering creative spaces to artists are centered on the short-term residency business, and not many policies have been focused on the formation of artists’ social networks. A foundation to create such a network should be laid by guaranteeing a certain size and period for forming creative and sustainable cultural clusters, since a network formation process requires time to develop.

Second, if the selection of artists is possible at the policy level, there is a need to select artists from various genres and fields. Also, cultural planners who can liaison with local communities are necessary.

Third, programs serving the local community should be diversified and activated. Artists can participate in free or low-priced educational programs for local residents, and work with local communities in other ways. As local groups and artists become familiar with each other through festivals, programs and such, it is desirable to expand supporting events including exhibitions and auctions.

Fourth, governments, private organizations and local artists should participate in the shaping of cultural clusters. Collaboration is essential. The government should provide a mainly financial supporting role to ensure that artists can shape a spontaneous system. Private or public cultural organizations should be in charge of most actual policy planning and execution. They need to be guaranteed autonomy from the public administration agencies. They should liaison between artists and local communities and thus be familiar with the local community’s issues and residents.

Fifth, most local government policies related to forming cultural clusters are implemented by the civic cultural department. Cooperation with city-related departments is lacking, even though the cultural clusters affect a city’s spatial structure, society, economy and culture. Urban cultural strategies should be integrated with urban planning in this context. Many urban revitalization strategies will in the future no longer depend mainly on development-oriented strategies. In such a case, urban cultural strategies including cultural clusters can be a good alternative.

Sixth, spatial strategies are required to expand the ripple effects of cultural clusters on urban revitalization, beyond merely providing support for artists. Thus it is advisable to avoid emphasizing isolated areas and focus on areas where people come and gather naturally. Meanwhile, new approach is necessary to optimize the inner spaces of a cultural cluster. Work spaces set aside for artists should be opened to local residents for education and experience. A spatial strategy to maintain the local community’s special characteristics is also necessary. Nowadays, cultural spaces (music appreciation rooms, bookstores, etc.) and old industrial spaces are quickly disappearing in many cities. Such landmarks could be used as artistic spaces by a cultural cluster.

The policy directions cited above aim at the integration of the arts and local communities. Underutilized urban spaces can supplement the existing institutional artistic spaces. Local residents can actively participate in cultural activities in addition to serving as observers. Empty offices, idle industrial facilities and traditional markets can be revitalized.
International Conference on Urban Regeneration and Compact City

On June 28, 2012, KRIHS, the Ministry of Land, Transport and Maritime Affairs (MLTM) and OECD jointly hosted the international conference on Urban Regeneration and Compact City. The goals were to enhance understanding of how urban regeneration is carried out in Korea and advanced countries and analyze practices of Compact City models to promote urban regeneration.

Han Man-hee, MLTM vice minister, delivered the keynote address. KRIHS president Park Yang-ho and Kim Sung-wan, president of the Korean Urban Regeneration Corporation (KURC), also made congratulatory speeches.

The conference consisted of two sessions: urban regeneration policies and using a Compact City model as an urban regeneration policy.

The first session included four presentations: “Urban Regeneration: Growth and Compact City” by Professor Kang Myung-gu, the University of Seoul; “An Introduction to US Urban Regeneration Policies” by Mr. Alven H. Lan, U.S. Department of Housing and Urban Development; “Urban Regeneration Cases among OECD Member Countries” by Professor Michael Parkinson, Liverpool John Moores University; and “Directions Toward Urban Regeneration” by Professor Gu Ja-hun, Hangyang University.

The second session featured five presentations by relevant experts: “Exploring environmental incentives” by adopting a Compact City model as a development strategy, by Professor Keisuke Hanaki, Tokyo Univ.; “An overview of Japanese compact city policies”, by Kentaro Akahoshi, senior deputy director of the Ministry of Land, Infrastructure, Transport and Tourism; “Research outcomes of OECD Compact City Policy,” by Dr. Tadashi Matsmoto, OECD; “Adoption of Korean-style Compact City,” by Dr. Lee Hyun-ji, OECD; Analyzing methods for Compact City policies by Dr. Kim Dae-jong, KRIHS.

Each session was followed by a panel discussion and Q&A session.

KRIHS-CLSPI Discuss Efficient Land Use Management

The 2012 international conference on Korea-China Territory Policy, held on May 22, 2012, was jointly hosted by KRIHS, the China Land Surveying and Planning Institute (CLSPI) and the Jeju Development Institute.

From KRIHS, Dr. Kim Dong-ju delivered a presentation on Korea’s national territory plans and development strategies. KRIHS’s Dr. Kang Mi-na presented outcomes of the periodic rural development policies in Korea.

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On China’s side, Professor Park In-sung, Zhejiang University, presented the process of establishing the Chinese real estate market and policies for subsidies housing. Mr. Yao Li, of CLSPI, explained China’s management policy of construction sites. The subsequent in-depth discussion focused on territory and rural policies.
of countries, land use plans and the process for creating a Jeju free international city. This conference is held annually, alternating between Korea and China.

KRIHS Visits Vietnam to Discuss Further Collaboration

KRIHS visited Vietnam in May to strengthen ties between the two nations in the fields of land use and construction. Officials paid a visit to the Academy of Managers for Construction and Cities (AMC) in Vietnam on May 18, 2012 to discuss the training program for Vietnamese local government officials, slated for August. GDPC head Dr. Sakong Ho-sang, Dr. Jo Jin-cheol and Dr. Choi Hyeok-jae met with six AMC counterparts, including vice president Pham Van Bo to discuss details of the program including theme, number of participants and duration.

The two sides agreed to sign an MOU to strengthen cooperation in research and academic exchange. KRIHS also paid a visit to the Vietnam General Department of Land Administration (GDLA) on May 17-19 to discuss land information management and land policies. The GDLA expressed a desire to implement a land information management project based on the Korean model. On May 21, 2012, KRIHS met with Nguyen Manh Hien, deputy minister of the Natural Resources and Environment, who expressed his hope that KRIHS would assist in revising his country’s land law, and support training programs.

Kenyan Government Officials Join a Training Program by KOICA

On June 14, 2012, the Korea International Cooperation Agency (KOICA) conducted a training program for Kenyan government officials, in an attempt to implement a large-scale framework of topographical data for Lamu, Republic of Kenya. The five officials from the Kenyan Ministry of Lands included Reuben Mwenda Murugu, senior assistant director of surveys, and Polly Wanjiku Gitimu, head of the mapping division. Dr. Kim Kirl delivered a presentation on the Korea Land Information Systems (KLIS) and Korea Planning Support Systems (KOPSS), introducing domestic case studies on establishing the Geospatial Information Application Systems in Kenya. Dr. Lee Jae-yong suggested a future development strategy in his presentation on U-City: Future Urban Space, while helping the participants to better understand spatial information and future technology.

The large-scale framework of topographical data for Lamu is an ongoing $2.8 million project aimed at providing geographical information to develop an international trading port and implement an urban redevelopment system.

GDPC Hosts Training Program for African Officials

The Global Development Partnership Center (GDPC) conducted a training program for government officials from developing countries in the African continent June 4 to 20, 2012. The 3-week training program, sponsored by the
Korea International Cooperation Agency (KOICA), drew nineteen trainees from eight African countries — Ethiopia, Kenya, Morocco, Mozambique, Nigeria, Sierra Leone, Tunisia, and Uganda. The training program included workshops, lectures, field trips, advisor meetings, individual research, and site tours. The lectures dealt with nine fields, including experiences and policy implications regarding national territorial development, applying cutting-edge technologies to transport infrastructure, water resources policy, housing welfare policy for low-income households, and urban development policies.

The participants gained valuable hands-on experience by visiting representative sites of Korea’s national territory development including Gwanghwamun Square, Sejong City (the multifunctional administrative city), Saemangeum Seawall, the Korea Water Resources Corporation (K-water), and the Yeosu Expo. At a workshop held on June 18, chaired by Dr. Kim Hyun-sik, the trainees presented action plans that they drew up for their respective countries’ territorial development circumstances. At the award ceremony for best presentation, representatives of five countries — Kenya, Morocco, Mozambique, Nigeria, and Uganda — were recognized for their outstanding work.

The KOICA-commissioned training program was well-received by the participants. Going forward, the GDPC will maintain a long-term partnership with the trainees and seek ways to collaborate on policy consultation activities in the fields of urban development and planning for each African country.

The GDPC hosted the 10th Global Development Partnership Forum on July 4, 2012, at the Ritz-Carlton Hotel in Seoul. The 10th forum drew a total of 27 people working in the overseas development-related divisions of several government-affiliated institutes and private enterprises, as well as 9 people from KRIHS.

The forum featured two presentations: Present Status of Korea’s Development Cooperation and Policy Direction of Korea’s Official Development Assistance (ODA) by Mr. Kim Choong-ho, Director General of the ODA Bureau at the Prime Minister’s Office in Korea; and “Status of the Construction Market in Emerging Countries” by Mr. Kim Gyu-choel, Director of the Overseas Construction Support Division at the Ministry of Land, Transport and Maritime Affairs (MLTM). The director general stressed the role of the private sector, strategies, promoting the model of Public-Private Partnerships (PPP), and policy directions of the Prime Minister’s Office for the strategic utilization of ODA. Mr. Kim provided an analysis on the present state of the construction market according to region. In particular, he explained the condition and trends of business and compared the issues of emerging countries including Iraq, Myanmar, Colombia, Peru, and Chile, based on the lessons learned from his experiences in these countries. The forum’s objective was to establish a network of experts, search for ways to advance overseas participation, and collaborate with governmental institutes.
KRIHS, KICT & Greening Partner Promote Energy Conservation for Low Carbon Green Growth Strategy

KRIHS, the Korea Institute of Construction Technology (KICT) and the Greening Partner hosted the 2011 Green Architecture Green Together Event at the COEX Grand Ballroom in Seoul on June 25, 2012. The event aimed to support government efforts to promote energy preservation and enhance public welfare. The British ambassador to South Korea delivered a presentation on the theme of British green growth strategies and major polices for green architecture. KRIHS president Park Yang-ho presented on green territory and city strategies to promote green growth. KICT president Woo Hyo-seop lectured on sustainable policy, technology and green building markets. The afternoon session was divided into public policy and business tracks: Government goals for expanding green building, best practices in green construction and green technologies were introduced.

The event served as an occasion to promote public consensus on the need for energy conservation, particularly in buildings, to realize low-carbon and green growth, to implement a national target of reducing greenhouse gas emissions, and to share views on relevant government policies and green architecture from public, private and academic sectors. Dignitaries including Han Man-hee, Vice Minister of the Ministry of Land, Transport and Maritime Affairs (MLTM); Park Yang-ho, president of KRIHS; Woo Hyo-seop, president of the KICT and relevant experts from home and abroad attended the event.

KRIHS Hosts Seminar on Urban Development and Regeneration

On June 15, 2012, KRIHS hosted a seminar on the role of major participants in urban development and regeneration, sponsored by the Ministry of Land, Transport and Maritime Affairs (MLTM). The seminar aimed to explore how major participants in urban development contribute to maximizing productive results and minimizing the side effects that arise from urban development. It kicked off with the opening speech of KRIHS President Park Yang-ho, followed by the congratulatory speeches of the secretary general of the ruling Saenuri Party and the vice minister of MLTM. The event included three presentations: the establishment of participants’ roles in urban development and regeneration, by Dr. Yoo Jae-yoon; developers’ roles and the driving force of private and public cooperation, by Professor Kim Kyung-min from the Graduate School of Environmental Studies, Seoul National University; and measures to expand the participation of private financiers in urban development and regeneration projects, by Mr. Hyun Jun-sang from Hana Daol Trust. Jung Chang-soo, a former vice minister of MLTM, chaired the following discussion that included government officials, university professors and members of financial institutions. They shared ideas including the need to establish an official organization responsible for urban development, and how to strengthen cooperation between the public and private sectors.
Korea-Russia Far East Forum

The Korea-Russia Far East Forum was held on July 19-21, 2012, in Vladivostok, and hosted jointly by KRIHS, the Korea Environment Institute (KEI), the Korea Maritime Institute (KMI), the Consulate General of the Republic of Korea in Vladivostok, the APEC Study Association of Korea, the Far Eastern Federal University and the Far Eastern Center for Economic Development. In attendance were representatives of the hosting institutions as well as relevant government officials, including KRIHS President Park Yang-ho; KMI President Kim Hak-so; Lee Jeong-taek, president of the APEC Study Association of Korea; KEI President Lee Byung-wook; and Lee Yang-gu, consul general of the ROK in Vladivostok. The forum aimed to seek ways to strengthen cooperation between the two countries in terms of logistics, the environment, and regional development and examine bilateral cooperation development agendas in the Far East region. As part of this effort, KRIHS and the Far Eastern Federal University signed an agreement to strengthen research capabilities and deepen cooperation in nurturing professionals in the field of national territory.

Professor Gudmundur F. Ulfarsson Discusses Impact of Smart Growth on Public Finance

On June 13, 2012, Professor Gudmundur F. Ulfarsson, from the University of Iceland, was invited to give a lecture entitled “Does Smart Growth Matter to Public Finance?” He took an empirical approach to explain the impact of Smart Growth policies, a fiscally motivated anti-sprawl policy movement, on public finance. His analysis used a series of spatial econometric models with relevant variables including low-population density and spatially expansive development patterns. He concluded that Smart Growth has a positive impact on public finance, the impact of which differs according to types of service facilities, demographic conditions and social environment in different regions. KRIHS researchers in various fields attended the lecture and went on to discuss smart growth further.