

# Implementing 2008 SNA for Korean regional accounts

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## 1. Introduction

When the rebasement of reference year (2005→2010) for Korean Regional Accounts was carried out along with the implementation of 2008 SNA in 2014, the capitalization of the expenditures on R&D and weapons systems was among a few main issues. Since the nation's R&D expenditures have accounted for more than 4% of GDP over the years, GDP(also regional GDP) would be considerably underestimated if R&D expenditures were not capitalized following 1993 SNA. Also considering the significant portion of government budget spent on national defence (around 10% of national budget), the capitalization of the expenditures on weapons systems had to be put into practice.

In the process of compiling the new series of Regional Accounts which would accommodate the core recommendation of 2008 SNA, one of major problems we were faced with was the lack of basic statistics supplied for the implementation. Generally statistical and administrative sources supporting the estimation of Regional Accounts were relatively poorly furnished compared with those for the estimation of National Accounts, and the problem got more complicated when it came down to capitalizing the weapons systems.

This paper will briefly introduce the process of the capitalization of R&D and weapons systems expenditures along with the problems we had to deal with in the process of the estimation.

## 2. The capitalization of R&D expenditures

### Basic sources for the estimation

To provide the basic information on R&D activities in Korea 'Survey of Research and Development' is conducted on an annual basis by Ministry of Science, ICT and Future Planning. The survey is designed based on Frascati Manual and covers public research institutes, universities, general hospitals and private enterprises as the survey

units. It became the essential part of the data sources for the R&D estimation. Other sources included Input-Output Table, Economic Census and tax data etc.

### Estimating R&D output

As a starting point we extracted labor cost and operating cost from the Survey of R&D. From the extract costs identified as investment such as Intellectual Property Products(IPPs) licence fees were subtracted. And purchase of R&D services by businesses specializing in R&D added as intermediate consumption to the figure produced above. Also as operating surplus and fixed capital consumption, cost for capital services added. Finally other taxes on production added to produce the R&D output. So we could have the R&D output using a cost approach. It can be presented as the table below.

< The production of R&D output >

+/-	Items	Data Sources
+	labor cost, operating cost	Survey of R&D
-	cost for S/W produced on own account	Survey of R&D
+	purchase of R&D services by businesses specializing R&D	Survey of R&D
+	cost for capital services	Input-Output Table
+	other taxes on production	Tax data

### Estimating Gross Fixed Capital Formation from R&D activities

Using the R&D output calculated above we could get the Gross Fixed Capital Formation(GFCF) resulting from the R&D expenditures, in which case a production balance can be applied as follows:

output + imports = intermediate consumption + final consumption + gross fixed capital formation + changes in inventories + exports

The fomula can be modified as follows:

gross fixed capital formation = (output + imports) – (intermediate consumption + final consumption + changes in inventories + exports)

To get the GFCF from R&D activities the R&D output should be valued at market prices. So taxes on products should be added to the output. Also for the estimation of GFCF of each institutional sector, net purchase of R&D from other domestic institutional sectors should be included in each sector's net imports. We counted the final consumption and the changes in inventories in R&D activities as 0. Thus, the GFCF of each institutional sector was produced as follows:

< The production of GFCF from R&D activities >

+/-	Items	Data Sources
+	output	produced in the previous process
+	taxes on products	Tax data
+	net imports(imports-exports)	Input-Output Table
+	net purchase from other institutional sectors	Survey of R&D
-	intermediate consumption	produced in the previous process (purchase of R&D services by businesses specializing R&D)

### Allocating national aggregates to regions

As the Survey of R&D is compiled at the regional level, we allocated national output to regions using regional proportion of R&D expenditures as the allocation parameter. But when allocating GFCF, it was not as simple. We exploit different methods for different institutional sectors.

We assumed that the output of R&D activities by general government and NPISHs was invested within the region where it was produced while the output by corporations could be used in any places regardless of producers' residence. Following the assumption we allocated the GFCF of general government and NPISHs to the regions where the output was produced. As for the GFCF of corporations, first, we allocated the national aggregate to industries using Gross Fixed Capital Formation Table, and then again allocated each industry's GFCF to regions according to the industry's regional proportion.

## 3. The capitalization of expenditures on weapons systems

### Estimating Gross Fixed Capital Formation

For the estimation of GFCF caused by the purchase of weapons systems by government – once treated as intermediate consumption by government under the 1993 SNA – we could draw on government budget report, from which the expenditures on military equipment were extracted. Since disposal of weapons rarely happens, we took the purchase as GFCF resulting from the expenditures on weapons systems. There must have been additional expenditures for improving the existing systems. But we could not find data sources showing those expenditures. So we did not add them to GFCF. It was allocated to regions based on the regional proportion of wages paid to military personnel.

### Estimating Consumption of Fixed Capital

The consumption of fixed capital(CFC) on weapons systems was produced in the process of estimating capital stock on the basis of Perpetual Inventory Method. We allocated it to regions according to the regional proportion of GFCF produced in the previous stage.

## 4. The Result

The implementation of capitalizing R&D and weapons systems caused regional GDP in 2010 to rise by 3.9% at the national level. R&D appeared to have a considerable impact on GDP raising it by 3.6%. The impact of the capitalization of weapons systems was not as significant as R&D raising GDP by 0.3% since only CFC was added to GDP. The change in GDP is shown on the table below.

(trillion won, %)

		2008	2009	2010	2011	2012
Regional GDP	After rebasement (a)	1,105.7	1,151.4	1,265.1	1,330.9	1,377.0
	Before rebasement (b)	1,028.5	1,065.7	1,172.7	1,241.6	1,275.0
	Base-up(a/b)	7.5	8.0	7.9	7.2	8.0
Increase of GDP by R&D capitalization	Amount (c)	32.3	36.1	42.2	44.8	51.9
	Increase rate (c/b)	3.1	3.4	3.6	3.6	4.1
Increase of GDP by weapons system	Amount (d)	2.8	3.2	3.3	3.5	3.8
	Increase rate (d/b)	0.3	0.3	0.3	0.3	0.3