Analysis of the Regional Socio-economic Effects of the Basic Income in South Korea

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Abstract

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The basic income debate is an important issue in South Korea. This debate was quite hot especially in the national president election campaign in the first quarter of 2022. Proponents of the basic income argue that basic income is the most efficient policy instrument in reducing inequality and poverty. Empirical results from partial equilibrium analysis, which mostly focus on the distributional and/or poverty issues, advocates basic income. On the other hand, Opponents of the basic income do not put much credit on the distributional improvements. They emphasize that we need to consider other aspects of the economy.

In this paper, we use a regional CGE modelling approach to investigate the pros and cons of the basic income in South Korea. The basic tool is the TERM-Korea Regional CGE model, which uses the most recent input-output table of the South Korean economy. We first present national results, and sectoral results follows next. In the summary part of the paper, we present the policy implications for the basic income scenario.

Keywords: regional socio-economic effects, multi-regional CGE model, TERM-Korea, basic income

I. Introduction

According to the '2021 Senior Statistics' (released on 29 Sep. 2022) by the Ministry of Health and Welfare (MOHW) in South Korea, the number of elderly people aged 65 and over reached 8.537 million in 2021, accounting for 16.5% of the total population. If this trend continues, 4 years later, in 2025, the elderly population will account for 20.3% of the total population, entering a super-aged society, and it is expected to reach 30.5% by 2036.

The number of the elderly who is living alone exceeded 1.66 million as of last year, and the proportion of single-person elderly households among the total elderly households reached a new high of 35.1%.

Among the elderly households living alone, those in their 70s accounted for the highest proportion at 44.1%, and by gender, women accounted for 71.9%.

Statistics Korea projected that the number of elderly households living alone will continue to increase. It is expected to double in 2037 to 3.35 million households and to reach 4.05 million households in 2047.

As of 2019, the life expectancy of a 65-year-old survivor is 21.3 years (19.1 years for men and 23.4 years for women). This means that a 65-year-old man can live to 84.1 years old and a woman to 88.4 years old. Compared to the average of OECD (Organization for Economic Cooperation and Development) member countries, men are 0.8 years longer and women 1.8 years longer.

Although the income distribution indicator for the retirement age group (66 years and older) has improved since 2016, the relative poverty rate as of 2019 was still high at 43.2%. This is the highest level among member countries of the Organization for Economic Cooperation and Development (OECD).

The current system provides a monthly basic pension of 300,000 won per month (2,800 USD per year) to the bottom 70% of the elderly based on their income level. Alternatively, we might think of

(1) 400,000 won per month for the bottom 70% seniors and 200,000 won for the top 30%

seniors

(2) Monthly payment of 300,000 won to the top 30% of seniors who are excluded from the current system

(3) 400,000 won per month is paid only to the bottom 70% of the elderly.

OR, we might provide additional 300,000 won/mo. to the aged as basic income.

Even though the government exercises common social policy for the whole nation, the regional effects varies according to the diversity of the industrial structure, population composition, labor market, etc.

The TERM-KOR, a regional CGE model for South Korea, is a good analytical tool for this purpose. With this, we can easily investigate regional effects of national policy in a general equilibrium sense. Furthermore, with this model, the pre-eminent policy simulation at the stage of policy design is also possible.

The composition of this paper is as follows: section two briefly describes the model and database. In section three, national results from the proposed hypothetical policy scenario will be explored. Both national and regional results will be shown, but the focus will be put on the production, employment and primary income. In the last section of this paper, summary of findings and research direction for the future will be discussed.

II. TERM-KOR Model and Database

We need to have good analytic tool to analyze the effects of proposed policy. For this purpose, we developed a TERM Model for Korea (TERM-KOR). This is quite new model and less than two-year old.

TERM (The Enormous Regional Model) is first developed in Australia by the two Professors, Mark Horridge and Glyn Wittwer of Monash University (They both are with Victoria University now). TERM model is quite useful in modelling economic impact analysis for the regional aspect. It is computable general equilibrium model and its database is based on the MRIO data. There are 17 countries that use TERM model for the regional economic analysis.

TERM-KOR has 33 commodities (COM or IND), 17 regions (REG) and 10 household (HOU) types by income level. But the TERM-KOR model can be aggregated to 16 COM/IND, 17 REG, and 10 HOU types for the real-time analysis or long-term forecasting of the economy.

The original TERM-KOR database first uses 2015 Input-Output Table and/or Supply-Use Table of South Korea to compile the National Database. Next, the information for 2015 Regional Input-Output Table for South Korea is incorporated to assemble regional details in the regional CGE model for the South Korea. Once the TERM database passes the balancing conditions for the regional CGE database, we can build a regional CGE model for the use of policy simulation. Of course, we may update the regional database for more recent year (say, 2020) at a later stage with the help of RAS (or entropy) technique.

All the detailed descriptions of the TERM model can be found in Horridge (2001). But most of the CGE models we are using now have vast of common features. The origin of modern CGE model stems from the 1-2-3 CGE model. For more information on the 1-2-3 CGE model, Devarajan, et al. (1997) would be a good reference,

Figure 1 shows the 17 regions in South Korea. The area in the north-west part of the map represent the metropolitan city of Seoul, where 14 million people reside. The city of Seoul has the highest level of income in all the 17 regions.

Figure 1. Map of South Korea
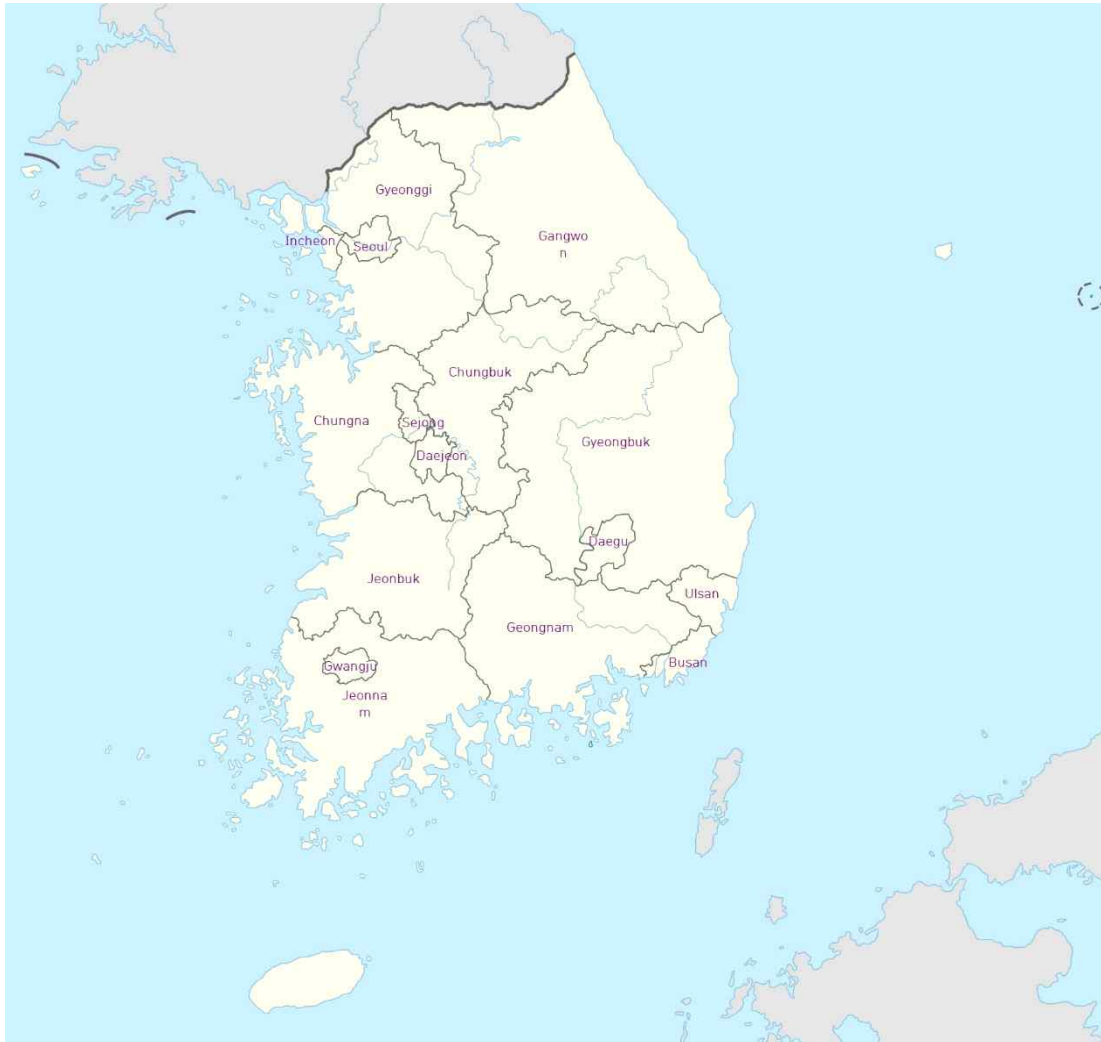
Source: Wikipedia.

A. TERM Model Database

Table 1 summarizes the typical TERM database. All the elements are from the *2015 Regional Input-Output Table* released by the Bank of Korea in June 2019. This format is based upon the ORANI database, and extended to handle the regional aspect. There are 17 special cities and provinces in South Korea (R=17). Uppercase *C* represents the number of commodities (S=33), *I* represents Industries (I=33), *S* represents sources (S=2, Domestic and Imported).

Table 1. The Structure of TERM Database

(Unit: trillion won)

		1	2	3	4	5	6
		Interm. Input (I×R)	Invest (I×R)	Hou Con (H×R)	Expo (1×R)	Gov Con (1×R)	STK (1×R)
BAS-Domestic	C×S×R	1,597.0	378.6	601.8	695.2	250.1	5.9
BAS-Imported		442.5	55.3	68.8	2.1	0.0	0.7
MAR-Domestic	C×S×M	86.4	10.3	70.7	19.7	0.0	0.0
MAR-Imported	×R	24.0	1.4	8.3	0.1	0.0	0.0
TAX-Domestic	C×S×R	35.4	33.0	47.8	0.0	0.0	0.3
TAX-Imported		10.7	2.3	7.4	0.0	0.0	0.1
1LAB (Comp. Employ.)	1×R	750.2					
1CAP (Oper. Surplus)	1×R	751.1					
1OCT (Other Costs)	1×R	19.6					
Sum		3,717.0	481.0	804.8	717.0	250.1	8.6

Source: Bank of Korea (2019), *2015 Regional Input-Output Table*.

In this paper, 33 sectors are aggregated to 16 sectors for the brevity of the discussion.

Table 2 shows the mapping between 33 sectors and 16 sectors. All the 14 manufacturing sectors are collapsed to single manufacturing sector,

Table 2. Sector Match (S33 to S16)

	Code	Abbreviation	Description
1	A	AgriForFish	Agricultural, Forest, Fishing
2	B	MineQuar	Mining and Quarrying
3	C	Manufact	Manufacturing (C1–C14)
4	O	PADSS	Public Admn, Defense, Social Security
5	P	Education	Education
6	Q	HealSocCare	Health, and Social Care
7	D, E	EGW	Electricity, Gas, and Water, Waste Disposal
8	F	Construct	Construction
9	G	Trade	Wholesale and Retail Trade
10	H	Transport	Transport Services
11	I	FoodSvcAcc	Foods, and Accommodation
12	J	CommBroad	Communication and Broadcasting
13	K	FinanInsur	Finance and Insurance
14	L	RealEstate	Real Estate
15	M, N	ProfBusiness	Professional and Business Services
16	R, S, T	ArtSportsOth	Arts, Sports, and NEC

Figure 2 shows the structure of the TERM database. A detailed discussion can be found in Horridge (2002),

Figure 2. The Structure of the TERM Database

Source: Horridge, M. (2002). *The TERM and Its Database*.

B. Scenario setting

In order to determine the size of policy shock, we need to know the population composition by region. Because the common amount of basic income will be given to each person in each of the 17 regions, the size of public transfer will be proportional to

the numbers of the aged person in each region. The last column in Table 2.1 shows the size of policy shock.

Table 2. Determination of the policy shock

No	Region name	GRDP (tril. Won)	Pop (1,000)	Pop65+ (1,000)	Sh. P65+ (%)	Basic Income (tril. Won)	Policy Shock (%)
0	National	1,936.0	51,781	8,537	16.5	30.7	1.59
1	Seoul	440.3	9,602	1,549	16.2	5.6	1.27
2	Pusan	91.7	3,344	655	19.8	2.4	2.57
3	Daegu	58.0	2,419	407	16.9	1.5	2.53
4	Incheon	90.0	2,951	422	14.3	1.5	1.69
5	Gwangju	41.6	1,488	213	14.4	0.8	1.84
6	Daejeon	44.1	1,500	217	14.6	0.8	1.77
7	Ulsan	68.6	1,140	147	12.9	0.5	0.77
8	Sejong	12.7	349	35	9.6	0.1	0.99
9	Gyeonggi	486.7	13,405	1,823	13.5	6.6	1.35
10	Gangwon	48.8	1,515	316	20.9	1.1	2.33
11	Chungbuk	71.3	1,632	290	17.7	1.0	1.46
12	Chungnam	114.0	2,204	406	18.3	1.5	1.28
13	Jeonbuk	53.2	1,792	381	21.4	1.4	2.58
14	Jeonnam	78.1	1,764	417	23.8	1.5	1.92
15	Gyeongbuk	105.3	2,655	570	21.5	2.1	1.95
16	Gyeongnam	112.1	3,350	582	17.4	2.1	1.87
17	Jeju	19.5	670	106	15.7	0.4	1.96

The macro closure and the actual implementation of the information on policy shock is explained in the next sub-section.

C. Short-run Closure and shocks

In this paper, we employs the so-called short-run macro closure. In the CMF file, we have the following information.

Automatic closure + Swap for short-run

! Swaps for short-run closure

! Old exog   New exog

swap invslack = NatMacro(*"RealInv"*); *! Real investment is exogenous*

swap xhouhtot = fhou; *! Consumption follows wage income, by reg*

swap flab_i = flabsupA; *! Switch off regional wage diffs*

swap labslack = flabsup_id; *! Switch off national labour supply mech*

and policy shocks added

Shock fhou(HOU,*"Seoul"*)   = uniform 1.27;

Shock fhou(HOU,*"Pusan"*)   = uniform 2.57;

Shock fhou(HOU,*"Daegu"*)   = uniform 2.53;

etc.

(Why?) In the TAB file, we have the following:

Variable

(all,h,HOU)(all,d,DST) **fhou(h,d)**

 # Regional propensity to consume from labour income #;

houslack *# Consumption slack variable to accommodate national constraint #;*

Equation E_fhou (all,h,HOU)(all,d,DST)

!   whouhtot(h,d)   =   winc_fi(h,d) + fhou(h,d) + houslack; !

whouhtot(h,d)   =   wlab_io(d) + **fhou(h,d)** + houslack;

Therefore, the policy shock of the introduction of basic income for the aged strengthens nominal household consumption (just like an increase in labour income).

In the next section, simulation results from the introduction of the basic income will be summarized.

III. Policy Simulation

A. National Results

Next table summarizes the national economic results of the hypothetical introduction of a basic income in South Korea. Each person aged 65 years and over receives 300,000 Korean Won per month (equivalent to 2,800 USD per year). The variables name colored with purple, e.g., 'RealInv' and 'RealGov', are treated as exogenous. The real household consumption increases by 1.9%, and Exports decreases by −0.35% (and imports increases 0.4%). Real GDP increases by 0.62%, and aggregated employment increases by 0.27%. The consumer price index increases 0.85%, and the nominal GDP increases by 1.3% in the short-run.

Table 3. National Results

(Unit: %)

No.	National Macro. Variables	Description	pch.
1	RealHou	Real Household Consumption	1.9
2	RealInv	Real Investment	0
3	RealGov	Real Government Consumption	0
4	ExpVol	Exports, Volume	−0.35
5	ImpVolUsed	Imports Volume, Used	0.4
6	ImpsLanded	Imports Volume, Landed	0.4
7	RealGDP	Real GDP	0.62
8	AggEmploy	Aggregate Employment	0.27
9	realwage_io	Real Wage, CPI deflated	0
10	plab_io	Nominal Wage	0.83
11	AggCapStock	Aggregated Capital Stock	0
12	GDPPI	GDP Deflator	0.67

13	CPI	Consumer Price Index	0.85
14	ExportPI	Export Price Index	0.14
15	ImpsLandedPI	Imports landed Price Index	0
16	Population	Population	0
17	NomHou	Nominal Household Consumption	2.76
18	NomGDP	Nominal GDP	1.3

The typical short-run closure is graphically shown below. First, A change in real wage causes employment to change in the opposite direction. The exact size of change depends on the wage elasticity of employment. An increase in employment boosts production and primary income (or GDP). In the expenditure side of GDP determination, investment and government consumption is assumed fixed. Thus changes in private consumption and trade balance need to be adjusted to arrive new equilibrium.

Figure 3. Short-run closure
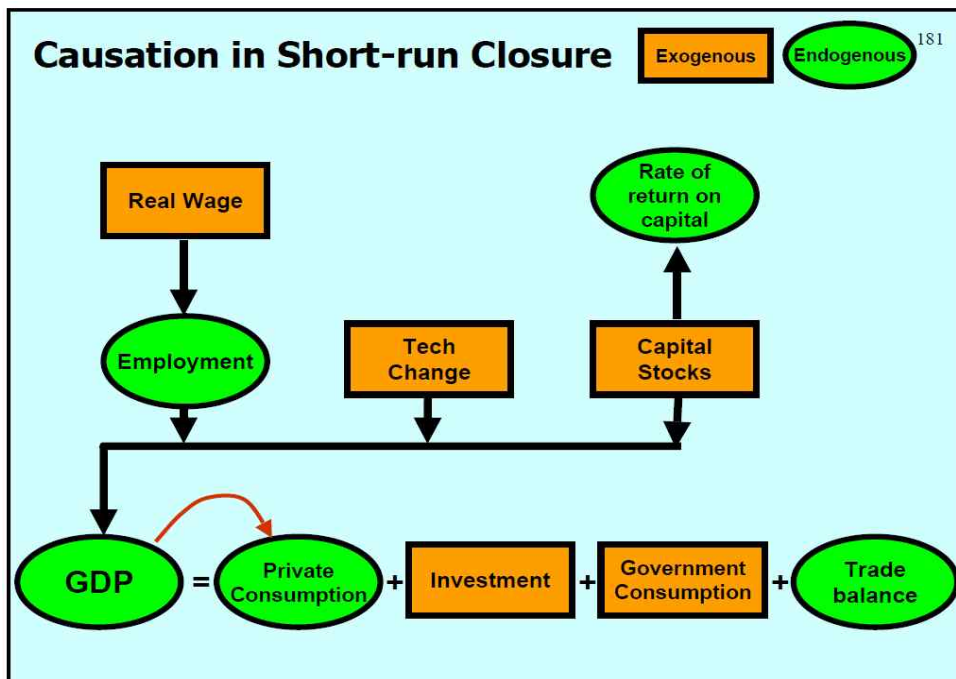
Source: Horridge, M. (2001). *Minimal: A Simple General Equilibrium Model*, p.36.

B. Sectoral Results

Table 4 summarizes the sectoral results of production, employment and primary income. In the production side, the introduction of the basic income boosts 'ArtSportsOth' (i.e., sectors R, S, and T) by 1.54%, and 'FoodSvcAcc' (i.e., sector I) by 1.08%. 'MineQuar' (i.e., sector B) changes its production by −0.13%.

Table 4. Sectoral Results

(Unit: %)

	Code	Sectors	production	employ-ment	factor income
1	A	AgrForFish	0.39	1.03	2.69
2	B	MineQuar	−0.13	−0.86	−0.54
3	C01–C14	Manufact	0.02	−0.47	0.35
4	D, E	EGW	0.42	0.7	1.41
5	F	Construct	0.02	−0.22	0.61
6	G	Trade	0.07	−0.22	0.69
7	H	Transport	0.13	−0.13	0.7
8	I	FoodSvcAcc	1.14	1.35	2.07
9	J	CommBroad	0.59	0.95	1.66
10	K	FinanInsur	1.08	2.1	2.75
11	L	RealEstate	0.73	4.83	4.82
12	M, N	ProfBusiness	−0.05	−0.38	0.48
13	O	PADSS	0.06	−0.22	0.65
14	P	Education	1.01	0.95	1.8
15	Q	HealSocCare	0.81	0.84	1.7
16	R, S, T	ArtSportsOth	1.54	2.15	2.87

As far as employment is concerned, real estate sector (i.e., sector L) increases its employment by 4.83%, and 'ArtSportsOth' sector (i.e., sectors R, S, and T) increases by 2.15%. On the income side, the 'RealEstate' sector (i.e., sector L) increases by 4.82%, 'ArtSportsOth' sector (i.e., sectors R, S, and T) increases by 2.87%, and 'FinanInsur' sector (i.e., sector K) increases by 2.75%.

According to our simulation, both 'MineQuar' and 'ProfBusiness' sectors show decrease in the production and employment. In 'Manufact', 'Construct', and 'PADSS' (Public Administration, Defense, and Social Security) sectors, employment and production move in the opposite direction.

Figure 4. production vs. employment (by sector)
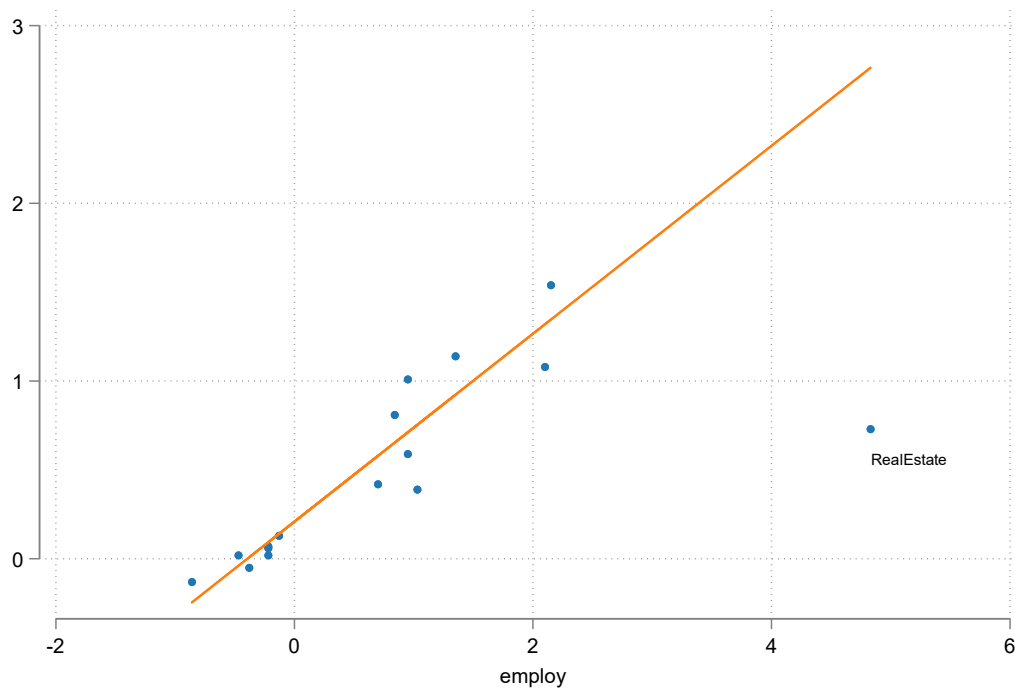
C. Regional Effects

Table A1 summarizes macroeconomic variables by region. Among those, we focus key macroeconomic variables. First, we will focus real GDP and employment by region. The real GDP growth in Jeonbuk, Jeonnam, Jeju and Ulsan is the highest (over 0.7%). On the other hand, Daejeon, Sejong, Chungbuk, and Gyeongnam regions are relatively low growth in real GDP (around 0.5%).

Figure 5 clearly shows that there is a linear relationship between real GDP growth and employment growth. This is true especially in the In the short-run when there is a fixed factor of production.

Figure 5. real GDP vs. Employment (by region)
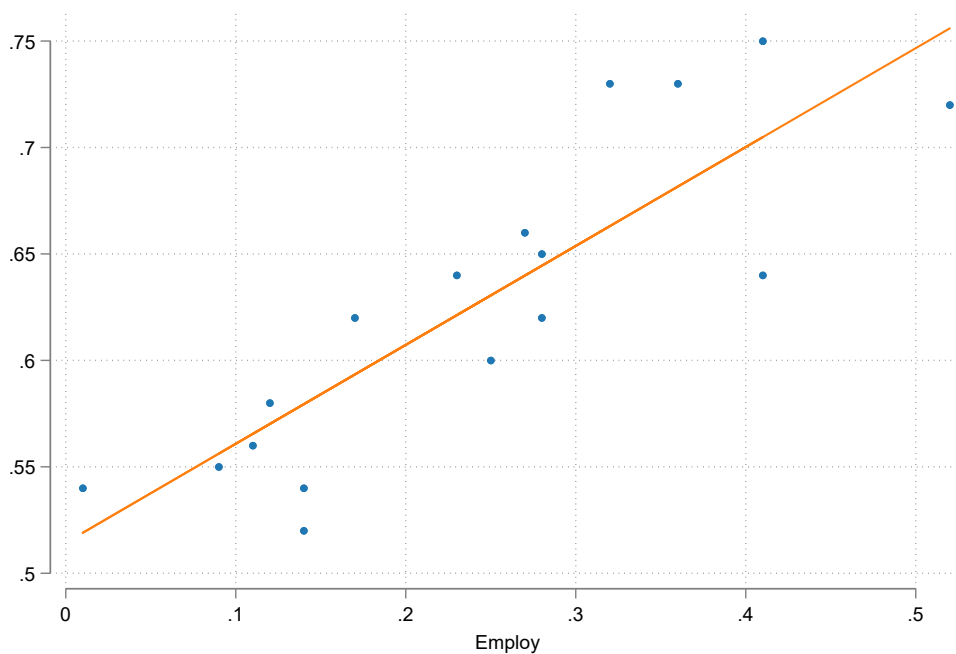
Note: The vertical axis indicates the growth rate of real GDP, and the horizontal axis indicates the growth rate of employment. Fitted line is estimated from robust regression.

D. Decomposition of real GDP

Table 5 summarizes the decomposition of GDP change by region. Jeonbuk (1.84) and Daegu (1.63) show the highest changes in household consumption. The contribution of investment is highest in Pusan (0.13) and Daegu (0.12). In our policy simulation, In general, household consumption plays an important role in economic performance because it has the largest share of GDP in expenditure side.

Table 5. Decomposition of Real GDP Components by Region

	contxgdpexp	HOU	INV	GOV	STOCKS	EXP	Imports	RExports	RImports	NetMar
1	Seoul	0.8	0.09	0	0	–0.13	–0.06	0.18	–0.25	0.01
2	Incheon	0.99	0.04	0	0	–0.14	–0.19	0.29	–0.33	0
3	Gyeonggi	0.85	–0.11	0	0	–0.12	–0.05	0.18	–0.15	0
4	Daejeon	0.91	0	0	0	–0.12	–0.38	0.36	–0.24	0
5	Sejong	0.15	–0.08	0	0	–0.06	–1.58	1.99	0.1	0.01
6	Chungbuk	0.64	–0.04	0	0	–0.12	–0.21	0.37	–0.11	0.01
7	Chungnam	0.52	–0.05	0	0	–0.1	–0.09	0.38	–0.02	0
8	Gwangju	1.21	0.09	0	0	–0.19	–0.51	0.38	–0.33	0
9	Jeonbuk	1.84	0.05	0	0	–0.19	–0.33	0.03	–0.64	–0.03
10	Jeonnam	0.86	0.02	0	0	–0.15	–0.15	0.35	–0.16	–0.01
11	Daegu	1.63	0.12	0	0	–0.15	–0.25	–0.16	–0.59	–0.02
12	Gyeongbuk	0.71	–0.04	0	0	–0.16	–0.09	0.23	–0.09	0
13	Pusan	1.66	0.13	0	0	–0.26	–0.19	–0.16	–0.54	–0.02
14	Ulsan	0.32	–0.03	0	0	–0.12	–0.11	0.59	0.09	0
15	Gyeongnam	0.97	–0.01	0	0	–0.24	–0.12	0.11	–0.16	0
16	Gangwon	1.26	0.04	0	0	–0.07	–0.37	0.24	–0.47	–0.01
17	Jeju	1.15	0.09	0	0	–0.12	–0.69	0.68	–0.38	0

E. Effects on Inequality and/or Poverty

Table 6 summarizes the effects of hypothetical basic income on income inequality and poverty. Inequality index are shown from R MD to GE(2). In all the inequality index, it can be found that the income inequality is decreased by the introduction of the basic income. On the contrary, the new welfare policy does not have poverty reduction effects. This is because the hypothetical basic income is a kind of universal policy.

Table 6. Effects on Inequality and/or Poverty

(Unit: p)

index	description	pre-policy	post-policy	difference
RMD	Relative mean deviation	0.23826	0.23777	–0.00049
CV	Coefficient of variation	0.86302	0.86294	–0.00008
G	Gini coefficient	0.33758	0.33687	–0.00071
GE(-1)	Entropy index	0.19726	0.19624	–0.00102
GE(0)	Mean Log Deviation	0.18915	0.18847	–0.00068
GE(1)	Theil index	0.22522	0.22474	–0.00048
GE(2)	Half of (Coeff. Var. squared)	0.37078	0.37070	–0.00008
FGT(0)	headcount ratio (proportion poor)	0.07774	0.07774	0.00000
FGT(1)	average normalised poverty gap	0.01574	0.01575	0.00001
FGT(2)	average squared normalised poverty gap	0.00424	0.00424	0.00000

In the next section, the summary of findings of this research and the direction of further research will be discussed.

IV. Summary and Conclusion

Even though the government exercises common social policy for the whole nation, the regional effects varies according to the diversity of the industrial structure, population composition, labour market, etc. These regional characteristics are quite hard to change despite of the policy efforts by the government authorities. in order to have better understanding of the regional nature of the national welfare policy,

TERM-Korea (TERM-KOR) model is a bottom-up CGE model applied to South Korea. The origin is the TERM (The Enormous Regional Model) first developed by Professor Mark Horridge of Center of Policy Studies (CoPS) in 2002. The TERM-KOR distinguishes 33 industries (and/or commodities), 17 regions, and 10 households by decile in South Korea. For the ease of reporting final results, the industries/commodities are aggregated to 16 sectors at the later stage.

In this paper, TERM-KOR is employed to investigate the regional socio-economic effects of the introduction of the basic income in South Korea. We can also include 229 municipalities as a top-down manner. Employment, value added, household consumption by municipalities can be used for the detailed analysis for income inequality and/or poverty.

With the new regional CGE model, TERM-KOR, we are able to successfully identify the national macroeconomic effect of the proposed basic income. We also are able to detect the winners and losers both in regional level and in sectoral aspects. We also analyzed inequality and/or poverty reduction effects, but found that the universal welfare policy is not that effective in reducing inequality or poverty.

For the future direction of research, I'm interested in the following issues on the regional CGE modelling. First, it is necessary to develop a SAM version of the TERM model, so that we can explicitly handle transfer income from government to household decile.

Second, it is necessary to integrate the TERM model and micro-simulation model to fully investigate welfare effects of the various social/welfare policy. In doing so, adding some elements that facilitate the discussion of the marginal cost of public funds (MCF) will

reinforce the usefulness of our regional CGE model in policy analysis.

Third, we may try to construct a municipal activity index for current business cycle analysis (such as national economic activity index by Chicago Fed). Because the rural development policy in each country needs some kind of scientific methodology to reinforce the policy effectiveness.

Fourth, some overlapping generational element might be incorporated in TERM type regional CGE models. This direction of research greatly increase the effectiveness of the anti-poverty policy. In addition to that, we can extend our analytical ability on the sustainability of the pension system to the regional(/local) level.

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Appendix

Table A1. Macroeconomic variables by Destination

(Unit: %)

MainMacro	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
RealHou	1.69	1.92	1.61	1.91	1.14	1.56	1.56	2.12	2.95	2.34	2.65	2.06	2.75	1.09	1.89	2.62	2.49
RealInv	0.29	0.18	-0.26	0.01	-0.21	-0.18	-0.18	0.43	0.22	0.07	0.46	-0.17	0.61	-0.21	-0.05	0.16	0.28
RealGov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ExpVol	-0.78	-0.37	-0.27	-0.55	-0.27	-0.27	-0.13	-0.55	-0.66	-0.24	-0.95	-0.28	-0.94	-0.11	-0.51	-0.75	-1.12
ImpVolUsed	0.75	0.41	0.4	0.49	0.12	0.2	0.18	0.58	0.79	0.24	0.76	0.19	0.76	0.14	0.33	0.9	1.04
ImpsLanded	0.52	0.48	0.44	0.45	0.41	0.29	0.23	0.4	0.65	0.35	0.33	0.43	0.52	0.25	0.31	0.48	0.46
RealGDP	0.64	0.64	0.6	0.54	0.52	0.55	0.66	0.65	0.73	0.75	0.58	0.56	0.62	0.73	0.54	0.62	0.72
AggEmploy	0.41	0.23	0.25	0.14	0.14	0.09	0.27	0.28	0.36	0.41	0.12	0.11	0.17	0.32	0.01	0.28	0.52
realwage_io	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
plab_io	0.84	0.81	0.58	1.08	0.45	0.63	0.42	1.19	1.12	0.61	1.77	0.73	1.64	0.48	1	1.18	1.04
AggCapStock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GDPPI	0.87	0.62	0.41	0.93	0.1	0.28	0.13	1.08	1.15	0.39	1.85	0.38	1.69	-0.03	0.74	1.18	1.13
CPI	0.84	0.81	0.58	1.08	0.45	0.63	0.42	1.19	1.12	0.61	1.77	0.73	1.64	0.48	1	1.18	1.04
ExportPI	0.38	0.15	0.1	0.2	0.1	0.1	0.05	0.19	0.24	0.09	0.35	0.1	0.4	0.04	0.18	0.32	0.57
ImpsLanded	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Population	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NomHou	2.54	2.75	2.19	3.01	1.59	2.19	1.99	3.33	4.11	2.97	4.47	2.8	4.43	1.57	2.9	3.83	3.56
NomGDP	1.52	1.27	1.01	1.47	0.62	0.83	0.79	1.75	1.89	1.14	2.44	0.95	2.33	0.7	1.28	1.81	1.86

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.

Table A2. Outputs Effects by Destination

munavextot	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
A__AgrForFis	0.38	0.38	0.41	0.34	0.41	0.39	0.42	0.34	0.35	0.41	0.26	0.4	0.3	0.43	0.37	0.33	0.37
B__MineQuar	-0.1	-0.08	0.01	-0.2	0.03	-0.04	0.06	-0.23	-0.25	0	-0.47	-0.06	-0.44	0.02	-0.19	-0.26	-0.25
C__Manufact	-0.04	0.02	0.12	-0.29	0.14	0.03	0.21	-0.29	-0.29	0.21	-0.78	0.04	-0.67	0.28	-0.22	-0.4	-0.42
DE_EGW	0.39	0.45	0.46	0.26	0.36	0.31	0.42	0.33	0.53	0.44	0.31	0.35	0.65	0.33	0.35	0.39	0.43
F__Construct	0.1	0.1	-0.05	-0.09	0.05	-0.03	0	0.16	0.03	0.13	0.05	-0.06	0.16	0.03	-0.01	-0.02	0.07
G__Trade	0.11	0.1	0.12	-0.07	0.14	0.05	0.16	-0.05	0.05	0.19	-0.22	0.04	-0.12	0.15	-0.06	0.06	0.21
H__Transport	0.21	0.11	0.28	0.28	0.21	0.17	0.2	0.2	0.11	0.11	0.09	0.17	-0.2	0.14	0.01	0.16	0.23
I__FoodSvcAc	0.9	1.12	1.13	1.21	0.98	1.21	1.05	1.37	1.86	1.24	1.53	1.29	1.45	0.98	1.26	1.27	0.79
J__CommBroad	0.5	0.65	0.63	0.58	0.79	0.77	0.78	0.77	0.97	0.98	0.55	0.8	0.56	0.82	0.76	0.87	1.02
K__FinanIns	0.99	0.99	1.01	1.11	0.94	1.04	1.01	1.23	1.46	1.25	1.31	1.12	1.38	1.12	1.2	1.23	1.35
L__RealEstat	0.65	0.79	0.62	0.73	0.37	0.63	0.57	0.86	1.15	0.77	1.07	0.73	1.1	0.47	0.78	0.94	0.77
MN_ProfBusi	-0.05	-0.01	0	-0.13	0.15	0.03	0.14	-0.11	-0.15	0.11	-0.35	-0.09	-0.27	0.11	-0.15	-0.16	-0.02
O__PADSS	0.04	0.05	0.11	0.01	0.16	0.1	0.14	0	0.01	0.1	-0.1	0.11	-0.06	0.22	0.07	0	0.03
P__Education	1.04	1.03	1.01	0.83	1.28	0.9	0.85	0.91	1.13	1.03	0.99	1.05	1.08	0.95	1.03	0.9	1
Q__HealSocCa	0.63	0.85	0.82	0.72	1	0.83	0.86	0.76	1.12	1.09	0.82	1.03	0.84	0.81	0.9	0.96	0.96
RST_ArtSpOth	1.37	1.48	1.48	1.58	1.38	1.43	1.35	1.76	2.15	1.62	2	1.62	1.89	1.32	1.61	1.72	1.63

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.

Table A3. Employment Effects by Destination

(Unit: %)

employ	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
A__AgrForFis	0.98	1.01	1.17	0.77	1.15	1.03	1.24	0.75	0.83	1.18	0.3	1.1	0.53	1.29	0.93	0.72	0.94
B__MineQuar	-0.79	-0.73	-0.52	-1.06	-0.46	-0.62	-0.37	-1.14	-1.19	-0.53	-1.76	-0.69	-1.68	-0.47	-1.03	-1.21	-1.2
C__Manufact	-0.52	-0.43	-0.21	-1.21	-0.17	-0.48	0.04	-1.09	-1.08	0.02	-2.17	-0.49	-1.95	0.22	-0.89	-1.32	-1.3
DE_EGW	0.54	0.85	0.76	0.18	0.54	0.27	0.79	0.33	0.96	0.86	0.3	0.48	1.44	0.43	0.46	0.52	0.67
F__Construct	-0.12	-0.12	-0.3	-0.35	-0.18	-0.28	-0.24	-0.05	-0.21	-0.09	-0.19	-0.31	-0.05	-0.21	-0.25	-0.27	-0.16
G__Trade	-0.15	-0.18	-0.14	-0.47	-0.12	-0.27	-0.08	-0.44	-0.27	-0.02	-0.75	-0.28	-0.57	-0.08	-0.47	-0.25	0.02
H__Transport	0.01	-0.16	0.13	0.14	0.02	-0.05	0.01	0	-0.16	-0.17	-0.19	-0.06	-0.72	-0.11	-0.35	-0.07	0.05
I__FoodSvcAc	1	1.32	1.33	1.44	1.12	1.44	1.22	1.68	2.38	1.49	1.91	1.56	1.79	1.12	1.52	1.54	0.84
J__CommBroad	0.74	1.11	1.05	0.93	1.46	1.42	1.43	1.41	1.9	1.92	0.85	1.48	0.89	1.53	1.38	1.66	2.02
K__FinanIns	1.9	1.9	1.94	2.17	1.76	2.01	1.94	2.47	3.04	2.53	2.66	2.19	2.83	2.22	2.39	2.47	2.76
L__RealEstat	4.12	5.45	3.8	4.82	1.53	3.94	3.41	6.1	8.85	5.19	8.08	4.89	8.3	2.43	5.33	6.83	5.23
MN_ProfBusi	-0.37	-0.32	-0.3	-0.5	-0.08	-0.26	-0.09	-0.48	-0.54	-0.15	-0.85	-0.43	-0.73	-0.14	-0.54	-0.56	-0.36
O__PADSS	-0.26	-0.24	-0.14	-0.3	-0.06	-0.16	-0.1	-0.31	-0.31	-0.16	-0.47	-0.15	-0.41	0.04	-0.21	-0.32	-0.27
P__Education	0.99	0.97	0.95	0.74	1.27	0.83	0.77	0.84	1.1	0.98	0.93	1	1.04	0.88	0.97	0.83	0.94
Q__HealSocCa	0.59	0.89	0.85	0.71	1.09	0.86	0.9	0.76	1.25	1.22	0.85	1.14	0.87	0.83	0.96	1.04	1.04
RST_ArtSpOth	1.91	2.02	2.07	2.15	1.95	1.9	1.82	2.43	3.02	2.26	2.71	2.24	2.67	1.74	2.2	2.63	2.52

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.

Table A4. Income Effects by Destination

(Unit: %)

	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
A__AgrForFis	2.64	2.67	2.73	2.49	2.57	2.52	2.69	2.58	2.65	2.78	2.32	2.75	2.63	2.86	2.71	2.51	2.78
B__MineQuar	-0.45	-0.39	-0.26	-0.66	-0.29	-0.39	-0.18	-0.68	-0.83	-0.24	-1.12	-0.41	-1.11	-0.28	-0.68	-0.8	-0.92
C__Manufact	0.37	0.43	0.39	0.01	0.3	0.21	0.46	0.21	0.15	0.63	-0.19	0.3	-0.12	0.67	0.19	0	-0.13
DE_EGW	1.31	1.54	1.24	1.24	0.92	0.86	1.1	1.48	1.97	1.35	2.03	1.14	2.9	0.85	1.4	1.64	1.63
F__Construct	0.72	0.69	0.29	0.74	0.28	0.35	0.19	1.14	0.92	0.53	1.59	0.43	1.59	0.28	0.76	0.93	0.89
G__Trade	0.71	0.66	0.46	0.69	0.36	0.4	0.36	0.82	0.9	0.6	1.14	0.5	1.17	0.41	0.61	0.98	1.06
H__Transport	0.85	0.58	0.77	1.28	0.49	0.55	0.43	1.19	0.89	0.37	1.48	0.64	0.59	0.32	0.49	1.09	1.11
I__FoodSvcAc	1.72	1.97	1.75	2.36	1.44	1.9	1.5	2.68	3.23	1.93	3.48	2.11	3.23	1.47	2.35	2.55	1.79
J__CommBroad	1.49	1.79	1.51	1.9	1.73	1.87	1.68	2.44	2.8	2.31	2.53	2.03	2.43	1.83	2.22	2.65	2.83
K__FinanIns	2.52	2.49	2.29	3.01	2.01	2.4	2.14	3.38	3.82	2.85	4.15	2.67	4.17	2.44	3.12	3.38	3.49
L__RealEstat	4.22	5.27	3.69	5.04	1.7	3.85	3.22	6.2	8.37	4.86	8.44	4.73	8.48	2.47	5.37	6.79	5.33
MN_ProfBusi	0.49	0.51	0.3	0.61	0.37	0.38	0.34	0.74	0.62	0.48	0.97	0.32	0.95	0.35	0.49	0.66	0.71
O__PADSS	0.6	0.58	0.44	0.8	0.39	0.47	0.33	0.89	0.84	0.46	1.33	0.59	1.26	0.52	0.8	0.89	0.79
P__Education	1.81	1.76	1.51	1.8	1.69	1.43	1.17	2.01	2.2	1.57	2.69	1.7	2.66	1.34	1.95	2	1.96
Q__HealSocCa	1.4	1.66	1.39	1.76	1.49	1.44	1.28	1.91	2.32	1.77	2.58	1.81	2.48	1.27	1.91	2.18	2.03
RST_ArtSpOth	2.61	2.69	2.49	3.09	2.25	2.4	2.12	3.46	3.95	2.71	4.34	2.81	4.15	2.1	3.05	3.61	3.36

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.

Table A5. Price Effects by Destination

(Unit: %)

	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
A__AgrForFis	1.22	1.22	1.22	1.18	1.13	1.13	1.17	1.24	1.28	1.25	1.22	1.24	1.36	1.26	1.28	1.22	1.33
B__MineQuar	-0.09	-0.08	-0.09	-0.09	-0.11	-0.12	-0.09	-0.07	-0.12	-0.06	-0.07	-0.1	-0.07	-0.1	-0.11	-0.11	-0.17
C__Manufact	0.11	0.1	0.05	0.15	0.02	0.05	0	0.16	0.21	0.03	0.3	0.05	0.29	-0.02	0.14	0.23	0.24
DE_EGW	0.3	0.26	0.21	0.36	0.07	0.24	0.09	0.51	0.52	0.18	0.75	0.18	0.76	0.09	0.34	0.48	0.43
F__Construct	0.28	0.25	0.12	0.39	0.08	0.15	0.05	0.46	0.44	0.16	0.78	0.2	0.74	0.08	0.36	0.45	0.4
G__Trade	0.53	0.54	0.35	0.69	0.22	0.38	0.25	0.81	0.87	0.45	1.23	0.47	1.2	0.29	0.66	0.85	0.77
H__Transport	0.27	0.2	0.18	0.44	0.08	0.14	0.06	0.45	0.39	0.11	0.69	0.19	0.48	0.05	0.25	0.44	0.42
I__FoodSvcAc	0.47	0.51	0.35	0.63	0.22	0.39	0.26	0.73	0.86	0.43	1.1	0.46	1.06	0.26	0.63	0.76	0.62
J__CommBroad	0.65	0.73	0.55	0.87	0.59	0.69	0.56	1.09	1.18	0.83	1.34	0.78	1.29	0.65	0.96	1.14	1.17
K__FinanIns	1.16	1.16	0.97	1.44	0.81	1.04	0.87	1.66	1.82	1.23	2.2	1.19	2.19	1.01	1.49	1.64	1.62
L__RealEstat	2.63	3.28	2.27	3.21	1.04	2.39	1.96	3.95	5.28	3.02	5.46	2.95	5.49	1.55	3.43	4.31	3.4
MN_ProfBusi	0.43	0.43	0.26	0.59	0.19	0.3	0.19	0.69	0.68	0.34	1.06	0.36	1.02	0.23	0.55	0.69	0.62
O__PADSS	0.48	0.47	0.3	0.68	0.21	0.34	0.18	0.78	0.74	0.34	1.23	0.42	1.15	0.27	0.65	0.77	0.67
P__Education	0.63	0.61	0.41	0.81	0.32	0.45	0.27	0.92	0.93	0.47	1.42	0.55	1.35	0.34	0.78	0.93	0.82
Q__HealSocCa	0.48	0.51	0.34	0.66	0.26	0.37	0.24	0.75	0.82	0.42	1.17	0.47	1.11	0.27	0.65	0.8	0.7
RST_ArtSpOth	0.64	0.61	0.49	0.78	0.33	0.47	0.34	0.91	0.98	0.53	1.28	0.59	1.27	0.36	0.76	1.02	0.96

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.

Table A6. Consumption Effects by Destination

(Unit: %)

x3tot	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
A__AgrForFis	1.29	1.41	1.18	1.39	0.78	1.12	1.11	1.54	2.28	1.6	2.03	1.54	2.15	0.73	1.44	1.87	1.75
B__MineQuar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C__Manufact	1.03	1.73	1.39	1.53	0.97	1.28	1.44	1.72	2.43	2.31	2.1	1.7	2.13	1.1	1.63	2.09	2
DE_EGW	1.65	1.71	1.56	1.83	0.97	1.54	1.49	2.04	2.99	2.04	2.58	1.98	2.5	1.02	1.89	2.78	2.77
F__Construct	2.69	2.91	2.48	2.84	1.75	2.37	2.37	3.12	4.54	3.26	4.02	3.15	4.27	1.63	2.96	3.74	3.53
G__Trade	2.12	2.3	1.95	2.24	1.35	1.86	1.84	2.46	3.6	2.56	3.17	2.48	3.36	1.24	2.32	2.96	2.78
H__Transport	2.14	2.33	1.98	2.25	1.38	1.89	1.88	2.49	3.63	2.6	3.22	2.51	3.42	1.29	2.37	2.99	2.81
I__FoodSvcAc	2.08	2.25	1.92	2.19	1.35	1.83	1.84	2.4	3.5	2.53	3.1	2.44	3.27	1.23	2.27	2.88	2.74
J__CommBroad	2.53	2.76	2.33	2.67	1.56	2.2	2.19	2.94	4.34	3.06	3.85	2.96	4.08	1.43	2.76	3.56	3.28
K__FinanIns	2.29	2.51	2.11	2.41	1.4	1.99	1.99	2.63	3.95	2.81	3.41	2.71	3.62	1.23	2.45	3.27	3.03
L__RealEstat	1.26	1.29	1.2	1.29	0.96	1.11	1.18	1.34	1.93	1.59	1.65	1.5	1.77	0.79	1.29	1.69	1.72
MN_ProfBusi	1.73	1.89	1.61	1.82	1.1	1.53	1.52	2.01	2.96	2.11	2.59	2.04	2.73	1.02	1.9	2.44	2.29
O__PADSS	2.15	2.34	2.01	2.25	1.4	1.91	1.92	2.47	3.64	2.64	3.15	2.54	3.36	1.28	2.34	2.98	2.83
P__Education	2.03	2.21	1.89	2.12	1.32	1.79	1.82	2.34	3.46	2.49	3	2.4	3.2	1.21	2.21	2.84	2.68
Q__HealSocCa	2.06	2.23	1.91	2.15	1.32	1.81	1.82	2.37	3.48	2.51	3.02	2.42	3.23	1.22	2.24	2.86	2.7
RST_ArtSpOth	2.03	2.21	1.88	2.13	1.29	1.79	1.8	2.34	3.45	2.48	3.02	2.39	3.22	1.18	2.21	2.82	2.65

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.

Table A7. Contribution in Primary Income by Destination

(Unit: %)

	SW	IC	GG	DJ	SJ	CB	CN	GJ	JB	JN	DG	GB	PS	US	GN	GW	JJ
A__AgrForFis	0	0	0	0	0	0.01	0.01	0	0.01	0.02	0	0.01	0	0	0.01	0.01	0.02
B__MineQuar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.01	0
C__Manufact	-0.01	-0.05	-0.03	-0.1	-0.02	-0.08	0.01	-0.13	-0.13	0	-0.21	-0.08	-0.16	0.05	-0.16	-0.06	-0.03
DE__EGW	0	0.01	0	0	0	0	0.01	0	0.01	0.01	0	0	0.01	0	0	0	0
F__Construct	0	-0.01	-0.01	-0.01	-0.03	-0.01	-0.01	0	-0.01	-0.01	-0.01	-0.02	0	-0.01	-0.01	-0.02	-0.01
G__Trade	-0.01	-0.01	0	-0.02	0	-0.01	0	-0.02	-0.01	0	-0.04	-0.01	-0.03	0	-0.01	-0.01	0
H__Transport	0	-0.01	0	0	0	0	0	0	0	0	0	0	-0.03	0	0	0	0
I__FoodSvcAc	0.02	0.02	0.02	0.03	0.01	0.02	0.01	0.04	0.05	0.02	0.04	0.02	0.04	0.01	0.03	0.04	0.03
J__CommBroad	0.03	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.05
K__FinanIns	0.1	0.03	0.03	0.06	0.02	0.02	0.02	0.07	0.06	0.03	0.08	0.02	0.08	0.02	0.04	0.04	0.06
L__RealEstat	0.04	0.04	0.03	0.04	0.01	0.02	0.02	0.05	0.07	0.02	0.09	0.02	0.08	0.01	0.04	0.05	0.04
MN_ProfBusi	-0.04	-0.01	-0.02	-0.05	0	-0.01	0	-0.03	-0.02	0	-0.05	-0.01	-0.04	-0.01	-0.02	-0.02	-0.02
O__PADSS	-0.01	-0.01	-0.01	-0.02	-0.01	-0.01	0	-0.01	-0.02	-0.01	-0.02	-0.01	-0.02	0	-0.01	-0.04	-0.02
P__Education	0.05	0.05	0.04	0.05	0.06	0.04	0.03	0.06	0.07	0.04	0.06	0.04	0.06	0.03	0.04	0.05	0.05
Q__HealSocCa	0.02	0.03	0.02	0.04	0.01	0.02	0.02	0.05	0.06	0.04	0.05	0.03	0.05	0.02	0.03	0.04	0.04
RST_ArtSpOth	0.04	0.03	0.03	0.04	0.01	0.02	0.02	0.05	0.05	0.02	0.06	0.02	0.05	0.01	0.03	0.06	0.08

Note: SW = Seoul, IC = Incheon, GG = Gyeonggi, DJ = Daejeon, SJ = Sejong, CB = Chungbuk, CN = Chungnam, GJ = Gwangju, JB = Jeonbuk, JN = Jeonnam, DG = Daegu, GB = Gyeongbuk, PS = Pusan, US = Ulsan, GN = Gyeongnam, GW = Gangwon, JJ = Jeju.