An evaluation on the effect of Brain Korea 21 Phase II program

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Abstract

In the late 1990s, Korean government in response to concern over the relatively low standing of the nation's universities and researchers, launched the Brain Korea 21 Program(BK21). BK21 seeks to nurture globally competitive research universities and graduate programs and to breed high-quality research manpower in Korea. It provides fellowship funding to graduate students, post doctoral fellows, and contract-based research professors who belong to research groups at top universities. In Phase II, which began in 2006 and is scheduled to run through 2012, BK21 allocates about US$ 260 million a year. Phase II emphasizes department-level excellence and the university-industry link.

BK21 has attracted a great deal of attention, in part because of its strategy of concentration that results in relatively large awards and because of the prestige it confers on recipients. Given the high profile of the program, there is great interest in the program and in determining its effects on universities and human resource development.

In this study, we develop an evaluation model to assess the net effect of the BK21 Phase II program. We use the panel analysis in the evaluation model. We propose difference-in-differences model. We measure and understand underlying policy intentions and program dynamics. The structural equation aims to assess the impact on BK21 program. The panel model aims to assess the net effect of the program in terms of SCI papers. Somi Seong, et al(2008) analyzed the net effects of BK21 program by difference-in-differences model. But, they failed to identify the effect because they didn't have enough data. We try to solve this problem from gathering data of National Research Foundation, NSCI. It is difficult to collect data but we expect to measure more exact net effects of BK21 program.

In the conclusion, we can identify the net effect of BK program in the view of the quantity and quality of SCI papers. In another result, when BK program support the regions not located in capital area separately, they have the positive effect to improve the quantity of SCI papers.

Keywords : difference-in-differences model, human resource development, Brain Korea 21 program

1. INTRODUCTION

There has been raising demand in Korea to intensively foster research-oriented graduate school to brace for the knowledge-based society and strengthen national competitiveness. Korea' Competitiveness in Human Resources was weak according to 1999 IMD World Competitiveness Yearbook. Higher education in Korea ranked the lowest among 47 economies. And Korea ranked 16th in the number of papers indexed by Science Citation Index (SCI) in 1999.

Korea Government launched Brain Korea 21 Program(BK21). The aim of the program is to build up a powerhouse in terms of human resources. The overview of BK21 is as following figure.

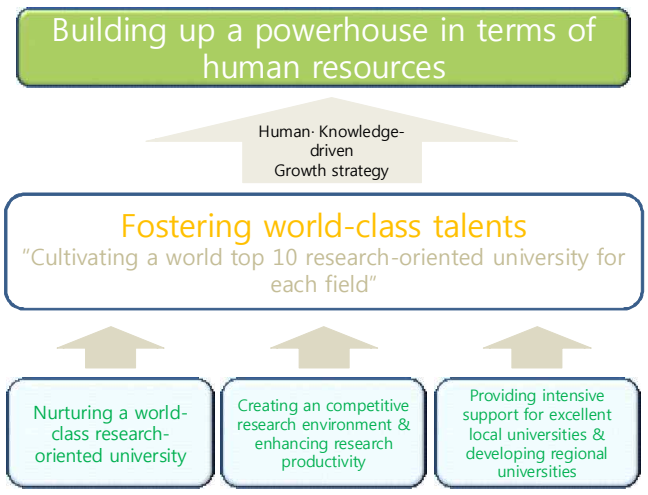

Figure 1. BK21 Project Overview – Goal

BK21 program has implemented for 10years during 2 phase. For 1st Phase Project, BK21 Program Provided KRW 200

billion every year for the past 7 years from 1999~20006 (total KRW 1.3421 trillion). BK21 supplied an annual 150 billion won for fostering world-class graduate schools and support for 26 science and technology projects teams as well as 20 education and research teams in humanities and social science sector. BK21 also supported an annual 40 billion won for developing quality regional universities and for 13 project teams and an annual 62 billion for enhancing research capabilities of graduate schools, and support for 12 specialty teams, 316 core project teams and 126 new project teams. BK21 program nurture creative and globally-accepted graduate schools students as well as new researcher pool.

BK21 program supports over 70% of project implementation cost for scholarship, salaries for new researchers, and expenditure for overseas training. BK21 program connects with university education reform, induce the reduction of undergraduate students, increase opportunity to study at graduate school, mandate to publish papers to be indexed SCI, and introduce central administration of research funds and faculty performances evaluation. BK21 programs also promote international cooperation as well as innovation in academic affairs and curriculum through benchmark against world renowned graduate schools in foreign countries

BK21 2nd Phase program supports KRW 290 billion every year for 7 years from 2006 to 2012 (total KRW 2.3 trillion). It supports 158 teams in the science and technology sector, 61 in the humanities and social science, 325 in the core sector (small-scale project team) and 25 in human resources development for specialty service. At first, BK21 fosters excellent graduate schools at the national level (annual 212 bil.), focus on promising technologies that will drive Korea for a next decade. On the other hands, BK21 fosters excellent graduate schools at the regional level (annual 78 bil.), and reduce gap in research capabilities between metropolitan-regional universities and encourage specialization of regional graduate schools in connection with local development strategy. Thirdly, BK21 nurtures human resources for high-quality specialty service (annual 2.2 bil.) and support to develop human resources for high-quality specialty service that would require securing of competitiveness bracing for the opening of global service market. Lastly, BK21 strengthens supports for graduate students and new researchers. It grants over 500,000 for master course students, over 900,000 for doctoral course students, over 2 million for post doctoral course students, and over 2.5 million for contract professors per month.

Table 1. BK21 Project Overview – Major Implementation Direction

1st Phase BK21 Project (1999~2005)	**2nd Phase BK21 Project (2006~2012)**
Deploy talented students for master and doctoral courses in the quality education and research institutes (concentration) -Establish higher-educated human resources development system -Normalize university education and create stable education and research environment -Reduce the number of students in universities, create competitive research environment	Deploy talented students for master and doctoral courses in the quality education and research institutes (concentration) -Build up competitive human resources development system with elimination and re-entry Encourage specialty of graduate schools & create competitive research environment -Promote innovative evaluation & management system and principle of selection and concentration Value industrial-academic cooperation, globalization and balanced national development -Put forward the project to nurture excellent regional graduate schools

2. Data

We collect the investment data in each group(BK21 groups and Non-BK21 groups) from National Research Foundation, and collect the paper data from Thomson DB.

Table 2. Basic statistics of the data

BK21 participation	BK21 group				Non-BK21 group				difference
Year	06	07	08	09	06	07	08	09	2009-2006
Number of paper per professor	3.00	2.98	3.41	3.44	1.86	1.58	1.73	1.93	0.37
Average Journal Impact factor per paper	1.87	1.96	2.09	2.20	1.63	1.66	1.82	1.64	0.32

3. Model

The principal problem with the methods is their inability to sufficiently control for differences between the two groups, thereby inadvertently attributing some preexisting differences to the impact of BK21. One of solutions to this problem is to use a difference-in-differences model. This compares differences in outputs before and after the program for those who receive BK21 funding and those who do not. Given certain assumptions, changes in the difference between treatment and comparison outputs can

be attributed to the treatment, i.e., to BK21 funding. Therefore, we can define the model as the following.

$$Y_{it} = \alpha_0 + \sum \beta_{1t} T_t + \beta_2 S_i + \sum \beta_{3t} T_t \times S_i + \sum \alpha_d X_{it}^d + u_i + \varepsilon_{it}$$

Y_{it} : Performance variable(number of papers per professor, Journal Impact Factor per paper)

T_t : Year dummies (2007,2008, 2009)

S_i : BK21 group dummies

X_{it}^d : Characteristics variable group(national/private, support area, etc.)

In this study, we develop an evaluation model to assess the net effect of the BK21 Phase II program. We use the panel analysis in the evaluation model.

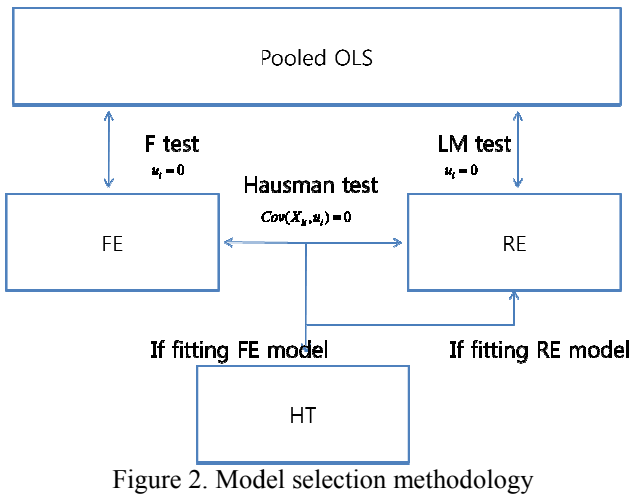

Figure 2. Model selection methodology

4. Result

Table3. Estimation Result in Panel analysis

		Number of paper per professor	Average Journal Impact factor per paper
BK21 participation		.85**	.14
Year Dummy	2007	-.28	.03
	2008	-.12	.19*
	2009	.07	.05
BK21 Participation × Year	2007	.27	.07
	2008	.55**	.03
	2009	.37*	.29**
Applied field Dummy		-.67**	-1.00***
Metropolitan university Dummy		.84*	.02
National University Dummy		-.37	-.03
Constant		2.35***	2.36***
Sample number		654	668
R^2		.15	.24
χ^2-value		79.87***	107.36***

Coefficients market with ***, ** and * are significant at 0.01, 0.05 and 0.10 level respectively.

BK21 program have displayed significant effects in both quantitative and qualitative aspects. As for quantitative evaluation (number of papers per professor), pure effect is found, especially in the 2nd and 3rd years. As for qualitative evaluation (average JIF per paper), pure effect is found in the 3rd year

5. Conclusion

We can justify that BK21 program has the pure effect to develop the ability of university on the view of paper. We can find out the effective policy to invest scholarship, salaries for new researchers, and expenditure for overseas training.

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