

The Study of the patent performance of National R&D programs in Korea using survival analysis

Focusing on health & medical program

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Evaluation and Planning

Background

◆ In-dept evaluation

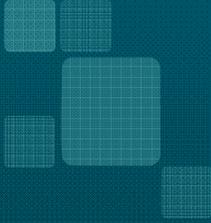
- ◆ In-dept evaluation on National R&D Program in Korea would like to measure how much effect on developing the patent when Government invest researchers who publish SCI paper.

SCI paper



Application and
Granted Patent

Following research



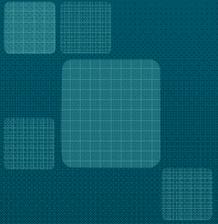
Background

◆ What is Survival Analysis?

- ◆ A class of statistical methods for studying the occurrence and timing of events
- ◆ These methods have been adapted by researchers in several different fields
- ◆ Sociology : event history analysis
- ◆ Engineering : reliability analysis, failure time analysis
- ◆ Economics : duration analysis, transitional analysis

Research Purpose

- ◆ Important factors on publishing patents
 - ◆ Measure of the direction of impact
 - ◆ Choice of important factors on the performance of patent
- ◆ Survey - June, 2009
 - ◆ Subject : SCI papers which have more than 5 citation from 2004 to 2008.
- ◆ Event
 - ◆ An occurrence of an application or a granted patent



Data

◆ Subject of analysis

- ◆ 73 researches in health & medical National R&D program from

◆ Investigation

- ◆ The size of funds in the following research
- ◆ The duration of the following research
- ◆ Cooperation type
 - ◆ with private or public sector
- ◆ The number of Cooperation organization

Methodology and Model

◆ Logit model

- ◆ It is designed for general problems in categorical data analysis, but they are effective and flexible in estimating survival models for discrete-time data with time-dependent covariates

Methodology and Model

◆ Logit Model

- ◆ Let P_{it} be the conditional probability that individual i has an event at time t , given that an event has not already occurred to that individual

$$\log(P_{it}/(1-P_{it})) = a_t + b_1X_{it1} + \dots + b_kX_{itk}$$

where, $t=1, 2, 3, \dots$

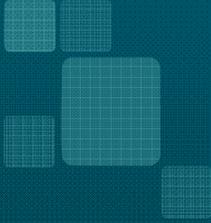
Methodology and Model

Variable		Description
Dependent	y	If a patent exists, then y is 1. Otherwise 0
Independent	x_1	If a university has the authority of a paper, then x_1 is 1. Otherwise 0.
	x_2	Following research duration(Unit : month)
	x_3	The scale of following research funds(Unit : million Won)
	x_4	If a researcher cooperate with private sector(Large cooperation, small & medium-sized companies, Venture businesses), then x_4 is 1. Otherwise 0.
	x_5	If a researcher cooperate with public sector(Universities, Pub. Research institute, foreign institutes), then x_5 is 1. Otherwise 0.
	x_6	The number of cooperation organizations when following research

Result

Variable	Model 1	Model 2	Model 3	Model 4
X ₁	-1.43856* (-2.98939)	-1.49741* (-3.12976)	-1.50444* (-3.1567)	-1.48399* (-3.14506)
X ₂	0.02204** (1.74551)	0.02565* (2.16971)	0.02488* (2.16955)	0.03039* (2.72395)
X ₃	0.00101 (1.41306)	0.00103 (1.33061)	0.00100 (1.30083)	
X ₄	0.64164 (0.64937)			
X ₅	-0.62742 (-0.71673)	-0.88606 (-1.30103)	-1.09496* (-1.97662)	-1.01671** (-1.8605)
X ₆	-0.29974 (-0.58849)	-0.13316 (-0.47505)		
LR	17.96019 (p=0.00300)	17.49163 (p=0.00155)	17.19888 (p=0.00064)	14.10061 (p=0.00087)

*Significant at the 5% level ; ** Significant at the 10% level
Value in () means t-statistic.



Result

- ◆ Fitness of Logit Model
 - ◆ Logit model uses the likelihood ratio test, LRT for testing model's fitness
- ◆ Fitness of 4 models
 - ◆ All models have fitness in the table where p has less than 0.01.

Result

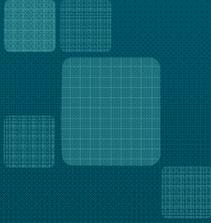
- ◆ In all models, x_1 has significant
 - ◆ X_1 has negative in all models.
 - ◆ If Universities have the authority of paper, the number of patent is declining.
 - ◆ SCI Paper's research result in the universities doesn't continue to developing a patent.
 - ◆ It is because, generally universities cherish research itself than commercialization.
 - ◆ They occasionally doesn't develop a patent and the research result is not commercialized.

Result

- ◆ x_3 , the scale of funds is insignificant.
 - ◆ The scale of funds in following research doesn't affect developing a patent from Paper's result.
- ◆ x_2 ,the duration of research is significant.
 - ◆ x_2 has positive.
 - ◆ It is because generally research environment in the long duration in following research is more stable and long-term.
 - ◆ It means that stable research environment, supporting research for a long time, helps researcher develop a patent.

Result

- ◆ X_5 , cooperation with public sector, in model 3, 4 are significant.
 - ◆ x_5 is negative.
 - ◆ Cooperation with public sector makes patent performance decreasing.
 - ◆ It is because Cooperation with public sector usually focuses on the more developed paper than commercialization.
 - ◆ In the general, they are concerned about basic research.

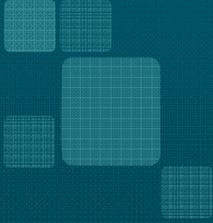


Result

- ◆ X_4 , cooperation with private sector, is insignificant.
- ◆ (x_6) , the number of cooperation organizations is not insignificant.

Conclusion

- ◆ Government must invest R&D funds in the long-term view.
 - ◆ Stability of research environment help researcher develop a patent.
- ◆ we must consider research stage and cooperation type, when we evaluate the patent performance.
 - ◆ Cooperation with public sector sometimes has another research direction such as basic research.
- ◆ We have to consider the quality of R&D cooperation because the quantity of cooperation is not insignificant.



Thank you!

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