



Do researchers with international mobility experiences have better academic performance through bibliometric indicators? - The case study of Taiwan

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Research background (1/2)

- This research is the extended study based on the internal research project last year.
 - *The Study on How International Collaboration Programs Influence Early Career Researchers (Chang & Chen, 2017, in press)*
- In that project, we interviewed the researchers who was granted by **Postdoctoral Research Abroad Program** from Ministry of Science and Technology (MOST) to understand how their international mobility experiences during their post-doc phases help them in future academic career paths.

Research background (2/2)

- One of the interviewee said *“.... this research stay in foreign country, international mobility experience, was extremely helpful during the interview process when applying the faculty job in universities, not only the recruit committees considered you as the one with the feature of internationalization and to be able to compete with the one with foreign doctoral degree, but also it could create the “talking-point” because the committees feel interested in the recent development of international labs, so the international mobility experience would become the “assets”.....”*

Taiwan situation

- In fact, nowadays in Taiwan have faced the situations that fewer and fewer people would like to pursuit doctoral degrees abroad, so the brain drain is happening; most of students choose to start their doctoral career domestically instead.
- At the meantime, the academic job market has been shrinking recently, to get the position in university, however, early-career researchers need to publish more articles in top tier journals or have international experiences to demonstrate the degree of internationalization, then to be able to become the faculty in universities.
- Hence, having research visit in foreign countries has become the option for **local students** to earn the international mobility experiences.
 - Connecting to international academic community as soon as possible.
 - Having chance to learn from the masters abroad.
 - Participating in international collaboration research projects and co-authorship with foreign scholars.

The benefits of international mobility

- Several past studies have indicated that the researches with intentional mobility experiences have produced slightly more publications, however, the research impact are relatively higher than non-mobile researchers (Aksnes, Rørstad, Piro & Sivertsen, 2013; Conchi & Michels, 2014; Robinson-Garcia, Cañibano, Woolley & Costas, 2016).
 - It shows that international mobility experiences will help researchers achieve better visibility and reach research excellence.
- Besides, the earlier international mobility experiences will boost the likelihood of having another research visit in the future (Børing, Flanagan, Gagliardi, Kaloudis & Karakasidou, 2015)
 - It means that earlier international mobility experiences can be the trajectory of future scientific migration.
- **Therefore, how to encourage early-career researchers to increase the intention of international mobility should be concerned.**

MOST programmes

- Since the international mobility can boost brain gain or cause brain drain, it is important for policy makers to study which factors will influence the international mobility and how to encourage domestic researchers to have better international connection via funding program.
- From 2002, the Ministry of Science and Technology (MOST) in Taiwan has funded the early-career researchers to let them have chances to do research stay at foreign countries.
- Two main funding program for students in their late doctoral career or their postdoctoral phases.
 - “Graduate Students Study Abroad Program”
 - “Postdoctoral Research Abroad Program”

Graduate Students Study Abroad Program

- It is intended to fund Taiwanese **doctoral students** to conduct research at an accredited educational institute abroad.
- The goal of this program is to encourage participants to gain international experience, to expand their research training and pave a way for future international collaborations, for a maximum of twelve months.
- The applicant must be a Ph.D. student currently enrolled in a Ph.D. program of an accredited educational institute in Taiwan and has completed at least one year study in the Ph.D. program.
- The grant period can range from seven to twelve months.
- The amount of grant is based on the grant period, ranging up to a maximum of 600,000 NT dollars (about 20,000 US dollars) for a twelve-month study.

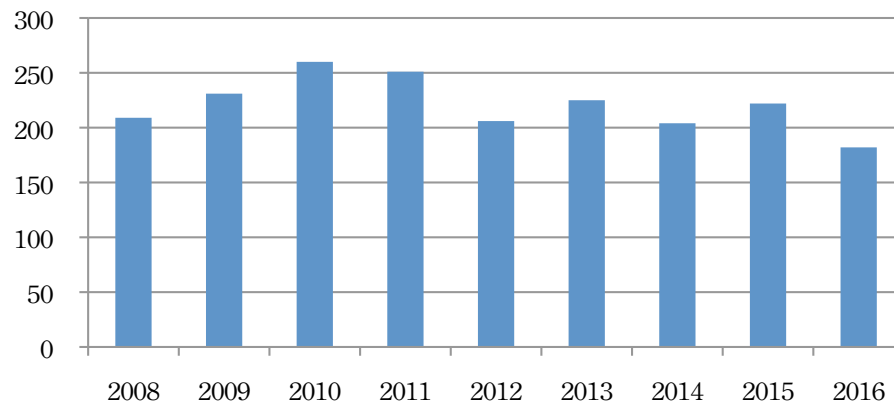
Postdoctoral Research Abroad Program

- It is intended to fund Taiwanese **postdoctoral researchers** to conduct research at an accredited educational institute abroad.
- The goal of this program is to encourage qualified individuals to gain research experience overseas, develop their global perspective, and strengthen international collaborations for a maximum of two years
- The applicant must hold a Ph.D. degree, conferred in **the last five years**, by any accredited educational institute in Taiwan.
- Each successful award recipient will receive 1,300,000 NT dollars (about 43,300 US dollars) each year for a maximum of two years, and this scholarship fund can be used at the recipient's discretion to contribute towards this research-related expenses.

Research motivation

- However, after the decade of this policy implementation, there is lack of evidence-based study to show the effectiveness of these funding programs and illustrate how the abroad programs influence the early-career researches in their career paths and academic performance.

Doctoral / postdoctoral studies abroad
The number of grant receipts



- Therefore, this study aims to fill the research gap and to provide the evidence for policy makers.

Research questions

- ① Do researchers who obtained their doctoral degrees abroad have better academic performance than those who earned the doctoral degrees domestically?
- ② Do researchers who obtained their doctoral degrees domestically and had received the grants of study/research abroad program from MOST have better academic performance than those who did not be funded?
- ③ Which modes of international mobility that researchers have experienced will help them create better academic performance?
 - Obtain Ph.D. degree abroad
 - Obtain Ph.D. degree domestically but having research stay abroad experiences
 - Obtain Ph.D. degree domestically

Research method (1/2)

- To establish the dataset, this study attempts to link the several database to get the correct researcher profiles and their bibliographic information.
- The in-house database of bibliographic information is constructed based on the data from Web of Science, and the author identification is based on the linkage between Academic Research Service Portal from MOST and the Scopus Author ID to identify the relationship between researchers and their publications.
- To answer the research questions, this study selects the target researchers based on the following criteria:
 - The age is under 45 years old.
 - The highest level of education is doctoral degree and the year of start and finish must be recorded completely.
 - Have at least one publication.

Research method (2/2)

- It should be noted that since this study collects data from the database of Academic Research Service Portal from MOST, it means that the researchers covered in that database are relative active in Taiwan academia because people who need to apply for grants from MOST are required to update their publication records.
- It indicates that some researchers who fit the selection criteria will not be included in this study.
- A total of 9,127 researchers are analysed in this study, and their publications were published from 1995 to 2013.

Variables

- For each selected researchers in the dataset, the following elements are codified or calculated:
 - Age
 - Gender
 - Location where the doctoral degree obtained
 - No. of publications
 - No. of citation (MNCS)
 - This study utilizes the three-year citation window and the number of citation is normalized according to the subject categories from Web of Science.
 - Whether the researchers had received the grants of study/research abroad program from MOST or not.
 - % of international co-authorship publications
 - Year of their first publication in Web of Science
 - Academic career length
 - Year of 2013 minus the year of their first publication

Basic statistics of the selected researchers

Variables	(n=9,127)
Gender (%)	
Female	27.59
Male	72.41
Average age	40.77
PhD obtained abroad (%)	30.68
Received the awards of study/research abroad program from MOST (%)	5.82
No. of publications	8.61
No. of citation (MNCS)	1.07
% of international co-authorship publications	19.01
Academic career length	6.65

The differences of academic performance between geographic vs. non-geographic mobility (1/2)

	PhD obtained domestically (n=6,327)	PhD obtained abroad (n=2,800)	Statistical test	p-value
No. of publications	9.31	7.03	t = 10.47	<0.0001***
No. of citation (MNCS)	0.95	1.34	t = -4.19	<0.0001***
% of intl' co-authorship publications	13.52	31.41	t = -26.01	<0.0001***
Academic career length	6.88	6.15	t = 8.94	<0.0001***

* indicates that p-value<0.1, ** indicates that p-value<0.05, *** indicates that p-value<0.01.

- The result indicates that the researchers with international mobility experiences via geographic mobility produce lower publications, but their publications have better visibility. Also, they are scientifically younger due to the shorter career length.**

The differences of academic performance between geographic vs. non-geographic mobility (2/2)

- This result might be related to the training process during doctoral study as well. The doctoral students in Taiwan are asked to publish at least one SCI/SSCI journal article normally before their graduation, and sometimes the graduation requirement from advisors are tougher than the requirement from the departments.
 - Therefore, the early-career researchers whose doctoral degrees obtained in Taiwan are prone to publish more journal articles than those who earned the doctoral degrees abroad.
- About the degree of internationalization, for the researchers who earned the doctoral degree from abroad, it is easier for them to participate the international research projects or get involved in international academic community.

The academic performance between whether receiving grant of abroad program or not (1/2)

	PhD obtained domestically without grants of abroad program (n=5,820)	PhD obtained domestically with grants of abroad program (n=507)	Statistical test	p-value
No. of publications	9.33	9.18	t = 0.29	0.7690
No. of citation (MNCS)	0.94	1.09	t = -3.17	0.0016***
% of intl' co-authorship publications	12.38	26.54	t = -11.03	<0.0001***
Academic career length	6.92	6.35	t = 4.06	<0.0001***

* indicates that p-value<0.1, ** indicates that p-value<0.05, *** indicates that p-value<0.01.

- About their academic performance through bibliometric indicators, the number of publications between two groups are very similar, they are not significantly different, however, their research impact have significant difference.**

The academic performance between whether receiving grant of abroad program or not (2/2)

- It means that the researchers who did not have international mobility via studying abroad during doctoral career might be beneficial in citation impact **by getting grants of abroad program to have research visit after their graduation.**
- The opportunities of research stays abroad let them have chances to make connection with international scholars to have international co-authorship publications.
 - Due to the fact that international co-authorship publications are more highly cited than non-international co-authorship publications (Aksnes, 2003).

international mobility help most?

- According to the previous results, it indicates that the researchers with international mobility experiences have better academic performance in terms of research impact, it means that studying abroad earlier, for example, pursuing doctoral degrees in other countries, or trying to find the opportunities of have research visits oversea during their late doctoral study or postdoctoral phases, they both can help researchers to broaden their research horizon, and get involved the international collaboration activities as soon as possible, even to collaborate with foreign scholars and publish journal articles together.
- To examine which mode of international mobility that researcher had experienced help them create better academic performance, this study utilizes the ANOVA and Scheffe's comparison among three groups to test whether their academic performance through bibliometric indicators have significant difference.

The statistical test among three groups of different modes of international mobility (1/2)

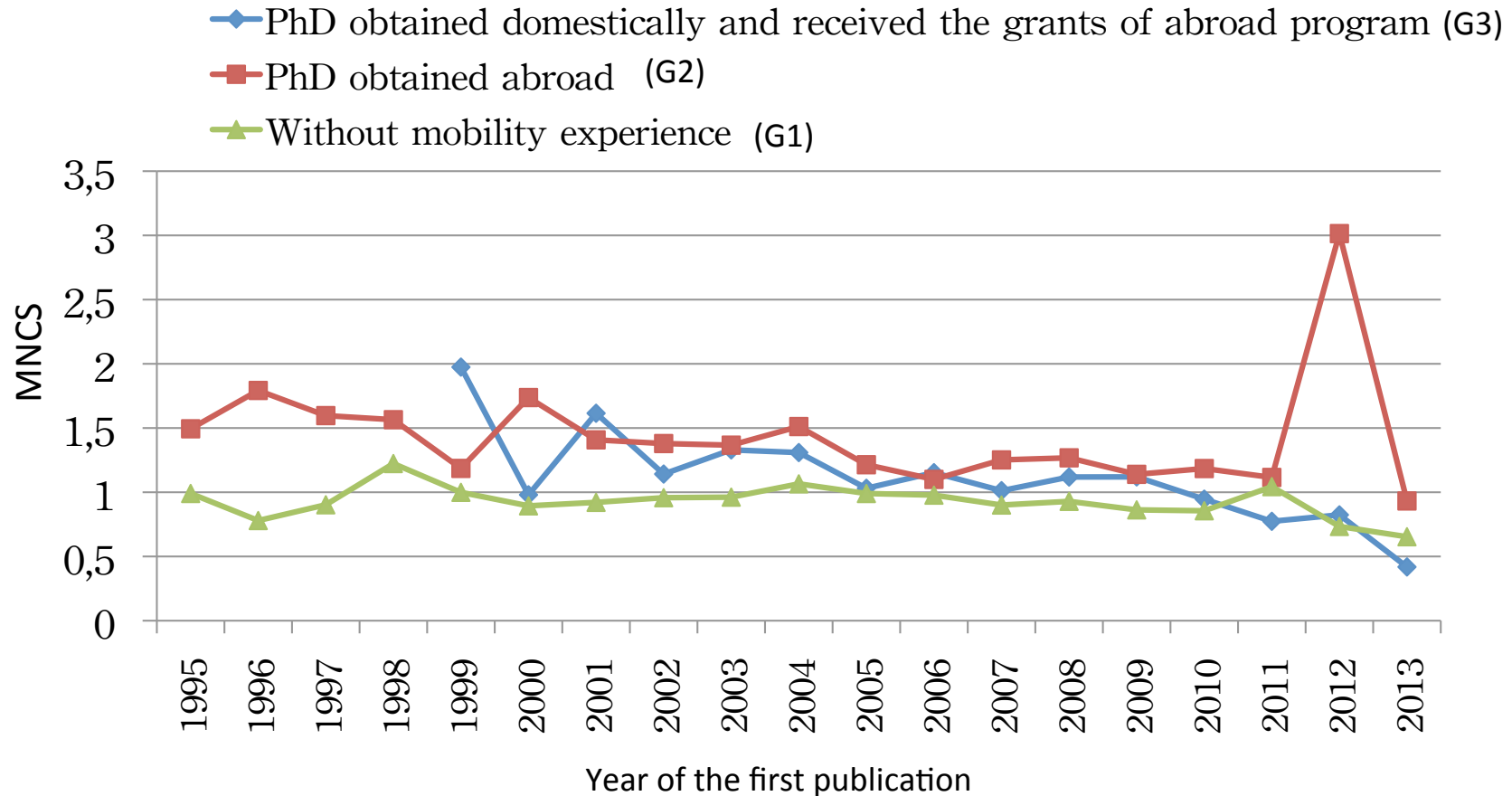
	Without mobility experience (G1)	With mobility experience		Statistical test	p-value
		PhD obtained abroad (G2)	PhD obtained domestically and received grant (G3)		
# of researchers	5,820	2,800	507		
No. of publication	9.33	7.03	9.18	F= 44.66	<0.0001***
No. of citation (MNCS)	0.94	1.34	1.09	F= 18.28	<0.0001***
% of intl' co-authorship publications	12.38	31.41	26.54	F=520.23	<0.0001***
Career length	6.92	6.15	6.35	F= 47.25	<0.0001***

* indicates that p-value<0.1, ** indicates that p-value<0.05, *** indicates that p-value<0.01.

The statistical test among three groups of different modes of international mobility (2/2)

- The result indicates the location where they obtained their doctoral degree matters because the number of publications in group of PhD obtained abroad is significant lower than the other two groups.
- However, in research impact, the groups with international mobility have significant higher citations than the researchers without international mobility experience.

The gap of citation impact among three groups, by year of the first publication (1/2)



The gap of citation impact among three groups, by year of the first publication (2/2)

- The gap of citation impact is decreasing, it means that “scientifically younger” researchers would be beneficial in research impact by having international mobility, especially the gap between “PhD obtained abroad (G2)” and “PhD obtained domestically and received the grants of abroad program (G3)” is getting closer.
- The result might be evident that the funding programs of abroad program from MOST are beneficial for young researchers, the programs offer opportunity to those who do not have chances to study abroad during their doctoral career to broaden their research visibility and get involved in international academic community to shorten their gap of competitiveness with those who obtained the doctoral degree abroad.

Conclusions

- This study aims to examine whether young researchers in Taiwan with international mobility experiences have better academic performance through bibliometric indicators.
 - The answer is yes.
 - But the researchers who obtained the doctoral degrees domestically did be beneficial in research impact from the MOST funding programs to let them have chance to do research stay abroad.
- In fact, the accumulation of human capital via international mobility is essential for Asia-Pacific region, and the academic networks created during the postdoctoral stages is stronger than doctoral degree pursuing phases (Wolley, Turpin, Marceau & Hill, 2008).
- Hence, the abroad program for researchers who obtained their doctoral degrees domestically is helpful, and it is even beneficial to the country by brain circulation. The evidences collected by this study would be useful for policy makers to evaluate the effectiveness of the funding programs and to encourage young researchers in Taiwan apply for the grants to broaden their research visibility.

THE END

Thank you for your listening! 😊

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