An Empirical Study of the Impact of Team Learning and Member Heterogeneity on Female Academic Researchers in Taiwan

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OUTLINE

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- Theoretical Background and Empirical Setting
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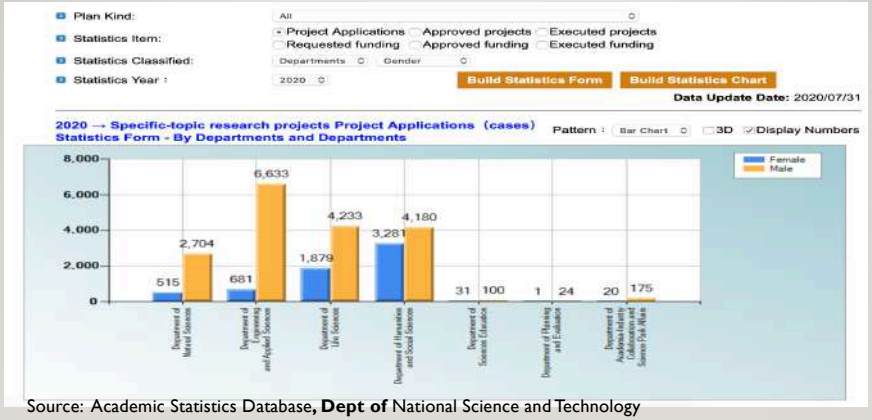
MOTIVATION AND PURPOSE

1. As we have known, most housework was undertaken by women, no matter it is now or then. Lots of researches related to work-family conflicts and work-family spillover are studied (Balogun & Akungba-Akoko, 2019; Zhang et al., 2020; Zhou, Li, & Gao, 2020). Even with higher-than-average level of education , the negative effects of work-family spillover or conflict may still be inevitable for female academic researchers in Taiwan. (**SOME DATA from** Academic Statistics Database**, Dept of** National Science and Technology)
2. In addition, there are more and more academic research done by teams.
3. Also, a bunch of literature indicated that the heterogeneity of team members may improve both personal and team performance.



Source: Academic Statistics Database**, Dept of** National Science and Technology
https://wsts.most.gov.tw/STSWeb/academia/AcademiaInquire.aspx?language=E&sys=PR

Gender ratio of researchers
Male to female ratio is 72:28

Project applications
Male : Female 85:15

Source: Academic Statistics Database, **Dept of** National Science and Technology

MOTIVATION AND PURPOSE

- Therefore, this study intends to explore whether the composition of academic research teams can effectively expand and enhance the research energy of individuals through team learning and knowledge sharing, thereby increasing the female academic research capacity.
- This study is based on the model of Hamilton, Nickerson, and Owan (2003) & Hamilton, Nickerson, and Owan (2012), and focuses on the impacts of team member skill heterogeneity, demographic heterogeneity, and team size on academic research capacity and performance.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

Hamilton, Nickerson, and Owan (2003) indicated

1. three reasons that workers might join teams:
   - ① Low-ability workers expect benefit from the ability of high-ability workers.
   - ② Teamwork may raise additional productivity due to teammate's cooperation.
   - ③ There might have some compensations for work as teams.
2. two reasons that high-ability workers might join teams:
   - ① Team productivity benefit his own productivity.
   - ② Teamwork is more enjoyable than work alone

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

3. There are some other problems raised by teamwork:
   - ① Teamwork might induce free-riders;
   - ② Teamwork might have adverse selection problems;
   - ③ Heterogeneity of worker ability might have positive or negative effects on team productivity.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

4. Hamilton, Nickerson, and Owan (2003)

$$y_{it} = \mathbf{X}_{it}\beta + \alpha \mathrm{TEAM}_{it} + \epsilon_{it} \quad ①$$

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

5. Hamilton, Nickerson, and Owan (2012) , the impact of diversity on productivity:

$$Y_{jt} = X_{1jt}\alpha + X_{2jt}\beta + X_{3jt}\delta + \varepsilon_{jt} \quad ②$$

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

Empirical model

The impact of team learning and member heterogeneity on academic research performance is the subject of this project. In order to explore whether the joint publication of the paper by the participating teams will improve the scholar's own research capacity and performance due to the many advantages discussed in the literature, referring to the model of Hamilton et al. (2003), this research plans to use the least square method for empirical analysis the following models:

$$q_{it} = X_{it}\beta + \propto z_{it} + \varepsilon_{it} \quad (1)$$

q_{it} is the cumulative number of papers published by i scholars in five years after year t,

z_{it} is whether the paper published by scholar i in year t has other co-authors involved

X_{it} includes the academic level of the scholar i when he published this paper in year t, whether he co-published papers with other scholars in the five years after year t, and the cumulative number of papers published in the five years before year t, etc.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

- Furthermore, two studies from Hamilton et al. (2003, 2012) both claim that the heterogeneity among team members will affect the results of team learning, so the team heterogeneity index is added to estimate the productivity of the team in the articles. Their statement mainly echoes the results discovered by the team's mutual learning model, that is, if team members have diverse technical capabilities and big differences in performance, they will have more diversified areas that can solve problems, and there will be more room for members to learn from each other. Therefore, the heterogeneity of the technical capabilities of members may have a positive impact on learning effectiveness.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

- In addition, if team members differ greatly in ethnic characteristics such as age, education level, race, etc., mutual learning and communication will be more difficult compared to teams with homogeneous group characteristics. In other words, high ethnic heterogeneity and high communication costs may have a negative impact on the effectiveness of team learning.
- Therefore, in order to explore the impact of the heterogeneity of team members on academic research performance, this article also focuses on the sample of scholars whose papers published in t are co-authors, and conducts further research based on the following model:

$$Q_{jt} = X_{jt}\eta + \Lambda_{jt}\psi + \theta_{jt} \quad (2)$$

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

$$Q_{jt} = X_{jt}\eta + \Lambda_{jt}\psi + \theta_{jt} \quad (2)$$

Q_{jt} is the cumulative number of papers published by scholar j who published joint papers in year t for five years after year t,

Λ_{jt} is an indicator of the skill heterogeneity and demographic heterogeneity of team members who published this paper by scholar j in year t,

X_{jt} includes the position of the scholar j when he published this paper in year t, whether he has co-published papers with other scholars in the five years after year t, and the cumulative number of papers published in the five years before year t, etc.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

"Team member skill heterogeneity" indicator $\boldsymbol{\Lambda_{j1t}}$

Hamilton et al. (2012) measured the heterogeneity of team skills by the ratio of the highest to the lowest average individual productivity of members. This study will replace productivity with the number of papers published to measure the skill heterogeneity of team members.

That is, the first variable in Λ_{jt} , Λ_{j1t} is measured by the ratio of the number of papers published by the strongest member of the research team of j scholar in year t to the number of papers published by the weakest member.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

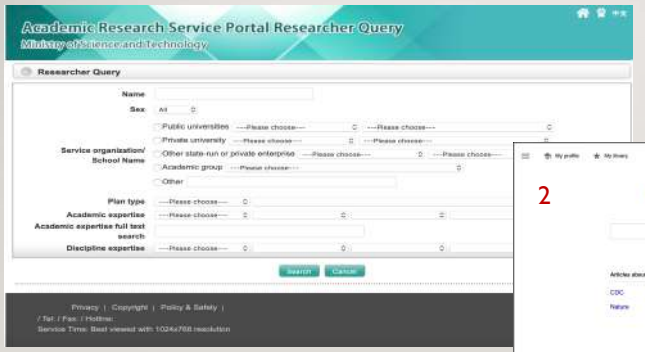
For "demographic heterogeneity of team member", the previous literature mostly used age, education level or race as measures.

However those are not available or not suitable for this study. We measure the second variable in $\boldsymbol{\Lambda_{jt}}$ ($\boldsymbol{\Lambda_{j2t}}$) by the difference between the rank of the team member in year t of j scholar and the rank of scholar j in year t.

THEORETICAL BACKGROUND AND EMPIRICAL SETTING

The third variable in Λ_{jt} (Λ_{j3t}) is team size, that is, the number of team members in the scholar j 's team in year t.

DATA COLLECTION AND LIMITATION



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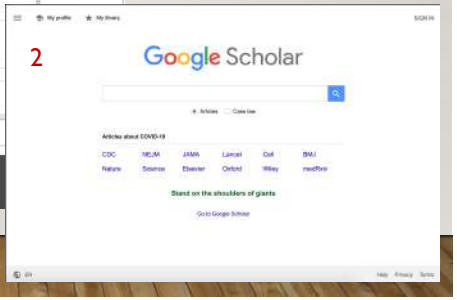

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Department website, full time faculty member

Thank you for Listening
&
Looking forward to your valuable Feedback and Suggestions

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