What’s Chinese Overseas Students’ Choice: to Return or not?

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Abstract
The global crisis is cutting deep into many economies around the world, triggering a slump in world labor market and putting globalization on hold. In China, the employment market also undertakes tough burden from undergraduate and graduate students in universities. As a special group, the Chinese students studying abroad face more choices and challenges than their peers. In this paper, we did an investigation on employment confidence and preference to work in China. We gathered the data from the Chinese students studying in USA as a sample, and the non-inferiority test is employed to analyze the dataset. Finally, we draw the conclusion that finance crisis batters the students’ employment confidence heavily, and lead them to find a job in China after graduation. Our objective is to remind related sectors and government of this situation, so that they could provide well with more suitable positions for them, and change the crisis into opportunity.

Key words: finance crisis; non-inferiority test; employment confidence; preference

Introduction
Recently, Chinese Academy of Social Sciences released "Economic Blue Book" in Beijing. It pointed out that in 2009 there will be 5.92 million university graduates who have difficulties to find a job. To make it worse, the global crisis is cutting deep into many economies around the world, triggering a slump in world labor market and putting globalization on hold with the layoffs increased and recruitment shrunk. There is a special group among the graduate job-seekers, overseas Chinese students. The benefit of studying abroad shining in their job seeking: fluent in foreign languages, profound understanding of foreign culture, adaptable to a multicultural working
environment, etc. On the other hand, they face big challenges in this economic context. Compared to domestic students, the finance crisis obliges them to change the career plan much more and they have to think over where to start their work carefully once again.

In this paper, we conduct an investigation on the employment confidence and preference to start career in China for the overseas’ Chinese students. The questionnaires were collected between January and March, 2009 by email or interview. Non-inferiority test is performed by R statistical software program to conduct quantitative analysis and make conclusions more persuasive.

**Questionnaire**

Questionnaires on employment confidence and preference to work in China after graduation were collected by Email and interview. Most respondents are Chinese students from the universities around New York City. The questionnaire is divided into two parts: the first part is the personal information of the respondents, including age, gender, major, education, working experience, graduation time. Part two is the main body involving four issues which is designed as the paired structure to from 2 comparison groups as follows:

*Please indicate your confidence level with 1 2 3 4 5 in the braces, and “1” as with the least confidence or preference, “5” as with the most confidence or preference.*

1. **Before the financial crisis,** to what degree you believe you can get a satisfactory job within six months after your graduation. (       )

2. **After the financial crisis,** to what degree you believe you can get a satisfactory job within six months after your graduation. (       )

3. **Before the financial crisis,** to what degree you would like to go back to China to work after your graduation. (       )

4. **After the financial crisis,** to what degree you would like to go back to China to work after your graduation. (       )

Finally, we collect 73 valid questionnaires, involving 38 different majors, including age arranging
from 19 to 32 years old with 47.9% male and 52.1% female. The graduate students who are pursuing Master's and PhD’s degree account for 47.9% and 42.5%, respectively. We only have 7 undergraduate students occupying 9.6% in all the respondents. The proportion of students without any working experience is about 65.8%. In this survey, the interviewees are professional in many different fields with relatively high education level, but quite lack of experience. To some extent, it depicts a picture of highly-educated, limit-experienced overseas Chinese students.

**Data**

We wish to test non-inferiority between the two comparison groups with respect to the distributions of measurements on an ordinal scale with K categories. Each pair of data falls in one cell of a $K \times K$ contingency table. $(n_{11}, n_{12}, \ldots, n_{K1}, n_{21}, n_{22}, \ldots, n_{K2}, \ldots, n_{KK})$ stands for the number of pairs in the corresponding cell according to the subscript. For example, $n_{ij}$ means the summation of result before crisis equals $i$, at the mean time, the result is $j$ after crisis. Subsequently, $(n_{11}, n_{12}, \ldots, n_{K1}, n_{21}, n_{22}, \ldots, n_{K2}, \ldots, n_{KK})$ is from a multinomial distribution with parameter $n$ and $p$, where $n = \sum_i \sum_j n_{ij}$ and $p = (p_{11}, p_{12}, \ldots, p_{K1}, p_{21}, p_{22}, \ldots, p_{K2}, \ldots, p_{KK})$ can be estimated by $\hat{p}_{ij} = n_{ij} / n$ indicates the probability of appearing in the $ij$th unit.

Employment confidence refers to the degree of optimism that job seekers feel about the overall state of labor market situation and their own capability. How confident people feel about their ability and labor market need affect their job hunting activity significantly. Statistically speaking, this kind of variable, like employment confidence could not be measured directly is always called the latent variable. Although we can not observe the employment confidence accurately, the ordered categorical data or ordinal data are frequently facilitated, e.g., the customer may be asked to mark the degree of satisfaction on some production with 1,2,3,4 and 5, with “1” means the least satisfactory and “5” means the most. Analogically, another variable in this survey concerned the
preference to work in China will be dealt in a similar way due to latent characteristic property.

Non-inferiority test

Non-inferiority test has been widely used in many fields, e.g., the epidemiological studies and clinical trials. When the issue of comparison between the newly developed treatment and the existing reference treatment comes out, it is likely to find benefits of the new one, since fewer side effects, greater convenience of employment, or lower cost of money and time. Therefore, the more appropriate problem we should consider is whether the investigative one is non-inferior or equivalent to, but not necessarily superior to the reference one in effect. The equivalence test for ordinal scale data has been concerned by some researchers. Lui & Cumberland (2001) developed a test procedure of equivalence in ordinal data with matched-pairs with respect to the tail marginal distributions and the marginal proportions. We will produce a similar procedure for non-inferiority test in this paper.

No inherent difference exists in the non-inferiority test compared to the classical hypothesis test. In particular, tail marginal distributions procedure is used to detect the non-inferiority when the underlying data are on an ordinal scale with matched pairs. To simply the final result and hypothesis, let $p_{i} = \sum_{j} p_{ij}$, $p_{j} = \sum_{i} p_{ij}$ represent the marginal proportions while $p_{(k)i} = \sum_{i-k}^{K} p_{ij}$, $p_{(k)j} = \sum_{i-k}^{K} p_{ij}$ represent the tail marginal proportions. Here, we revisit the general form of non-inferiority test for this scenario as follows:

$$H_{0}: \quad p_{(k)i} - p_{(k)j} \leq -\Delta_{k} \quad \text{for some} \quad k = 2, 3, \ldots, K$$

$$H_{1}: \quad p_{(k)i} - p_{(k)j} > -\Delta_{k} \quad \text{for all} \quad k = 2, 3, \ldots, K$$

where $\Delta_{k}$ is the non-inferiority margin, additionally, $\Delta_{k}$ could be various for different $k$. 
The assignment of $\Delta_k$ depends on the experience in practice and in need. It is noted that since both tail marginal proportions $p_{(k)}$ and $p_{(k)}$ decrease as $k$ increases, it seems reasonable to choose the maximum level $\Delta_k$ in a decreasing manner as well.

Moreover, there are some properties can be derived in the test procedure:

$$\text{Var}(\hat{p}_{(k)} - \hat{p}_{(k)}) = [\hat{p}_{(k)} + \hat{p}_{(k)} - \hat{p}_{(k)} - \Delta_k^2]/n$$

Consequently, we define

$$Z_k(-\Delta_k) = [\hat{p}_{(k)} - \hat{p}_{(k)} + \Delta_k]/\sqrt{\text{Var}(\hat{p}_{(k)} - \hat{p}_{(k)})}$$

When we reject the null hypothesis $H_0$ at level $\alpha$, that is, $Z_k(-\Delta_k) > Z_\alpha$ for all $k$, $Z_\alpha$ is upper 100($\alpha$)th quantile of the standard normal distribution. We may claim that the investigative group (After crisis) is non-inferior to the existing one (Before crisis) in two tail marginal proportions. It is important to understand that in the test of non-inferiority, the null hypothesis states that the difference for some $k$ but alternative one concerns difference for all $k$.

**Analysis Result**

It is true that a certain degree of confidence frustration is inevitable due to the financial crisis. However, the Chinese overseas students always perform much more popular than their peers. So shall we imagine a little optimism depending upon the overseas students’ inherent advantages?

Therefore, the non-inferiority test comes to the rescue. If we draw the non-inferiority conclusion, we dare to say we are not necessary to get into panic for this group of students and may focus on others more. Firstly, we set the value of non-inferiority margin for 2-5 level in order equal to 0.2, 0.1, 0.05 and 0.04. There’s little need to assign the margin for the first category, because the two tail marginal proportions are both identical to 1. Then we get $Z_k(-\Delta_k)$ are 0.788, -1.386, -2.502 and -1.858, for $k = 2, 3, 4, 5$. None of the quantities can be met $Z_k(-\Delta_k) > Z_\alpha = 1.645$, that is, we can not reject the null hypothesis to get the non-inferiority, given the tolerance level. We will arrive at
the conclusion the financial crisis blow the Chinese overseas students’ employment confidence strongly.

Before the crisis, it is commonly agreed by overseas Chinese students to start their career in USA after graduation to accumulate some international working experience. Surprisingly, in our survey, we can see that before the financial crisis, respondents who chose "more likely" or "most likely" to return to China (select "4" or "5") accounted 57.5% after the crisis. Conservatively, we start with the non-inferiority test with the similar process as the above one. To maintain consistency, we set the margin values as same as the above analysis in the issue of preference to work in China, that is, 0.2, 0.1, 0.05 and 0.04. After calculations, the values were as follows: 2.32, 2.004, 2.515 and 1.825. We may say the financial crisis make the Chinese overseas students consider starting career in China much more. To save the space, we skip the other tests, such like superiority test or equivalence test could be applied in the ongoing study.

Why this happened? In USA, there are some political causes pushing this happening: the H-1B visa employer fee increased a lot while the serious shortage of capital troubles most of the enterprises. At the same time, the regulation prohibits students from being unemployed for more than 90 days during the initial 12-month period of OPT. Students must report when they begin working for an employer and when they stop working for that employer. If unemployed for more than 90 days total, a student is considered to be in violation of status. Therefore, it is a good time for China’s government to attract more high-quality overseas students by providing more suitable and promising position for them and improving the employment confidence in order to change the crisis to the opportunity.

Reference