University Analysis for the Tianxia Ambassador Program

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1 Objective

In order to ensure the effectiveness of one-on-one outreach, this project attempts to establish an outside view [1] of the characteristics of the target universities in US, UK, Canada and Australia. By collecting and visualizing publicly available data on Chinese student number and EA chapter presence, we seek insights concerning the strategic prioritization among these universities.

2 Methodology

For data collection, we regard a university as relevant so long as it satisfies ONE of the following:

- It has a university-level EA chapter.
- It is densely populated with (overseas or domestic) Chinese students.
- It is prestigious and worth having a pipeline.

It turns out that 68 universities (22 in US, 23 in UK, 10 in Canada, 13 in Australia) are within the scope. Then we make graphical comparisons primarily based on their corresponding Chinese student number and worldwide overall ranking. Other inside-view factors (i.e. EA chapter situation, CEA focus, existing Chinese alumni and CLTP talent need) are left as future work.

2.1 Data Source

Please find this workbook for the raw data collected. There are quite a few useful sites that provide centralized data with good credentials such as Statistica, College Factual, EDUCATIONDATA.ORG, UK Higher Education Statistics Agency (HESA), Universities Canada and Australian Government public data.

2.2 Chinese Student Number Estimation

Unfortunately not every university discloses unambiguous statistics of the current Chinese population in the student body. This section illustrates what estimation was done before we are able to systematically analyze them. Overseas Chinese student data, however, is easier to obtain than the domestic Chinese counterpart (i.e. those classified as non-international but ethnically Chinese students) due to the common internationalization agenda. Hence, readers shall place less credence in the latter on which we perform a relatively crude approximation.

2.2.1 Overseas Chinese

The major uncertainty here is that individual universities in Australia typically do not publicize their headcounts of overseas Chinese students. Our approach is to multiply the total number of international students in each university by 28% (this portion of international students in Australia are from China [2]) which is then rounded down to nearest hundred for a conservative number. Same procedure is also done for University of Calgary and Université de Montréal in Canada.

2.2.2 Domestic Chinese

Almost none of the universities reveal how many domestic Chinese students there are among the current student population. By the same token, the approximation here is done by multiplying the total number of domestic students in each university by an average country ratio (specified below) and then rounded down to nearest ten.

- US: we estimate the percentage of Chinese Americans in the US higher education population by $\frac{1.3\% \times 78\%}{1 \times 41\%} = 2.47\%$, since 1.3% of the total U.S. population as of 2018 are Chinese Americans [3] and the average college enrollment rate for ethnically Chinese young adults is 78% compared to the total population 41% [4].

- UK: similar to US except that the HESA further provides UK-domiciled Asian student enrollment statistics by university [5], we substitute the above Chinese-out-of-total with Chinese-out-of-Asian calculations resulting in $\frac{9.9\% \times 66.3\%}{9.9\% \times 66.3\% + 90.1\% \times 46.7\%} = 13.49\%$.

- Canada: the only available proxy turns out to be 5.1%, the ratio of Chinese Canadians in the population [6]. The tendency in Canada to focus exclusively on whether or not a student comes from immigrant parents rather than his/her ethnicity leads to the lack of data on race [7], making it harder to estimate at the university level [8]. Although one may consider calculating $\frac{241{,}170 + 245{,}575}{2{,}924{,}665 + 3{,}362{,}325} = 7.74\%$ from the census results [9], the fact that at the age of 25 the census "Chinese" may include a significant amount of immigrants who are already counted in the overseas part makes it only an upper bound.

- Australia: the ratio of Chinese Australians in the higher education student population is available: $\frac{17{,}814}{1{,}082{,}533} = 1.65\%$ [10].

2.3 University Ranking Classification

Data are collected from the three Most prestigious global rankings: QS World University Rankings, Times Higher Education World University Rankings and Academic Ranking of World Universities. When a university is ranked only in an interval (e.g. 101-150), the average (e.g. 125) is used. To utilize data from all three sources, we propose the below criteria to classify the universities:

- "Top 20" if all three rankings ≤ 20
- "Top 50" if all three rankings ≤ 50 but not "Top 20"
- "Top 100" if all three rankings ≤ 100 but neither "Top 20" nor "Top 50"
- "Top 200" if all three rankings ≤ 200 but neither "Top 20", "Top 50" nor "Top 100"
- "Others"

In other words, a university is among the top 20 only if it is ranked top 20 in all three sources and so on. We can see later that this is rather stringent since the top national universities in Canada and Australia are outside the "Top 20" group.

3 Results

We provide visualizations on the different measures through common charts and then show an aggregate view via an interactive map.

Figure 1 shows a comparison of the total number of Chinese students in four countries, including those many universities that we did not collect data on. Although we have a higher credence on the overseas data than the domestic estimations, this graph still suggests that our outreach should prioritize countries in the order of US > Australia > UK > Canada if solely this factor is considered. The significantly higher US number is because its total student population is about 4.8 times of those in the other three countries combined.

Figure 2 illustrates how overseas Chinese students are populated among these schools. University of Toronto, University of Waterloo and University College London are the most prominent. In the same vein, figure 3 reveals the case for the domestic portion, indicating that the top 9 institutions are all located in Canada. It is possible that the estimation ratio in Section 2.2.2 inflated the actual percentage in Canada and hence we may not draw conclusions from this plot. Jointly we have figure 4 guiding us to find the top 5 Chinese student hubs within each country.

Next we take a look at figure 5 showing how the universities are classified according to our standard in Section 2.3. Almost 75% of the American universities in the pool are among the top 100 (here including top 20 and top 50) while the counterpart percentage in Canada is just above a quarter. Connecting to the fact that US has a huge student body, it

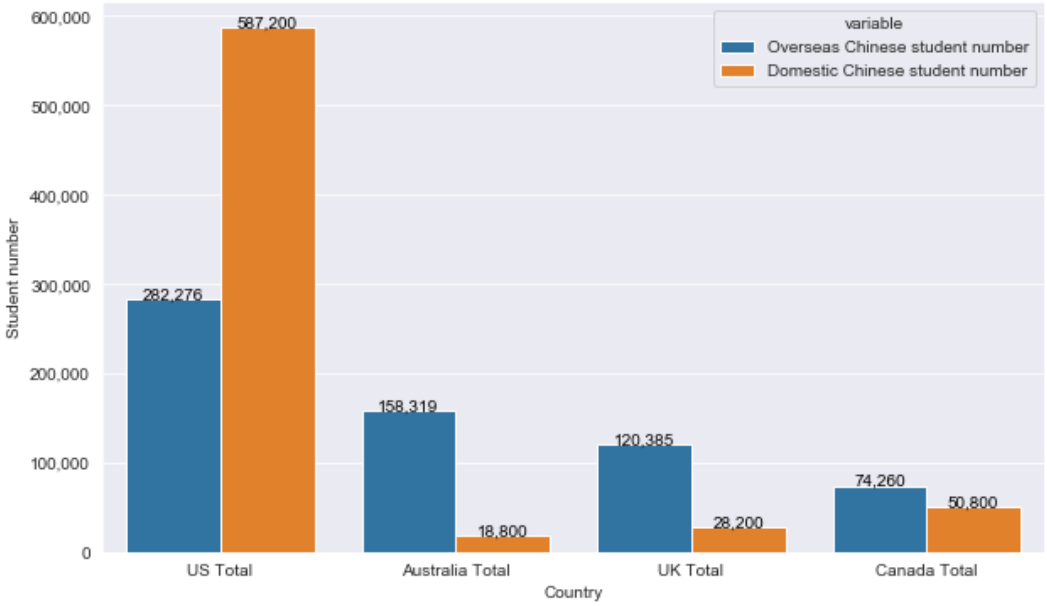

Figure 1: Chinese Student Number by Country

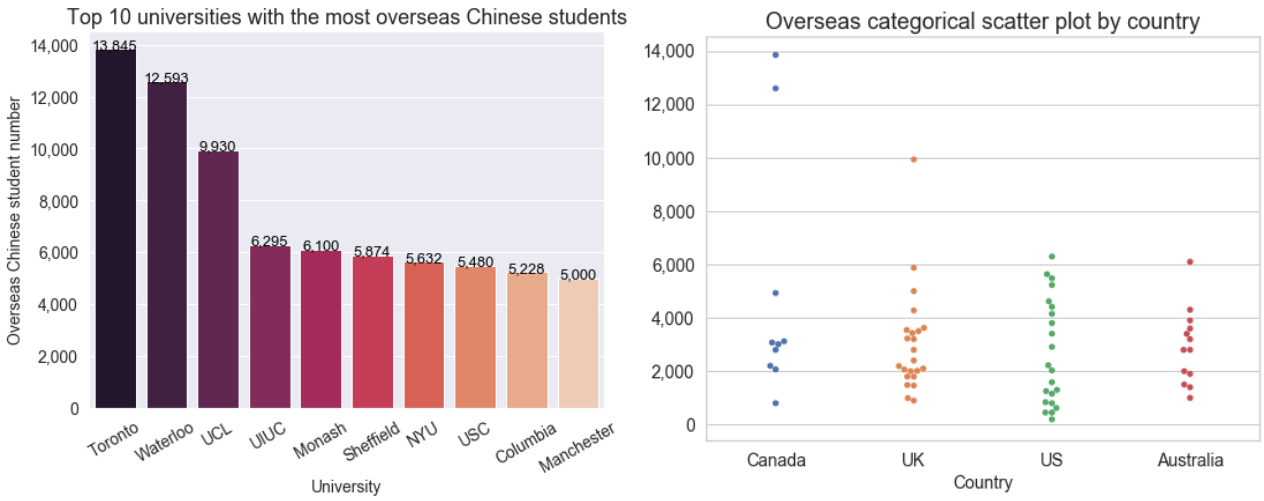

Figure 2: Overseas Chinese

appears that we have not fully exploited the opportunities in this country: we could include more American universities in the future since currently we tend to be concentrated in its uppermost universities leaving out the remaining spread-out Chinese students. On the flip side, the relative superiority of higher education in the US is demonstrated as well, which implies more talents here.

Taking both the Chinese popularity and the university prestige into account gives figure 8 laying out the distribution with ranking as x-axis and total Chinese student number as y-axis. Note that unlike the previous plots, the y-axes here have different scales and thus we

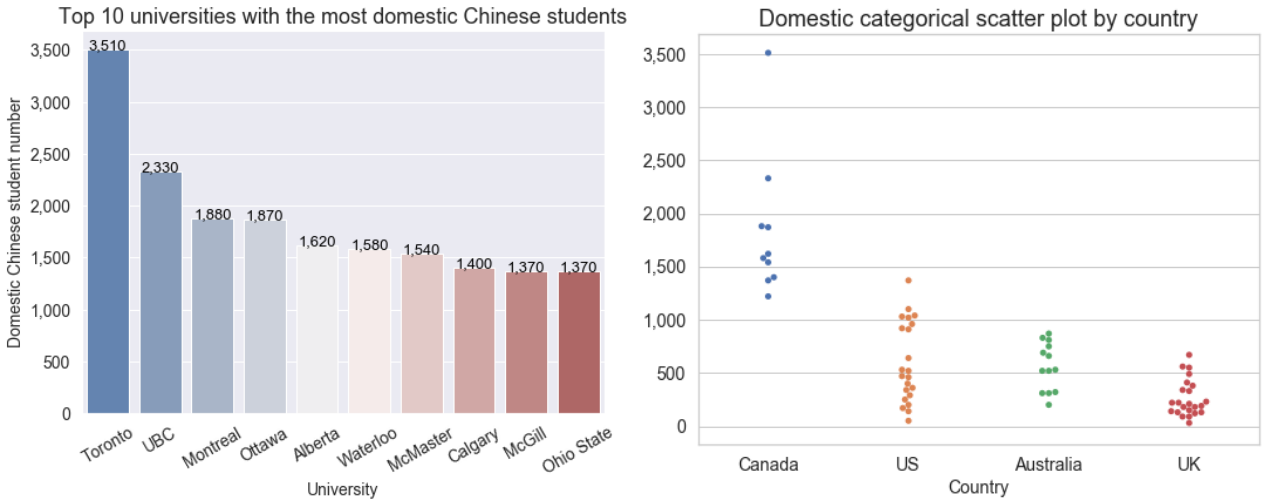

Figure 3: Domestic Chinese

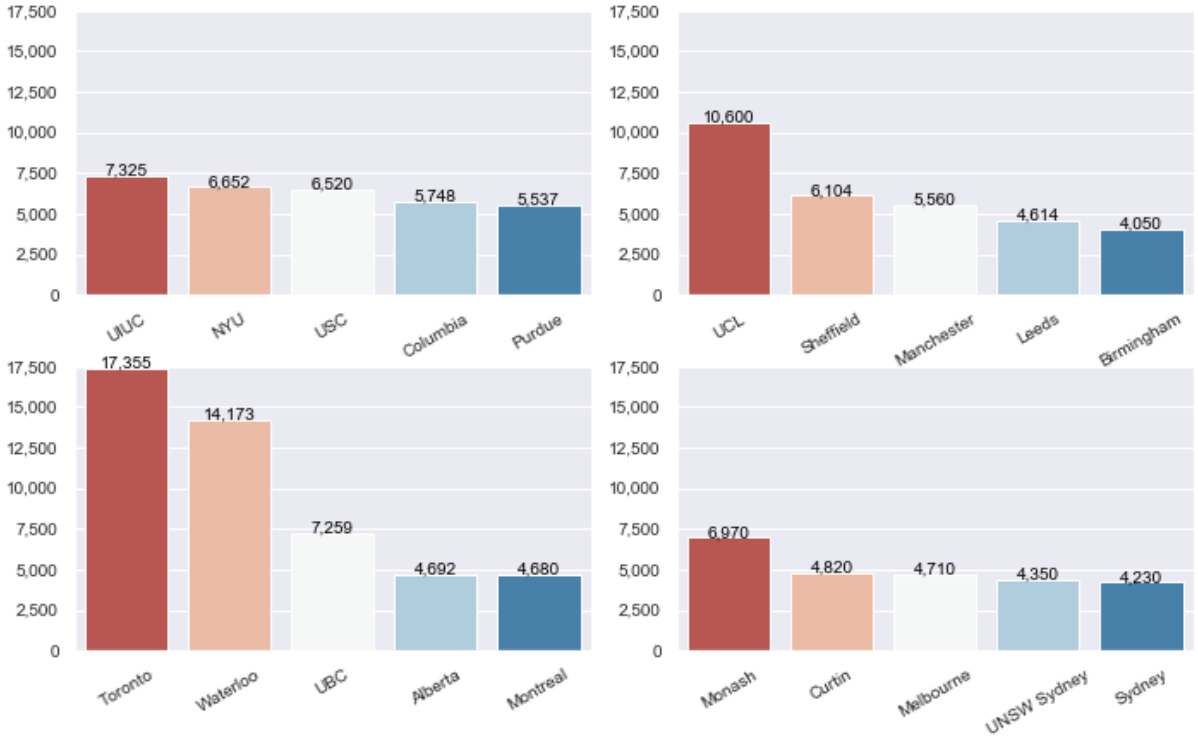

Figure 4: Top 5 universities with the most total Chinese students in each country

can only compare schools within the same country. Ideally we would prioritize those in the upper-left corner such as undoubtedly University College London in UK and University of Toronto in Canada. Nevertheless, choosing between University of Southern California (more Chinese but less prestigious) and Harvard University (less Chinese but more prestigious), for example, requires evaluating the trade-off between the two factors. For similar distributional

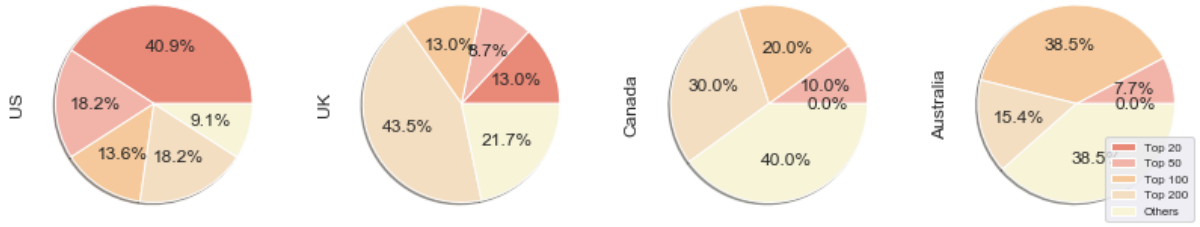

Figure 5: University ranking classification by country

plots by overseas or by domestic student number only, please refer to the notebook.

In order to compare universities across the border and address the overlapping annotation problem in figure 8, here is an interactive bubble map for further geospatial analysis. Zoom in to the Great Lakes of North America region for illustration. Clicking a marker will show which university it is and clicking a circle will show detailed data as seen from figure 6. Note that in this screenshot the radius of a circle is a multiple of the university's total Chinese student number which enables us to compare the Chinese popularity straightforwardly. To use overseas or domestic number as radius instead, please check the corresponding box in the top-right corner and uncheck others. In addition, different colors of the circles indicate different rankings: purple for "Top 20", red for "Top 50", etc. Zoom out and drag to see other parts of the world.

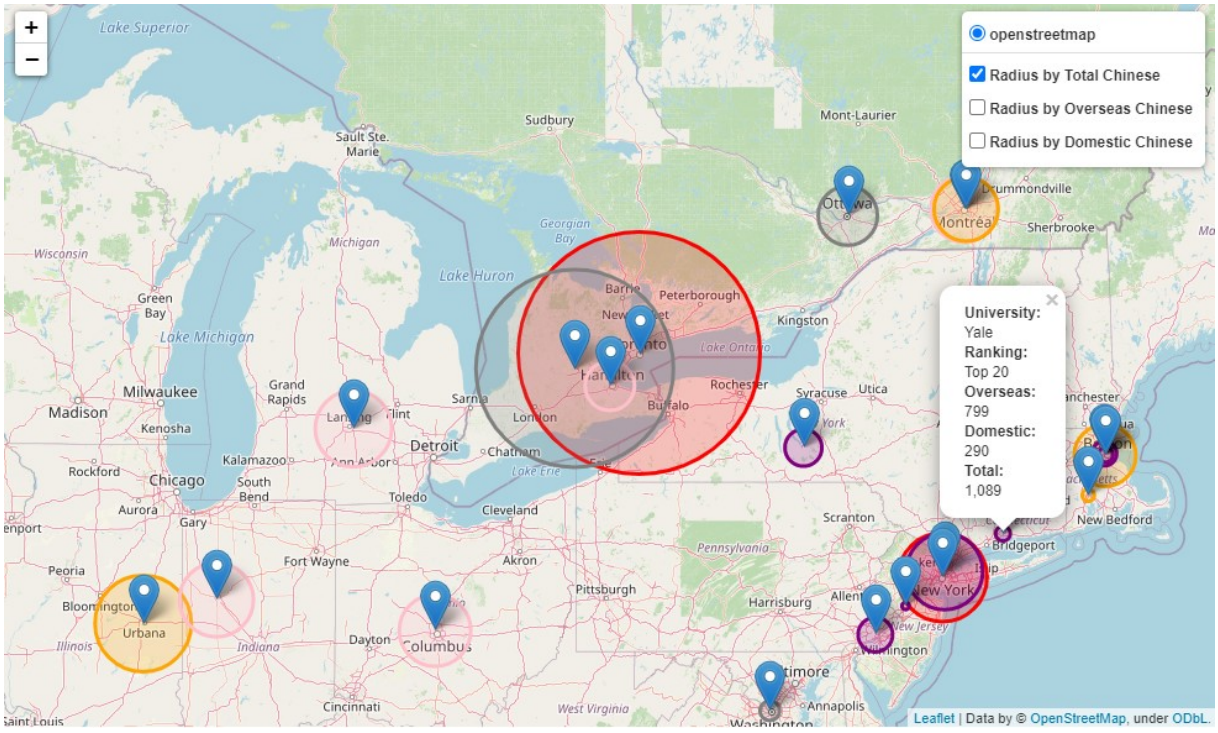

Figure 6: Map Demo

4 Discussion and future work

The major uncertainty lies in the domestic Chinese data estimation in Section 2.2.2. There are only three universities that disclose the exact data and our method seems not so far off: University College London, University of Leeds and University of Sussex have in fact 755, 220, 119 domestic Chinese students where our estimates are 670, 340, 130 respectively. Access to more accurate data will boost the reliability of the conclusion.

Figure 7 helps reaffirm that Chinese students in US and Australia are more spread-out in comparison. Future work could consider more universities with a substantial Chinese presence.

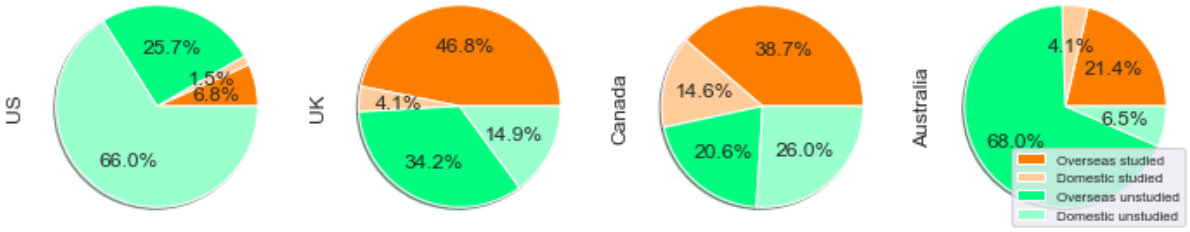

Figure 7: Unstudied Chinese student percentage in each country

Acknowledgement

Special thanks to the advice from Alicia and support from CLTP.

GitHub Link to Code and Data

Project link https://github.com/AndyYFTao/EA-CLTP-DataAnalysis
Map link https://andyyftao.github.io/CLTP-Guidance-Bubble-Map/

References

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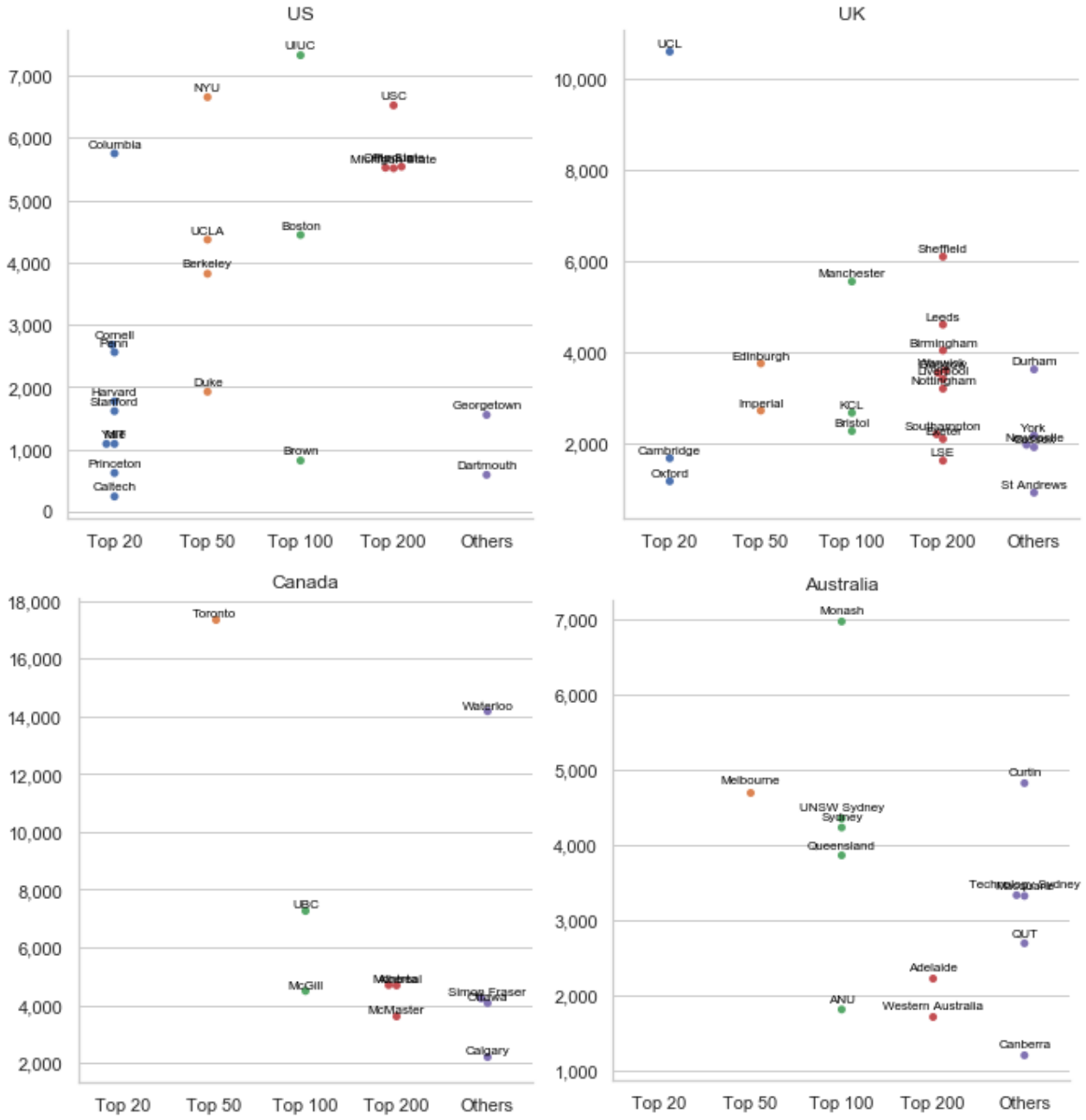

Figure 8: Total Chinese student number vs. University ranking in each country

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