The Effect of Original Countries' Income Per Capita on the Flow of China's Inbound International Students (1999-2011) Version 3.0

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ABSTRACT

In this paper we estimate the effect of original countries' GDP per capita on China's inbound international students, with panel data during time period of 1999-2011, using a gravity model. And we contribute to the literature in multiple dimensions: Firstly, we carefully examined the effect of original countries' GDP per capita, and this effect was usually either considered positive but not confirmed, or even excluded from discussion in the previous studies. And by solving the problem of endogeneity, we conclude the effects of original countries' GDP per capita are unanimously positive for the flow of degree, non-degree, and overall students. Secondly, we classified the international students into degree and non-degree ones, and examined the effect on them respectively. And by comparing the absolute value of coefficients, we conclude they are slightly different. Finally, we focus on China's inbound international student, and this fills the gap in previous studies, which discussed the developed countries mostly.

INTRODUCTION

Accompany with the wave of globalization after the World War II, international students' migration has become one of the most important phenomenon in high education. Data captures

this trend. “Records indicate that in 1960, there were nearly 238,000 international university students worldwide” (McMahon 1992), while the latest report from UNESCO shows that, the amount of international students in global high education exceeded 3,572,840 in 2010 (UNESCO 2012), which means the flow of students migration scaled up 15 times in recent half a century, if we consider these two numbers are comparable.

The ubiquitousness of this growth is also applied country by country. As to the largest developed country United States, the amount of international students grows from 36,494 in 1954 (Agarwal & Winkler, 1985) to 684,714 in 2010 (UNESCO 2012). And as to the largest developing country China, after the “Reform and Opening-up” policy, this number (non-degree students included) also exceed 292,611 in 2011 (MOE, 2011), which is nearly 200 times than that of 1,428 in 1979 (MOE, 1984).

Observing the rapid growth in this international flow of students’ migration, scholars try to discuss the mechanism behind, using diverse theoretical model and empirical methods, and focusing on different regions, such as Lee & Tan (1984), Agarwal & Winkler (1985), McMahon (1992), Gonzalez, Mesanza & Mariel (2011), Naidoo (2007), Wei, Wang & Mao (2012), and Van Bouwel & Veugelers (2013). And most of them are about the developed countries.

In this paper we try to estimate the effect of original countries’ GDP per capita on China’s inbound international students, with panel data during time period of 1999-2011, using a gravity model. And we may contribute to the literature in multiple dimensions:

Firstly, we carefully examined the effect of original countries’ GDP per capita, and this effect was usually either considered positive but not confirmed, or even excluded from discussion in the previous studies. In fact, it was the problem of endogeneity due to omitting variables, education quality, that led to this unclear situation. And by solving the problem of endogeneity, we conclude the effects of original countries’ GDP per capita are unanimously positive for the flow of degree, non-degree, and overall students.

Secondly, we classified the international students into degree and non-degree ones, and examined the effect on them respectively. It’s obvious that the mechanisms behind these two types of students to some extent are different. And by comparing the absolute value of coefficients, we conclude that, as to the biased estimate where the effect of education quality included, the negative effect of GDP per capita is larger for degree students, while as to the unbiased estimate where the effect of education quality excluded, the positive is larger for non-degree students.

Finally, we focus on China’s inbound international student, and this fills the gap in previous studies, which discussed the developed countries mostly. In the year of 2011 China has 292,611 intentional students in total, and the annual growth rate exceeds 17% in recent 13 years. Considering her high-speed economic growth, and larger scale in high education and total population, it’s not difficult to image China will become another center of global international students’ migration in foreseeable future, after United States and Europe.

The rest of this paper is structured as follows: Section 2 introduces the context of internationalization of China's high education, Section 3 reviews the previous studies on international students' migration, Section 4 describes our data, Section 5 presents econometric models and our findings, and Section 6 lays out the conclusion.

CONTEXT: INTERNATIONALIZATION OF CHINA'S HIGH EDUCATION

China has a long history of international students.

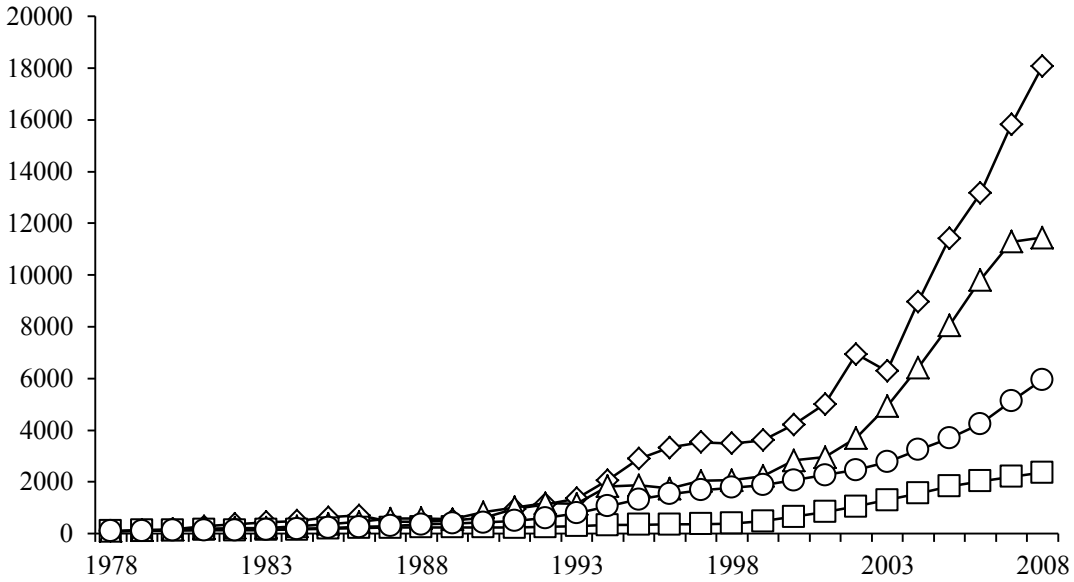
Indeed, the origin of China's inbound students can be traced back to Sui (581-618 CE) and following Tang (618-907 CE) dynasties. During that period, China was the super power who dominated the Asia continent. And her neighbor Japan and Korea sent many official embassies to China for the purpose of learning from advanced civilization. These embassies, including both diplomats and monks, were termed Kenzuishi and Kentoshi ("-sui-" referring to the Sui Dynasty and "-to-" referring to the Tang Dynasty). Those Kenzuishi and Kentoshi brought their home a significant amount of advanced science, technology, philosophy, and art, and their visits comprised the earliest wave of international students in China's historical record.

However, with the advent of the Industrial Revolution in Europe, China lost her advantage in the following centuries, and finally sent the youth abroad. In the late Qing Dynasty (1644-1912 CE), Yung Wing (1828-1912) became the first Chinese student studying in United States, and received his degree from Yale in 1854. After Yung Wing's success, the "Middle Kingdom" started to organized her own "Kenzuishi and Kentoshi" to the western world, as a part of her Self-Strengthening Movement. Then, during the 20th century, people who had studied in the United States, Europe, Japan, and former Soviet Union played an important role in China's modernization.

After the People's Republic founded in 1949, the number of China's inbound students resumed step by step, especially for those socialist countries such as Vietnam, North Korea, etc. Even so, the level of internationalization was still low, until China stats her new era in 1978.

The Year of 1978 was an important milestone in China's history. The "Reform and Opening-up" policy was established by Deng Xiaoping, and lead not only a miracle-like economic growth, but also a rapid development in internationalization of higher education. Assuming GDP, international trade, high education enrolment, and number of foreign students all equal 100 in 1979, Figure 1 showed their growth in recent 30 years: people always consider the 60 times GDP growth a miracle, while that of foreign students are even 181 times (MOE 2009, National Bureau of Statistics 2009a and 2009b).

Figure1: Trends of Some interesting indexes since 1978



LITERATURE REVIEW

Previous studies on international students' migration can be classified into two different types. The first type including Mazzarol & Soutar (2002), Findlay, King, Stam & Ruiz-Gelices (2006), Li and Bary (2007), Maringe & Carter (2007), and Kondakci (2011), bases its conclusion on interviews or questionnaire surveys, and tries to find the factors influencing their decisions on oversea studies, at individual level. The second type including Lee & Tan (1984), Agarwal & Winkler (1985), McMahon (1992), Gonzalez, Mesanza & Mariel (2011), Naidoo (2007), Wei, Wang & Mao (2012), and Van Bouwel & Veugelers (2013), considers the international students from home countries to host countries, to some extent, a cross-border flow, therefore the tool of gravity model can be applied here, just like it was applied in the field of intentional trade and immigrations. Actually, education can be considered as one kind of service trade, and studying abroad is also one kind of temporary immigrations.

Although the second type shares the same method with our studies, it lacks enough discussion on a key variable, GDP per capita.

Lee & Tan (1984) examined the flow of international students from developing countries to developed countries, circa 1979, and they expected a positive effect of per capita income on this flow. But the econometric result indicated that: for all developed countries and United States as destinations, the coefficients were positive but not all of them were significant; while for France and United Kingdom as destinations, the coefficient were negative although none of them were significant.

Agarwal & Winkler (1985) analyzed the international students from 15 eastern hemisphere countries in United States during 1954-1973, and they considered the sign of real income coefficient ambiguous, since "it incorporate both a positive income elasticity and the negative elas-

ticity associated with immigration benefits and forgone earnings". And the econometric result also showed that for undergraduate and graduate students, the coefficient of real income were significantly positive and insignificantly negative, respectively.

McMahon (1992) reviewed 18 developing countries' outbound international students during the 1960s and 1970s, and they also assumed the effect of economic strength positive. But the econometric result did not support them much: as to the international students to worldwide, the coefficients for full set, lower income subset, and higher income subset were all negative (only one insignificant); while as to the international students to United States, these three coefficients were all positive (still only one insignificant).

Naidoo (2007) studied United Kingdom's inbound international students from 9 countries during 1985-2003, and he also hypothesized the sigh of income was positive. Again, this hypothesis lacked enough econometric support. The econometric result indicated that, if all other variables were controlled, the sigh of income tended to be positive, but unfortunately it was insignificant.

Wei, Wang, & Mao (2012) discussed the international students' migration worldwide, and they considered the effect of GDP per capita were ambiguous. To some extent, the econometric results confirmed their prediction: in the model of inter developing countries, developing countries to developed countries and developed countries to developing countries, the signs seemed positive, although not all of them were significant; in the overall model, the signs were still positive but this time none of them was significant; and in the model of inter developed countries, the signs turned to negative, although all of them were insignificant.

Mesanza & Mariel (2011) and Van Bouwel & Veugelers (2013) did not consider GDP per capita was an important factor, influencing the cross-border intentional students flow. Therefore this variable was ignored and excluded from their econometric models.

With all the papers of the second type mentioned above, it's not difficult to make a summary that: the effect of original countries' GDP per capita, in those previous studies, was usually either considered positive but not confirmed, or even excluded from discussion.

We think it was the problem of endogeneity due to omitting variables, education quality, that led to this unclear situation.

On one hand, local education quality takes an important role in international students' migration, but this variable is always hard to measure, especially for cross-country studies. And generally speaking, the larger sample size to be considered, the more difficulties to be faced. In previous studies, Lee & Tan (1984) used staff-student ratio and real cost per student in their equation, these two variables might have some kind of correlation with local education quality, but they were still different; Agarwal & Winkler (1985) and McMahon (1992) did not consider any variables representing education quality; Naidoo (2007) did not either, but he put many country-dummy variables in the equation, which may actually contain the unobservable education quality, and he really got a positive result, although statistically insignificant; and Wei,

Wang, & Mao (2012) also used local staff-student ratio in higher education, therefore they faced the same problem with Lee & Tan (1984).

On the other hand, GDP per capita is always correlated with omitted education quality: the country with more wealth tends to have a higher quality system of education, while the country with less wealth tends to have a poorer one. And that's the problem: a variable is in the right side of regression equation, but correlated with the error term, which leads to a serious problem of endogeneity, and the estimate of GDP per capita is biased.

In fact, the higher GDP per capital of the original countries means the higher purchasing power for their students to enjoy education goods provided by another country. If we could isolate the effect of GDP per capita from omitted education quality, the pure effect is expected to be positive.

And to solve this problem, we will use 2SLS and fixed effects models to reach an unbiased estimator. And our result is the effects of original countries' GDP per capita are unanimously positive, for the flow of degree, non-degree, and overall students.

METHOD: DATA AND MODELS

The data of China's inbound international students comes from Minister of Education. According to its criteria, China's inbound intentional students are classified into degree and non-degree students. The former consists of specialized courses undergraduate, full courses undergraduate, master and doctor students, while the latter includes regular, senior, language program and short-time visiting students. Minister of Education provides the number of students in total and each subset by country of original. And in the introduction Minister of Education points out, this data is collected from all the high education institutes approved by China's provincial governments.

It should be noted that, the data we used in this paper is slightly different from its original version: firstly, to be consistent with the list of members of United Nations, we delete the observations of the non-sovereign territories, including (West Bank and Gaza, French Southern Territories, Faroe Islands, Bermuda, Puerto Rico, French Guiana, Guadeloupe, Martinique, Cayman Islands, Turks and Caicos Islands, British Virgin Islands, French Polynesia, Cook Islands, United States Minor Outlying Islands, and American Samoa); secondly, the observations of former Yugoslavia and former Serbia and Montenegro are not considered; thirdly, to keep our data balanced, we drop the observations of East Timor, Serbia, Montenegro, and South Sudan, since in 1999 there did not exist; fourthly, there are two Costa Rica in the data of 2004, being listed in America and Oceania, respectively, and we remove the latter since it's a obvious mistake in geography; finally, Tuvalu is never included in original data, and then we consider China's inbound international students from Tuvalu is always zero.

Therefore, except for East Timor, Serbia, Montenegro, South Sudan and China herself, we have observations from 188 countries out of 193 sovereign members of United Nations.

As to the other variables also included in our equations, such as GDP per capita, population, gross enrolment ratio in tertiary education, scientific and technical journal articles, researchers in R&D, and resources rents, all of them come from on-line database of World Bank, http://data.worldbank.org. It should be noted that, we use the nominal GDP and real annul GDP growth rate to calculate the GDP deflator. And therefore GDP per capita, with bilateral trade mentioned blow, are real variables.

To avoid too many missed values, we calculate the 13-year average gross enrolment ratio, scientific and technical journal articles, and researchers in R&D of these 188 countries instead of year-by-year one, which means these three variables are considered as fixed as time goes by, for a given country.

The data of bilateral trade come from on-line database of National Bureau of Statistics, http://data.stats.gov.cn. Bilateral trade is calculated by summation of China's imports from a given country and exports to this country.

We calculated the distance by ourselves. For convenience, we assume that distance between a given country's capital and Beijing represent the distance between this country and China, the earth is also assumed an idea sphere with radius equal to 6,361 kilometers, and then the distance can be calculated by the formulae to get minor arc in great circle of the earth. The capitals' longitudes and latitudes used in formulas come from API of maps.google.com, and we write a small programme to get them.

Whether bordering China by land and by sea, see any piece of world map. The former includes Mongolia, Russia, North Korea, Vietnam, Laos, Myanmar, India, Bhutan, Nepal, Pakistan, Afghanistan, Tajikistan, Kyrgyzstan, and Kazakhstan, and the latter includes North Korea, South Korea, Japan, Philippines, Malaysia, Brunei, Indonesia, and Vietnam.

Whether having diplomatic relations with China, see the column of Countries and Regions in homepage of Minister Foreign Affairs, http://www.fmprc.gov.cn. It should be noted that our data covers 1999-2011, therefore two special cases should be pay attention to: the first is some country one had diplomatic relation with China, but during 1999-2011, this diplomatic relation was terminated; and the second is some country one had no diplomatic relation with China, but during 1999-2011, this diplomatic relation was established or re-established. Considering these two special cases, whether having diplomatic relations with China is still a 0-1 dummy variable, however, it may changes it value as time goes by during these 13 years.

And the descriptive statistics is listed below:

Table 1: Descriptive statistics

Variables of original countries	Obs	Mean	Std. Dev.	Min	Max
Total students in China	2444	797.54	4098.26	0	66806
Degree students in China	2444	280.30	1548.01	0	27021
Non-degree students in China	2444	517.24	2712.99	0	41298
Self-financed students in China	2444	740.46	4032.62	0	66394
GDP per capital	2284	7558.63	13500.36	112.58	127349.7
Population	2431	2.71E+07	8.88E+07	9334	1.21E+09
Bilateral trade	2291	460935	1983976	0	2.97E+07
Distance to Beijing	2444	9026.67	3764.90	807.74	19267.03
Distance to New York	2444	8638.87	3535.27	327.66	16225.97
Diplomatic relations with China	2444	0.86	0.34	0	1
Border China by land	2444	0.07	0.26	0	1
Border China by sea	2444	0.04	0.20	0	1
SARS year	2444	0.077	0.27	0	1
Gross enroll. Ratio in tertiary edu	2223	27.03	23.22	0.46	90.10
Sci & tech articles*	2256	3400.13	16153.12	0	212883
Researchers in R&D*	720	1994.69	1879.47	5.97	9067.54
Resource rents**	2381	10.09	15.73	0	94.64

* Per million people, ** % of GDP

RESULTS

Main results of P-OLS and P-tobit

We use different models to show our finds step by step. Firstly, we use Pooled-OLS and Pooled-Tobit estimations (since the number of international students cannot be negative), with and without proxy variables partially representing omitted education quality; secondly, we use IV-OLS and IV-Tobit estimations, to isolate the effect of GDP per capita from omitted education quality; finally, we use Fixed-effect model for panel data to control unobservable education quality, assuming it does not change as time goes by.

The Pooled-OLS and Pooled-Tobit results are listed below:

Table 2: Main results from OLS models

	(1) P-OLS	(2) P-OLS	(3) P-OLS	(4)P- OLS
variables	log total students			
log GDP per capital	-0.127***	-0.078*	0.068	0.209***
	(0.032)	(0.042)	(0.060)	(0.067)
log population	0.246***	0.251***	0.427***	0.442***
	(0.024)	(0.024)	(0.043)	(0.043)
log trade	0.284***	0.282***	0.330***	0.330***
	(0.014)	(0.014)	(0.033)	(0.033)
log distance to Beijing	-0.511***	-0.554***	-0.889***	-0.966***
	(0.078)	(0.083)	(0.104)	(0.099)
diplomacy relations	1.536***	1.561***	1.594***	1.652***
	(0.090)	(0.091)	(0.144)	(0.150)
border by land	1.023***	0.989***	0.837***	0.782***
	(0.140)	(0.142)	(0.176)	(0.173)
border by sea	1.230***	1.152***	0.522***	0.249
	(0.169)	(0.176)	(0.171)	(0.166)
SARS year	-0.663***	-0.660***	-0.661***	-0.650***
	(0.086)	(0.086)	(0.110)	(0.109)
gross enroll. ratio in tertiary edu	0.011***	0.012***	0.015***	0.018***
	(0.002)	(0.002)	(0.002)	(0.003)
log Sci & tech articles		-0.055*		-0.234***
		(0.029)		(0.065)
log researchers			-0.221***	-0.098*
			(0.042)	(0.058)
Observations	2,104	2,104	1,205	1,205
R-squared	0.711	0.711	0.738	0.742

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Main results from Tobit models

	(5) P-Tobit	(6) P-Tobit	(7) P-Tobit	(8) P-Tobit
variables	**log total students**			
log GDP per capital	-0.178***	-0.105**	0.064	0.220***
	(0.035)	(0.047)	(0.062)	(0.069)
log population	0.242***	0.252***	0.414***	0.429***
	(0.027)	(0.027)	(0.045)	(0.045)
log trade	0.323***	0.318***	0.342***	0.344***
	(0.018)	(0.018)	(0.035)	(0.035)
log distance to Beijing	-0.452***	-0.509***	-0.880***	-0.964***
	(0.081)	(0.085)	(0.104)	(0.099)
diplomacy relations	1.805***	1.850***	1.728***	1.803***
	(0.107)	(0.109)	(0.161)	(0.170)
border by land	1.002***	0.959***	0.850***	0.790***
	(0.143)	(0.143)	(0.175)	(0.171)
border by sea	1.192***	1.084***	0.508***	0.205
	(0.165)	(0.172)	(0.173)	(0.168)
SARS year	-0.682***	-0.679***	-0.663***	-0.649***
	(0.091)	(0.091)	(0.112)	(0.111)
gross enroll. ratio in tertiary edu	0.012***	0.014***	0.015***	0.019***
	(0.002)	(0.002)	(0.002)	(0.003)
log Sci & tech articles		-0.078**		-0.261***
		(0.031)		(0.067)
log researchers			-0.232***	-0.096
			(0.043)	(0.058)
Observations	2,104	2,104	1,205	1,205
Pseudo R-squared	0.288	0.289	0.306	0.310

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

From the tables above we see: for model (1) and (5) without any variables representing education quality, the coefficients of GDP per capita are both negative, and significant at 1%; for model (2), (3), (4), (6), (7), and (8), when we add proxy variables of log Sci & tech articles and log researchers step by step, which are partially representing education quality, the coefficients of GDP per capita change to positive, and significant at 1%.

Honestly, here we have to admit the model (3), (4), (7), and (8), where the proxy variable of log researchers has been added in, might be biased due to the sample selection problem. We have only 720 observations of researchers (see Table 1), and when we take the 13-year average of this variable, the observations increase to 1205; even so, the sample size was reduced by almost one half (2104 to 1205). It should be notice that, this sample attrition may not be random since the countries failing to report this statistics are usually poor, or too small, and this problem cannot be solved within this framework of proxy variables, since neither we can provide the missing statistics of researchers, nor treat them as zero.

Therefore, the P-OLS and P-Tobit models with proxy variables representing the education quality should be considered as only the partial evidence, and we need to turn to the second step. Let's then consider IV and Fixed effect estimation.

Main results of IV-OLS, IV-Tobit and FE

We choose the distance to New York and the resources rents (%of GDP) to be instrumental variables. As to the former, New York is the center of global economy, and the distance to New York could be considered correlated to this country's GDP per capital but uncorrelated to error term, including education quality. As to the latter, resources rents is defined as the share of added value of oil, natural gas, coal, mineral, and forest by total GDP, which tell us a story of resource curse, or the principle in economics of development: the developing countries tends to rely on resource products instead of manufacture products, and these two explanations are both irrelevant with education quality.

The first-stage result of IV-OLS shows the robust F statistics is 79.144, and null hypothesis of weak instruments is rejected at 1% level. Furthermore, the chi2 score of test of overidentifying restrictions is 3.50 (with p = 0.06), which means the null hypothesis of all the instruments are exogeneity cannot be rejected.

Meanwhile, if we assume the unobservable education quality does not change as time goes by, at least during these 13 years, we can also use fixed effect estimation to deal with this endogeneity.

And the IV-OLS, IV-Tobit and FE results are list below:

Table 4: Main results from IV and FE models

	(9) IV-OLS	(10) IV-Tobit	(11) FE
variables		**log total students**	
log GDP per capital	0.649**	0.598**	2.134***
	(0.181)	(0.169)	(0.406)
log population	0.588**	0.550**	6.670***
	(0.078)	(0.074)	(0.562)
log trade	0.164**	0.144**	0.102***
	(0.039)	(0.035)	(0.028)
log distance to Beijing	-0.654**	-0.695**	
	(0.106)	(0.100)	
diplomacy relations	1.707**	1.440**	1.635***
	(0.118)	(0.100)	(0.246)
border by land	1.494**	1.450**	
	(0.199)	(0.187)	
border by sea	0.844**	0.917**	
	(0.215)	(0.213)	
SARS year	-0.665**	-0.648**	-0.363***
	(0.110)	(0.102)	(0.039)
gross enroll. ratio in tertiary edu	-0.024**	-0.021**	
	(0.008)	(0.007)	
Observations	2,104	2,104	2,104
R-squared	0.634		0.504

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

From the tables above we see: for model (9) (10) and (11), when we use IV and Fixed effect estimation, to isolate the effect of GDP per capita from omitted education quality, or to control unobservable education quality, assuming it does not change as time goes by, the coefficients of GDP per capita are all positive, and significant at 1% level (it should be notice that, here the proxy variables of log Sci & tech articles and log researchers are both excluded from our models, and the observations are hence 2104).

Therefore we can conclude: it was the problem of endogeneity due to omitting variables, education quality, that led to that unclear situation in previous studies, and by solving the problem of endogeneity, the effect of original countries' GDP per capita is positive.

Results for degree and non-degree students

China's inbound international students are classified into degree and non-degree ones. It's obvious that the mechanisms behind these two types of students to some extent are different. The Pooled-OLS and Pooled-Tobit results for them are listed below:

Table 5: Degree/non-dgree students results from OLS and Tobit models

	(13) P-OLS	(14) P-Tobit	(15) P-OLS	(16) P-Tobit
VARIABLES	log degree students		log non-degree students	
log GDP per capital	-0.339***	-0.442***	0.067**	-0.021

And the IV-OLS, IV-Tobit and FE results are listed below:

Table 6: Degree students results from IV and FE models

	(17) IV-OLS	(18) IV-Tobit	(19) FE
VARIABLES	log degree students		
log GDP per capital	0.450**	0.375*	1.977***
	(0.201)	(0.211)	(0.455)

Table 7: Non-degree students results from IV and FE models

	(21) IV-OLS	(22) IV-Tobit	(23) FE
VARIABLES	log non-degree students		
log GDP per capital	0.637***	0.643***	2.671***
	(0.152)	(0.152)	(0.340)

By comparing the absolute value of coefficients, we conclude that, as to the biased estimate where the effect of education quality included, the negative effect of GDP per capita is larger

for degree students, while as to the unbiased estimate where the effect of education quality excluded, the positive is larger for non-degree students (note: when P-OLS and P-Tobit are applied, we add both of the proxy variables of log Sci & tech articles and log researchers into the models).

Results for self-financed students

China grants 5%-12% of inbound international students the government scholarship during these 13 years, and will the results above still hold if we rule out those scholarship holders? The answer is yes. And the results of P-OLS, P-Tobit, IV-OLS, IV-Tobit and FE are listed below (note: when P-OLS and P-Tobit are applied, we add both of the proxy variables of log Sci & tech articles and log researchers into the models).:

Table 8: Self-financed students results from P-OLS, P-Tobit, IV-OLS, IV-Tobit and FE models

	(24) P-OLS	(25) P-Tobit	(26) IV-OLS	(27) IV-Tobit	(28) FE
VARIABLES	log self-financed students				
log GDP per capital	0.388*** (0.074)	0.353*** (0.084)	0.614*** (0.173)	0.590*** (0.183)	3.11*** (0.446)

CONCLUSION

The effect of original countries' GDP per capita, in the previous studies, was usually either considered positive but not confirmed, or even excluded from discussion. It was the problem of endogeneity due to omitting variables, education quality, that led to this unclear situation.

In this paper we try to estimate the effect of original countries' GDP per capita on China's inbound international students, with panel data during time period of 1999-2011, using a gravity model. And by solving the problem of endogeneity, we conclude the effects of original countries' GDP per capita are unanimously positive for the flow of degree, non-degree, and overall students.

And considering degree students and non-degree students separately: as to the biased estimate where the effect of education quality included, the negative effect of GDP per capita is larger for the former, while as to the unbiased estimate where the effect of education quality excluded, the positive is larger for the latter.

Finally, if we only consider the self-financed international students (without Chinese government scholarship), the results still hold.

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