

## Poverty in China's Colleges and the Targeting of Financial Aid

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### Abstract

To examine poverty on China's campuses, we utilize the Chinese College Students Survey carried out in 2010. With poverty line defined as the college-specific expenditures a student needs to maintain the basic living standard on campus, we find that 22 percent of college students in China are living in poverty. Poverty is more severe among students from the rural or Western parts of the country. The college need-based aid program must be improved because its targeting count error is over 50 percent. Lacking other income sources, poor students rely heavily on loans and working to finance their college education.

**Key words:** Poverty; Financial aid; Financial sources; Higher education; China

**JEL codes:** I32; I38; I24; I28

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## 1. Introduction

The poverty rate in the general Chinese population has been decreasing in the past decades, reaching about 2.8 percent based on the official poverty line in 2007.<sup>1</sup> Indeed, most Chinese have been relieved from poverty.<sup>2</sup> However, a wide income gap still exists between the rich and the poor in China, and the widest gap is in education, especially in tertiary education.<sup>3</sup>

Despite being free for decades, college tuition in China has increased tremendously since the mid-1990s. The rising college tuition and overall costs have led to increasing concerns about poverty on campus. Education, particularly higher education, is a way to escape poverty and improve social mobility. If poverty on campus prevents poor college students from finishing their studies, income inequality among the young generation will more likely persist. The consequences of poverty can even be more severe if students do not attend college because of financial difficulties. Poverty not only endangers the persistence of poor students in college,<sup>4</sup> but also causes health problems (physical or psychological) and even crimes.<sup>5</sup> These problems can adversely affect the labor market performance of these poor students in the future.

Although on-campus poverty is prevalent in developing countries, few studies are devoted to understanding the issue.<sup>6</sup> Poverty on campus has motivated the prompt development of the financial aid system in China in recent years. However, few empirical studies calculate the post-aid poverty rate and evaluate the effectiveness of

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<sup>1</sup> The CIA World Factbook, 2008.

<sup>2</sup> Park and Wang 2001; Ravallion 2010.

<sup>3</sup> Rozelle et al. 2008.

<sup>4</sup> Bettinger 2004; Desjardins, Ahlburg and McCall 2002; Dynarski 2003; Goldrick-Rab 2006; Singell 2004.

<sup>5</sup> Holzer et al. 2007; China.org.cn 2006.

<sup>6</sup> Previous research focuses on general household poverty. For example, see Fang, Zhang and Fan 2002; Fan, Zhang and Zhang 2004; Jalan and Ravallion 1998; Kanbur and Zhang 1999; Park and Wang 2001; Park, Wang and Wu 2002; Ravallion and Chen 2007. Some studies consider education and health expenditures when assessing poverty in China. See Gustafsson and Li 2004.

the financial aid systems of Chinese colleges. Our paper attempts to fill this gap by examining poverty on Chinese college campuses and by employing newly collected data on college students in China. In particular, we examine the extent of poverty and its variations, the targeting effectiveness of financial aid, and the financial sources of college students.

Our data are derived from the first round of the Chinese College Students Survey (CCSS), which was carried out by the China Data Center and the School of Higher Education at Tsinghua University in May and June 2010. We randomly selected 100 colleges that served as the ultimate sample for the CCSS; as a pretest, the first-round survey covered 19 colleges. In each college, approximately 300 students were randomly selected from the graduating class. Thus, our sample was composed of a total of 6,059 students. The questionnaire not only collected basic information such as individual characteristics and family background but also contained questions regarding college entrance examination (CEE) scores, college activities, and student placement after graduation. Most importantly, we gathered detailed information on college expenses and income sources.

Our findings show that poverty on China's campuses is severe. In 2010, the average necessary cost of attending college was 12,318 yuan, including a tuition fee amounting to 5,480 yuan. College expenses represent 67 percent of the average Chinese household income. With poverty line defined as the college-specific expenditures a student needs to maintain the basic living standard on campus, we find that 22 percent of college students have a household income below the poverty line.<sup>7</sup> As expected, the poverty rate is higher among students from rural areas and from Central and Western China. Moreover, the poverty rate is higher in elite colleges than

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<sup>7</sup> In Table A2, we report various measures of poverty according to different poverty lines. Qualitatively, our analysis is not sensitive to using different measures.

in other colleges, as elite colleges require higher costs.

The financial aid system covers 48 percent of students in China, with the aid averaging 2,547 yuan per student in 2010. Overall, the allocation of the need-based aid targets low-income students, whereas college grade point average (GPA) matters most for merit-based scholarships. However, the probabilities of obtaining need-based aid and merit-based scholarship also vary according to the student's demographic characteristics, college quality, pre-college *hukou* status, and geographical area.

In our study, we also examine the targeting accuracy of need-based aid, and note that targeting is far from perfect. The coverage rate of need-based aid among the poor—defined as the percentage of poor students covered by the aid—is only 47 percent. Hence, more than half of the poor students cannot avail themselves of need-based aid. The leakage rate, or the percentage of non-poor students who are receiving need-based aid, is as high as 57 percent. Moreover, the targeting count error is 64 percent, which indicates that 64 percent of the beneficiaries are not the neediest ones.

Financial aid reduces poverty rate, but its effects are moderate because of mistargeting and the generally small pool of aid. The post-aid poverty rate is 17 percent, which is only 4.6 percentage points lower than the pre-aid poverty rate. Moreover, 79 percent of poor students remain in poverty ex post. The post-aid poverty rate is 25 percent among rural students, and 21 percent among students from Western China.

Finally, we examine how students from poor families pay for their college education given the inadequacy of financial aid. Although on average, family contribution is still the main source of support, poor students depend less on family contribution (which accounts for 61 percent of their financial sources) compared with non-poor students, but rely more on loans (14 percent), earnings from work while

studying (8 percent), and financial aid (18 percent). In fact, more than one-third of college students borrow money to finance their education, and have unpaid debts amounting to approximately 5,291 yuan. In addition, about three-quarters of the students work while studying.

Our paper contributes to the literature on poverty in higher education in three ways. First, to our knowledge, we are the first to formalize and calculate the poverty rate on Chinese campuses with the aim of benchmarking income to college expenses. Discussions in the literature normally focus only on income, comparing low-income to high-income families.<sup>8</sup> Although the magnitude of poverty rate depends on the definition of poverty line, our analyses are not sensitive to the use of different definitions. Second, we are also the first to examine financial-aid targeting in Chinese colleges, and find that the present targeting is not accurate. The existing literature focuses on the effects of financial aid on college entry and persistence,<sup>9</sup> and on who receives more financial aid.<sup>10</sup> Finally, we investigate the determinants of financial sources, whereas only scattered evidence on this topic exists in the literature.<sup>11</sup>

The rest of the current paper is organized as follows. Section 2 presents the background of China's poverty and financial aid system in colleges. Section 3 describes the data. Section 4 shows the extent of poverty on Chinese campuses. Section 5 focuses on financial aid targeting and its effects. Section 6 examines the financial sources of college students. Section 7 concludes the study.

## **2. Background and Literature**

Higher education was offered for free in China until 1993, when families were

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<sup>8</sup> Li 2006a; Li 2006b; Li 2007.

<sup>9</sup> Deming and Dynarski 2009; Dynarski 2002; Kane 2004; Yang 2010.

<sup>10</sup> Yang 2009.

<sup>11</sup> Li 2006b.

asked to share the cost. Since then, the cost of attending college has increased sharply. Figure 1 illustrates that in China, college tuition and the required fees rose by about 4.75 times from 1996 to 2008, which was much faster than the rise of the consumer price index and disposable income in the country. According to statistics from the Ministry of Education, the average tuition and required fees amounted to about 7,000 yuan in 2008. After adding other necessary living expenses in college, the total annual cost of attending college exceeded 10,000 yuan (about US\$1,458). This value was much higher than the average income per capita in rural areas (4,761 yuan) for that period. According to the Ministry of Education, about 5.27 million college students suffered from poverty, accounting for 23 percent of the total number of Chinese students in 2009. Among them, 1.66 million were categorized as “extremely poor.”<sup>12</sup>

The rapid increase in the cost of attending college has triggered debates about whether the high cost prevents poor students from gaining access to higher education, thereby causing greater education inequality. A few studies (mainly in Chinese) use micro data to show that the cost of college is far beyond the average per capita income, and that the cost varies substantially across demographic groups and locations.<sup>13</sup> For example, Li (2006b) finds that the average college expenditure is 14,900 yuan, and that poor families, despite receiving financial aid, have a very high cost of attendance relative to income.<sup>14</sup>

To help impoverished students, the Chinese government established a financial aid system that has expanded tremendously. In 2005, the government set up a special state grant of 800 million yuan (US\$98.77 million) annually to help poverty-stricken college students. In 2009, the need-based financial aid system gave 9.53 billion yuan to 6.75 million students (29.5 percent of the total number of college students).

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<sup>12</sup> See the official webpage at <http://www.moe.edu.cn/edoas/website18/02/info1281583397537402.htm>.

<sup>13</sup> Chen and Min 1999; Chung and Lu 2003; Ding 2000; Li 2006a; Li 2006b; Li 2007.

<sup>14</sup> Li 2007.

Merit-based aid has also grown since 2005, and 9.3 billion yuan were awarded to 7.24 million students in 2009. The subsidized loan program was implemented nationally in 2000 and lent 9.36 billion yuan to 1.71 million students nine years later. In 2009, the government spent a total of 37 billion yuan to support college students; the amount was more than thrice the amount spent in 2004 (11.5 billion yuan). Other types of financial aid such as food subsidies, work-study benefits, and tuition waivers or reductions were provided in much smaller scales.

Despite the expansion, no explicit national formula is in place to determine the eligibility of students and the amount of financial aid each one needs. The discretion mainly rests upon the colleges. Specifically, the central and provincial governments allocate the poverty quota and the amount of aid for each college on the basis of enrolment.<sup>15</sup> Most colleges determine eligibility based on the official definition of poor students stipulated by the Ministry of Education, which states that a student is poor if the expected family and student contribution is less than the necessary expenditure (including living cost) in each college. The amount of financial aid is mainly based on students' family income, which is reported by the students themselves.<sup>16</sup>

Nevertheless, the effectiveness of financial aid in targeting poor students, the extent to which such aid has helped in reducing poverty, and the ways Chinese students finance their college education remain unknown. Our study attempts to fill the gap using newly available micro data.

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<sup>15</sup> Although no explicit rule states that the allocation of financial aid favors elite colleges, our data show that the coverage rate for poor students is much higher in elite colleges than in non-elite colleges (52% versus 41%). The main reason for such setting is that elite colleges have better connections with the government and greater social influence, which enable them to obtain more financial support from the government and more donations from individuals, firms, and other social organizations.

<sup>16</sup> Chsi.com.cn 2010; Chsi.com.cn 2007.

### 3. Survey and Data

Our data are derived from the first round of the Chinese College Students Survey (CCSS) carried out by the China Data Center and the School of Higher Education at Tsinghua University in May and June 2010. The stratified random sampling method was employed, with locations (Beijing, Shanghai, Tianjin, Northeastern China, Eastern China, Central China, and Western China)<sup>17</sup> and type of colleges (tiers 1–7) as stratifying variables. Out of the 2,305 colleges in China, we randomly selected 100 colleges that served as the ultimate sample for the CCSS. The sampling of students within a college was randomized.

As a pretest, the first-round survey included 19 colleges selected from the full sample of 100, approximately half (10) of which were elite colleges or were covered by the 211 Program<sup>18</sup> (including four colleges covered by the 985 Program<sup>19</sup>). We intentionally oversampled the elite colleges to pretest our survey instruments and organizations. The sampled colleges were located in 11 provinces, covering six out of seven geographical areas. To draw statistical inference using this small sample, we weighed all of our statistical analyses by reassigning our sampled colleges into eight categories according to two variables: elite colleges (those belonging to the 211 program) and regions (Northeast, East, West, and Central).<sup>20</sup> The weight of each

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<sup>17</sup> In the sampling process, we separated these three metropolises (Beijing, Shanghai, and Tianjin) from the rest of China because they have an extremely large concentration of colleges, especially top universities.

<sup>18</sup> In the 1990s, the Chinese government proposed to “enhance 100 colleges in the 21<sup>st</sup> century,” which was later called the 211 Program. Although the proposal indicated only 100 colleges, in practice, 112 are included in the program. Colleges covered by the program have longer histories and offer high-quality education. More importantly, they receive more financial support from the government.

<sup>19</sup> On May 4, 1998, during the Peking University Centenary Celebration, then-president Jiang Zemin stated that China had to build world-class universities. Subsequently, the Chinese government launched a program to increase financial support for elite colleges. This program is typically referred to as the 985 Program. In practice, 39 colleges are covered by this program. All colleges covered by the 985 Program must also be covered by the 211 Program.

<sup>20</sup> We categorized the colleges from the three metropolises (Beijing, Shanghai, and Tianjin) as part of the East to ensure that at least one college was represented in each of the eight categories. In terms of both geography and economic activities, the three cities should belong to the East.

college was the number of that category of colleges in the population represented by the number of the same category in our sample.<sup>21</sup>

In each college, approximately 300 students were randomly selected from the graduating class. A total of 6,059 students from the graduating classes from all the colleges were selected: 3,167 from elite colleges and 2,892 from other colleges. Among the nine non-elite colleges, six were public colleges (2,201 students), two were private colleges (415 students), and one was a vocational college (276 students).

We designed the questionnaire in collaboration with experts in other disciplines such as sociology and education. The questionnaire not only collected basic information such as individual characteristics and family background, but also contained questions regarding CEE scores, college activities, and student placement after graduation. Most importantly, we gathered detailed information on college expenses and income sources.

The survey in each college was managed by one to three college administrators in charge of teaching or student activities. We intensively trained these survey administrators in Beijing for several days. Students completed the questionnaires, and the accomplished questionnaires were placed inside coded envelopes to guarantee anonymity. The survey administrators then collected the submitted questionnaires. The survey was conducted with considerable care, with our team closely monitoring both the survey in each college and the data entry process.

Table A1 in the Appendix summarizes the characteristics of the students. In the entire sample, the average age is 23 years. Fifty-five percent of the students are from rural areas, 44 percent are females, and 6 percent are minorities.<sup>22</sup> The average

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<sup>21</sup> For example, the weight for a non-elite college in East China is the number of non-elite colleges in the area in the population divided by the number of non-elite colleges in the same area in our sample.

<sup>22</sup> To examine whether the sample is representative, we compare these numbers to the administrative data of all college students in 2003 and find that our data are similar to the national data. In particular, in the national census, 50 percent of college students are from rural areas, 43 percent are females, and

annual family income is 44,618 yuan, and the average family size is four. The average per capita income is 12,800 yuan.<sup>23</sup> The average age of the students' fathers is 50 years; on average, the fathers have received 9.9 years of schooling. In addition, 52 percent of the students are from elite colleges, which is the result of our oversampling of these colleges in the pretest.

#### **4. Poverty on Campus**

In this paper, we define poverty line as the expenditures a college student needs to maintain the basic living standard on campus.<sup>24</sup> These expenditures include tuition, boarding, and necessary living costs (food, clothing, transportation, and other miscellaneous expenses). Our definition of poverty line is consistent with the official definition of poverty stipulated by the Ministry of Education, which defines that a student is poor when the expected family and student contribution is less than the necessary college expenditure (including living cost).

As shown in Table 1, the average necessary college expenditure was 12,318 yuan annually in 2010. This amount included 5,480 yuan for tuition,<sup>25</sup> 978 yuan for boarding, and 5,860 yuan for regular living expenses. As this expenditure is averaged across the nation, it may not reflect the variation in local costs. To take into account the variations in the cost of living across colleges, we construct a college-specific

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7.7 percent are members of minorities. In terms of college majors, our sample also has similar distribution to that in the census. We do not weight the descriptive statistics in order to show the distribution of our sample. Nevertheless, the weighted results are quite similar.

<sup>23</sup> Household income in our data is 15 percent higher than the national mean because the parents of the students are 50 years old on average, which is older than the national mean. These households comprise a selected group, i.e., those that have produced college students.

<sup>24</sup> This is different from the conventional poverty line defined as the income needed for an adult to maintain the basic living standard. For the general poverty line for an adult, a daily expenditure of US \$1.25 per person is used worldwide. In China, the official poverty line was the annual income per capita of 1,196 yuan (measured at 2010 prices) in 2010. Students from families with incomes below the conventional poverty line are unlikely to attend colleges because of the financial difficulties. Hence, they are not included in our sample. For college students, to maintain the basic living standard on campus means students or their families need to have incomes that can cover the necessary college expenditures.

<sup>25</sup> Here, tuition refers to what a student actually paid for, accounting for tuition waiver.

poverty line, using the average college-level necessary expenditures.<sup>26</sup> This serves as our main definition of poverty line in the current paper.

According to this college-specific poverty line, the poverty rate in China's colleges is high. The first column in Table 2 shows that the head count ratio, or the percentage of students with family incomes below the poverty line, is as high as 21.8 percent.<sup>27</sup> This rate indicates that more than one-fifth of college students are in poverty. As expected, the poverty rate is higher for students from rural areas and from Central and Western China. The poverty rate in the elite colleges is higher than that in the non-elite colleges, but the difference is modest.

To measure the degree of poverty, we construct the poverty gap index, which is defined as the average of the gap between the poverty line and the student's family income (counting those not in poverty as having zero gap) as a percentage of the poverty line. As shown in Table 2, the poverty gap in 2010 was 0.080,<sup>28</sup> and the cross-group differences are similar to those using the measure of poverty rate.

In Table A2 in the Appendix, we also explore three alternative definitions of poverty line to validate the sensitivity of our definition. First, we define a naive poverty line, which is the average necessary expenses of all colleges, or 12,318 yuan per year in 2010. Second, we follow Meng, Greg, and Wang (2005) and construct the poverty line using the average necessary expenditures of the poorest 20 percent of the students.<sup>29</sup> This is to address the potential over-estimation of the minimum expenditures needed for the basis standard of college living by the average college expenditures. Finally, we construct the college-specific poverty line using the average

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<sup>26</sup> Tuition may vary across majors within a college. We also calculate poverty measures using the average necessary expenditure for a given college and major and find similar results. However, we do not report the results because of space limitations.

<sup>27</sup> The poverty rate is much higher than the general household poverty rate, which was 7.97% in 2001. See Ravallion and Chen 2007.

<sup>28</sup> The number is much larger than the national household poverty gap, which was around 0.021 in 2001, as shown by Ravallion and Chen 2007.

<sup>29</sup> Meng, Gregory and Wang 2005.

necessary expenditures of the poorest 20 percent of students in each college. Results using these alternative definitions are qualitatively similar; thus, we focus our analysis on the main definition of the poverty line.

On-campus poverty in China is more severe than that in many other countries. In Figure 3, we show the ratios of tuition fees in public colleges to the GDP per capita for both developed and developing countries. China ranks second (with a ratio of 0.23) among these countries, suggesting that China's colleges are some of the most expensive.

#### **4.1. Who are in Poverty?**

In this section, we examine the poverty profile. Specifically, we estimate the probability of a student being in poverty as we define poverty using college-specific poverty line (i.e., household income is less than necessary expenses at a specific college). We employ the Probit model for these estimations and report the marginal effects and robust standard errors in Table 3.

Among a number of student characteristics (except home location), only being in an elite college can explain poverty. In Column 1 of Table 3, we include in the regression only a female dummy and a minority dummy. No evidence proves that females and minorities are more likely to be in poverty, as the coefficients on the female dummy and the minority dummy are not significant. In Column 2, we add three more variables: students' CEE scores, a dummy indicating whether students took a natural science track (versus arts and social sciences track) in high school, and another dummy signifying whether a student is in an elite college (that is covered by the 211 Program). Although the CEE scores and a specialization in science cannot explain poverty, being in elite college can. Interestingly, the poverty rate in elite colleges is three percentage points higher, which suggests that elite colleges have

more students whose family income cannot cover the necessary college costs.

By contrast, a student's home location is very important in explaining poverty. Specifically, students from rural areas or from Western/Central areas are more likely to be in poverty. In Column 3 of Table 3, we add in the regression a dummy indicating a student from a rural area. The coefficient on the rural student dummy is 0.137, and it is significant at the one percent level; thus, rural students are 13.7 percentage points more likely to be in poverty. In Column 4, we add dummies indicating whether students are from Central or Western China (relative to those from Eastern China). As expected, the poverty rate is about 10 percentage points higher among students from Central China and 13 percentage points higher among students from Western China. With the inclusion of these new variables, the estimated coefficient on the rural dummy barely changes.

The rural effect cannot be explained by either college or home province fixed effects. In Column 5, we add college fixed effects and drop the elite college dummy. In Column 6, we also control for home province fixed effects and drop the central and western dummies. With these modifications to the model, the estimated coefficient of the rural dummy barely changes.

## **5. Financial Aid: Targeting and Its Effects**

As shown above, poverty in Chinese colleges is severe. To help impoverished students, the Chinese government established a financial aid system, which has expanded tremendously in the past decade. In this section, we examine whether the college aid program has targeted effectively. We investigate both need-based aid and merit-based scholarship.

## 5.1. Who Gets Financial Aid

Table 4 shows that in 2010, about 25 percent of students received need-based grants, and the average amount for those who received them was 2,041 yuan. In the same period, about 34 percent of students received merit-based scholarships, with an average amount of 2,084 yuan. In total, 48 percent of students received either need-based grants or merit-based scholarships with an average amount of 2,547 yuan, which was only 46 percent of the tuition fees.<sup>30</sup> This coverage rate and the amount of financial aid are low compared with those in many other countries. Particularly, in OECD countries, more than 75 percent of students receive public aid.<sup>31</sup> In 2010, 82 percent of students in public four-year institutions in the United States were covered by financial aid, with each student receiving an average amount of grants and scholarships worth \$6,931, which accounted for 86 percent of their tuition fees.<sup>32</sup>

Overall, the need-based aid targets low-income students. Table 4 shows that students in poverty are more likely to receive need-based aid than non-poor students (46.7 versus 19.6 percent). Poor students also get more (2,234 versus 1,913 yuan). Figure 2 also indicates that the distribution of need-based aid is directed toward low-income students.

Probit regressions (Table 5) that estimate the probability of getting need-based aid confirm the descriptive results. In Column 1 of Table 5, we report a simple regression with only one covariate, the dummy for being poor (in poverty). The poor dummy is significant at the one percent level, and the estimated coefficient suggests that poor students are 23 percentage points more likely to get aid than non-poor students.

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<sup>30</sup> The information on student loans is not available in our data. The aggregate data show that less than 10 percent of the students receive student loans, with an average amount of 5,474 yuan in 2009. Students who receive student loans generally get some financial aid.

<sup>31</sup> OECD 2011.

<sup>32</sup> NCES 2012.

The probability of getting need-based aid also varies according to the student's demographic characteristics, college quality, and performance in college. In Column 2, we add the female dummy and the minority dummy to the regression. Female students are 5.5 percentage points more likely to get need-based aid, whereas minorities do not differ from *Han* Chinese in terms of receiving aid. In Column 3, we add the elite college dummy, the coefficient of which is positive and significant at the one percent level, suggesting that students in elite colleges are more likely to get need-based aid. In Column 4, we include further a dummy for having a GPA in the top 20 percent of the class and its interaction with the poor dummy. Students with good GPAs are more likely to get need-based aid, as the dummy for the top 20 percent of GPA is positive and significant at the one percent level. This finding results from the fact that many schools require a student's GPA to be above some criteria to qualify for the need-based financial aid. The interaction term is insignificant, suggesting that the GPA-related criteria of aid eligibility do not change with students' poverty status. When we compare Columns 1 to 4, the coefficient on the poor dummy almost does not change after including these other variables.

Finally, the probability of getting financial aid also varies with geography. In Column 5, we include the rural, central, and western dummies to indicate students' home location. Students from rural and western areas are more likely to get need-based aid. With the inclusion of these dummies, the coefficient on the poor dummy drops to 0.162, although it remains significant at the one percent level. In Column 6, we include the college dummies and home province dummies, and we exclude the central and western dummies. With these changes, the coefficient on the poor dummy changes only slightly.

By contrast, being poor has no bearing in getting a merit-based scholarship. In Table 6, we estimate the probability of getting a merit-based scholarship using the

same regression specification. Throughout the table, the estimated coefficient on the poor dummy is either insignificant or significantly negative, which is consistent with the merit-based nature of scholarships. Moreover, student characteristics matter. Female students, *Han* Chinese, and students in elite colleges are more likely to get scholarships (Columns 2–3), and these results remain consistent even after we control for a student’s GPA (Column 4). Students with GPAs ranking in the top 20 percent of the class are significantly more likely to get scholarships. We add location dummies in Column 5, and find that students from rural areas are more likely to get a scholarship. However, the rural effect becomes insignificant after we control for the college and home province fixed effects in Column 6.

## **5.2. Targeting and Poverty Reduction**

In this section, we evaluate the targeting accuracy of need-based aid. Regression results show that the overall allocation of the need-based aid is targeted at low-income students. However, the coverage rate of need-based aid among the poor, defined as the percentage (out of students in poverty) of students covered by the aid, is only 47 percent, which means that more than half of the poor students cannot get need-based aid. The leakage rate, or the percentage (out of those students who get need-based aid) of students who are not poor, is also high—57 percent of the aid recipients are non-poor students. The numbers are similar despite the use of other definitions of poverty line.<sup>33</sup>

One problem with the previous targeting measures is their sensitivity to the number of designated beneficiaries. For example, if the number of designations is less than the number of poor students, the coverage rate among the poor is less than 100

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<sup>33</sup> In particular, the coverage rate ranges from 0.465 to 0.473, and the leakage rate ranges from 0.530 to 0.638.

percent by design. Similarly, if designations exceed the number of poor students, the leakage rate is always positive, even when targeting is perfect in the sense that all designations go to the poorest students.

Following Park, Wang, and Wu (2002), we also examine the targeting count error (TCE), which counts mistargeting given the number of beneficiaries.<sup>34</sup> Using this measure, we can assess targeting by comparing the distribution of the need-based aid with the distribution under perfect targeting given the number of beneficiaries. More specifically, the TCE is the percentage of need-based financial aid not given to students who would receive the aid under perfect targeting. The following is the formula for TCE:

$$\text{TCE} = (\text{Number of students with family income below } Z^*, \text{ who do not get aid})/D,$$
where  $D$  is the number of available designations, and  $Z^*$  is the income level of the marginal student when targeting is perfect. Perfect targeting means students are ranked based on their family income, in which only the poorest  $D$  number of students gets financial aid.

The TCE measure depends on the definition of perfect targeting. When we define perfect targeting as delivering the aid to the poorest students out of the whole sample, the TCE is about 64 percent, which means that 64 percent of the beneficiaries are not the neediest ones. When we focus on within-college mistargeting by defining perfect targeting as delivering aid to the poorest students in each college, TCE decreases but is still as high as 58 percent.

In summary, financial aid does not target well for all targeting measures used. As a result, the effect of financial aid in reducing poverty rate is moderate. Table 7 shows that post need-based aid poverty rate declines to 19.2 percent, which is only 2.6 percentage points lower than the pre-aid poverty rate. After taking scholarships into

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<sup>34</sup> Park, Wang and Wu 2002.

account, the post-aid poverty rate declines to 17.2 percent, which is 4.6 percentage points lower than the pre-aid poverty rate. Moreover, 79 percent of the poor students remain in poverty ex post. The post-aid poverty rate is still as high as 25 percent among rural students and 21 percent among students from Western China.

## **6. Financial Sources of College Students**

Our results indicate that many students remain in poverty even after receiving financial aid. Consequently, a question on how students finance their college education arises. Table 8 shows that family support is still the main source of financing, contributing 76 percent to college expenses on average. Loans, need-based aid, scholarships, and earnings from work each contribute 5–6 percent. More than one-third of college students borrow money for college education, and their unpaid debt reaches 5,291 yuan. In addition, about three-quarters of the students work while in college.

The composition of financial sources also differs substantially between poor and non-poor students. For non-poor students, 80 percent of the income comes from family support, but the number is only 60 percent for poor students. Up to 30 percent of non-poor students borrow money for college education. Conversely, 66 percent of poor students resort to borrowing. Poor students are also more likely to work while studying compared with non-poor students (86 percent versus 73 percent).

Multivariate regressions reported in Table 9 confirm that poor students rely less on family support and rely more on borrowing from banks and on working during college. In the first two columns of Table 9, we report the ordinary least squares estimates of the determinants of family contribution to student income. The poor dummy is negative and significant at the one percent level, suggesting that poor students rely less on family support. Interestingly, female and rural students also have

less family support. We report the estimated Probit models on the probability of having borrowed in college in Columns 3–4, and on the probability of having worked in college in Columns 5–6. Consistent with the descriptive results, poor students are 27 percentage points more likely to have resorted to borrowing, and are 10 percentage points more likely to have worked in college. Male students, minority students, and those from rural and Western China are more likely to have resorted to borrowing. Female students, *Han* Chinese students, and those from rural and western areas are more likely to have worked in college.

## **7. Conclusion**

We investigate poverty in Chinese colleges using data from the Chinese College Students Survey (CCSS) carried out by the China Data Center of Tsinghua University in May and June 2010. In particular, we examine the extent of poverty and its variations, the targeting effectiveness of financial aid, and the financial sources of college students. We find that poverty on campus is severe in China. Overall, 22 percent of the college students are in poverty, and the poverty rate is 32 percent for students from rural areas and 28 percent for students from Western China.

Despite the Chinese government's efforts to improve the financial aid system, the post-aid poverty rate is still about 17 percent, which is only 4.6 percentage points lower than the pre-aid poverty rate. Moreover, the post-aid poverty profile is similar to the pre-aid profile, such that students from rural and western areas are much more likely to be in poverty. This could be the result of the overall lack of financial aid and the imprecise targeting. The coverage rate (48 percent) and the amount of financial aid (2,547 yuan) in China are quite low compared with those in many other countries. Although students in poverty are more likely to receive need-based aid, the coverage rate among the poor is only 47 percent, the leakage rate is 57 percent, and the

targeting count error is 64 percent. These results call for additional and more effectively designed financial aid systems.

Furthermore, our results suggest that the current financial aid system is merit-based to a certain extent. Students' academic performance in colleges is an important factor in determining whether students get financial aid and the amount of the aid, and students in elite colleges are more likely to receive financial aid and obtain a larger amount. Moving towards a need-based system will be important for equity.

Finally, students pay for college using different financial sources. Poor students rely less on family contribution and more on other sources including loans, earnings from work, and financial aid. For them, family support only contributes 61 percent to their total financial sources. For the whole sample, 37 percent of the students borrow money to pay for college education, and 66 percent of the poor students resort to borrowing. In addition, 75 percent of the students work during college.

Rising poverty in China's colleges and its associated social and economic problems have attracted a lot of attention from the media, policy makers, and academics. As our results show, poverty on campus is still very severe in China, and imprecise targeting and insufficient amount of aid are the two biggest problems of the current financial aid system. To alleviate the poverty problem in Chinese colleges, the government should improve the targeting accuracy and increase the amount of financial aid. Aside from the need-based aid and the merit-based scholarship, well-functioning financial market or loan programs can also help students afford college education.

The high poverty rate on campuses in China partly results from the excessively high cost of attending college. Therefore, controlling tuition fees or the salaries of college teachers can help. This issue has also prodded the government to implement policies

prohibiting any raise in tuition fees since 2006. However, people care most about the post-aid poverty rate rather than the pre-aid poverty rate because the latter can just result from the enrolment of many relatively poor students in college, which is an improvement on education inequality. The most effective and politically feasible way to reduce post-aid poverty rate is for the government to expand the financial aid system and provide enough assistance to students who are most needy.

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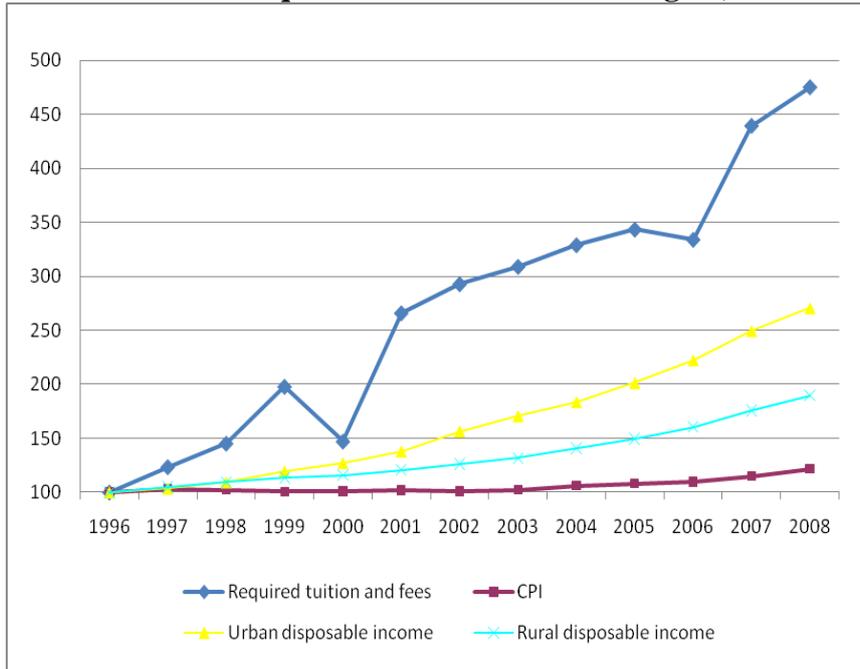
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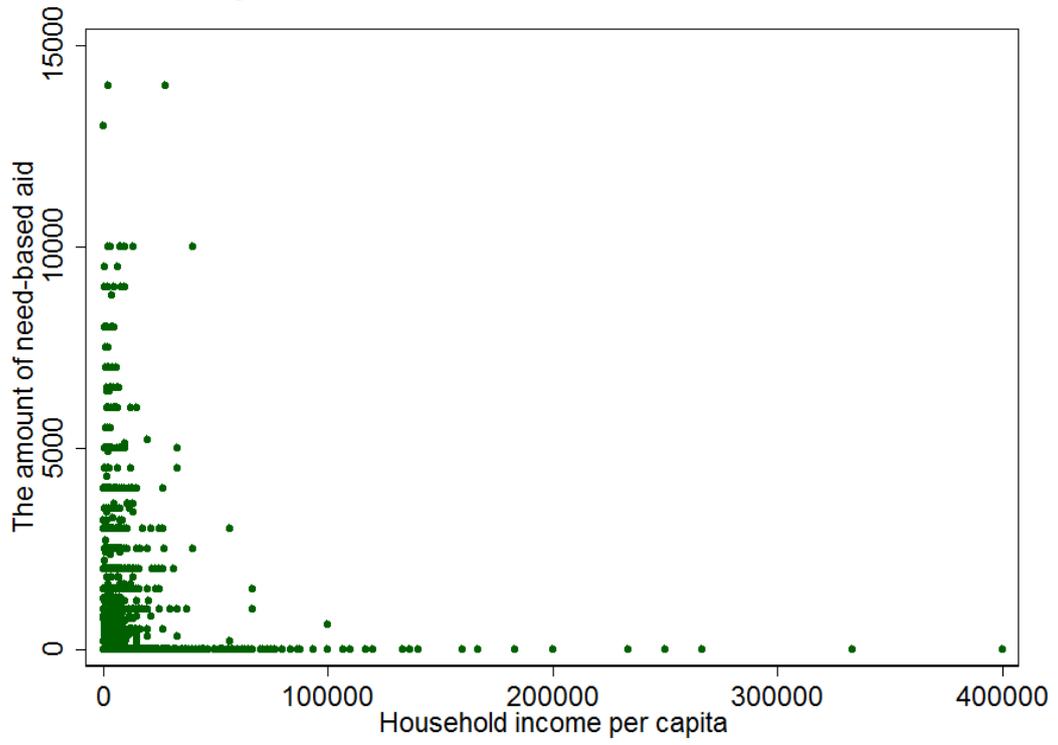
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**Figure 1. Tuition and Required Fees of Chinese Colleges (Year 1996=100)**

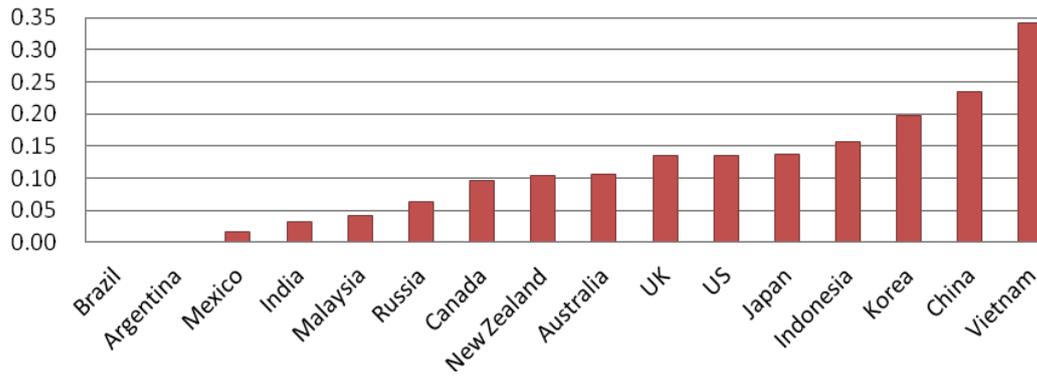


Data source: China Educational Statistical Yearbooks

**Figure 2. The Distribution of Need-based Aid**



**Figure 3. Tuition Fees in Public Colleges as a Proportion of GDP per Capita**



Source: The United Nations Educational, Scientific, and Cultural Organization (UNESCO) for OECD countries; the International Comparative Higher Education Finance and Accessibility Project (ICHEFAP) for other countries. Information on GDP per capita comes from World Development Indicators.

Note: The average tuition is not available for developing countries. However, the ICHEFAP project reports the tuition fees for living-at-home students or unpopular majors (labeled as the low level) and the tuition fees for living-independent student or popular majors (labeled as the high level). To simplify the exposition, we take the average of the low level and the high level as the average level. The rank of the average level is similar to the rank of the low level and the rank of the high level. The period of the information is after the 2005–2006 academic year for most countries, with the exception of India (2001–2002), Vietnam (2002–2003), and Japan (2002–2003).

**Table 1. College Expenses (Unit: yuan per year, Number of observations=5947)**

	Mean (1)	Standard Deviation (2)
Necessary expenses: tuition + boarding + regular cost of living	12318	4888
In which		
Tuition	5480	2832
Boarding	978	506
Regular cost-of-living	5860	3381
Other expenses	1343	2808
Total expenses (necessary expenses+ other expenses)	13661	5956

**Table 2. Poverty Indices**

	Head count ratio: Household income $\leq$ poverty line (1)	Poverty gap index (2)
Full sample	0.218	0.080
Urban	0.099	0.034
Rural	0.315	0.117
Home location		
Eastern China	0.159	0.059
Central China	0.220	0.084
Western China	0.280	0.099
Non-elite colleges	0.210	0.075
Elite colleges	0.225	0.085

Note: Poverty line is defined as the college-specific average necessary expenditures (tuition + boarding + regular cost of living) over all the students.

**Table 3. Probit Regressions Estimating the Determinants of Being in Poverty for Chinese College Students**

Dependent variable	Probability of being in poverty					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.019 (0.017)	-0.019 (0.018)	-0.009 (0.018)	-0.007 (0.018)	-0.022 (0.020)	-0.022 (0.020)
Minority	0.015 (0.047)	0.028 (0.050)	0.052 (0.053)	0.037 (0.049)	0.036 (0.052)	0.059 (0.051)
CEE scores		-0.004 (0.009)	-0.011 (0.009)	-0.009 (0.009)	0.007 (0.011)	0.004 (0.011)
Science		-0.016 (0.022)	-0.019 (0.022)	-0.009 (0.021)	0.004 (0.022)	0.010 (0.022)
Elite college		0.030* (0.018)	0.060*** (0.018)	0.048*** (0.017)		
Rural			0.137*** (0.016)	0.140*** (0.017)	0.146*** (0.017)	0.140*** (0.018)
Central China				0.099*** (0.024)	0.032 (0.029)	
Western China				0.131*** (0.025)	0.035 (0.031)	
College fixed effect					Yes	Yes
Home province fixed effect						Yes
Observations	5491	5188	5188	5188	5188	5073
Pseudo R <sup>2</sup>	0.00	0.00	0.03	0.05	0.07	0.09

Notes: We report the marginal effect from the Probit estimates. Robust standard errors are in parentheses. \*denotes statistical significance at the 10% level, \*\* at the 5% level, \*\*\* at the 1% level.

**Table 4. Financial Aid**

	Full sample	Poor	Non-poor
Need-based grant			
Percentage receiving	0.246	0.467	0.196
Amount of those receiving	2041	2234	1913
Merit-based scholarship			
Percentage receiving	0.343	0.382	0.345
Amount of those receiving	2084	2253	2036
Total financial aid			
Percentage receiving	0.475	0.640	0.448
Amount of those receiving	2547	2958	2393

**Table 5. Probit Regressions Estimating the Determinants of Getting Need-based Aid for Chinese College Students**

Dependent variable	Probability of getting need-based aid					
	(1)	(2)	(3)	(4)	(5)	(6)
Poor	0.231*** (0.026)	0.225*** (0.026)	0.224*** (0.027)	0.232*** (0.042)	0.165*** (0.040)	0.162*** (0.040)
Female		0.055*** (0.020)	0.061*** (0.021)	0.043** (0.022)	0.053** (0.021)	0.050** (0.023)
Minority		-0.021 (0.040)	-0.009 (0.043)	0.007 (0.047)	0.030 (0.048)	0.041 (0.050)
Elite college			0.036** (0.018)	0.045** (0.019)	0.089*** (0.020)	
GPA top 20%				0.092*** (0.023)	0.094*** (0.023)	0.096*** (0.024)
Poor * GPA top 20%				-0.021 (0.043)	-0.020 (0.041)	-0.037 (0.039)
Rural					0.194*** (0.017)	0.194*** (0.018)
Central China					0.038 (0.024)	
Western China					0.140*** (0.026)	
College fixed effect						Yes
Home province fixed effect						Yes
Observations	5555	5490	5188	5084	5084	4956
Pseudo R <sup>2</sup>	0.04	0.04	0.04	0.05	0.12	0.14

Notes: Robust standard errors are in parentheses. \*denotes statistical significance at the 10% level, \*\* at the 5% level, \*\*\* at the 1% level. The coefficients for the Probit model are the marginal effects.

**Table 6. Probit Regressions Estimating the Determinants of Getting Scholarships for Chinese College Students**

Dependent variable	Probability of getting scholarships					
	(1)	(2)	(3)	(4)	(5)	(6)
Poor	0.024 (0.027)	0.034 (0.027)	0.038 (0.028)	-0.071 (0.048)	-0.078* (0.047)	-0.093* (0.050)
Female		0.173*** (0.023)	0.187*** (0.025)	0.090*** (0.027)	0.089*** (0.027)	0.105*** (0.030)
Minority		-0.176*** (0.035)	-0.176*** (0.038)	-0.128*** (0.045)	-0.118** (0.047)	-0.098* (0.053)
Elite college			0.031 (0.023)	0.105*** (0.027)	0.127*** (0.027)	
GPA top 20%				0.438*** (0.024)	0.440*** (0.024)	0.447*** (0.025)
Poor * GPA top 20%				0.096 (0.067)	0.095 (0.067)	0.098 (0.072)
Rural					0.057** (0.025)	0.038 (0.027)
Central China					-0.061** (0.028)	
Western China					-0.007 (0.030)	
College fixed effect						Yes
Home province fixed effect						Yes
Observations	5552	5487	5184	5081	5081	4940
Pseudo R <sup>2</sup>	0.00	0.03	0.03	0.20	0.21	0.24

Notes: Robust standard errors are in parentheses. \*denotes statistical significance at the 10% level, \*\* at the 5% level, \*\*\* at the 1% level. The coefficients for the Probit model are the marginal effects.

**Table 7. The Effect of Financial Aid on Reducing Poverty**

Definition	Poverty rate pre-aid	Poverty rate post need-based aid	Poverty rate post-aid	Poverty gap pre-aid	Poverty gap post need-based aid	Poverty gap post-aid
Mean	0.218	0.192	0.172	0.080	0.065	0.056
In poverty	1.000	0.884	0.791	0.367	0.300	0.259
Urban	0.099	0.090	0.082	0.034	0.029	0.025
Rural	0.315	0.274	0.245	0.117	0.095	0.082
Home location						
Eastern China	0.159	0.146	0.132	0.059	0.050	0.042
Central China	0.220	0.197	0.174	0.084	0.068	0.058
Western China	0.280	0.236	0.211	0.099	0.078	0.070
Non-elite colleges	0.210	0.182	0.167	0.075	0.062	0.055
Elite colleges	0.225	0.201	0.176	0.085	0.067	0.057

Notes: Poverty rate post need-based aid is the poverty rate calculated using income that accounts for need-based aid.

**Table 8. Financial Sources**

	Full sample	Poor	Non-poor
Total amount of financial resources	12553	11666	12752
Share			
Family support	0.758	0.606	0.797
Loans	0.064	0.139	0.046
Scholarships	0.067	0.080	0.064
Need-based aid	0.048	0.096	0.035
Work	0.062	0.078	0.058
Other	0.001	0.001	0.000
Borrowed for college	0.372	0.659	0.302
Amount of unpaid debt	5291	6601	4944
Worked in college	0.751	0.864	0.730

**Table 9. OLS and Probit Estimates of the Determinants of Financial Sources of Chinese College Students**

Dependent variable	Family support as a % of total student income		Have borrowed for college		Have worked during college time	
	OLS		Probit		Probit	
Model	(1)	(2)	(3)	(4)	(5)	(6)
Poor	-0.107*** (0.018)	-0.102*** (0.019)	0.270*** (0.030)	0.273*** (0.030)	0.098*** (0.021)	0.095*** (0.021)
Female	-0.062*** (0.013)	-0.061*** (0.014)	-0.053** (0.025)	-0.046* (0.027)	0.063*** (0.020)	0.041* (0.021)
Minority	0.029 (0.024)	0.035 (0.023)	0.100* (0.054)	0.111** (0.055)	-0.078* (0.047)	-0.081* (0.047)
Rural	-0.116*** (0.012)	-0.122*** (0.012)	0.313*** (0.021)	0.297*** (0.022)	0.146*** (0.021)	0.139*** (0.023)
Central China	0.021 (0.014)	0.024 (0.017)	0.019 (0.029)	0.015 (0.038)	-0.059** (0.023)	0.021 (0.026)
Western China	-0.018 (0.016)	0.018 (0.019)	0.101*** (0.030)	0.073* (0.041)	0.056** (0.023)	0.070** (0.028)
College fixed effect		Yes		Yes		Yes
Observations (Pseudo)	4925	4925	5452	5452	5440	5440
R-squared	0.09	0.10	0.12	0.13	0.06	0.07

Notes: Robust standard errors are in parentheses. \*denotes statistical significance at the 10% level, \*\* at the 5% level, \*\*\* at the 1% level. The coefficients for the Probit model are the marginal effects.

**Table A1. Descriptive Statistics (Number of Observations=5947)**

	Mean	Standard Deviation	Min	Max
Rural	0.546	0.498	0	1
Female	0.438	0.496	0	1
Minority	0.062	0.241	0	1
Age	22.90	1.10	11	35
Household income	44618	62600	900	1000000
Income per capita	12800	20149	150	400000
Family size	3.90	1.03	1	9
Father's year of education	9.94	3.25	0	18
Father's age	50	4.64	21	70
Elite college	0.523	0.500	0	1
CEE scores	0.000	0.990	-8.76	4.27
Science	0.789	0.408	0	1
Top 20% in the class in college	0.457	0.498	0	1
Average GPA	3.06	0.51	0	4

**Table A2. Poverty Indices Calculated Using Alternative Poverty Lines**

Measure	Head count ratio			Poverty gap index		
	Income $\leq$ Poverty line II	Income $\leq$ Poverty line III	Income $\leq$ Poverty line IV	Income $\leq$ Poverty line II	Income $\leq$ Poverty line III	Income $\leq$ Poverty line IV
	(1)	(2)	(3)	(4)	(5)	(6)
All sample	0.243	0.211	0.178	0.087	0.060	0.064
Urban	0.103	0.086	0.078	0.033	0.021	0.026
Rural	0.356	0.313	0.258	0.131	0.091	0.094
Eastern Student	0.188	0.165	0.130	0.067	0.045	0.047
Central Student	0.237	0.208	0.189	0.083	0.056	0.064
Western Student	0.308	0.265	0.215	0.114	0.080	0.081
Male	0.257	0.223	0.190	0.093	0.065	0.069
Female	0.224	0.197	0.161	0.079	0.054	0.057
Eastern college	0.202	0.178	0.143	0.072	0.048	0.051
Central college	0.227	0.196	0.185	0.078	0.052	0.062
Western college	0.303	0.262	0.206	0.113	0.081	0.079
Non-elite colleges	0.239	0.210	0.169	0.085	0.057	0.062
Elite colleges	0.246	0.212	0.186	0.089	0.062	0.065