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On Income Advantage in University Admissions and College Major Choices: Evidence from the University of the Philippines[*]

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Abstract

The empirical evidence in developed economies suggests a rise in inequality of access to higher education in favor of students from higher-income households. Is this `income advantage' also pronounced in developing economies like the Philippines, where there have been recent deliberate efforts by the government to democratize access to higher education? Using quantitative (logistics regression) analysis on admissions data from the country's largest and foremost state university – the University of the Philippines (UP) System (whose students are labeled locally as "Scholars of the People") – for the period 2006-2015, we find that there is an `income advantage' not only in terms of being admitted into the UP System, but also in being admitted into the applicant's first-choice course cluster: Applicants coming from the top three income deciles have higher probabilities of being admitted. Other significant determinants of admission to the UP system and to one's first-choice course cluster are sex, high school grade weighted average, high school type, and high school region. Our results suggest that the new free tuition policy at public universities and colleges, including the UP system, is more likely to disproportionately benefit students coming from higher-income families.

Keywords: college major choice, admissions inequality, higher education, Philippines

JEL codes: I23, I24

Wordcount (including references): 7408

1   Introduction

The positive impact of higher education on both individual and socio-economics outcomes cannot be disputed. On an individual level, higher education has strong, positive effects on both income opportunities and job quality (Boarini & Strauss, 2010). On an aggregate level, higher education generally has positive impacts on economic growth and institutional development (i.e., on societal norms and formal organizations) (Oketch, et al., 2014). Accordingly, the inclusivity of university admissions is an important educational policy concern.

In recent years, there has been growing evidence that access to higher education in developed economies in terms of admission and completion rates, particularly the United States, has become more biased towards students from higher-income households (Dahill-Brown, Witte, & Wolfe, 2016; Bailey & Dynarski, 2011; Bowen, Kurzweil, & Tobin, 2005; Carnvale & Rose, 2004; Khadaroo, 2008). This is in spite of the announced affirmative action policies and targeted recruitment by universities and the scholarships and aid given by government, favoring deserving students from underprivileged backgrounds. These policies which have been in place in the United States since 1980s supposedly to address inequality in access to higher education, have resulted in minimal impact at best. Further, the literature finds that affirmative action policies had a small aggregate effect on university admissions (Holzer & Neumark, 2006). This effect is more pronounced in increasing diversity in elite colleges and universities and graduate programs but is less pronounced to insignificant for schools that are below the top quintile of schools (Kane, 1998).

In developing economies like the Philippines, where a majority of the population is unable to afford higher education, the importance of access to higher education cannot be sufficiently underscored. According to the Philippine Statistics Authority, only around a privileged 20% of Filipinos (with a population of more than 100 million since 2015) have either attended some or completed college (Philippine Statistics Authority, 2010). Only around an even smaller number of 0.70% of the total population graduate from college every year in the last decade (Commission on Higher Education, 2018).

Apart from having the opportunity to study in, and ultimately, graduate from college, access to higher education also implies that the student is able to major in a course of his choice. This is not only important in determining the individual's future career path, but ultimately, also in shaping the country's labor force demographics.

In the case of the Philippines, private universities outnumber public ones. However, the University of the Philippines (UP) is the the premier and largest state university in the country. The UP system comprises of nine constituent units (eight campuses and an open university) scattered throughout the country. UP – whose students are dubbed as "Scholars of the People" – has received an average of around 66,000 applicants from 2006-2015 and more than 100,000 applicants in the last two years. UP has also played a more proactive role in the government's efforts to promote S&T programs. A majority of its course offerings are S&T courses; and since 2016, all of its College of Science departments have been tagged as COEs.

It is in this light that this paper aims to verify, using formal statistical analysis, if an `income advantage' exists for high school applicants coming from higher-income families in terms of admission into the UP system and into the first-course choice, in spite of the UP administration's more deliberate efforts to democratize the admissions process. The paper aims

to contribute to the literature on inequality in university admissions systems in a developing economy like the Philippines. We limit the data to 2015 since in 2016, CHED launched the K-12 transition program, mandating high school students to spend two extra years in high school in line with global education standards. The K-12 program creates a structural break in the data, particularly, in terms of the aspirations and competencies of the applicant pool.

Using logistic regression analysis on 664,332 UP College Admission Test (UPCAT) applicants over the period 2006-2015, we find formal statistical evidence that in terms of admissions probability, income matters: Those from lower income deciles have progressively lower probabilities of being admitted to the UP System compared to those from the top three deciles. Applicants coming from the lowest income decile have a 10.6% lower probability (on average) of getting admitted into UP than those coming from the top three income deciles. For applicants from the 4th decile, they have a 4.4% lower probability of getting admitted into UP. This income advantage also holds for admission into one's first-choice course: Those coming from the 1st decile (7th decile) have a 4.0% (1.8%) lower probability (on average) of being admitted into their first-choice major than those coming from the top three deciles.

The paper finds other interesting results. For instance, females are 2.5% less likely to be admitted into their first-choice course in spite of the fact that, in the period 2006-2015, 63% of the applicants are female.

As expected, applicants with higher high school weighted averages have an advantage. Applicants with better high school performances are 5.7% more likely (on average) to enter the UP System; and are 2.3% more likely (on average) to be admitted into their first-choice major. The advantage is even more pronounced for those who come from public science high schools: They have a 14.5% higher probability of being admitted into the UP System; and have a 7.7% higher likelihood of entering their first-choice major than applicants who come from private high schools.

The results suggest that the recently enacted free tuition program[1] is more likely to disproportionately favor applicants coming from more privileged, higher-income households. Corresponding policy implications emerge. First, emphasis should be placed on leveling the quality of primary and secondary education, where the corresponding income distribution of students is more representative of the overall income distribution. The free tuition program should be supplemented by commensurate student support at the primary and secondary levels to ensure a level playing field for students who are financially at a disadvantage to be given equal opportunity to complete secondary education. Moreover, UP should continue to promote inclusivity and ease of access in its admissions by periodically reassessing admission policies in response to the current situation and needs, such as the influx of students from non-formal education systems.

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[1] The Free Tuition Program was enacted by virtue of Republic Act 10931 signed in 2016 and its Implementing Rules and Regulations (IRR) were released in March 2018. The law's main objective is to make tertiary education accessible to all and thus, provides for free tuition, miscellaneous, and other school fees for eligible students in 112 State Universities and Colleges (SUCs) and 78 Local Universities and Colleges (LUCs). While the IRR provides for an opt-out provision for students willing to pay, opponents say that the program might threaten our budgetary capacity, increase demand for and enrollment in public universities thereby causing quality of education to deteriorate, and give undue privilege to those who has the means to pay. *See PIDS PN 2017-03. "Who Benefits and Loses from an Untargeted Tuition Subsidy in SUCs?"*

The rest of the paper is structured as follows. Section 2 is a brief review of related literature and policy. Section 3 presents the UP admissions data. Section 4 discusses the methodology. Section 5 presents and discusses the results. Finally, section 6 concludes and offers some policy recommendations.

2   Review of related literature and policy

The impact of higher education on various outcomes such as income earnings, economic growth, and institutional development informs the appropriate direction of education policy. Oketch, et al. (2014) find that the private and social returns to higher education have been underestimated in earlier literature. They also find consistent and medium impact of higher education on economic growth and development of institutions (both formal organizations and social norms). Indeed, Filipino students consider higher education as an opportunity to achieve improved socioeconomic outcomes.

Inequality in higher education admission systems

The overarching influence of family income on access to higher education lies on the fact that going to college entails financial costs and it is usually parents who shoulder this cost. Therefore, coming from a low-income household poses a huge resource constraint to attend college. Given the private and social returns of higher education, much is written on how income shapes inequality in admissions. Specifically, various studies find the existence of an "income advantage" in university admissions. This "income advantage" can take different forms including family income, parents' educational attainment, high school type, among others. Hall (2012) asserts that universities, as institutions, play an ambiguous role in the discussion of inequality because while it provides opportunities to its students, it also acts as "gatekeepers" by maintaining differentiation through meritocracy, ranking, and exclusion.

Admissions inequality is strongly observed across developed countries, especially in the United States. Pallais and Turner (2006) confirm the underrepresentation of students from low-income households in universities in the United States, especially in top-ranked institutions. They further posit that the reasons for this underrepresentation can be summarized into three—poor to limited precollegiate achievement and preparation, credit constraints, and information constraints. Their findings are among the high number of studies that confirm the impact of socioeconomic status on higher education around the world (Hemsley-Brown & Oplatka, 2015).

The problem of underrepresentation of students from low-income households in the United States is not a recent phenomenon. Cho et al. (2008) find that the number of first- and non-first-generation students significantly varies based on family income. More specifically, first-generation college students, or students whose parents or legal guardians have not completed a bachelor's degree, are underrepresented in the highest income category. Similarly, non-first-generation college students, or students who has at least one parent with a bachelor's degree, are underrepresented in the lowest income category. Indeed, their findings suggest the intergenerational dimension of the relationship between income and higher education.

Given the persistence of inequality in university admissions, affirmative action policies and financial aid packages have been made available by both the government and universities in the United States. However, these policies which have been in place since 1980s have resulted

in minimal impact at best. The literature finds that affirmative action policies had a small aggregate effect on university admissions (Holzer & Neumark, 2006). This effect is more pronounced in increasing diversity in elite colleges and universities and graduate programs but is less pronounced to insignificant for schools that are below the top quintile of schools (Kane, 1998).

Apart from socioeconomic status, some studies find that the type of secondary school of an applicant has an impact on university admission. In England, between two applicants with comparable level of overall academic achievements, an applicant from a fee-paying independent school has a 30% advantage over an applicant from a state comprehensive school in securing admission from one of England's thirty most selective universities (Hall, 2012; Sutton Trust, 2011).

Among developing countries, China pursued a policy expanding and promoting higher education just in 1999. Given that admission systems in China are younger and less developed than those in developed countries, a point of interest is whether family background plays a role in college admission. Mok and Jiang (2016) find that an applicant whose father is more educated, wealthier, or from an urban geographical origin is likely to be admitted to a university. Further, they find that massification of higher education may lead to greater social inequality particularly when intergenerational transfer of assets and resources have already affected higher education admissions.

However, some admissions systems have evolved over time in response to the increasing stratification of university students. Dahill-Brown et al. (2016) find that in the case of the UW-Madison system, admission officers have found ways to ensure that an increase in their consideration of academic merit of an applicant does not produce a corresponding decrease in access and opportunity for applicants who do not do well in that measure. This is evidenced by the fact that from 1972 to 2007, there is an increase in the impact of minority status and membership in the lowest income quintile on likelihood of admissions.

On the determinants of college major choice

It is not only admission into a university that matters for a student who wants to pursue higher education. College major choice is likewise important. Economic, social, and cultural factors typically impact this decision. The literature in the United States finds a composite set of factors that could possibly and significantly affect the a student's college major choice decision (Lee & Chatfield, 2011; Somers, et al., 2006). Figure 1 shows these determinants.

[insert Figure 1 here]

Indeed, social and institutional characteristics impact the decision-making process of the student and permutations of these factors lead to different college major choices. On the other hand, some studies have focused more closely on the impact of expected earnings on college major choice through experimental approaches. Wiswall and Zafar (2014) find that while future expected earnings and self-determined abilities are significant determinants of major choice, heterogeneous tastes are the dominant factor and that other studies that ignore the correlation between tastes and future earnings expectations inflate the role of earnings in college major choices.

Contrary to this observation of the importance of heterogenous tastes, Edmonds (2012) finds that there is no difference between how three factors of college major choice—practical, interpersonal, and personal has influenced students' decision. This implies that socioeconomic status is likely to influence one's college major choice as much as preferences do. However, this study derives its results from a rather limited group of students and attempts to group complex preferences into three major categories which may not capture the large variations among factors within a category.

Walls (2009) uses a similar approach in terms of grouping determinants into three categories—interpersonal, future outcomes, and personal experiences. Using a sample of 973 students, he finds that students from different college majors have different main determinants of college major choice. For instance, students of Business and Engineering are heavily influenced by future outcomes while students of Fine Arts are heavily influenced by personal experiences. He recommends a closer look into the nuanced relationships between and among the three categories and how these links ultimately affect college major choices.

Country-specific studies confirm that the determinants of college major choice as identified in the studies above apply across different countries. Al-Ali Mustafa et al, (2018) finds that the predictors of the college choice include quality of education, cultural values, and cost of education. Other factors such as student's gender, nationality, and parents' occupation also affect the student's choice of college.

Research on the determinants of college major choice of students from developing economies is rather limited. Tan (2009) attempts to rank the determinants of college major choice of select students in the Philippines and finds that future job opportunities and financial security are the two most important. Interestingly, the paper fails to find "cost and financial aid" factor as among the stronger determinants. However, this finding may have been affected by a bias in sample selection as its respondents mostly come from upper-middle income households. In terms of communal influence, parents are found to be the strongest influence of major choice.

Finally, Malubay et al. (2015) find that economic opportunities are the most significant determinant of college major choice among student respondents from the Philippines. Interestingly, age and social factors, as well as nationality and economic factors, also impact their decision to take hospitality management.

3   UP admissions data

Private higher education institutions outnumber public ones. However, for some students who come from lower-income families, public universities and colleges are their only option. The University of the Philippines (UP) is inarguably one of the most sought-after institutions of higher learning in the Philippines. Indeed, in the last two years, it has received more than 100,000 applications per year from high schools from all over the country. It has moreover consistently placed as the country's top university based on internationally-accepted university rankings such as Times Higher Education (THE) and Quacquarelli Symonds (QS).

Since its establishment in 1908, UP has also been at the forefront of various events in Philippine history and its graduates have served in high-level positions of public and private institutions. In turn, the government recognizes the institutional autonomy of UP as the country's national

university and is protected by law[2]. In 2018, the UP system was allotted around Php 16.1 B of funding, which is 26% of the total budget allocation for all State Universities and Colleges (Commission on Higher Education, 2017).

The UP system is now composed of eight (8) constituent universities and one (1) autonomous college. It is no surprise that UP attracts thousands of high school students from all around the country to take the UP College Admissions Test (UPCAT). Indeed, it consistently has had the highest enrollment rate among all State Universities and Colleges (SUCs) while maintaining a competitive acceptance rate which ranges from 15% to 19%. Prior to the decline in enrollment rate in 2016 due to gaps in the implementation of K-12 program, UP had a student population of approximately 71,000 distributed among the 8 constituent universities and 1 autonomous college (Commission on Higher Education, 2018).

UP admissions policy

The onset of the 1970s saw more efforts to democratize UP admission policies to allow sufficient representation of the poor in the student demographics. This led to pilot programs such as the Experimental Democratization Sample (XDS) in 1977 that admitted a freshman batch based on family income, UPCAT score slightly below the "cut-off" or "passing" score applied in previous years, and provincial representation. The UP administration found that the academic performance of the XDS group is comparable to that of regular freshmen. Democratization efforts were rethought of through the 1980s and early 1990s until the Office of Admissions was formed in 1994 to handle the admissions operations of the entire UP system. Immediately after its composition, a study team composed of various UP officials and faculty conducted a profiling of the student population and hypothetical alterations to admissions policies.

The efforts of this study team produced the Excellence-Equity Admissions System (EEAS) which was implemented beginning 1998. The EEAS streamlined the computation of the UP grades (UPG) which include the UPCAT scores and high school grades, with automatic adjustment provisions based on minority representation and geographic origin. An automatic adjustment of .05 is added to the UPG of applicants coming from public barangay, public vocational, and public general high schools (excluding science high schools and SUC-administered public schools). Another source of an automatic adjustment of .05 in the UPG is cultural minority representation. 70% of the slots is awarded to the applicants with the highest UPCAT grade. 30% of the slots is awarded to the best students coming from underrepresented geographic areas (Lontoc, 2011). As of the latest admitted batch, admissions to UP is not solely determined solely by the UPCAT score. The UPG combines (60%) UPCAT scores and (40%) of standardized HS final grades for three years preceding graduation (Office of the Vice-President for Academic Affairs, 2018).

In 2016, CHED launched the K-12 transition program in light of the recently implemented K-12 basic education curriculum in the Philippines. The K-12 program changed the basic education curriculum from the previous 10 to the current 12 years. The last 6 years are divided between junior high school (4 years) and senior high school (2 years). Indeed, this structural break changed the competencies of the applicant pool as well as the physical and financial capacity of the University to accept more students. Therefore, this paper limits the sample to

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[2] Republic Act 9500, otherwise known as "An Act to Strengthen the University of the Philippines as the National University", was passed in 2008 and recognizes and protects the autonomous status of the university.

applicants before 2015. The following sections provide an overview of relevant admissions-related data from 2006 to 2015.

3.1   Profile of applicants

Figure 2 below shows the number of UPCAT Applicants for the period 2006 to 2015. The number of applicants grew from 68,724 applicants in 2006 to 88,554 applicants in 2015, comprising a 28.9% increase in the number of applicants during the period.

[insert Figure 2 here]

Considering the presence of UP's constituent universities across the three major island groups –Luzon, Visayas and Mindanao – high school students from different regions apply for admissions as well. Figure 3 below shows the number of applicants per region. However, there appears to be more applicants from high-density regions such as NCR, CALABARZON, and Central Luzon. Indeed, for the entire period 2006-2015, 34.8% of total number of applicants come from NCR, and 20.4% and 11.1% come from CALABARZON and Central Luzon, respectively.

[insert Figure 3 here]

UPCAT applicants also come from a variety of high school types, but a majority comes from private schools, which outnumber public schools especially in the National Capital Region. Figure 4 below presents the percentage of applicants based on high school type. 59.6% of the total number of applicants for the period 2006-2015 comes from private schools, while only 28.4% comes from public general high schools. Applicants from public science high schools make up 6.65% of the total number of applicants.

[insert Figure 4 here]

Interestingly, with the exception of 2014, UPCAT applicants that come from the top 3 income deciles make up more than 50% of the total number of applicants every year. UPCAT applicants were divided into 10 deciles based on self-reported household income for ease of analysis and interpretation. Generally, those from the upper income deciles (8th to 10th) have annual incomes of Php 450,000 and above. Meanwhile, those from the lower income deciles (1st to 4th) have an annual income of Php 174,000 and below. Below is the percentage of UPCAT applicants per income group.

[insert Figure 5 here]

Finally, among all applicants from 2006 to 2015, 63% are females while only 37% are males. Meanwhile, only 1.8% of all applicants identified themselves as part of a cultural minority or indigenous group.

3.2   Profile of first-course choices

To account for the differences in the course offerings among constituent universities, degree programs offered throughout the UP system were grouped into clusters based on the academic clustering scheme of the UP Diliman campus: Arts and Letters (A&L), Management and Economics (M&E), Science and Technology (S&T), and Social Sciences (SS) clusters. For

the purposes of this paper, those degree programs which may fall under two clusters at the same time were classified based on the college hosting the program. For instance, the BS Agricultural Economics of Los Baños campus can fall under S&T and M&E at the same time but since it is offered by the College of Economics and Management, the degree program was classified under the M&E cluster.

Out of the four clusters, S&T courses remain to be the most popular among UPCAT applicants. This may be due to the fact that the number of degree programs classified under S&T far outnumbers those by other clusters. Interestingly, there has been a slight downward trend on the percentage of students choosing S&T and is accompanied by a slight upward trend on those who choose M&E. Figure 6 shows the UPCAT applicants' first-choice clusters from 2006-2015. Throughout the period, S&T is the consistent first-choice cluster by a majority of applicants every year, ranging from 52% to 58% of the total applicants per year. S&T is consistently followed by M&E as a first-choice cluster, ranging from 20% to 26% of total applicants per year. Around 11% to 12% choose SS, while 10% to 12% of applicants per year choose A&L.

[insert Figure 6 here]

3.3   Profile of applicants admitted into the UP System

Figure 7 shows the number of applicants admitted into the UP System as a percentage of the total number of applicants per year for the period 2006-2015. Around 15.3% to 19.4% of the total number of applicants per year is admitted into the UP System. On average, around 17% of the total number of applicants for the period 2006-2015 were admitted into the UP System.

[insert Figure 7 here]

Figure 8 presents the number of applicants admitted into the UP System by region as a percentage of the total number of applicants per region for the period 2006-2015. For the entire period, 34% of the applicants from Davao are admitted into UP. This closely followed by Central Visayas and Western Visayas with 31% and 30%, respectively, and by Northern Mindanao, SOCCSKARGEN and CAR with 28%, 28% and 26%, respectively. However, only 12% of the total number of applicants comes from conflict-ridden ARMM.

[insert Figure 8 here]

In terms of admission rates, income matters. Around 9% to 12% of applicants yearly admitted into the UP System are from the top 3 deciles (Figure 9). In stark contrast, only around 6% to 9% of the total number of yearly applicants who are able to hurdle the UPCAT exam and enter UP are from the 1st to 7th income deciles.

[insert Figure 9 here]

The income advantage is also pronounced when considering the percentage of the total number of applicants per year that are admitted into the UP System and are also admitted into their first-choice courses for the period 2006-2015 (Figure 10). Around 3.3% to 6.4% of the total number of applicants admitted into their first-choice courses is from the top 3 income deciles. Around 0.9% to 2.3% is from the middle (5th to 7th) income deciles, while around 1.0% to 2.2% is from the four lowest (1st to 4th) income deciles.

[insert Figure 10 here]

4　Methodology

Using data from 644,332 applicants from the University of the Philippines Admissions Office over a period of ten years from 2006 to 2015, we employ logistics regression to determine the significant determinants of course cluster choice of UP applicants.

The model is as follows:

$$log\left(\frac{\text{Pr }(y=1)}{\text{Pr}(y=0)}\right) = \alpha + X\beta + \varepsilon,$$

where the dependent variable is alternatively defined as follows:
- The probability that the applicant is admitted into the UP System; and
- The probability that the applicant admitted into the UP System is also admitted into his first-choice course.

X is a vector of determinants, consisting of the following:
- Female, which is a dummy variable which takes the value of 1 if the applicant is female, and 0 if male;
- Filipino, which is a dummy variable which takes the value of 1 if the applicant is Filipino, and 0 otherwise;
- Minority, which is a dummy variable which takes the value of 1 if the applicant belongs to a minority group, and 0 otherwise;
- Intarmed, which is a dummy variable which takes the value of 1 if the applicant is female, and 0 otherwise;
- UP dependent, which is a dummy variable which takes the value of 1 if the applicant is the dependent of a UP employee, and 0 otherwise;
- HS GWA, which is the applicant's high school general weighted average;
- Income decile dummies, which are constructed using the self-reported incomes of the applicants. Income entries that were either left blank or had zero values were taken out of the sample to account for (self) reporting biases. To account for inflationary effects and render incomes across years comparable, the reported incomes at time t were then multiplied by the consumer price index (CPI) in 2015 then divided by the prevailing CPI at time t to render incomes from 2006 to 2014 comparable to incomes in 2015. We then use the reconstructed income series to generate the income decile dummies, using the top three deciles (i.e, the 8th , 9th and 10th income deciles) as the base category.
- The high school type dummies are as follows: (1) general public; (2) public vocational; (3) public barrio[3]; (4) UP-administered[4]; (5) state-university-

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[3] The high school is a public barrio high school if located in the barrio, except high schools in the barrio that are established and maintained by the Bureau of Public Schools, the Bureau of Vocation Education, the Bureau of Private Schools and the laboratory schools of state universities and colleges. This definition is in accordance with Republic Act No. 6054, entitled "An Act to Institute a Charter for Barrio High Schools".

[4] UP-administered high schools are laboratory high schools operating under the UP System, namely, the UP Integrated School in Diliman, UP Rural High School in Los Banos, UP High School Cebu and UP High School Iloilo.

administered[5]; (6) foreign; (7) public science; and (8) private high school, which is employed as the base category.

- The first-choice campus dummies are constructed for applicants whose first-choice campuses, as indicated in the UPCAT Application Forms, are Baguio, Cebu, Diliman, Iloilo, Los Banos, Manila, Pampanga, Tacloban and Mindanao, with the flagship campus, Diliman, as the base category.
- The high school region dummies are constructed for each of the 18 regions in the Philippines, using the National Capital Region (NCR) as the base category; and
- Year dummies, using 2006 as the base year.

5   Results

Table 1 presents the logistic regression results for the determinants of being admitted into the UP System for the period 2006-2015. Income systematically matters for getting admitted into the UP System. Those from lower income deciles also have progressively lower probabilities of entering the UP System compared to those from the top three deciles. For instance, applicants coming from the 1st decile have a 10.6% lower probability (on average) of getting admitted into UP than those coming from the top three deciles, while those coming from the 7th decile only have a 4.4% lower probability (on average).

Meanwhile, females and Filipinos have 3.5% and 3.4% lower probabilities than males and foreigners, respectively, of getting admitted into the UP System.

Applicants who ticked the Intarmed option, are UP-employee dependents, and have higher HS GWAs have 2.9%, 9.8%, and 5.7% higher probabilities of being admitted into the UP System than those who did not, are non-UP dependents, and have lower HS GWAs, respectively.

High school type also matters. Applicants coming from public vocational and public barrio high schools are 6.0% and 7.4%, respectively, less likely (on average) to enter the UP System than those coming from private schools. In contrast, those from other high school types are more likely to be admitted into UP. In particular, those who come from UP-administered high schools have a distinct advantage of having a 36.2% higher probability of being admitted into the UP college system than those from private high schools. Those from foreign and public science high schools also have significantly greater advantages – of 13.3% and 14.5% higher probabilities (on average) – over those from private high schools. Those from state university-administered high schools have a more modest 1.6% higher likelihood over being admitted into the UP System.

[insert Table 1 here]

Compared to those whose first choice for a campus is Diliman, those whose first-choice campuses are Baguio, Cebu and Los Banos have 3.2%, 0.8%, and 3.5% higher probabilities (on average), respectively, of being admitted into the UP System. Meanwhile, those whose top campus choices are Iloilo, Manila and Tacloban have 0.4%, 5.9% and 3.1% and 4.4% lower probabilities (on average), respectively, of entering the UP System.

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[5] State-university-administered high schools are laboratory high schools operated and maintained by state-funded universities and colleges.

In terms of high school region, applicants coming from Western, Central and Eastern Visayas, Northern Mindanao, Davao, SOCCSKARGEN, and CAR are 4.7%, 4.9%, 3.4% 3.8%, 8.7%, 5.2%, and 3.1%, respectively, more likely (on average) to get admitted into the UP System than those from NCR. In contrast, those coming from the other regions are around 0.8% to 9.1% less likely, on average, to get admitted into UP than those from NCR. The significant impact of high school regions on UP admission probabilities implies geographical differences in the quality of secondary education across the country,

In terms of year of admission, the likelihood of being admitted to the UP System relative to 2006 has declined in the last four years, owing likely to the surge in the number of applicants from 66,559 in 2011 to 73,474 in 2012 (a 10.39% increase) and 88,554 in 2015 – a 33.05% increase from 2011.

Table 2 presents the results for the determinants of acceptance into first-choice cluster for the period 2006-2015. Indeed, the income advantage is apparent as in the trend for being admitted into the UP System: Applicants from lower income deciles are progressively less likely to be admitted in their first-choice clusters compared to those from the top three deciles. For instance, applicants coming from the 1st decile have a 4.0% lower probability (on average) of getting admitted into UP than those coming from the top three deciles, while those coming from the 7th decile only have a 1.8% lower probability (on average).

As in the case of admissions to the UP System, females and Filipinos are at a disadvantage with 2.5% and 1.8% lower probabilities than males and non-Filipinos (on average), respectively, of being accepted into their first-choice clusters. Also, just like in the previous results, applicants who ticked the Intarmed option, are UP-employee dependents, and have higher HS GWAs have 1.5%, 3.2% and 2.3% higher probabilities of being accepted into their first-choice clusters than those who did not, are non-UP dependents and have lower HS GWAs, respectively. Moreover, having an S&T course as the first choice raises the probability of admission into the S&T cluster by 6.0% on average.

In terms of high school type, applicants who come from public vocational and public barrio high schools are 3.1% and 3.0% less likely, respectively, to get their first-choice clusters compared those who come from private schools. In contrast, those from other high school types are more likely to be admitted into UP than those from private schools. Those who come from a UP-administered high school have a considerable advantage as they are 13.4% more likely to be admitted into their first-choice clusters than those from private high schools. Those from public science high schools also have a clear advantage as they are 7.7% more likely (on average) to enter their first-choice clusters than those from private high schools. Those from state university-administered high schools have a more modest 1.6% higher likelihood over being admitted into the UP System.

Applicants whose first-choice campus are Baguio, Cebu, Pampanga, Iloilo, Los Banos, Mindanao have 1.9%, 1.3%, 1.1%, 0.8% and 2.2% higher probabilities (on average), respectively, of being admitted into their first-choice clusters compared to those who first-choice is the flagship campus Diliman. Those whose first-choice campus choices are Manila and Tacloban have 2.7% and 0.4%, lower probabilities (on average), respectively, of getting their first-choice clusters than those whose first-choice campus is Diliman.

Compared to applicants from NCR, applicants from most of the high schools in other regions are at a disadvantage with 1.8% to 4.4% less likelihood (on average) of getting admitted into

their clusters of first choice. In contrast, those from Western and Eastern Visayas, Davao, SOCCSKARGEN and CAR are 0.6% to 0.8% more likely (on average) to get into their first-choice clusters compared to those from NCR.

In line with the previous regression results, the likelihood that an applicant is admitted into his first-choice cluster has progressively declined over the last ten years. The probability that an applicant get into his first-choice cluster is 1.6% less likely in 2006 than in the base year 2015. However, this probability has increased considerably by the end of the period: The probability that an applicant who gets admitted into the UP System and also gets admitted into his cluster of first choice has increased to 6.3%, indicating a 6.3% less likelihood of entering his first-choice cluster in 2015 than in 2006.

[insert Table 2 here]

6   Conclusions and policy recommendations

The paper finds formal statistical evidence for an income advantage in the UP admission systems: applicants coming from higher income families have a higher likelihood of being admitted into the UP system and into their first-choice courses. Moreover, gender, high school performance, high school type, campus choice, and regional specifics are significant determinants of being admitted into the UP System and into one's first-choice course.

The results obtained can inform public policy approaches to promote equity in and democratize access to higher education in the UP system.

First, to address the glaring disadvantage of students from public vocational and public *barrio* schools vis-à-vis students from private schools and science high schools in terms of the UP system admissions, the government should strive to level the quality of secondary education across various high school types. Various interventions in primary and secondary education can be done by placing emphasis on improvements in the curricula, standardized testing, and provision of facilities on top of accelerating improvements in more critical factors, such as teaching personnel, books and other learning materials, physical infrastructure, and financial accessibility. Measures to improve the quality of teaching at the junior and senior high school levels may also positively affect the student's performance, not only in the UPCAT, but also in the admissions exams administered by other universities. Such a policy move would also facilitate the student's adaptation to the academic demands of a university.

Second, while the recently enacted Free Tuition in public universities program aims to promote greater access to higher education, the paper finds that students from poorer income backgrounds are at a disadvantage in terms of admission to the UP system and their first-choice course. Accordingly, the government should supplement the existing free tuition policy with better student support at the primary and secondary levels to ensure that those who are financially at a disadvantage are given equal opportunities to complete secondary education.

Finally, the University of the Philippines may further promote inclusivity and ease of access in its admissions by periodically assessing its admission policies in response to the present situation and needs. For instance, the Department of Education has recently promoted the Alternative Learning System (ALS), which produces secondary school graduates who did not go through the formal high school system. Moreover, there appears to be a steadily-increasing

interest by the public in distance learning and homeschooling. Integrating these students from non-formal systems into the university is a policy matter that UP can start looking into.

In sum, UP continues to be an important institution of higher learning in the country and it is no surprise that the demand for admission slots far outweigh the supply. However, to continue shaping the intellectual youth from various walks of life, and thus, continue contributing to national development, the entire public higher education system – not only UP – should strive to further promote equity in and democratize access to higher education.
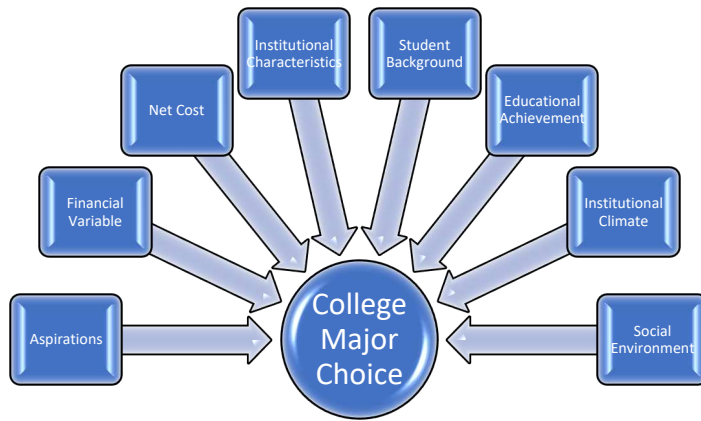
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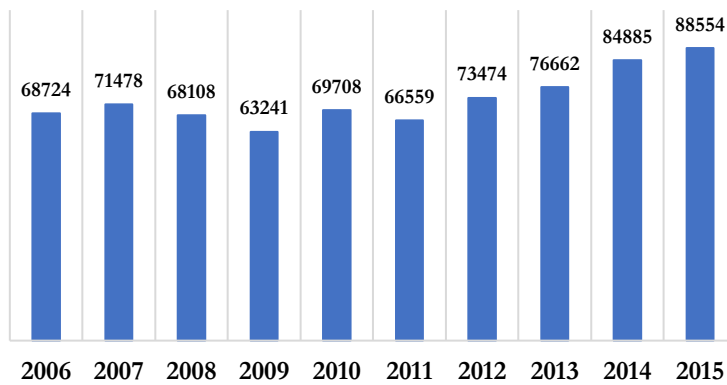
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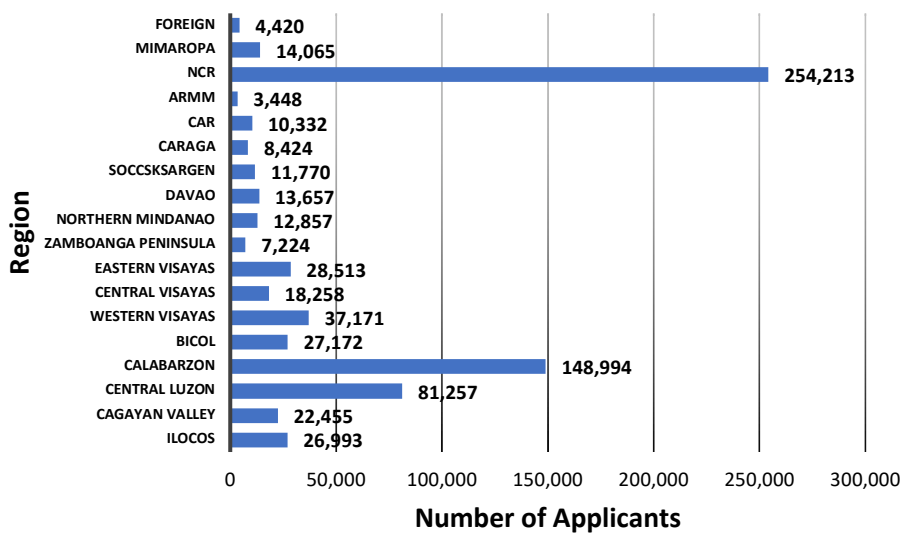
Figure 1. Determinants of College Major Choice

Figure 2. Number of UPCAT Applicants, 2006-2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
68724	71478	68108	63241	69708	66559	73474	76662	84885	88554

Figure 3. Number of UPCAT Applicants per region, 2006-2015

Region	Number of Applicants
FOREIGN	4,420
MIMAROPA	14,065
NCR	254,213
ARMM	3,448
CAR	10,332
CARAGA	8,424
SOCCSKSARGEN	11,770
DAVAO	13,657
NORTHERN MINDANAO	12,857
ZAMBOANGA PENINSULA	7,224
EASTERN VISAYAS	28,513
CENTRAL VISAYAS	18,258
WESTERN VISAYAS	37,171
BICOL	27,172
CALABARZON	148,994
CENTRAL LUZON	81,257
CAGAYAN VALLEY	22,455
ILOCOS	26,993

Figure 4. UPCAT Applicants by High School Type, 2006-2015
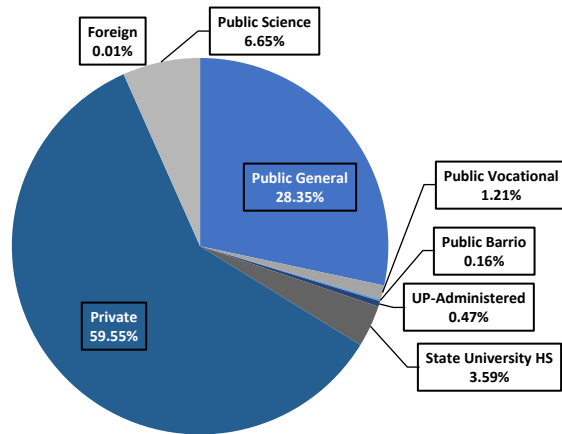
Figure 5. UPCAT Applicants per Income Group, 2006-2015
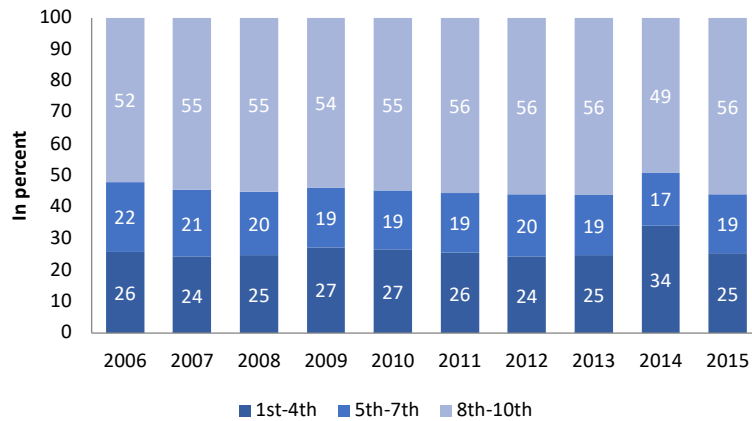
Figure 6. UPCAT applicants' first-choice course (% of total number of applicants per year), 2006-2015
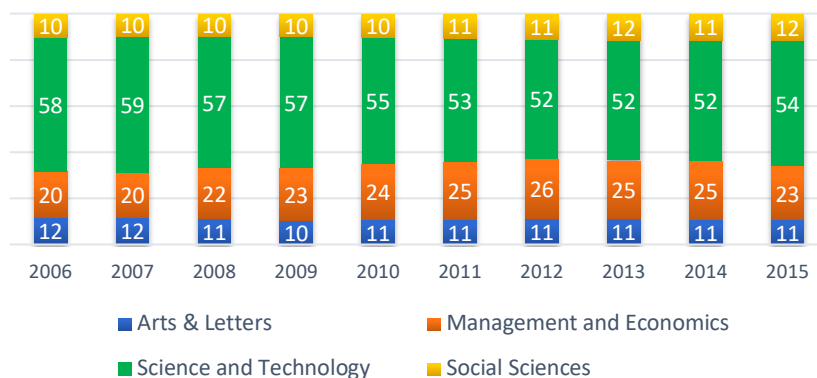
Figure 7. Number of applicants admitted into the UP System (% of total applicants), 2006-2015
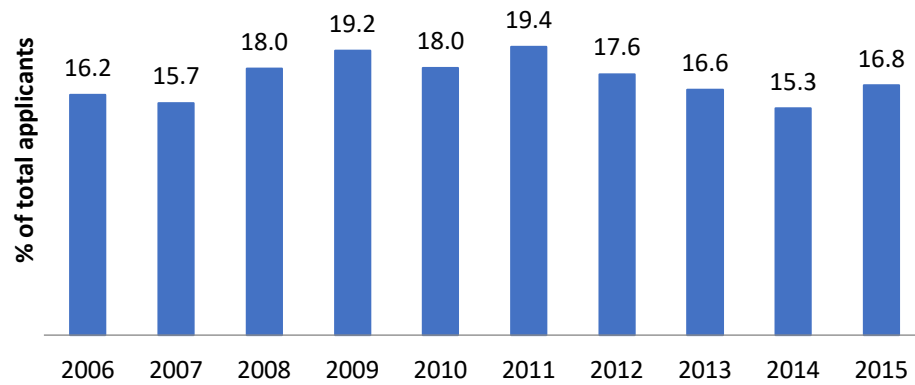
Figure 8. Number of applicants admitted into the UP System by region (% of applicants per region), 2006-2015
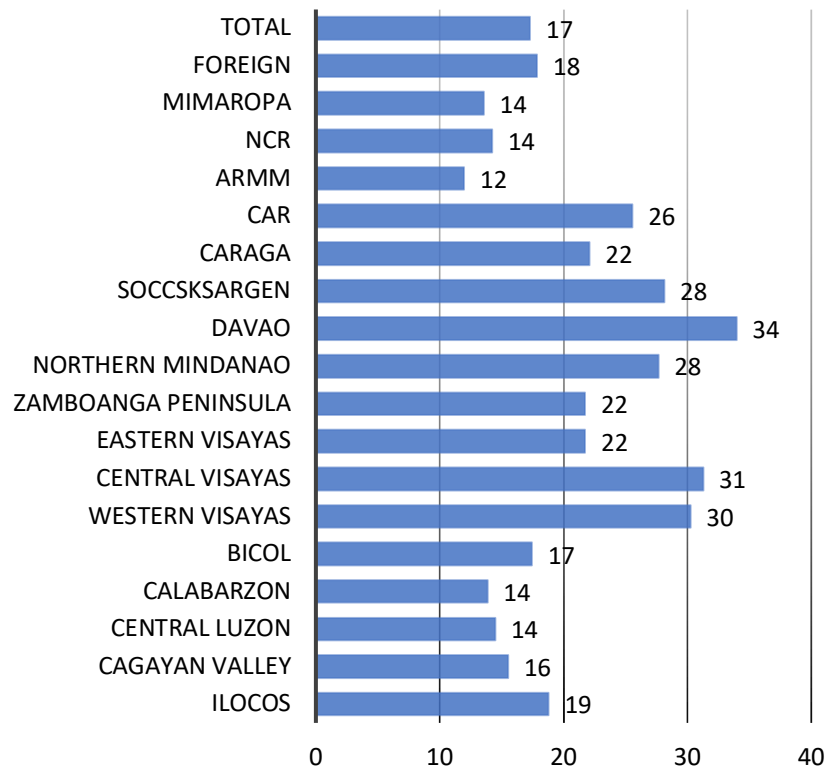
Figure 9. Number of applicants admitted into the UP System by income decile (% total number of applicants per year), 2006-2015
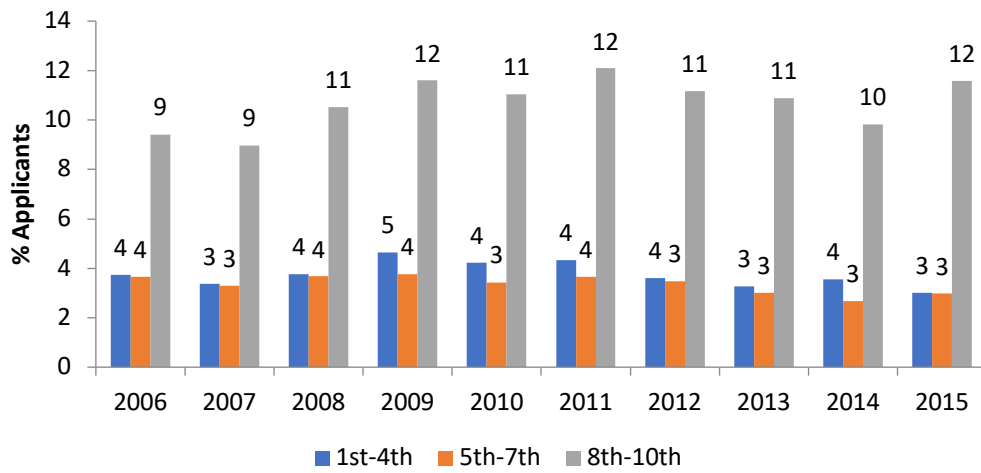
Figure 10. Number of applicants admitted into the UP System and into their first-choice courses by income decile (% total number of applicants per year), 2006-2015

Table 1. Determinants of admissions into the UP System, 2006-2015
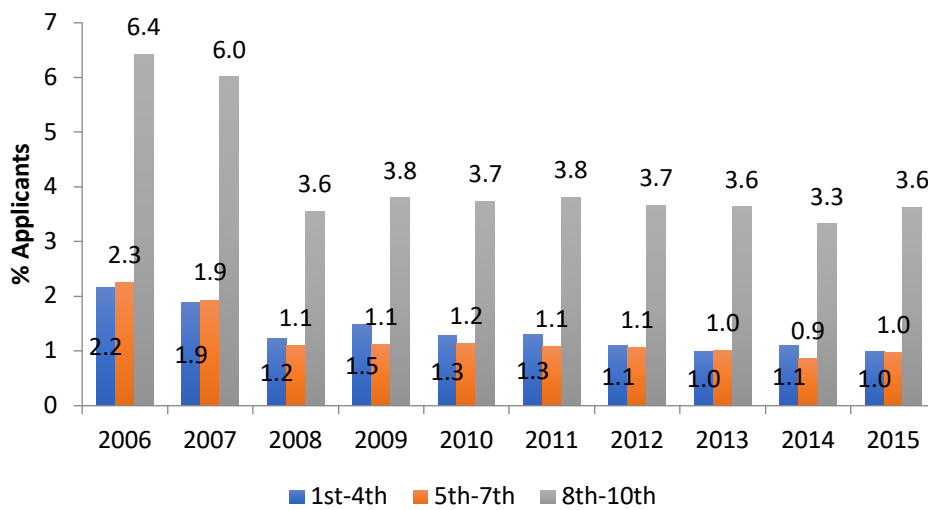
Dependent Variable: Dummy variable, where admitted into the UP System =1; 0, otherwise

Determinant	Coefficient	RRR	dy/dx	p-value	Determinant	Coefficient	RRR	dy/dx	p-value
S&T cluster	-0.012	0.988	-0.001	0.12	*High school region (base category: NCR)*				
Female	-0.348	0.706	-0.035	0.00	Ilocos	-0.462	0.630	-0.047	0.00
Filipino	-0.338	0.713	-0.034	0.00	Cagayan Valley	-0.773	0.461	-0.079	0.00
Minority	0.036	1.037	0.004	0.25	Central Luzon	-0.516	0.597	-0.052	0.00
Intarmed	0.286	1.331	0.029	0.00	CALABARZON	-0.559	0.572	-0.057	0.00
UP dependent	0.967	2.629	0.098	0.00	Bicol	-0.388	0.679	-0.039	0.00
HS GWA	0.560	1.751	0.057	0.00	Western Visayas	0.464	1.591	0.047	0.00
Income deciles (base category: Top 3 deciles)					Central Visayas	0.479	1.615	0.049	0.00
Income decile 1	-1.040	0.354	-0.106	0.00	Eastern Visayas	0.333	1.395	0.034	0.00
Income decile 2	-0.681	0.506	-0.069	0.00	Zamboanga Peninsula	-0.074	0.929	-0.008	0.04
Income decile 3	-0.673	0.510	-0.068	0.00	Northern Mindanao	0.379	1.461	0.038	0.00
Income decile 4	-0.615	0.541	-0.062	0.00	Davao	0.860	2.362	0.087	0.00
Income decile 5	-0.572	0.564	-0.058	0.00	SOCCSKSARGEN	0.512	1.669	0.052	0.00
Income decile 6	-0.509	0.601	-0.052	0.00	CARAGA	-0.235	0.790	-0.024	0.00
Income decile 7	-0.429	0.651	-0.044	0.00	CAR	0.305	1.357	0.031	0.00
High school type (base category: Private high school)					ARMM	-0.466	0.627	-0.047	0.00
Public	0.020	1.020	0.002	0.05	MIMAROPA	-0.900	0.407	-0.091	0.00
Public vocational	-0.594	0.552	-0.060	0.00	*Year dummies (base category: 2006)*				
Public barrio	-0.730	0.482	-0.074	0.00	2007	-0.266	0.766	-0.027	0.00
UP-administered	3.567	35.406	0.362	0.00	2008	0.208	1.231	0.021	0.00
State university-administered	0.161	1.175	0.016	0.00	2009	0.232	1.261	0.024	0.00
Foreign	1.312	3.714	0.133	0.05	2010	0.113	1.120	0.011	0.00
Public science	1.428	4.172	0.145	0.00	2011	0.149	1.161	0.015	0.00
Campus choice (base category: Diliman)					2012	-0.052	0.949	-0.005	0.01
None	-20.240	0.000	-2.056	0.99	2013	-0.270	0.763	-0.027	0.00
Baguio	0.312	1.367	0.032	0.00	2014	-0.325	0.723	-0.033	0.00
Cebu	0.077	1.080	0.008	0.01	2015	-0.294	0.745	-0.030	0.00
Pampanga	0.029	1.029	0.003	0.66	Constant	-49.749	0.000		0.00
Iloilo	-0.043	0.958	-0.004	0.07	No. of observations	644332			
Los Banos	0.340	1.405	0.035	0.00	Log-likelihood	-208561.15			
Manila	-0.578	0.561	-0.059	0.00	Pseudo R-squared	0.3186			
Tacloban	-0.302	0.739	-0.031	0.00	LR chi-squared (55)	195033.74			
Mindanao	0.017	1.017	0.002	0.61	p-value	0.0000			

Table 2. Determinants of acceptance into first-choice cluster, 2006-2015

Dependent Variable: Dummy variable, where applicant is admitted into first-choice cluster = 1; 0, otherwise

Determinant	Coefficient	RRR	dy/dx	p-value	Determinant	Coefficient	RRR	dy/dx	p-value
S&T cluster	1.184	3.268	0.060	0.00	*High school region (base category: NCR)*				
Female	-0.482	0.618	-0.025	0.00	Ilocos	-0.446	0.640	-0.023	0.00
Filipino	-0.350	0.705	-0.018	0.00	Cagayan Valley	-0.634	0.530	-0.032	0.00
Minority	-0.064	0.938	-0.003	0.14	Central Luzon	-0.554	0.575	-0.028	0.00
Intarmed	0.293	1.340	0.015	0.00	CALABARZON	-0.467	0.627	-0.024	0.00
UP dependent	0.628	1.873	0.032	0.00	Bicol	-0.388	0.678	-0.020	0.00
HS GWA	0.447	1.563	0.023	0.00	Western Visayas	0.124	1.133	0.006	0.00
Income deciles (base category: Top 3 deciles)					Central Visayas	-0.017	0.983	-0.001	0.62
Income decile 1	-0.787	0.455	-0.040	0.00	Eastern Visayas	0.130	1.138	0.007	0.00
Income decile 2	-0.547	0.579	-0.028	0.00	Zamboanga Peninsula	-0.345	0.708	-0.018	0.00
Income decile 3	-0.516	0.597	-0.026	0.00	Northern Mindanao	0.071	1.074	0.004	0.05
Income decile 4	-0.495	0.610	-0.025	0.00	Davao	0.590	1.804	0.030	0.00
Income decile 5	-0.445	0.641	-0.023	0.00	SOCCSKSARGEN	0.127	1.136	0.006	0.00
Income decile 6	-0.408	0.665	-0.021	0.00	CARAGA	-0.454	0.635	-0.023	0.00
Income decile 7	-0.346	0.708	-0.018	0.00	CAR	0.151	1.163	0.008	0.00
High school type (base category: Private high school)					ARMM	-0.836	0.433	-0.043	0.00
Public	0.018	1.018	0.001	0.23	MIMAROPA	-0.864	0.422	-0.044	0.00
Public vocational	-0.609	0.544	-0.031	0.00	*Year dummies (base category: 2006)*				
Public barrio	-0.587	0.556	-0.030	0.02	2007	-0.310	0.733	-0.016	0.00
UP-administered	2.637	13.974	0.134	0.00	2008	-0.829	0.437	-0.042	0.00
State university-administered	0.165	1.180	0.008	0.00	2009	-0.861	0.423	-0.044	0.00
Foreign	0.031	1.031	0.002	0.98	2010	-0.900	0.406	-0.046	0.00
Public science	1.519	4.568	0.077	0.00	2011	-0.934	0.393	-0.048	0.00
Campus choice (base category: Diliman)					2012	-1.019	0.361	-0.052	0.00
None	-17.991	0.000	-0.917	0.99	2013	-1.139	0.320	-0.058	0.00
Baguio	0.366	1.442	0.019	0.00	2014	-1.201	0.301	-0.061	0.00
Cebu	0.258	1.295	0.013	0.00	2015	-1.238	0.290	-0.063	0.00
Pampanga	0.207	1.230	0.011	0.04	Constant	-41.053	0.000		0.00
Iloilo	0.200	1.221	0.002	0.00	No. of observations	644332			
Los Banos	0.478	1.613	0.024	0.00	Log-likelihood	-117630.25			
Manila	-0.528	0.590	-0.027	0.00	Pseudo R-squared	0.2694			
Tacloban	-0.077	0.926	-0.004	0.14	LR chi-squared (55)	86761.64			
Mindanao	0.432	1.540	0.022	0.00	p-value	0.0000			