The Effect of the Increasing Demand for Elite Schools on Stratification

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Abstract

As demand pushes the selectivity of elite schools up, there are growing concerns that the correlation between family income and ability lead to more school stratification by family income and reduced social mobility. In this paper, I use detailed applications data to document that - contrary to these concerns- increasing school stratification by ability co-existed with stable stratification by family income in Mexico City public high schools during the 2001-2010 period. For understanding this puzzle, I show how the effect of an increase in demand for elite schools on stratification depends on the structural correlations between family income and both ability and demand. I also use a simple behaviorial model to show how a shock -e.g. a policy- that increases the expected utility of elite schools for all applicants can lead to a reduction in the demand gap by family income. My empirical analysis reveals an initial -and decreasing- demand gap by family income that helps to explain the observed stability in stratification. (JEL I21, I24, D59).

1 Introduction

More and more parents and students seem to put a high value on education at elite institutions, pushing the selectivity of these institutions up. For example, the top 10 percent selective colleges in the U.S. are substantially more selective today than in 1962. The average student in top one percent colleges went from scoring at the 90th percentile of the SAT/ACT tests in 1962 to scoring at the 98th percentile in 2007 (*Hoxby*, 2009). As the selectivity of elite schools increases, there are growing concerns that the correlation between family income an ability –an established empirical regularity– lead to more stratification by family income and reduced social mobility.

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In this paper, I use detailed applications data to document a case in which - contrary to the above concerns - increasing school stratification by ability co-exists with stable stratification by family income: Mexico City public high schools. Panels C and D in Figure 1 plot the within and between-school variance of entry exam scores and family income, respectively, of students accepted to public senior high schools in the city during the 2001-2010 period. As said, school stratification by academic ability increases during the period. While in 2001 both the within and between-school variation of incoming students' exam scores were of similar magnitude, by 2010 the between-school differences explain more than 2/3 of the variation of the entry exam scores. In contrast, stratification by family income remains stable.

For understanding the increase in stratification by ability, I study the change in demand for admission to two school systems that stand out among public high schools (grades 10-12) in Mexico City: IPN (National Polytechnic Institute) and UNAM (National Autonomous University of Mexico). Both IPN and UNAM systems are managed by leading universities, offer better school inputs than the other public schools and entail the largest competition to gain admission to.

Admission to public high schools in Mexico City is centralized and uses an assignment mechanism - the serial dictatorship algorithm - which ranks students according to their score in a common exam and then allocates students to schools following their stated ranking of preferences over schools. In this setting, a generalized increase in demand for elite (IPN and UNAM) schools leads mechanically to higher admission chances for higher-ability students and larger stratification by ability.

Figure 2 shows the evolution of the expressed demand for elite schools during the 2001-2010 period. All four indicators reported are consistent with an increasing trend in demand. For example, the share of applicants who select at least one elite school in their choice list goes up from 75% in 2001 to 85% in 2010 and the share that select an elite school as first option from 58% to 75%. Furthermore, the increase in demand is fairly constant along the ability distribution - as found running separate regressions of demand measures on vectors of year dummies and priority(exam score)-vintile dummies fully interacted, controlling for gender, graduation from a private junior high school (JHS) and dummies for JHS municipalities in a sample of regular Mexico City applicants ranked in the first 200,000 positions in the priority queue.

As expected, the increase in demand for elite schools generates dissimilar admission chances along the ability distribution. Student with high entry scores translate their higher demand into higher admission rates to elite schools, at the expense mainly of students in the middle of the ability distribution - as low-ability students have from the beginning low admission rates.

For understanding the stability in stratification by family income, I show how the effect of an increase in demand for elite schools on stratification depends on the structural correlations between family income and both ability and demand. Intuitively, although on the one hand ability becomes more important to gain a seat at elite schools and high-income students tend to be also higher achieving; on the other hand, as elite schools receive more high-achieving students - both from high and low-income status - there are less seats available for low-achieving, high-income students, who before would disproportionately - to their number - benefit from the reduced demand for elite schools of more able students.

My empirical analysis reveals the existence of initial -2001- demand and admission gaps. Conditional on the exam score, low-income students are less likely to select at least one elite school in their choice list by around 15 percentage points than their more privileged counterparts and to select an elite school as their first choice by around 20 percentage points. The gap is fairly consistent along the ability distribution. Given the allocation rules, the aspirations gap translates mechanically into an admission gap. High-income students are more - or at least equally - likely to be assigned to elite schools than low-income students at each vintile of the priority queue. Although the gap in the bottom-half of the priority queue is negligible, as elite admission is limited here, it increases along the priority distribution and stabilizes at around 20 percentage points in the top-fifth vintile.

I run a modified version of the model explained before in which I include an indicator for high family income - above the cohort's median - fully interacted with the vectors of year and priority-vintile dummies to estimate changes with respect to 2001 in the within-priority-vintile gap. Results show a decrease in the demand gap by family income after 2001. For the top vintiles of the priority queue, the reduction between 2001 and 2010 amounted to around 10 percentage points for students who select at least one elite school and around 15 percentage points for those who select an elite school as first choice. The reduction represents around 2/3 and 3/4, respectively, of the initial gap.

In consequence, there is a clear decline in the admission gap after 2001, particularly between 2001 and 2005, and for the middle and top of the priority distribution. The reduction in the admission gap for the top priority-vintiles is of around 12-18 percentage points for the whole period, or roughly 2/3 of the initial gap. Among high-achievers, the admission gap decreases as more low-income students demand and gain admission to elite schools, while among low and middle-achievers, the admission gap decreases as less high-income students can achieve elite-school admission.

In an influential paper, *Epple and Romano* (1998) analyze - theoretically and empirically - how competition between public and private schools, and household preferences for peer quality leads to school stratification by ability and - to a lesser degree - by family income. *MacLeod and Urquiola* (2009) model the effect of school competition and student preferences for peer quality and school value-added on school stratification and student outcomes under different educational markets. I study - theoretically and empirically - the effect of increasing student preferences over elite schools on stratification by ability and family income in an one-side market with centralized admission and rule-based allocation of students to public schools.

Several studies in economics have documented that even conditional on academic ability - a likely complement for schooling - low-income students (parents) tend to have less ambitious schooling aspirations (see, for example, *Hastings et al.* (2006) and *Hoxby and Avery* (2012) on the United States). This so-called aspirations gap can both limit social mobility and compromise the effectiveness of school choice programs designed to give disadvantaged students access to better schools. Researchers have turned into investigating why - even in contexts where credit constrains may not be binding - low-income students express a relatively low demand for further or better schooling, looking for example at imperfect information about school quality (*Hastings and Weinstein* (2008)), returns to education (*Jensen* (2010)) or allocation rules (*Ajayi* (2013)).

In this context, I find a decreasing demand gap by family income that helps to explain the puzzle of increasing stratification by ability with stable stratification by family income. Results are of interest for countries with school systems that have clear patterns of vertical differentiation - as the U.S.

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2 Mexico City public high schools

2.1 Elite school systems: IPN and UNAM

In this paper, I study the effects of a change in the demand for admission to two school systems that stand out among public high schools (grades 10-12) in Mexico City: IPN (National Polytechnic Institute) and UNAM (National Autonomous University of Mexico). Both systems are managed by leading universities, offer better school inputs than the other public schools and entail the largest competition to gain admission to.

IPN is also the main public technological higher education institution in Mexico, while UNAM is the oldest and largest public university. IPN high schools provide general senior secondary-level education with a scientific and technical background, but attendance of an IPN high school does not grant access to the IPN higher education institute. In contrast, students in UNAM high schools follow a generalist curriculum and have automatic admission to an UNAM higher education campus, although with some restrictions in the choice of college major.

The IPN system has 16 high schools with a total incoming class of around 21,600 students, while the 14 UNAM high schools enroll 34,200 new students per year (around 8% and 12%, respectively, of Comipems applicants in 2010). Both sets of schools are very selective and have by far more applicants than available seats. In consequence, students in these school systems have peers who are higher-achieving and - because family background is positively related to achievement and schooling choices - from more privileged backgrounds. Table1 presents simple averages of school characteristics across school systems (based on information from the Comipems application system and the Mexican census of schools). Students admitted to IPN and UNAM schools have peers with an entry-exam score on average around 1.5 standard deviation larger than students in the other schools and, in the same line, who are around twice as much more likely to have at least one senior-secondary educated and white-collar parent than peers in non-elite schools. There are also clear differences in terms of graduation from a private junior high school - an indication of socioeconomic status - and per capita household income.

In addition to better peers, IPN and - particularly - UNAM high schools offer to admitted students a set of improved inputs with respect to the other public schools, at least in terms of class size and teacher credentials (see again Table 1).

Furthermore, there is evidence - at least for the IPN system - that elite schools in this context translate their better inputs into better student outcomes. Using the variation in admission outcomes generated by the centralized allocation from students to schools, *Estrada and Gignoux* (2014) find a large effect of admission to the IPN system on students' expected earnings with a college education and learning achievement in Mathematics. Studying the effects of admission in other equally selective schools in the city, but not with better school inputs, the authors find also that these gains are not driven by exposure to more selected peers.

Summing up, IPN and UNAM high schools offer to admitted students exposure to better peers and school inputs that can generate better student outcomes. In the case of UNAM, they also offer secure admission to one of the leading public universities in the country. Hence, there is no surprise that, from the beginning of the period under study, the demand for admission into IPN and UNAM schools is high.

2.2 The Comipems admission process

Since 1996, the Metropolitan Commission of Public Senior-Secondary Education Institutions (Comipems) centralizes admission into nine of the ten systems of public high schools (grades 10-12) in Mexico City metropolitan area, which comprises the Federal District and 22 municipalities from the neighboring State of Mexico.[1] The admission process is based on students' scores in a common test and explicit schooling choices, and the number of slots available in each school. The allocation of students to schools uses the serial dictatorship algorithm. The process works as follows:

First, applicants submit a ranked set with up to 20 schooling options (from 536 options in 2010). Students actually submit a choice list of preferred tracks as some schools offer more than one track. However, most schools, including IPN and UNAM schools, have only one track at the time of admission. In practice, students receive at school an application package in January of their last year of junior high school (grade 9). Applicants must turn in their registration form (with their ranked sets of schooling options) in February or March of the same year. Second, applicants take a common standardized exam in the last weekend of June. All applicants with at least 31 correct answers out of 128 questions in the exam are allowed to register in a Comipems school (around 97% in the 2001-2010 period).[2]

[1] A recent system of high schools administered by the Federal District government and targeted to low-achieving students does not belong to Comipems.

[2] Applicants who list a school from the UNAM system as their first choice must take an exam version designed by this institution, while all the other students take an exam design designed by Ceneval (the institution in charge of the assignment process). Both exams are designed to be equivalent in level of difficulty. I do not have information to suppose that some students might prefer taking one version of the test to strategically increase the probability of gaining admission to one of

In parallel, schools submit their number of available seats. Schools do not submit any priority criteria over students.

Then, students are allocated to schools. A computer program places students in a queue according to their test score, where the student with the highest score gets the first position in the queue, the student with the second highest score obtains the second position and so on. Students with the same test score obtain the same priority. In order of the queue, the algorithm proceeds to allocate individuals to the school with available seats they ranked the highest in their choice list. So, the first student obtains her top choice, the second student obtains her top choice among schools with available seats, and so on. The algorithm stops when the application from the last student in the queue is processed. In case of ties, schools decide to either accept or reject all students in tie.[3]

Finally, students who only choose schools which happened to be too selective with respect to their test scores, i.e. who miss admission for all their listed choices, can register in the schools with remaining slots in a second-stage process. All IPN and UNAM schools fill their seats during the first stage.

3 Stratification by Family Income

In this section,

4 Comipems Data

My main data set comprises the micro-data with the applications to the Comipems system during the 2001-2010 period. The database includes the submitted lists of schooling choices, the score at the entry exam, the assignment outcome in the first stage of the allocation process and the junior-high school (JHS) attended for all applicants. I normalize the exam score by exam cohort with mean 0 and standard deviation 1. In addition, I have basic family background information from a questionnaire attached to the registration form (e.g. parental occupation and education, and household income and size). The response to the background questionnaire is optional and there is some non-response that I discuss below.

Students report household income in the background questionnaire selecting one of 15 income brackets. I assume that each discrete income category corresponds to the mean of the two values that define each bracket. For the last bracket, which do not have an obvious interval, I make an assumption about the upper value - only .08 percent of students selected this income bracket. I convert then the values to pesos in December 2010 prices and construct a measure of per capita household income using the reported household size in the same questionnaire. I generate then a dummy variable to categorize students in

their most preferred choices.

[3]IPN and UNAM schools require a minimum junior high school GPA of 7/10 for admission, in contrast to the 6/10 necessary for graduation from this schooling level and for admission to the other Comipems schools. In consequence, the allocation algorithm ignores the applications to IPN and UNAM schools from applicants with a GPA below 7/10 (5% of elite school applicants in 2001-2010).

high and low-income (above and below the cohort median of the per capita household income).[4]

I focus the analysis of the individual admission outcomes to students enrolled at the time of application in junior-secondary schools from the Federal District and participating municipalities from the State of Mexico (76% of total applicants in the period). I exclude then applicants who graduated from JHS in previous years (22%), who attend schools in other localities (1.7%) and students of adult-education institutions (0.6%). Total applications increased steadily during the period of analysis, from 207,662 in 2001 to 276,581 in 2010. I restrict the sample to students ranked in the first 200,000 positions in the admission priority queue. I do it to gain comparability across years - see more below - and because students with a position in the admission queue above 200,000 have barely a chance of being admitted to an elite school. These restrictions lead to a data set with 1,532,805 observations and 1,305,694 observations when the no-response to background questions is taken into account.

For the analysis of school stratification, I consider all admitted applicants in the first stage of the admission process. I omit for data limitations the students enrolled in the second stage of the process. Around 15% of the total applicants missed admission to all their listed schooling choices during the 2001-2010 period. Not all registered to one school with available spots during the second stage, though. For example, in 2005, the only year for which I have information about second-stage admission, less than half did it (47%). I comment later on the potential consequences of this omission on my results.

4.1 Descriptive statistics

Table 2 presents descriptive statistics for the sample of students used for the analysis of admission outcomes. Column 1 reports means and standard deviations (in parenthesis) for all students, while column 2 restricts to students who responded the three questions in the background questionnaire used for the analysis. Eyeballing indicates no significant differences between the two samples and suggests that non-response - which account for 15% of students - is random.

Slightly more than half of students are female (53%) and 8% come from a private junior high school - and indication of high socio-economic status. As said before, students select on average 9 schooling options and only 2% of them list 20 options - the maximum allowed number. The preference for elite schools is clear. 80% of students select at least one elite school and 68% have one elite school as their most preferred choice. On average, elite schools account for 46% of schooling options in students' ranked sets. Students are assigned on average to their 3rd/4th more preferred schooling option (3.5) and only 30% of those in the sample gain admission to an elite school - the figure would be lower if we consider the omitted students at the end of the admission priority. 10% miss admission to all their listed schooling choices and go to second round assignment. In terms of family background, 44% of students have at

[4] The 2001 background questionnaire does not include a question for household size. I predict then household size for applicants in 2001 using the parameters estimated in an OLS regression of household size on entry exam score, female status, private JHS attendance, number of submitted choices, share of elite schools and the selection of a elite school as top ranked option the 2002-2010 sample.

least one parent with a senior-high-school education and 33% at least one parent with a white-collar occupation. per capita family income is on average $1,346 pesos per month (in December 2010), which amounts to around $178 US dollars, adjusting for purchasing power parity.

Columns 3 and 4 give the same descriptive statistics for students above (column 3) and below (column 4) the cohort median of per capita household income. It stands out the large correlation between family income and academic achievement, and family income and demand for (and admission to) elite schools. High-income students (column 3) have on average an entry exam score larger by .4 standard deviations than low-income students. Also, high-income students are more likely to select at least one elite school (by 2 percentage points), to rank an elite school as their more preferred school (by .17 percentage points) and to have a larger share of elite schools in their ranked set (by 17 percentage points). Consequently, high-income students are twice as much more likely to gain admission to an elite school than low-income students. As expected, high-income students are more likely to have white-collar and SHS-educated parents - and indication of the internal consistency of these measures - and to graduate from a private JHS - actually, only 2% of low-income students graduated from a private JHS versus 14% of high-income students.

Summing up, the simple descriptive statistics presented here indicate a large demand for elite schools and both a correlation between family income and academic achievement, and family income and elite school aspirations (and admission outcomes). I proceed to give more robust evidence on theses stylized facts and to analyze the related consequences.

5 Demand and admission outcomes: empirical results

5.1 Increasing demand and identification of effects on admission outcomes

I use time variation in demand, the stability in the supply of elite-school seats during the period and the rule-based allocation of students to schools to study the effect of an increase in the demand for elite schools on admission outcomes - and school stratification. The observed change in demand in Figure 2 could be result from a change in the applicants' composition rather than a change in comparable individuals' schooling preferences - induced by a preference shock as discussed in the previous section. I therefore estimate in an OLS regression the following model:

$$y_{ic} = \beta_0 + \beta_{1c} C'_{ic} + \beta_{2P} P'_{ic} + \Gamma X'_{ic} + e_{ic} \quad (1)$$

where y_{ic} denotes the outcome of student i from exam year (cohort) c, C' is a vector of dummies for years 2002...2010 (2001 is the reference year), β_{1Y} are the parameters of interest, P' is a vector of dummies for 2...20 priority vintiles and β_{2P} the associated vector of parameters, X' is a vector of exogenous covariates - which includes a gender indicator, an indicator for graduation from a private JHS and a vector of JHS-municipality dummies - and Γ is the associated vector of parameters. In all estimations, standard errors are clustered at the attended junior high school level.

Table 3 (columns 1-4) reports estimates from equation 1 for the four demand indicators plotted in Figure 2. Results are consistent with the graphical evidence. Hence, comparing students with similar observable characteristics across cohorts leads to the same finding: a monotonically increasing demand.

Even after conditioning on observable characteristics, if the error term is correlated with the cohort dummies, the vector β_{1Y} could capture not only a change in schooling preferences, but also changes in applicants' unobservable characteristics. Although the descriptive evidence suggests that it is a change in actual schooling preferences what drives the observed change in demand, the main results of this paper do not depend on whether this is or not true - as I explain below.

Before proceeding, note that the capacity of elite schools during this period is roughly constant. As a result, the share of students in the sample allocated to elite schools per year remains stable along the period - see column 5 in the same table. 29% of the regular students from DF and the State of Mexico in top-200,000 positions in the priority queue gained admission to an elite school in 2001. The largest observed difference with respect to this year corresponds to 2008 and amounts to .08 percentage points - coefficients for the other years are around .02-.05 percentage points and in three cases are not statistically significant at conventional levels.

I turn now to study changes along the ability distribution. For brevity, I focus the demand analysis in two indicators (% students who selected at least an elite school and % students whose first choice is an elite school). The first is informative about the extensive margin, while the second about the intensive margin. Also for clarity of exposition, I only report results for three years: 2001, 2005 and 2010. However, no important information is lost, as the trends under analysis are rather monotonic - see Figure 2 and table 3.

Figure 3 (panels A and B) shows the conditional expectation function for the two demand indicators on the the priority queue (in vintiles) for the three selected years. As it is possible to observe, the change in demand is fairly constant across the priority distribution.

In the same spirit than in equation 1, I use the following model to obtain estimates of changes within-priority-vintiles controlling for students' characteristics:

$$y_{ic} = \beta_0 + \beta_{1C}C'_{ic} + \beta_{2P}P'_{ic} + \beta_{3CP}C'_{ic} * P'_{ic} + \gamma X'_{ic} + e_{ic} \tag{2}$$

where $C' * P'$ is a vector of interactions among dummies for years 2002...2010 and 2...20 priority vintiles, β_{3PC} is the associated vector of parameters and all the rest is the same than before.

Panels C and D in Figure 3 reports the parameters of interest $\beta_{1C} + \beta_{3CP}$ - with confidence intervals at the 95% level. Results confirm that there is an economically and statistically significant increase in the demand for elite schools and that this change is not restricted to some segments of the priority(ability) distribution. If anything, the change is smaller at the very top of the priority distribution, which would lead to smaller changes in admission outcomes and school composition than otherwise.

Again, it is not possible to disentangle the change in actual schooling preferences over elite schools from a change in applicants' unobserved characteristics. Although this might be important to understand what is driving the observed change in demand, it is not for studying the effects of an increase in demand on admission outcomes.

As discussed before, the allocation of students to schools depends solely on the priority queue and submitted schooling preferences, on the one hand, and the school seats, on the other. Hence, holding constant the position at the priority queue and the supply of seats at elite schools, any change in admission outcomes *must* come from a change in demand expressed in the choice lists. In this framework, the vector $\beta_{1C} + \beta_{3YC}$ captures the overall effect of a changing demand on admission outcomes of students with the same priority profile - and other observed characteristics.[5]

5.2 Admission outcomes

Panel A in Figure 4 presents the conditional expectation function of the probability of admission to an elite school on the position in the priority queue (in vintiles) for the years 2001, 2005 and 2010. In all cases, it is possible to observe a monotonically increasing relationship between elite-school admission and priority position (academic ability). Students first at the priority queue are more likely to be allocated to elite schools than students later at the priority queue. There are important differences students in the intensity of this relationship across years, though.

In 2001, admission to an elite school is almost a linear function of the position in the priority queue. Although at different levels, there are applicants across practically all the support of the priority distribution who are able to obtain a spot at an elite school. As some high-priority students do not apply to elite schools - see again Panel A in Figure 3 - not all high-priority students are allocated to elite schools, which leave some school seats available for students with lower admission priority.

In contrast, there is practically no students in the bottom-half of the priority queue who are allocated to elite schools in 2005. In the upper-half of the queue, some students in the vintiles 7-10 - and 11 - are still able to gain elite-school admission, but less than before. This is the result from a clear increase in the rate of admission in the top 6 vintiles. The same process continues to 2010.

Panel B in the same graph presents the regression coefficients from an OLS estimation of equation 2. The coefficients correspond to changes within-vintile in the probability of elite-school admission between 2001 - the year of reference - and 2005 and 2010. Again, it is visually clear - and highly statistically significant - that students in the bottom and middle of the priority queue reduced drastically their

[5]Assuming no change along time in the relative distribution of regular and non-regular applicants' exam scores.

admission chances between 2001 and 2005 - and 2010. The largest drop is for students in the middle of the queue, who were able to obtain admission before because the relatively low demand for elite schools among top-priority students.

Overall, the empirical results are consistent with the predictions presented in the theoretical analysis. As the allocation of students to schools is solely based in students' preferences (expressed through the choice lists) and position at the priority queue (fully determined by their exam score), a fairly constant increase in demand for elite schools translate in dissimilar admission chances along the ability distribution. A larger demand increases admission chances a priori (direct-choice effect), but actual admission outcomes depend on the preferences of those first at the priority queue (crowding-out effect). Student with top priority translate their higher demand into higher admission rates to elite schools, but the opposite is true for middle and bottom-priority students, who see elite schools already full when their time to choose comes in.

5.3 Demand and admission gaps

In the theoretical section, I derive several implications for a scenario in which low-income students have, conditional on ability, a lower demand for elite schools. In Table 2, I show that low-income applicants - defined as those below the median income - express indeed a lower demand for elite schools during the 2001-2010 period, but also that they tend to perform significantly worse than high-income students in the entry exam. I turn now to do a finer comparison that controls for academic ability.

Panels A and B in Figure 5 present the local means of two demand indicators along the priority queue (in vintiles) by income status for the year 2001. The existence of a (conditional) aspirations gap is clear. Conditional on the exam score, - which fully determines the priority queue - low-income students are less likely to select at least one elite school in their choice list by around 15 percentage points than more privileged youth and to select an elite school as their first choice by around 20 percentage points. The aspirations gap is fairly consistent along the ability distribution, although for the second indicator is smaller at the very top of the distribution - first vintile.

Given the rules to allocate students to schools, the (conditional) aspirations gap generates mechanically a (conditional) admission gap. Panel A in Figure 6 shows the corresponding conditional expectation functions for elite-school admission by income status in 2001. As expected, high-income students are more - or at least equally - likely to be assigned to elite schools than low-income students at each vintile of the priority queue. The gap in the bottom-half of the priority queue is small or negligible, as only a small part of students gain elite-school admission here. The gap is increasing though along the priority distribution and from the top-five quantile and on it stabilizes at around 20 percentage points - a similar amount to the gap in selection of an elite school as first choice.

In the theoretical section, I discuss how a homogeneous shock in the expected utility from elite schools of high and low-income students can lead to a reduction in the aspirations (demand) gap between these two groups. The main intuition is that the ordinal information contained in a choice list $\succ_i$ does not capture the preference intensity inherent to expected utility. I estimate the following extension to equation 2 to obtain estimates of changes in an outcome gap within-priority-vintiles:

$$y_{ic} = \beta_0+\beta_{1C}C'_{ic}+\beta_{2P}P'_{ic}+\beta_{3CP}C'_{ic}*P'_{ic}+\beta_4 w_{ic}+\beta_{5C}C'_{ic}*w_{ic}+\beta_{6P}P'_{ic}*w_{ic}+\beta_{7CP}C'_{ic}*P'_{ic}*w_{ic}+\gamma X'_{ic}+e_{ic} \tag{3}$$

where w_{iy} is an indicator that turns on if student i from cohort c is a high-income student and it is off otherwise, $C'_{ic} * w_{ic}$ is a vector of interactions between year dummies and income status, $P'_{ic} * w_{ic}$ is a vector of interactions between priority-vintile dummies and income status, and $C'_{ic} * P'_{ic} * w_{ic}$ is a vector of triple interactions among year dummies, priority-vintile dummies and the income status dummy, and all the rest is the same than before.

I am interested in the vector of parameters $\beta_{5C}C'_{ic} + \beta_{7CP}$, which capture the change with respect to 2001 in the within-priority-vintile gap in outcome y between high and low-income students, conditional on observable characteristics. As before, I control for covariates to explore if the change in the admission gap is due to a a change in comparable individuals' schooling preferences or to a change in the composition of individuals within priority vintiles. Panels C and D in Figure 5 presents the point estimates of the parameters of interest - with confidence intervals at the 95% level. As it is possible to observe, the aspirations gap indeed decreased after 2001 - although the confidence intervals for several point estimates corresponding to 2005 are marginally insignificant at the 95% level. The estimation is relatively imprecise and the confidence intervals overlap, but it seems that the reduction in the aspirations gap is larger for the top-half of the ability distribution and continued between 2005 and 2010. For the top vintiles of the priority queue, the reduction between 2001 and 2010 amounted to around 10 percentage points for students who select at least one elite school and around 15 percentage points for those who select an elite school as first choice. The reduction represents around 2/3 and 3/4, respectively, of the initial gap.

Panel B in Figure 6 reports the coefficients of interest for changes in the admission gap. In consequence with the previous results, there is a clear decline in the admission gap after 2001, particularly between 2001 and 2005 - the decline is less evident later. The reduction in the admission gap is zero for the very bottom priority vintiles - students here do not gain admission to elite schools - and then increasing along the priority queue. Comparing 2001 and 2010, the reduction in the admission gap for the top priority-vintiles is of around 12-18 percentage points, or roughly 2/3 of the initial gap. This is an important reduction in the inequality of outcomes for students of different socio-economic background, but a similar ability profile.

In line with the theoretical analysis, the reduction in the (conditional) admission is result of both:

1) a reduction in the conditional aspirations gap (Panels C and D in Figure 5) and 2) the interaction between the initial admission gap (Panel A in 6) and a crowding-out effect (Figure 3 Panel A) due to a general increase in the demand for elite schools (Panels C and D in Figure 3). In other words, among high-achievers, the admission gap decreases as more low-income students demand and gain admission to elite schools, while among low and middle-achievers, the admission gap decreases as less high-income students can achieve elite-school admission.

6 Demand: School Choice

In this section, I introduce a simple behavioral model that maps how a change in the utility that students derive from elite schools can be translated into a change in the observed demand (schooling choices) for these schools, with the purpose of giving a basic economic framework to the analysis. The focus of this paper though is not in explaining or identifying what causes the observed change in demand, but rather in the consequences of such a demand shock.

6.1 School Choice Model

Following*Balinski and Sonmez* (1999), the student placement problem consists of:

- a finite set of students I, which is the union of the sets of high and low-income students $I = I_H \cup I_L$,
- a finite set of schools S, which is the union of the sets of elite and non-elite schools $S = S_E \cup S_N$
- a vector of school capacities $q = (q)_{s \in S}$, where q_s is the number of available seats at school $s \in S$,
- a profile of student choices $\succ = (\succ)_{i \in I}$, where each student $i \in I$ reports a strict preference relation $\succ_i$ over all schools in S and her outside option o.
- a vector of test scores $a = (a)_{i \in I}$, where a_i is the score in a common entry exam of student $i \in I$,
- a linear order of students in which students' choices over schools are processed π. The priority queue π depends fully on test scores, such that $i \underset{(>)}{\pi} i' \Leftrightarrow a_i > a_{i'}$.

Note that the set of elite schools I_H is exogenously defined. Here $s \succ_i s'$ means student i prefers school s to school s'.

Let $SD : I \to S \cup \{o\}$ be the matching function of students to schools such that no school is assigned to more students than its capacity, so $\mid SD(s) \mid \leq q_s$ for all $s \in S$ and $SD(i) = o$ if student i is unmatched to a school. The serial dictatorship algorithm (SD) allocates students to schools in strict order π following the profile of student preferences $\succ$. As students are allocated to school seats, school seats are removed from q. Hence, the first student obtains her top choice, the second student obtains her top choice among schools with available seats, and so on.

The serial dictatorship algorithm makes a dominant strategy for all students to report in her choice list $\succ_i$ their true preferences over schools – see (*Pathak*, 2011) and *Balinski and Sonmez* (1999) – given the standard assumptions in the school choice literature. Relevant assumptions for strategy-proofness in SD are the presence of hedonic preferences and the absence of constrains in the ranking of schooling options. Preferences are hedonic if students only care about the school they are assigned independently of the other students who are assigned there. Although there are cases in which one can think that this might not be true, there is no evidence in the literature to suppose that hedonic preferences are in general an unrealistic assumption. Regarding the schooling options that students can submit, the Comipems actually limit students to rank a maximum of 20 options. However, the data suggests that this constrain is hardly binding. Applicants submitted 9.1 schooling options on average and only 2.5% listed the maximum number of options allowed during the 2001-2010 period. Define $u = (u)_{i \in I}$ as the profile of student utilities over schools, where $f : u \rightarrow \succ$. Given strategy-proofness, student i submits a strict ranking of schooling choices $\succ_i$ consistent with:

$$s \succ_i s' \succ_i o \Longleftrightarrow u_i(s) > u_i(s') > u_i(o) \tag{4}$$

I define for simplicity $\succ$ as a preference relation over all schools, though students have the incentive to only report in $\succ$ those schools from which they derive a higher utility than their outside option o.

Before proceeding, it is important to stress that, even if elite schools are higher quality schools, there is no reason to expect that elite schools dominate non-elite schools in students' preferences $\succ$ if students use more than one parameter to evaluate schools. For example, in standard school choice models in the literature, students' expected utility over schools depends on (exogenous to students' choices) school quality x_s, distance to school d_i and an idiosyncratic term v_i – so, $\succ_i (x_s, d_i, v_i)$.

6.2 From utility to demand shock

Now, suppose there is a shock in the economy that increases student utility from elite schools in a way that is meaningful enough to have an effect on students' relative valuation of schools. Again, I will be agnostic about the specific nature of the shock. So, define a post-shock utility profile $\hat{u}_i$ such that $\tilde{u_i}(s) > u_i(s)$ for all $i \in I$ and $s \in S_E$, and a post-shock profile of student choices $\hat{\succ}$. The proposed utility shock translates into two effects in $\hat{\succ}$:

- Intensive margin effect (IME): the expected rank of elite schools in $\hat{\succ}_i$ increases (IME>0) if $\exists s \in S_E$ and $s' \epsilon S_N$ such that $s \hat{\succ}_i s' \hat{\succ}_i o \Longleftrightarrow s' \succ_i s \succ_i o$; and IME=0 otherwise.

This implies the existence prior to the shock of at least a non-elite school with an utility marginally larger than the utility of an elite school in $\succ_i$.

- Extensive margin effect (EME): the expected number of elite schools preferred to the outside option in $\hat{\succ}_i$ increases (EME>0) if $\exists s \in S_E$ such that $s \hat{\succ}_i o \Longleftrightarrow o \succ_i s$, and EME=0 otherwise.

This implies the existence prior to the shock of at least an elite school with an utility marginally lower than student i's outside option o.

In other words, as the utility derived from elite schools goes up, students are more likely to give higher rankings to elite schools, either because the utility of the relevant elite schools is now higher relative to that of non-elite schools or the outside option. The specific cause of such a shock is not central here. In general, one can think that the shock may be due to an increase in the school inputs available in elite schools or in the returns to school inputs already more prevalent in these schools. Also, one could think in an information shock that corrects students' downward-biased expectations about the level or value of available inputs in elite schools - even if the actual level and value of the inputs do not change. Beyond the specificity, what matters for the following analysis is the change in demand for elite schools.

6.3 Effect on admission outcomes

An important feature of the school choice problem is that one school seat can only be assigned to one student and no more. Hence, a change in the demand for elite schools can lead to important general equilibrium effects in admission outcomes if seats in elite schools are a scarce good – e.g. there are more applicants than available seats – and the supply of elite schools is inelastic – at least in the short run. As selectivity is present in the context under study – and it is part of a meaningful definition of elite schools – I consider here and after that elite schools are always selective schools.[6]

Suppose student i's exam score is the unbiased expected value of her true ability (α_i):

$$a_i = \alpha_i + \varepsilon_i \tag{5}$$

Where ε_i is an independent error term and $E(\varepsilon_i|\alpha_i) = 0$. For simplicity, define $\succ_i^{elite}$ as an index of student i's demand for elite schools in $\succ_i$, in which a higher ranking of elite schools increases $\succ_i^{elite}$. As discussed before, the allocation of students to schools is rule-based and depends only on students' schooling preferences and test scores (which translate into a common admission priority at schools). More precisely, admission to elite schools depends on a student's own preferences and exam score $(\succ_i, a_i)$, but also on the preferences and exam scores of the other students $(\succ_{-i}, a_{-i})$. We can write then student i's ex-ante probability of admission to an elite school (before the realization of the exam score) as:

$$\Pr\left[SD_\varepsilon(i) \in S_E\right] = f(\succ_i^{elite}, \alpha_i, \succ_{-i}^{elite}, \alpha_{-i}) = \int_{\sup(\varepsilon)} f(\varepsilon) 1\left[SD_\varepsilon(i) \in S_E\right] d\varepsilon \tag{6}$$

Let's decompose now the effect on admission outcomes of a change in $\succ_i^{elite}$ in one that goes only

[6] Although to hold, my results only need elite schools to be selective post-shock.

through student i's change in preferences over schools and one that takes into account the overall change in demand and the zero-sum nature of the game:

1. Partial equilibrium (direct-choice) effect: the probability of admission to an elite school increases for students with IME>0 or EME>0 (increasing $\succ_i^{elite}$), as the SD algorithm allocates students to schools following their submitted choice list. Conversely, the probability of admission to a non-elite school decreases for students with IME>0 or EME>0.

2. General equilibrium (crowding-out) effect: the probability of admission to an elite school decreases as the overall demand for admission to an elite school goes up (IME$_{-i}$>0 or EME$_{-i}$>0 - increasing $\succ_{-i}^{elite}$). The effect is decreasing in ability (students first at the priority queue crowd out students later at the priority queue). As the SD algorithm allocates students to schools using a priority queue solely based on students' exam scores.

So, abstracting from a student's position in the admission queue, giving elite schools higher rankings increases the likelihood that a student be admitted to an elite school. But the actual admission outcomes of students depend on their position in the admission queue and the preferences of the students before them on the queue.

6.4 Demand and admission gap

Suppose high-income students I_H derive higher utility from admission to elite schools S_E. The simple utility model discussed before - $\succ_i$ (x_s, d_i, v_i) - can be useful to give some rational for this gap. For example, high-income students may derive higher utility for school inputs (x_s) more abundant at elite schools, either because they have more complementary inputs or better information about the levels and returns to school inputs. Also, high-income students may live closer to elite schools than to non-elite schools, and face lower travel distances (d_i) from home to elite schools. Finally, high-income students may have a higher idiosyncratic taste (v_i) for elite schools, explained by family or other social interactions.

For simplicity, let's assume high-income status produces a higher utility from admission to elite schools on a meaningfully enough way to have an effect on the relative valuation of students over schools. I condition on academic ability in the analysis to allow for a positive correlation between family income and ability - an empirical regularity - and a complementary between school inputs and ability - a frequent feature in models of human capital production. So, fix $i \in I_H$, $i' \in I_L$, $s \in S_E$ *and* $\alpha_i = \alpha_{i'} = \alpha$, then $u_i(s) > u_{i'}(s)$.

As the difference in utilities over elite schools by family-income status is by assumption sufficiently large to change the relative valuation of students over schools, it follows that even conditional on academic ability, high-income students have a higher rank for elite schools in $\succ$ and a larger share of elite schools in $\succ$ preferred to the outside option o than low-income students, using the same analysis done in 3.2. Call this difference in choices - $\succ_i^{elite} |\alpha_i = \alpha] > \succ_{i'}^{elite} |\alpha_{i'} = \alpha]$- the (conditional) demand gap. As students with the same academic ability have the same expected admission priority, the (conditional) demand gap translate mechanically into a (conditional) admission gap: $\Pr\left[SD_\varepsilon(i) \in S_E|\alpha_i = \alpha\right]\right] > \Pr\left[SD_\varepsilon(i') \in S_E|\alpha_i = \alpha\right]\right]$.

Let's focus now on how the utility shock presented in the previous subsection affects the demand and admission outcomes of both groups. Note that the utility shock defined in 3.2 is not different for the two sets of students. However, an homogeneous utility shock can decrease the (expressed) demand gap between the two groups because choice lists $\hat{\succ}$ only represent ordinal preferences. Fix $s \in S_E$ and $s' \in S_N$, and note that to kick in the intensive margin effect (IME) requires $s' \succ_i s \succ_i o$ for least one school in $\succ_i$. But, ceteris paribus, high-income students have a higher rank for elite schools in $\succ_i$. So, the IME is less likely to kick in for high-income students. The same argument is valid for the extensive margin effect (EME).

- Decreasing demand gap. Partial-equilibrium (direct-choice) effect. Given that the SD algorithm allocates students to schools solely based on submitted rankings and exam scores, a decrease in the (conditional) demand gap translates mechanically into a decrease in the (conditional) admission gap. As: $\succ_i^{elite} |\alpha_i = \alpha] = \succ_{i'}^{elite} |\alpha_i = \alpha] \Longleftrightarrow \Pr\left[SD_\varepsilon(i) \in S_E|\alpha_i = \alpha\right]\right] = \Pr\left[SD_\varepsilon(i') \in S_E|\alpha_i = \alpha\right]\right]$.

The decrease in the aspirations gap may be particularly important to equalize the admission outcomes of high-achieving students from low and high-income status. For example, suppose the shock leads for a share q of high-achieving, low-income students to switch preferences from $\succ_i = \{s', s, ...o, ...\}$ to $\hat{\succ}_i = \{s, s', ...o, ...\}$. As high-achieving students tend to have a high admission priority, the change in submitted preferences leads to a corresponding increase in admission to elite schools. In comparison, a similar change among a q share of low-achieving students would hardly lead to a significant increase in elite-school admission as these students tend to have a low admission priority. In the same line, if high-achieving, high-income students already - before the shock - have an elite school as their most preferred schooling option, then a change in the "lower" part of $\succ$ may be inconsequential, as anyways these students are likely to be admitted to an elite school.

There is another way, though, in which the shock can lead to a equalization of admission outcomes and this is one independent of a decrease in the aspirations gap:

- The interaction between: General-equilibrium (crowding-out) effect and the (initial) demand gap. I show in the previous subsection than the increase in overall demand leads to a crowd-out effect in which higher-achieving students crowd lower-achieving students out from elite schools. The effect is stronger for (lower-achieving) high-income students as pre-shock they are over-represented in elite schools.

Summing up, the first effect is more important for the top of the ability distribution and the reduction in the admission gap comes from an (relative) increase in high-achieving, low-income students' admission to elite schools. In contrast, the second effect is more relevant in the the middle and bottom of the ability distribution. Here, the reduction in the admission gap is explained by a decrease in the admission to elite schools of low-achieving, high-income students who - before the overall increase in demand - were more likely to be admitted to elite schools.

7 Conclusions

Convergence in aspirations for elite (selective) schools - understood as a generalized increasing demand coupled with a decreasing demand gap by family income - can lead to important effects in admission outcomes and school stratification. In a system in which students are put in an admission queue based on their score in a common exam and then allocated to schools following their preferences over schools, an increase in demand leads to higher elite admission chances for students with higher ability and larger school stratification by ability.

Higher school stratification by ability does not translate mechanically into higher stratification by family income though - even with a positive correlation between family income and academic ability - if family income correlates with (more ambitious) schooling preferences. Initial - and decreasing - aspirations and admission gaps into elite schools by family income can explain why increasing school stratification by academic ability co-existed with stable stratification by family income in Mexico City's public high schools during the 2001-2010 period.

This paper presents a framework and evidence that can be relevant for policies that increase demand for specific sets of schools by, for example, removing informational or financial barriers in settings in which academic ability matters for the matching of students to schools. The welfare effects of the analyzed effects in admission outcomes and school stratification are, though, beyond the scope of this work.

In terms of student achievement, stratification by ability can lead to better overall student outcomes if the benefits of tracking by ability outweigh those of peer-effects - as suggested by *Duflo et al.* (2011). Higher stratification by family income - which could arise in a different setting - may be though an outcome less acceptable for policy.

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Tables

Table 1: School Inputs and Students: Means and (SD)

VARIABLES	(1) IPN Schools	(2) UNAM Schools	(3) Other Schools
Panel A: Student Characteristics			
School Entry Score	1.378	1.299	-0.203
	(0.400)	(0.447)	(0.488)
SD of School Entry Score	0.478	0.385	0.639
	(0.0841)	(0.0614)	(0.119)
At least one parent has SHS	0.537	0.629	0.275
	(0.0734)	(0.111)	(0.105)
At least one parent is white collar	0.408	0.494	0.210
	(0.0707)	(0.101)	(0.0815)
Private JHS	0.121	0.195	0.0277
	(0.0504)	(0.110)	(0.0282)
Per capita household income	1,598	1,932	995.4
	(221.0)	(406.0)	(227.3)
Admitted students	1,187	2,470	582.9
	(340.6)	(1,055)	(457.0)
Panel B: School Inputs			
Class Size	39.59	24.65	42.23
	(2.782)	(4.690)	(5.207)
Share Teachers with College	0.856	0.943	0.826
	(0.133)	(0.0480)	(0.122)
Observations	16	14	258

Notes: School-level means and standard deviations (in parentheses) for the sample of students admitted in the first stage process of the Comipems assignment process to IPN high schools (1), UNAM high schools (2) and other Comipems high schools (3). There is missing information for 7 other Comipems schools. Source: school census data (Formato 911) 2005 and COMIPEMS 2005.

Table 2: Comipems Regular Applicants: Means and (SD)

VARIABLES	(1) Full Sample	(2) Full Sample - NR	(3) High-Income	(4) Low-Income
Comipems Score (std)	0.344	0.374	0.561	0.159
	(0.864)	(0.866)	(0.887)	(0.788)
Female	0.525	0.527	0.505	0.552
	(0.499)	(0.499)	(0.500)	(0.497)
Private JHS	0.0815	0.0812	0.136	0.0185
	(0.274)	(0.273)	(0.343)	(0.135)
Number of Chosen Options	9.073	9.100	9.083	9.119
	(3.769)	(3.773)	(3.852)	(3.681)
Submitted 20 options	0.0261	0.0264	0.0284	0.0242
	(0.159)	(0.160)	(0.166)	(0.154)
Selected an Elite School	0.805	0.809	0.867	0.742
	(0.396)	(0.393)	(0.340)	(0.437)
Share of Elite Schools	0.455	0.459	0.540	0.366
	(0.345)	(0.345)	(0.343)	(0.324)
First Choice is Elite School	0.681	0.688	0.769	0.595
	(0.466)	(0.463)	(0.421)	(0.491)
Number of Assigned Option	3.514	3.491	3.552	3.420
	(3.196)	(3.190)	(3.268)	(3.097)
Admitted into Elite School	0.296	0.306	0.395	0.204
	(0.456)	(0.461)	(0.489)	(0.403)
2nd Round Assignment	0.106	0.103	0.113	0.0917
	(0.308)	(0.304)	(0.317)	(0.289)
One parent has at least SHS		0.440	0.616	0.238
		(0.496)	(0.486)	(0.426)
At least one parent is white-collar		0.336	0.506	0.141
		(0.472)	(0.500)	(0.348)
PC Family Income		1,346	2,054	530.7
		(1,187)	(1,228)	(236.5)
Observations	1,532,805	1,305,694	698,518	607,176
Years	2001-2010	2001-2010	2001-2010	2001-2010

Notes: Means and standard deviations (in parentheses) for Comipems regular applicants from the D.F. and participating municipalities from the State of Mexico. Column A presents statistics for all these applicants and column B for those who reported parental schooling, occupation and household income. Columns C and D split the sample in Column 3 in applicants with a per capita household income above their cohort median (high-income) and below (low-income). Source: COMIPEMS 2001-2010.

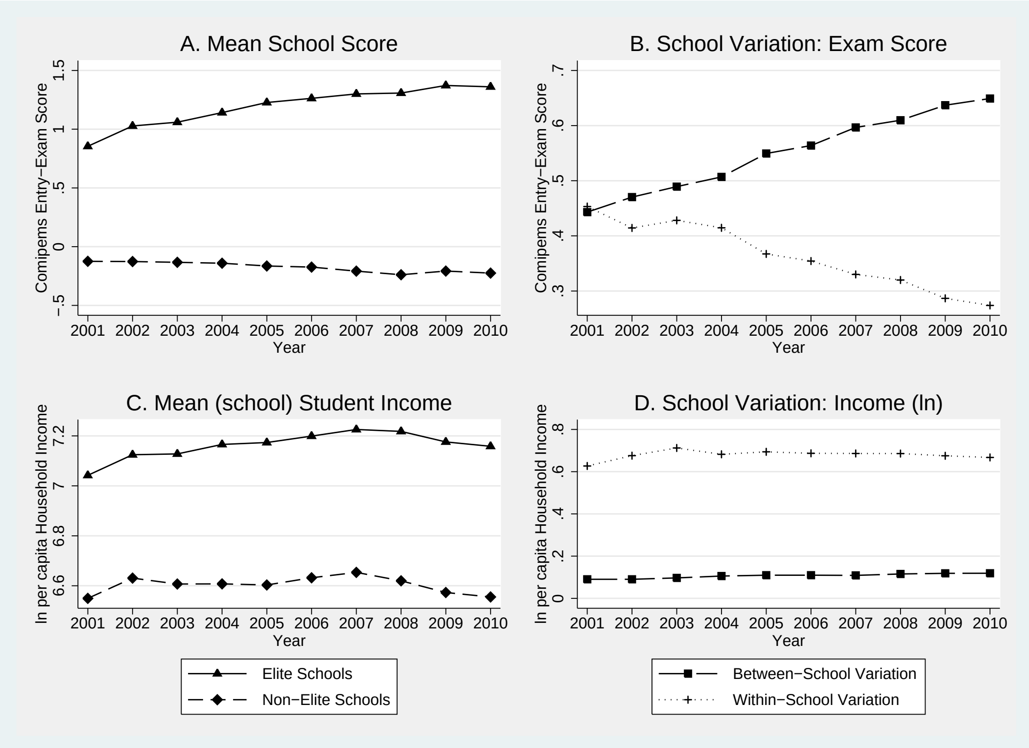
Table 3: Change in Demand and Admission to Elite Schools: 2001-2010 (OLS)

VARIABLES	(1) Selected an Elite School	(2) First Choice is Elite School	(3) Share of Elite Schools	(4) Number of Elite Schools	(5) Assigned to Elite School
Year 2002	0.0202***	0.0401***	0.0361***	0.335***	0.00549***
	(0.00191)	(0.00210)	(0.00154)	(0.0159)	(0.00168)
Year 2003	0.0380***	0.0631***	0.0521***	0.519***	0.00435**
	(0.00211)	(0.00225)	(0.00178)	(0.0177)	(0.00177)
Year 2004	0.0403***	0.0766***	0.0609***	0.592***	0.00493***
	(0.00231)	(0.00247)	(0.00183)	(0.0189)	(0.00186)
Year 2005	0.0563***	0.0997***	0.0651***	0.992***	0.00331
	(0.00255)	(0.00274)	(0.00194)	(0.0217)	(0.00208)
Year 2006	0.0782***	0.130***	0.0698***	1.249***	-0.00193
	(0.00286)	(0.00296)	(0.00204)	(0.0229)	(0.00223)
Year 2007	0.0796***	0.138***	0.0768***	1.421***	0.00490**
	(0.00293)	(0.00309)	(0.00223)	(0.0268)	(0.00236)
Year 2008	0.0879***	0.151***	0.0821***	1.601***	0.00803***
	(0.00315)	(0.00328)	(0.00223)	(0.0277)	(0.00246)
Year 2009	0.0977***	0.171***	0.0961***	1.731***	0.00205
	(0.00331)	(0.00347)	(0.00237)	(0.0276)	(0.00255)
Year 2010	0.103***	0.176***	0.0956***	1.880***	0.00434*
	(0.00326)	(0.00355)	(0.00240)	(0.0285)	(0.00259)
Female	0.00163	-0.00440***	0.00415***	-0.0408***	-0.00582***
	(0.00104)	(0.00131)	(0.000963)	(0.00844)	(0.000864)
Private JHS	0.0594***	0.105***	0.191***	0.550***	0.0502***
	(0.00494)	(0.00546)	(0.00609)	(0.0589)	(0.00391)
Observations	1,519,439	1,519,439	1,519,439	1,519,439	1,519,439
R-squared	0.240	0.226	0.333	0.272	0.522
JHS Municipality Dummies	Yes	Yes	Yes	Yes	Yes
Exam-Rank-Vintile Dummies	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var. in 2001	0.749	0.580	0.390	3.036	0.287

Notes: Dependent variables are an indicator for whether the applicant selected at least an elite school in her choice list (column 1), an indicator for the selection of an elite school as first choice (column 2), the share and number of elite schools in the applicant's choice list (columns 3 and 4, repectively) and an indicator for whether the applicant was assigned to an elite school (column 5). Elite schools are high schools from the IPN and UNAM systems. Source: COMIPEMS 2001-2010. Sample: regular applicants from the D.F. and participating municipalities from the State of Mexico. Robust standard errors are in parenthesis clustered at the attended-JHS level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

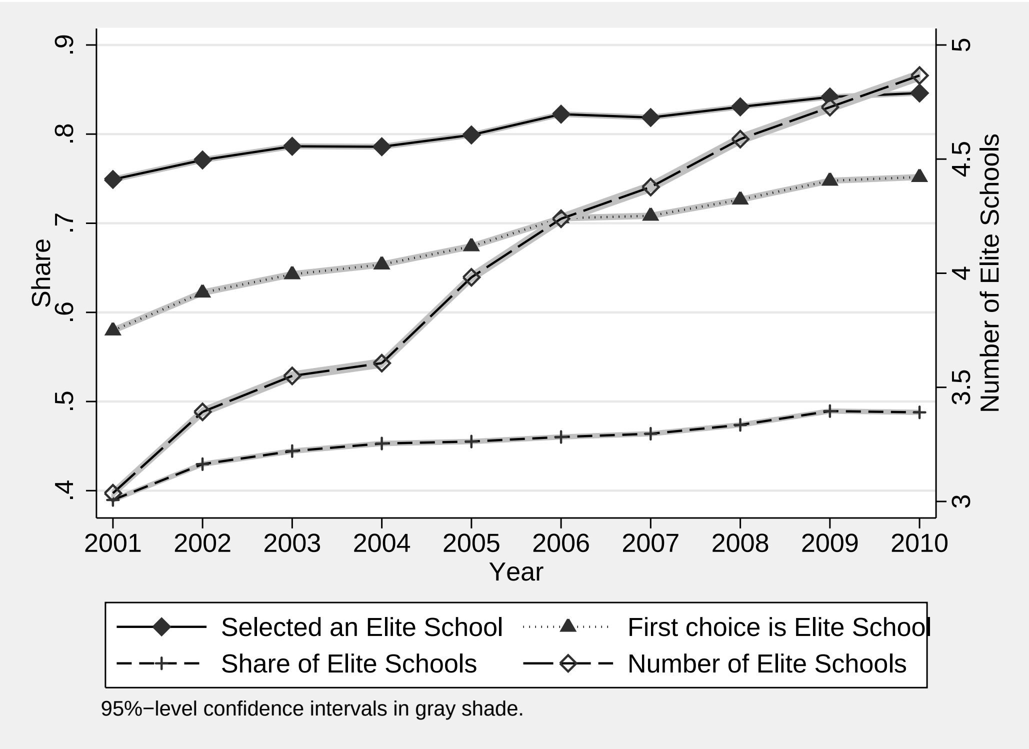
Figures

Figure 1: School Stratification by Academic Ability and Household Income: 2001-2010



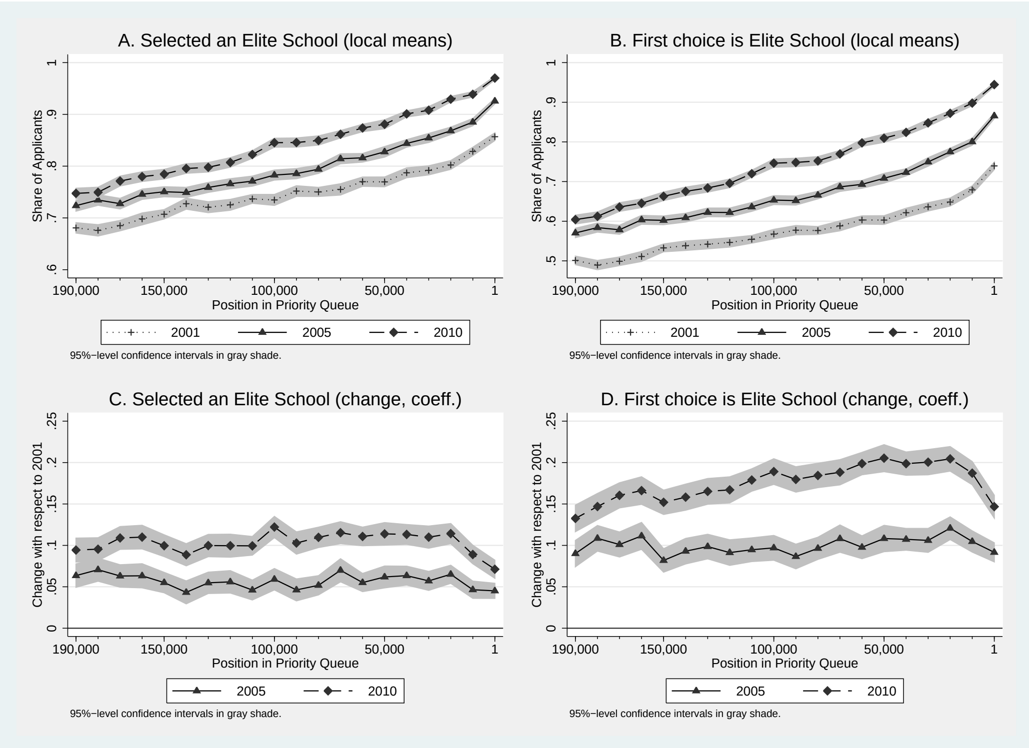
Notes: Panels A and C report, respectively, means by elite-school status of school-level means of the assigned applicants' entry-exam score and per capita household income (in natural logarithms). Panels B and D report, respectively, the between and within-school variation of the assigned applicants' entry-exam score and per capita household income (in natural logarithms). Source: COMIPEMS 2001-2010. Sample: Applicants allocated to a Comipems school in the first stage of the Comipems assignment process.

Figure 2: Demand for Elite Schools: 2001-2010



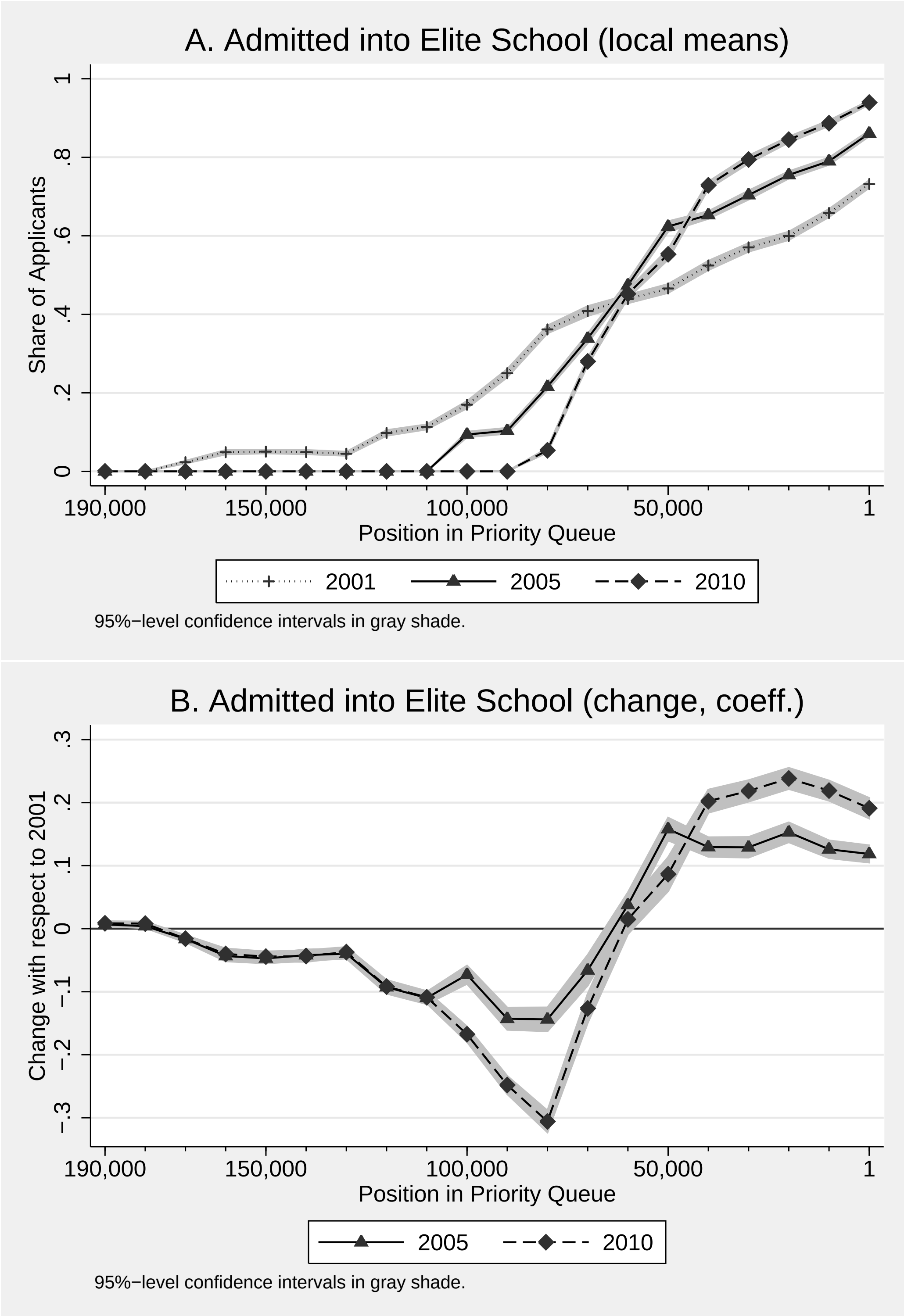
Notes: Conditional means by vintile of Comipems entry-exam score of the following variables: an indicator for whether the applicant selected at least an elite school in her choice list, an indicator for the selection of an elite school as first choice, and the share and number of elite schools in the applicant's choice list. Confidence intervals at the 95-percent level are reported in all cases. Source: COMIPEMS 2001-2010. Sample: regular applicants from the D.F. and participating municipalities from the State of Mexico.

Figure 3: Demand for Elite Schools by Position in Priority Queue



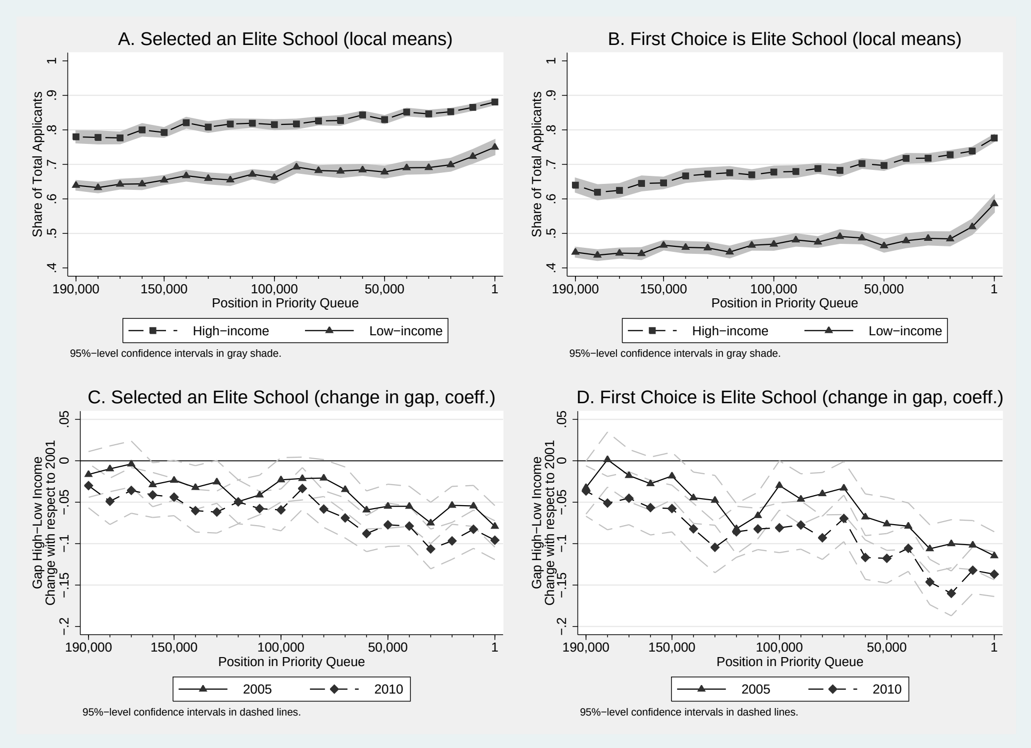
Notes: Panels A and B report, respectively, conditional means by vintile of the entry-exam score of an indicator for whether the applicant selected at least an elite school in her choice list and an indicator for the selection of an elite school as first choice. Panels C and D report regression coefficients for within-entry-exam-vintile changes in the same variables between 2001 and 2005 and 2010. Coefficients are obtained from, separate, OLS regressions of the outcomes on a vector of year dummies, a vector of extry-exam vintiles, a set of full interactions between these two vectors, and a gender indicator, an indicator for graduation from a private junior high school (JHS) and a vector of JHS-municipality dummies. Standard errors are clustered at the attended-JHS level in the regressions. Confidence intervals at the 95-percent level are reported in all cases. Source: COMIPEMS 2001-2010. Sample: regular applicants from the D.F. and participating municipalities from the State of Mexico.

Figure 4: Admission to Elite Schools by Position in Priority Queue



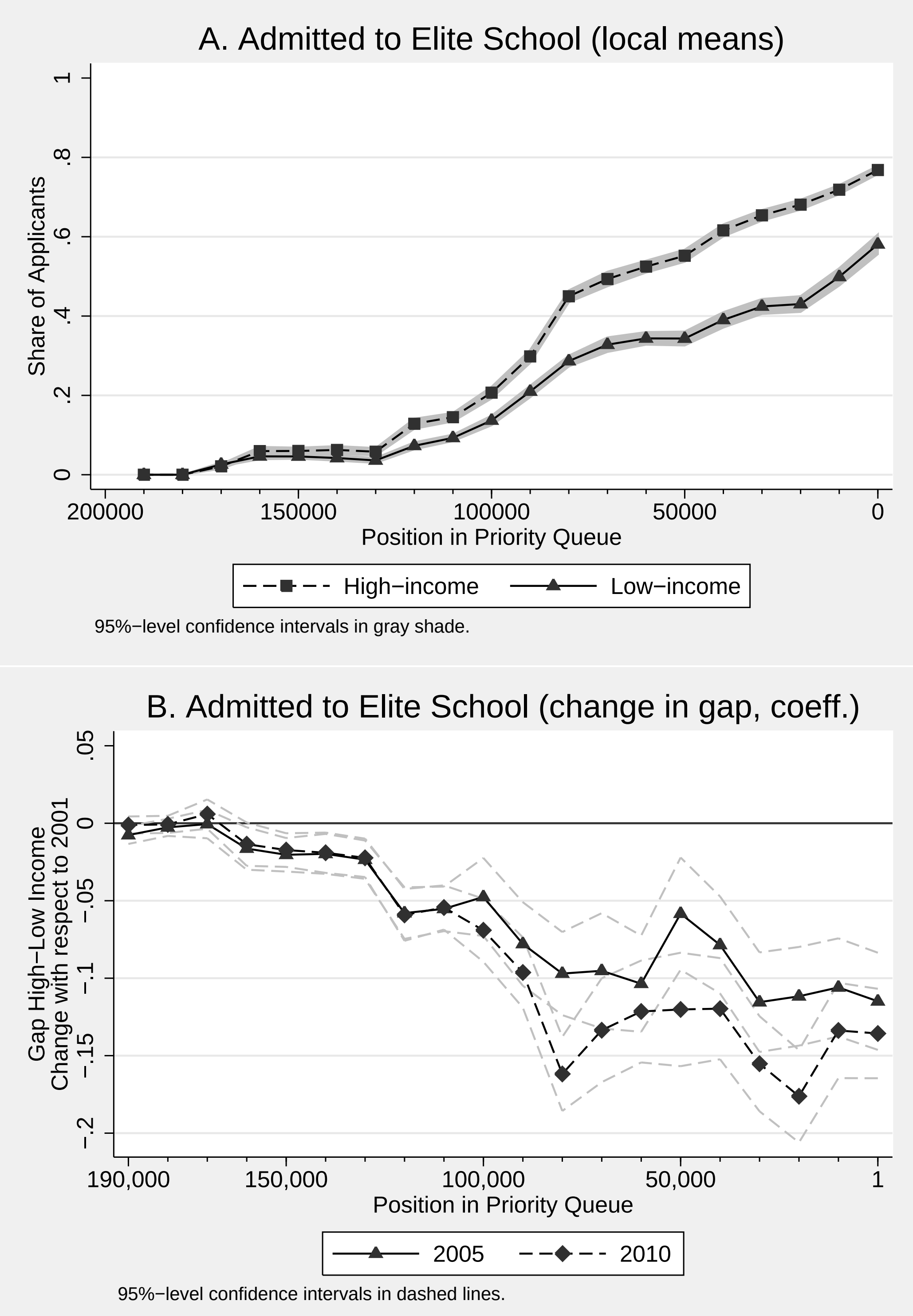
Notes: Panel A reports conditional means by vintile of the entry-exam score of an indicator for whether the applicant was assigned to an elite school. Panels B reports regression coefficients for within-entry-exam-vintile changes in the same variable between 2001 and 2005 and 2010. Coefficients are obtained from an OLS regressions of the outcome on a vector of year dummies, a vector of extry-exam vintiles, a set of full interactions between these two vectors, and a gender indicator, an indicator for graduation from a private junior high school (JHS) and a vector of JHS-municipality dummies. Standard errors are clustered at the attended-JHS level in the regression. Confidence intervals at the 95-percent level are reported in both cases. Source: COMIPEMS 2001-2010. Sample: regular applicants from the D.F. and participating municipalities from the State of Mexico.

Figure 5: Demand Gap between High and Low-income Applicants by Position in Priority Queue



Notes: Panels A and B report, respectively, conditional means by vintile of the entry-exam score and family income status (above the median is high and below the median is low) of an indicator for whether the applicant selected at least an elite school in her choice list and an indicator for the selection of an elite school as first choice. Panels C and D report regression coefficients for within-entry-exam-vintile changes in the gap between high and low-income applicants in the same variables between 2001 and 2005 and 2010. Coefficients are obtained from, separate, OLS regressions of the outcomes on a vector of year dummies, a vector of extry-exam vintiles, a set of full interactions between these two vectors, an indicator for high-income status and a set of full interactions between this indicator and the previous vectors, and a gender indicator, an indicator for graduation from a private junior high school (JHS) and a vector of JHS-municipality dummies. Standard errors are clustered at the attended-JHS level in the regressions. Confidence intervals at the 95-percent level are reported in all cases. Source: COMIPEMS 2001-2010. Sample: regular applicants from the D.F. and participating municipalities from the State of Mexico.

Figure 6: Admission Gap between High and Low-income Applicants by Position in Priority Queue



Notes: Panel A reports conditional means by vintile of the entry-exam score and family income status (above the median is high and below the median is low) of an indicator for whether the applicant was assigned to an elite school. Panels B reports regression coefficients for within-entry-exam-vintile changes in the gap between high and low-income applicants in the same variable between 2001 and 2005 and 2010. Coefficients are obtained from an OLS regressions of the outcome on a vector of year dummies, a vector of extry-exam vintiles, a set of full interactions between these two vectors, an indicator for high-income status and a set of full interactions between this indicator and the previous vectors, and a gender indicator, an indicator for graduation from a private junior high school (JHS) and a vector of JHS-municipality dummies. Standard errors are clustered at the attended-JHS level in the regressions. Confidence intervals at the 95-percent level are reported in all cases. Source: COMIPEMS 2001-2010. Sample: regular applicants from the D.F. and participating municipalities from the State of Mexico.