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NATIVE STUDENTS FROM GRADUATE PROGRAMS?

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ABSTRACT

This paper examines how the growth in the number of foreign students enrolled in graduate programs affects native enrollment in those programs. Although there is little evidence of a crowdout effect for the typical native student, the impact of foreign students on native educational outcomes differs dramatically across ethnic groups, and is particularly adverse for white native men. There is a strong negative correlation between increases in the number of foreign students enrolled at a particular university and the number of white native men in that university's graduate program. This crowdout effect is strongest at the most elite institutions.

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DO FOREIGN STUDENTS CROWD OUT NATIVE STUDENTS FROM GRADUATE PROGRAMS?

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I. Introduction

The Immigration and Nationality Act provides two types of “nonimmigrant” (i.e., non-permanent) visas for persons wishing to study in the United States. The “F-1” visa is for academic studies, and the “M-1” visa is for vocational studies. The number of visas issued to foreign students increased greatly in recent decades. In 1980, 155.0 thousand foreigners were granted temporary visas to study in the United States. By 2000, the number of student visas totaled 315.4 thousand, with the bulk of the visas (98.0 percent) being granted to persons enrolled in academic programs.

As a result of the increasing number of visas granted to foreign students, the share of nonresident aliens enrolled in graduate programs in the United States rose from 5.5 percent in 1976 to 12.4 percent in 1999. This increase had a particularly large impact on graduate enrollment in the sciences. By 1999-2000, nonresident aliens received 38.2 percent of all doctorates awarded in the physical sciences, 52.1 percent in engineering, 26.6 percent in the life sciences, and 22.8 percent in the social sciences (U.S. Department of Education, 2002, Tables 208, 275).

Remarkably, there has been practically no research analyzing the costs and benefits of foreign students. We know almost nothing about their impact on the higher education system, their impact on the U.S. labor market, and their impact on the economies of the source

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countries.¹ This paper investigates how the rapid growth in the number of foreign students enrolled in graduate programs affected native enrollment in those programs. If the number of slots in graduate programs were fixed, any increase in the number of foreign students would crowd out natives who would presumably have filled those positions. Even if the graduate programs were expanding, an increase in the supply of foreign students might sufficiently alter incentives for natives to pursue some programs, particularly if many foreign students stay in the United States and reduce economic opportunities in some occupations.

On aggregate, the empirical analysis reported in this paper shows that there is little evidence of a crowdout effect for the typical native. This result, however, masks sizable differences in the impact of foreign students across ethnic groups and between native men and women. In fact, there is a strong negative correlation between increases in the number of foreign students enrolled *at a particular university* and the number of white native men enrolled in that university's graduate program. The study thus suggests that the growth in foreign student enrollment has indeed altered the educational opportunities available to white native men.

II. The Crowdout Effect

A university's decision to admit additional foreign students to its graduate program obviously depends on many factors, including the relative quality of the applicants, the possibility that foreign students pay for a higher fraction of their education, the widespread adoption of the axiom that "diversity" is beneficial in a university setting, and the relative

¹ A few studies examine how foreign-born teaching assistants affect the educational outcomes experienced by native-born undergraduates; see, for instance, Jacobs and Friedman (1988), Borjas (2000), and Fleisher, Hashimoto, and Weinberg (2003). Hoxby (1998) and Betts (1998) present the only studies that explicitly focus on measuring the impact of immigrants on the high school completion rates or enrollment rates in undergraduate programs of native students. Borjas (2002) summarizes some of the available evidence and details the research questions that would lie at the core of any cost-benefit evaluation of the foreign student program.

marginal products of the foreign and native students as employees of the university (since many graduate students typically work as research assistants or teaching assistants). Some of these factors may imply that, other things being equal, admission officers would prefer to admit a foreign student over a native-born applicant.

The admission and eventual enrollment of foreign students alters the educational opportunities available to qualified natives in two distinct ways. First, it may be the case that the number of slots available in a particular graduate program is fixed in the short run. The enrollment of an additional foreign student would then necessarily imply that one fewer native student would be enrolled. This is the simplest and clearest case of a crowdout effect. Even if the university were expanding and admitting more foreign *and* more native students, there may still be a crowdout effect in the sense that native enrollment would have risen faster if the university had not increased its supply of foreign students. In the empirical analysis reported below, I adopt the conservative definition of a crowdout effect that requires native enrollment to actually fall (rather than not rise as much as it would have risen otherwise) when the number of foreign students increases.

The entry of foreign students can alter the educational decisions made by native students in another, less direct, way. In particular, an increase in the number of enrolled foreign students may affect the incentives that natives have to pursue some educational programs. Suppose, for instance, that many of the foreign students enrolled in a particular program (e.g., computer science) remain in the United States after graduation. One would then expect that wages in these computer-related occupations would fall and those occupations would become relatively less

attractive to natives.² The foreign students may still choose to enter those low-paying jobs because their career decisions are mainly guided by the fact that the student visa is perceived as providing an entry ticket into the United States, so that they would be comparing the low U.S. wage in a computer-related occupation with the even lower wage that would be available if they remained in the source countries. In contrast, native students have many more career choices, and would shy away from applying to those educational programs where foreign students cluster. In the long run, this behavioral response would again imply that an increase in the enrollment of foreign students in a particular program would reduce the number of natives enrolled in that program.³

There is one important distinction between the two types of crowdout effects discussed above. The first crowdout effect is specific to a particular university—and indicates how native enrollment in that institution changes as the number of foreign students enrolled in that institution increases. The second crowdout effect results from an economy-wide behavioral response that effectively inhibits natives from pursuing particular educational programs in all universities (or perhaps from pursuing a graduate education altogether if the labor supply increase resulting from the foreign student program is sufficiently large in all fields). The empirical analysis presented below nets out these economy-wide fluctuations and examines the shifts that occur in native enrollment *within a particular university* as the size of the foreign student population increases. The study, therefore, will isolate the institution-specific type of crowdout effect.

² Borjas (2003) presents the most recent evidence on the wage impact of immigration in the U.S. labor market. He finds that an immigration-induced 10 percent increase in the number of workers belonging to a particular skill group lowers the wage of that group by 3 to 4 percent.

³ Freeman et al (2001) describe how the major shifts in the bioscience job market, shifts that are partly due to the influx of foreign students, alter the incentives for pursuing careers in that sector.

III. Data

Since 1986, the Integrated Postsecondary Education Data System (IPEDS) has collected detailed information on enrollment, employment, and finances in institutions of higher education. Each institution reports the number of persons enrolled in particular programs both at the undergraduate and graduate levels, including the gender and race of students, as well as the number of nonresident aliens (which, for simplicity, I will refer to as “foreign students”). The educational institution also reports detailed information on expenditures in various categories relevant to the higher education sector (e.g., instruction and research). Prior to 1986, the same type of information was collected by the Higher Education General Information System (HEGIS), a precursor of the IPEDS data. My empirical analysis uses enrollment information provided by both of these surveys.

My analysis focuses on enrollment trends in graduate programs. These enrollment statistics do not include students who attend professional schools.⁴ Further, the analysis is restricted to higher education institutions in the United States that are accredited at the college level by the U.S. Department of Education and that are legally authorized to offer at least a one-year program of study creditable to a degree.⁵

My empirical study of enrollment trends uses the cross-sections observed in 1978, 1982, 1986, 1990, 1994, and 1998. In each of these cross-sections, I calculate the total number of graduate students enrolled in each institution, regardless of whether they are enrolled full-time or

⁴ In the IPEDS file, professional students include students enrolled in professional programs in schools of law, medicine, and dentistry, but do not include students attending business or engineering schools. The business and engineering students are classified as graduate students, and are therefore included in the analysis that follows.

part-time. The choice of the timing of the cross-section snapshots is due to two factors. Prior to the 1990s, the IPEDS surveys were not conducted annually, and some of the available cross-sections do not contain any information on the number of foreign students enrolled in the institution. Further, the four-year gap across cross-sections implies that there is a significant turnover in the graduate student population of a particular institution from survey to survey, minimizing the problems that would arise if many students were double-counted because they appeared in several surveys.⁶ Because the IPEDS contains only limited information on field of study, I restrict the analysis to the size of the entire graduate program at a particular institution.

Table 1 summarizes the enrollment trends for various groups of students. The number of foreign students more than doubled between 1978 and 1998, from 79.4 thousand to 194.3 thousand. There has also been a sizable increase in the number of native-born graduate students. In 1978, there were 1.2 million native graduates students, and this number increased to 1.4 million in 1990, and to 1.6 million in 1998. It turns out, however, that *all* of this growth occurred among native women. In contrast, the number of male native-born students hovered around 600 thousand throughout the entire period.

One particular group of natives—white men—will play a significant role in the analysis reported below. They are the only native group that had a lower enrollment in graduate programs at the end of the period than at the beginning. In particular, there were 556.0 thousand white native men enrolled in graduate programs in 1978. This statistic fell to 539 thousand in 1990, and

⁵ Operationally, this sample restriction limits the study to institutions that have a valid Federal Interagency Committee on Education (FICE) code.

⁶ Alternatively, I could have analyzed enrollment trends for first-time graduate students (an enrollment statistic that is also reported in the IPEDS). These data, however, seem to contain significant measurement errors, particularly in the earlier surveys.

to 509 thousand in 1998. Note, however, that graduate enrollment for this group did not decline monotonically throughout the period.

IV. Estimating Crowdout Effects

Let N_{it} denote the number of native graduate students enrolled in university i at time t , and let F_{it} denote the respective number of foreign students. Much of the statistical evidence reported in this paper is obtained by stacking the enrollment data obtained from the HEGIS and IPEDS across universities and surveys and estimating the regression model:

$$(1) \quad N_{it} = \theta F_{it} + s_i + \pi_t + \varepsilon_{it},$$

where s_i is a vector of fixed effects indicating the university; and π_t is a vector of fixed effects indicating the time period. The university fixed effects absorb any university-specific factors that may determine the size of native enrollment. The period fixed effects absorb any time-specific factors that determine the size of the native population interested in pursuing a graduate education at a particular point in time. Throughout the analysis, the regression will be weighted by the total enrollment of the graduate program in a particular university at a particular point in time (or $N_{it} + F_{it}$). Further, the standard errors are clustered by university to adjust for possible serial correlation within a particular institution.

Under some conditions, the magnitude of the coefficient θ provides information about the crowdout effect suggested by the enrollment data. In particular, θ measures what happens to native enrollment *within a particular university* when that institution decides to enroll one more foreign student. If the estimate of θ were zero, for example, the data would indicate that the

enrollment of an additional foreign student simply expands the size of the university and has no effect on its pre-existing (native) enrollment. If the estimate of θ were -1 , there would be a one-to-one crowdout effect. The total number of students enrolled in the university's graduate program is constant, and each additional foreign student displaces a native student who presumably would have otherwise enrolled. Of course, θ may also be positive, perhaps even exceeding one. Over time, some universities have expanded, and the coefficient θ measures how this expansion affected the relative enrollment of native and foreign students.

The top panel of Table 2 reports the coefficient θ estimated from various specifications of the model. Each coefficient reported in the table is estimated from a different regression model, where the dependent variable is the number of native graduate students in a particular race-gender group. Consider the first regression coefficient reported in the table, where the dependent variable is the total number of natives (both men and women) enrolled in school i at time t and the independent variable gives the total number of foreign students enrolled in that school at that time. The estimated coefficient is .046 (with a standard error of .279), indicating that an additional foreign student, at the margin, had no impact on the number of natives enrolled at that institution.

This aggregate correlation, however, masks a great deal of dispersion, particularly in terms of the impact of foreign students on the enrollment of natives who differ in their gender and ethnic background. Most important, Table 2 documents the existence of a significant negative correlation between foreign students and the enrollment of white native men. For this group, the coefficient is $-.418$ (.139). This negative coefficient does not indicate that graduate enrollment for this group was declining at every university. That potential trend is absorbed by the period fixed effects included in the regression model. Instead, the estimated coefficient

indicates that the enrollment of white native men fell most in those schools that had larger increases in the number of foreign students enrolled. In short, the evidence suggests a significant *institution-specific* crowdout effect of foreign students on the enrollment of white men.⁷

The raw data underlying this result can be easily illustrated. Figure 1 presents the scatter diagram that relates the 1978-98 change in the enrollment of white native men to the respective change in the number of foreign students enrolled at a particular university. Each point in the scatter diagram, therefore, represents enrollment changes that occurred at a school over the period. It is clear that the enrollment of white native men fell most steeply in those schools that had the largest increases in foreign student enrollment.

Because graduate education for both foreign and native students is highly subsidized by U.S. taxpayers (Winston 1999), it is important to determine if the crowdout effect differs between public and private institutions. The bottom two panels of Table 2 report some of the regression coefficients estimated in each of the two sectors. Although the crowdout effect on white native men is negative and significant in both sectors, it is substantially larger in private universities. Moreover, the regression for white native *women* suggests that they may be crowded out of private institutions as well. In fact, the coefficient for total white native enrollment in the private sector is $-.856 (.428)$, suggesting a one-to-one displacement of white natives as foreign student enrollment increases.⁸

⁷ The estimated crowdout effects would be even stronger if the enrollment data also included enrollment in professional programs. In particular, the estimated coefficient for native white men would be $-.576 (.145)$.

⁸ It is worth stressing that the potential crowdout effect of foreign students on white native men isolates a unique relationship that is not found when one contrasts the enrollment trends of white native men with other groups. A regression of the enrollment of white native men on the number of foreign students and the number of white native women (as well as institution and period fixed effects) indicates that an increase in the number of

Crowdout and School Quality

Any policy evaluation of a potential crowdout effect will depend on the constraints that the enrollment of foreign students imposes on the educational access available to natives. As a result, it is important to examine how the crowdout effect varies across institutions that differ in the quality of their graduate programs.

To assign a quality ranking to a particular institution, I used the data on instructional expenditures reported in the IPEDS files. I calculated the *average* per-student instructional expenditures for the survey years 1990-1993.⁹ The averaging of the expenditure data over the four years helps to minimize the problem of both measurement error and short-run fluctuations in instructional expenditures. I divided the population of institutions into 50 quantiles. There are approximately 1,100 institutions in my data extract, so that each quantile of the distribution contains around 22 schools. The top two quantiles of this distribution contain the list of “usual suspects,” including Harvard, Yale, Princeton, Columbia, and the California Institute of Technology.

Figure 2 presents the cumulative probability distributions for the stock of foreign and native students (as of 1998) along the quality spectrum. Native enrollment is much more evenly distributed across the spectrum than is foreign enrollment. For instance, 48.0 percent of natives are enrolled in schools in the bottom 30 quantiles of the quality distribution, as compared to only 22.8 percent of foreign students.

foreign students reduces the enrollment of white native men, but an increase in the number of white native women does not. The estimated coefficients are $-.539 (.109)$ and $.496 (.060)$, respectively.

⁹ The denominator includes all undergraduate and graduate students, regardless of whether they are enrolled part-time or full-time. The expenditure data was deflated using the CPI-U series. I restricted the set of institutions to those that reported an average per-student expenditure of less than \$100,000 (eliminating mainly medical, law, and theological schools from the data). The data on instructional expenditures is not available for approximately 20 percent of the institutions. These institutions are omitted from the analysis reported in this subsection.

Equally important, there is an important difference in how enrollment grew for foreign and native students across the various quantiles. Figure 3 shows that native enrollment between 1978 and 1998 grew fastest at the lower-quality institutions, while foreign enrollment grew fastest at the higher-quality institutions. The figure also suggests that the crowdout effect of foreign students on white native men isolates a unique relationship that is not found when one contrasts the enrollment trends of white native men with other groups. The 1980s and 1990s witnessed not only a large increase in foreign enrollment, but also a large increase in the number of native women enrolled in graduate programs. Figure 3 shows that native women are much more evenly scattered across the quality spectrum, so that the growth of women occurred in the same types of institutions where the enrollment of white native men grew most (or decreased least). In short, there is no evidence that the increase in the supply of native women in graduate programs crowded out native white men.

Table 3 reports the coefficient θ from regression models estimated separately in sets of institutions of roughly similar quality. The correlation between the enrollment of white native men and foreign students is slightly positive for the lower-quality schools (.188, with a standard error of .281), turns zero for schools in the middle of the quality distribution (-.038, with a standard error of .140), and becomes negative for schools at the top of the distribution (-.493, with a standard error of .167). In fact, the coefficient is most negative when the regression model is estimated in the subset of elite institutions in the 50th quantile. The crowdout effect for white native men is then -.605 (.253). In fact, the table suggests that there may also be a crowdout effect for white native women at these elite institutions.

Reverse Causality

An alternative interpretation of the negative sign of the coefficient θ is that universities increased their enrollment of foreign graduate students because they faced a substantial decline in the number of (qualified) white native men who wished to enroll in their graduate programs. The decline in the number of white native men could be due to changing demographics: there may have been a substantial decline in the size of the population of white native men who are college graduates. One problem with this hypothesis is that the period fixed effects included in the regression model already control for such demographic trends. Moreover, the actual demographic trends are *not* consistent with this hypothesis. The pool of potential graduate students among white native men rose dramatically between 1970 and 1980 (as the baby boomers reached their 20s), but declined by only about 200 thousand persons since then, with almost all of the decline occurring between 1980 and 1990. In contrast, the number of native white men enrolled in graduate programs has hovered between 500 and 550 thousand throughout the past two decades.¹⁰

Alternatively, one could argue that white native men simply do not longer wish to pursue careers that require a graduate education. This counterfactual resembles the often-heard argument that “immigrants do jobs that natives do not want to do” in the U.S. labor market. If one takes this set of arguments seriously, it would seem to imply that there are few jobs that natives *do* want to do. The argument is used to justify why immigrants do not compete with low-skill workers, such as gardeners and taxi drivers—since natives do not want to perform those presumably menial jobs. It is also used to justify why increased immigration of high-tech workers is needed to alleviate presumed labor shortages in the high-tech sector—since natives do

¹⁰ See also the related evidence presented by Groen and Rizzo (2003).

not want to be software programmers. And, in this context, it would be used to explain why immigrants do not crowd out natives from graduate programs, since white native men no longer wish to attend graduate school.

It is unlikely that this is a valid conjecture. After all, the greatest declines in the enrollment of white native men occurred at high-quality institutions. Surely all potential graduate students—regardless of their race—would prefer to attend those institutions that provide the best job opportunities after graduation. Of course, it is possible that it is the *most* qualified white native men who no longer wish to attend graduate school, so that graduate programs have a shortage of qualified applicants and are forced to fill in the existing slots with foreign applicants. Moreover, note that the number of white native *women* attending elite institutions was adversely affected by the growing enrollment of foreign students—despite the very large increase in the number of women enrolling in graduate programs.

V. Summary and Implications

The evidence presented in this paper documents a strong negative correlation between the enrollment of white native men in graduate programs and the enrollment of foreign students. Those educational institutions that experienced the largest increases in foreign enrollment are also the institutions that experienced the steepest drops in the enrollment of white native men. The evidence is consistent with the hypothesis that foreign students limit the opportunities available to white native men in graduate education, particularly at the most elite institutions.

It is worth stressing that the potential crowdout effect of foreign students on the enrollment of white native men may not signal a suboptimal allocation of resources in the graduate education sector. The implications of the finding depend crucially on three related

issues. First, what happens to the displaced white native men? Second, what happens to the foreign students after they complete their education? Finally, what are the costs and benefits that foreign students impart on universities and on the U.S. economy?

The first of these questions is difficult to answer, as we simply do not know the career choices made by the displaced white men (and it is difficult to imagine a simple way of measuring this counterfactual). Did these men move on to lower-quality graduate programs, or did many of them decide to forego a graduate education altogether? Moreover, any cost-benefit analysis requires information on how these men would have fared had they attended the graduate program of their choice.

We could potentially learn more about the career choices and contributions made by the foreign students after they complete their graduate education. Over 50 percent of foreign students who received their doctorates in the 1990s stayed in the United States (Finn 2000). What is the nature of the selection that determines the population of stayers?

Finally, foreign students impart many other costs and benefits. They pay tuition, and these tuition revenues—if they were to exceed the actual cost of providing an education—could be an additional source of economic benefit. But the pricing of higher education in the United States is highly distorted in both private and public institutions, with the typical tuition payment not being sufficiently large to cover the actual cost of an education. If immigration policy is supposed to benefit the native population, it may be difficult to justify a subsidy system that limits educational opportunities for many native students unless the economic gains from foreign students are very large. Although we do not know the size of these gains, it is well documented that foreign doctorates who reside in the United States contribute disproportionately to the advancement of science (Stephan and Levin 2001). At the same time, however, existing

calculations of the economic benefits from immigration tend to suggest that the net benefit that accrues to the native-born population is small (Borjas, 1995; Johnson, 1998).

In sum, although the rapid growth of the foreign student program in the past two decades has altered the higher education sector in significant ways, there is still much to learn before we can objectively assess the costs and benefits of this important shift in the parameters of U.S. immigration policy.

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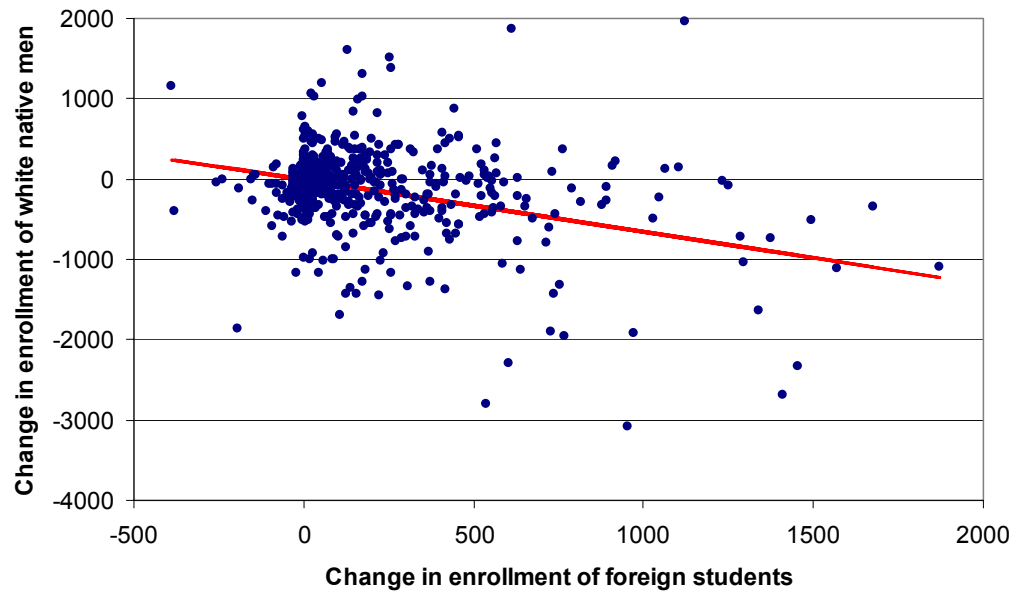
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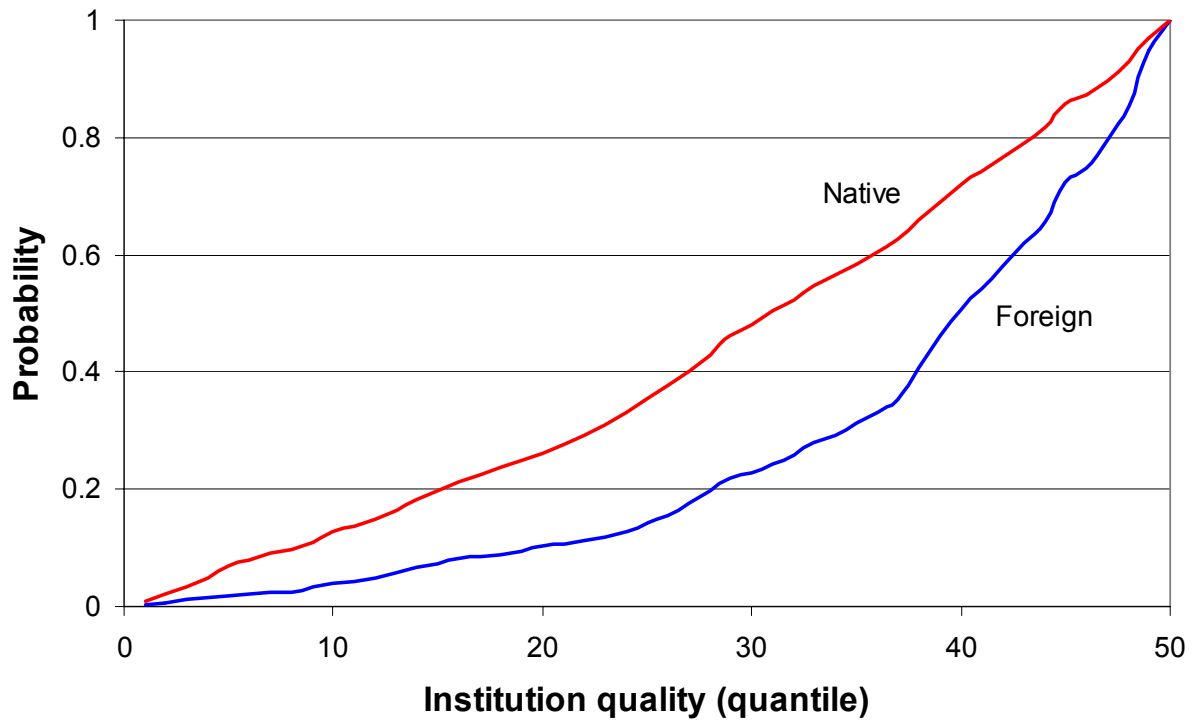
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Figure 1. Scatter Diagram Relating Change in Enrollment of Foreign Students and White Native Men, 1978-98



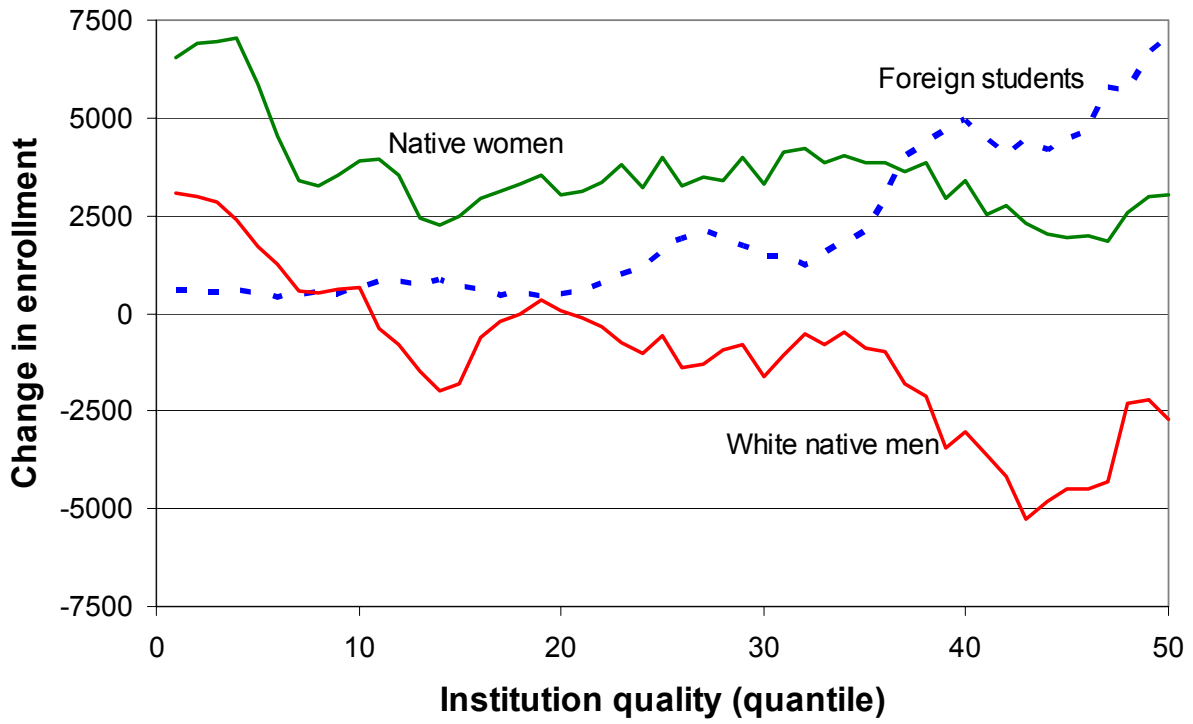
Notes: Each point in the scatter diagram indicates the 1978-98 change in foreign students and white native men for a particular university. The regression line weighs the data by the total graduate enrollment at the university (as of 1998). The coefficient is $-.649$, with a standard error of $.053$.

**Figure 2. Cumulative Probability Distributions
for Native and Foreign Graduate Enrollment, 1998**



Notes: The enrollment data is drawn from the 1998 IPEDS. The quality ranking for an institution is based on the institution's per-student instructional expenditure between 1990 and 1993; see the text for more details.

**Figure 3. Change in Enrollment between 1978 and 1998,
by Quality of Institution**



Notes: The enrollment data for each institution are drawn from the 1978 HEGIS and the 1998 IPEDS. The quality ranking for an institution is based on the institution's per-student instructional expenditure between 1990 and 1993; see the text for more details. The lines in the figures represent a five-quantile moving average.

Table 1. Enrollment Trends in Graduate Programs, 1978-1998
(Number of students in 1000s)

<u>Group:</u>	<u>Year</u>					
	<u>1978</u>	<u>1982</u>	<u>1986</u>	<u>1990</u>	<u>1994</u>	<u>1998</u>
Nonresident aliens	79.4	105.0	132.4	167.3	179.5	194.3
Male	60.7	78.7	97.0	116.4	118.1	120.8
Female	18.7	26.3	35.4	50.9	61.4	73.4
All natives	1239.3	1217.3	1302.9	1418.8	1542.0	1569.6
Male	627.0	591.0	596.3	621.0	657.7	631.3
Female	612.3	626.3	706.6	797.9	884.3	938.2
Asian natives	27.5	35.0	41.7	53.2	72.6	86.2
Male	16.3	20.9	24.5	29.7	38.3	41.8
Female	11.1	14.2	17.2	23.6	34.3	44.4
Black natives	76.4	68.9	70.3	83.9	110.6	138.6
Male	29.9	26.1	25.6	29.3	37.7	44.1
Female	46.5	42.8	44.7	54.6	72.9	94.5
Hispanic natives	27.9	31.7	44.4	47.2	63.9	82.7
Male	14.4	14.8	19.9	20.6	27.0	32.4
Female	13.5	17.0	24.6	26.6	36.9	50.3
White natives	1094.0	1074.7	1101.4	1228.4	1286.8	1252.4
Male	556.0	525.5	505.2	538.8	551.4	509.3
Female	537.9	549.2	596.2	689.5	735.4	743.1

Source: The statistics are calculated using the HEGIS (pre-1982) and the IPEDS (post-1986) data files.

Table 2. Impact of Foreign Students on Native Enrollment

<u>Ethnicity of native group:</u>	<u>Gender of natives</u>		
	<u>Male and female</u>	<u>Male</u>	<u>Female</u>
A. All schools			
All natives	.046 (.279)	-.198 (.152)	.244 (.141)
Asian natives	.232 (.054)	.105 (.025)	.127 (.030)
Black natives	.105 (.026)	.033 (.009)	.071 (.019)
Hispanic natives	.191 (.126)	.080 (.054)	.111 (.073)
White natives	-.488 (.268)	-.418 (.139)	-.070 (.145)
B. Public institutions			
All natives	.214 (.342)	-.093 (.178)	.307 (.177)
White natives	-.197 (.259)	-.272 (.139)	.075 (.135)
C. Private institutions			
All natives	-.194 (.404)	-.328 (.227)	.134 (.208)
White natives	-.856 (.428)	-.589 (.222)	-.267 (.239)

Notes: Standard errors are reported in parentheses and are clustered by institution. The regressions reported in Panel A have 8,236 observations; the regressions in Panel B have 3,103 observations, while the regressions in Panel C have 5,133 observations. All regressions include a vector of fixed effects indicating the institution and a vector of fixed effects indicating the survey year.

**Table 3. Impact of Foreign Students on Native Enrollment,
by Quality of Institution**

	Quantile of quality distribution							
	1-10 th		11 th -40 th		41-50 th		50 th	
	θ	Standard error	θ	Standard error	θ	Standard error	θ	Standard error
<u>Native group:</u>								
All natives	9.358	(3.371)	.515	(.323)	-.176	(.294)	-.466	(.558)
Men	3.911	(1.668)	.104	(.152)	-.308	(.166)	-.466	(.291)
Women	5.448	(1.745)	.411	(.192)	.132	(.153)	.000	(.268)
All Asians	.169	(.105)	.151	(.026)	.216	(.091)	.165	(.034)
Men	.097	(.041)	.079	(.018)	.088	(.043)	.051	(.023)
Women	.072	(.066)	.072	(.009)	.128	(.050)	.114	(.013)
All blacks	.377	(.170)	.121	(.030)	.117	(.038)	.149	(.041)
Men	.200	(.068)	.044	(.011)	.033	(.012)	.045	(.014)
Women	.177	(.150)	.077	(.021)	.084	(.028)	.104	(.028)
All Hispanics	8.090	(4.171)	.074	(.041)	.094	(.037)	.083	(.007)
Men	3.427	(1.805)	.034	(.015)	.033	(.011)	.027	(.004)
Women	4.663	(2.367)	.040	(.027)	.061	(.029)	.056	(.004)
All whites	.719	(1.035)	.191	(.308)	-.649	(.322)	-.882	(.488)
Men	.188	(.281)	-.038	(.140)	-.493	(.167)	-.605	(.253)
Women	.530	(.801)	.229	(.187)	-.157	(.179)	-.277	(.236)

Notes: All standard errors are clustered by institution. The regressions estimated in the bottom 10 quantiles have 1,101 observations; the regressions estimated in the middle 30 quantiles have 3,632 observations; the regressions estimated in the top 10 quantiles have 1,216 observations; and the regressions estimated in the 50th quantile have 115 observations. All regressions include a vector of fixed effects indicating the institution and a vector of fixed effects indicating the survey year.