Prestige Matters: Value of Connections Formed in Elite Colleges *

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Abstract

This paper provides evidence that graduates of elite public institutions in India have an earnings advantage in the labor-market even though attending these colleges has no discernible effect on learning outcomes. Data do not bear out the predictions of signaling theories of human capital. Using original survey data, I find that college networks do not facilitate job search. Also, the wage-premium does not dissipate with experience. However, the number of college friends in the same industry does explain the wage premium. These results support the hypothesis that the labor market rewards the connections students' form at elite colleges.

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1 Introduction

The reputation of elite institutions attracts the very best students, and the graduates of such institutions often earn a premium in the labor market. Because college quality affects students' enrollment decisions and governments' investment decisions, determining the returns to quality of higher education is important. Limited credit markets, uncertain labor market conditions, and acute information asymmetries in developing countries make the need to understand the returns to college quality even more compelling. In addition to understanding the returns to attending elite institutions from a public finance perspective, understanding what mechanisms are responsible for generating these returns- if such return truly exists- is crucial. An understanding of these mechanisms would enable us to inform policy choices in improving college education and making it more accessible.

As noted in previous research addressing this question, estimating the returns to college quality is empirically challenging. The unobserved individual traits that influence admissions decision, may also affect labor market outcomes. Employing a variety of methods, previous research focusing on estimating the returns to selective colleges has found mixed evidence (Dale and Krueger 2002; Black and Smith 2004; Hoekstra 2009; Saavendra 2009; Dale and Krueger 2011). But minimal evidence is available concerning the mechanisms by which prestigious institutions may affect labor market outcomes. One main difficulty in assessing these mechanisms is the lack of comprehensive data that link school outcomes, college outcomes, family background, earnings, networks, referrals, and occupation for individuals. Using data from India, this study applies a regression discontinuity design to estimate the returns to college quality. More notably, it research employs an original survey to shed light on the black box of the underlying mechanisms.

Attending an elite college can influence an individual's labor market outcomes in a number of ways. First, the elite institutions may increase the productivity of the students as a result of high value added (human capital theory). Second, because such colleges tend to be more selective, students may also attend prestigious institutions to signal their ability to prospective employers and distinguish themselves from other

prospective employees. The firms may screen applicants on the basis of the type of college attended, and statistically discriminate in favor of such colleges (signalling theory). A third possibility is that college graduates develop helpful social networks (networking theory). This effect can operate in two ways. The networks can help graduates get better paying jobs by reducing information asymmetries. Additionally, the students' peers and friends from college are likely to be placed well, and such connections may matter to employers. Original data, collected via an in-person survey, allow me to isolate the underlying mechanism.

This paper contributes to the literature in three ways. First, it provides causal estimates for returns to attending prestigious colleges in India, using the features of India's education system. Second, it addresses the mechanisms that can drive the returns. Third, it compiles a comprehensive data set that includes observational data and in-person interview-based survey data, to test what drives the returns to attending prestigious colleges. Public colleges in India are very prestigious and therefore attract the best students. Numerous media reports and popular press stories indicate these graduates receive high wages. Average comparisons of common college exit test scores also show these students out-perform their private counterparts. The admission procedure to public colleges makes this setting ideal for examining the returns to attending such colleges. Public colleges admit students based on a cutoff point of the students' scores on the Senior Secondary School Examinations.[1] I use a unique data set that I collected to test whether public college graduates earn more than private college graduates. In doing so, I test whether evidence supports the predictions of the signalling, networking, or human capital models of higher education. I find that the educational outcomes of public college students who were on the margin of the admission cutoff do not differ from those of students who barely missed the cutoff and thus attended private colleges.[2] However, graduating from a public college provides a premium in the labor market. I employ a regression discontinuity design and show the results are robust to several spec-

[1]Senior Secondary School Examinations are the equivalent of high school exit tests in US. Technical education colleges such as medicine and engineering use different centralized tests for admission.

[2]Rubinstein and Sekhri (2011) use this rule and show the students who barely get admitted to public colleges perform similarly in college exit tests to those who barely miss and attend private colleges.

ifications and methods of estimation. I show that selection into the sample or into being employed are not likely to bias the results. I do not observe the wages of all employed individuals in the data, and I cannot rule out selection in reporting wages. However, I estimate treatment-effect bounds (Lee's bounds (2009)), which confirm the results.

My findings do not provide evidence for the human capital theory. The average quality of the college cohort drives the public main effect, implying the selectivity of the college the employee attended is important to the firms. A first-order prediction of the signalling model would be that if the public college is a signal, then we should see a positive return to attending a public college in equilibrium even though public college attendance does not influence human-capital production. The data support this prediction. However, dynamic learning by firms, as in the framework of Farber and Gibbons (1996)and Altonji and Pierret (2001), would predict this positive return would diminish with experience and inframarginal students' wages would increase with experience. In addition, the divergence in wages would increase overall but decrease at the admission threshold. However, the public college returns do not diminish with experience over the 10 year period in the data. The overall wage dispersion does not increase and wages do not converge around the admission cutoff with experience. Hence, the predictions of the dynamic learning models are empirically rejected in this setting.

The average quality of the cohort should not affect job referrals. In addition, using data from several questions asked in the survey, I find no evidence that referrals or job-search facilitation by networks result in better-paying jobs.[3] Besides being consistent with the signalling model, the average quality of the cohort would also matter if the firms placed a value on the prospective employee's connections. The findings weigh in favor of this model. The number of college friends that public college graduates have accounts for the majority of the premium. In developing countries such as India, corruption is rampant and red tape increases the cost of doing business. Thus employers reward connections and favors that employees' can bring to the firm. I bolster these findings with an instrumental variable approach using the eligibility for public colleges as an instrument for college friends in the same industry.

[3] See Munshi 2003 for an example in which network ties facilitate job search.

Educational networks have been shown to be an important source of information in the finance industry in the developed world. Cohen, Frazzini, and Malloy (2008) show that mutual fund managers have vital informational benefits when investing in firms managed by peers in their education networks. Social ties also matter for business decisions. Hong, Kubik, and Stein (2004) show that peers influence stock market participation. Kelly (2012) shows that educational peers can have a significant effect on executive decisions about the firms and that these decisions are much more influenced when peers have interacted. In the developing countries context, Khawaja and Mian (2005) show the values of political connections for businesses by demonstrating that banks favor politically connected firms in their lending decisions. My paper also contributes to this literature and presents evidence that firms favor employees with more connections and ability to network with these connections.

The remainder of the paper is organized as follows: Section 2 provides background information about general education college education and admission rules. Section 3 discusses the data. Section 4 presents the estimation strategy. Section 5 documents the results and the findings of robustness tests. Section 6 discusses the mechanisms. I discuss selection issues in detail in section 7. Section 8 provides concluding remarks.

2 Background

2.1 Public versus Private Colleges

In India, general eduction colleges operate in all districts with the goal of making tertiary education accessible. The colleges account for about nine-tenths of undergraduate enrollments (Agarwal, 2006), but these colleges are not allowed to confer a degree and must affiliate with a university to operate. [4] Each college has its own campus and infrastructure. Private colleges are managed privately. However, they may receive public funds ("private aided college") or they may be totally self-financed ("private unaided

[4]The University Grant Commission Act (UGC), which is the government body that regulates tertiary education, has a provision that prohibits any institution from awarding degrees unless it is established under an act of Parliament or is specially empowered to award degrees.

college"). The private aided colleges can raise funds by charging higher fees and accepting donations from philanthropic or business groups. On the other hand, public colleges are managed and financed by the government. Public colleges cannot accept any private donations, and the state funds their maintenance and development expenses. In the sample, the private aided colleges receive public funds to meet their recurring expenditures (mostly teacher salaries) and charge much higher tuition than the government colleges. Although the teachers have to take the same University Grants Commission Exam to qualify for teaching positions in private colleges, they do not enjoy the same degree of job security as the government teachers. Their contracts differ from college to college and are negotiated with the private management. Private colleges also hire more adjunct teachers on short-term contracts than public colleges. In contrast, public colleges are managed and run by state employees. Teacher contracts are negotiated with the government and offer tenure security. The state funds public colleges' facilities and equipment, but private colleges (both aided and un-aided) have to self-finance such expenditures. Private aided colleges can apply government aid only to pay teachers salaries. Public colleges are considered very prestigious and students favor these over private colleges.[5]

2.2 Public College Admissions

Admission to general education public colleges (excluding technical education such as medicine or engineering etc) is determined on the basis of the students' performance on the Senior Secondary School examinations taken in class XII.[6] Students cannot be admitted to college without at least passing this exam, but to be admitted to public colleges, their score must exceed a specified cutoff. This admission cutoff for public colleges is determined every year and varies by college and stream of education. Students who score above the cutoff are eligible for admission to public colleges. Although the colleges post a list of of students who are offered admission to public colleges, the public

[5] For example-Presidency college in Calcutta, West Bengal has been an elite public college. It was converted into a university recently.

[6] Class XII is equivalent to a high school grade 12, the last year of high school. All high schools in India must be affiliated either with one of the two national boards (Central Board of Secondary Education or Indian Certificate of Secondary Education) or with their state's regional board. The exit exams are conducted by school boards across India and are recognized nationally.

does not know the admission cutoffs and rules used to determine the cutoffs are kept confidential. Students apply to various colleges simultaneously as the admissions open in the spring. The admission decisions are made public in early fall, shortly before the start of the academic year. Colleges diligently follow admission rules. The percentage of students attending public colleges rises sharply from near 0 to above 90 percent around the admission threshold. Streams are declared in the penultimate year of the high school 2 years before the Senior Secondary School Examinations are taken. Hence, performance in the exit exams does not affect stream choice.

2.3 Uniform College Exit Tests

All students in colleges (private or public) affiliated with the same university, take the same exit exams. These exams vary by stream of education, but conditional on the stream, private and public college students study the same curriculum and take the same exit tests. These exams test for language competencies(English and regional language) and stream-specific competencies; for example, commerce students take tests in accounting, taxation, and so forth. The examinations for the affiliated colleges are conducted by the respective universities, which also set the course curriculum. The affiliated colleges only offer prescribed courses. Thus, conditional on the university and stream, I can compare the educational outcomes of students in public and private colleges because they take the same exit tests.

3 Data

The data used in the analysis are collected from several different sources. I obtained admissions records for public and private colleges from a district in North India. These records include the Senior Secondary School Examination scores, age, gender, place of residence, board of secondary education, stream of study, and father's occupation. The college exit test scores were obtained from the affiliating university. I matched these admission records and college exit test scores using a unique roll number assigned to each student. Institutional details on admission cutoffs were obtained from the colleges.

The sample included admission cohorts from 1999 to 2002. I conducted a detailed follow-up survey of these students in 2011-12. [7] I did not survey graduates from rural areas due to cost considerations in the follow-up survey. Of the 1981 individuals that the survey tried to locate, 1,506 students (76 percent) were successfully surveyed.

The general education colleges do not offer professional degrees like law or medicine. In general migration out of district for higher education is low. Students do not migrate out of their district to attend general education colleges (Rubinstein and Sekhri, 2011). Private colleges offer merit scholarships which ensures that students around the cutoff who apply to college attend either public or private colleges. As a further test, I collected the applications of students who applied but did not get into the public colleges. I verified that these students had indeed attended colleges. Rubinstein and Sekhri (2011) also document that the drop-out rate from private and public colleges in India is similar and the observable characteristics of the students are no different. Neither Senior Secondary School Examination scores nor father's occupation influence drop-out decisions very close to the cutoff; hence students with different abilities and socio-economic backgrounds are equally likely to drop out on either side of the cutoff.

Besides the administrative data, I also conducted an in-person interview-based survey that asked detailed questions about labor-market participation. I obtained data on employment history, duration of each employment, occupation, type of organization worked for,type of industry, and salary per month. Salary information was elicited as a categorical variable. The categories included rupees 5,000 or less, 5,000-10,000, 10,000-15,000, 15,000-20,000, 20,000-30,000, and greater than 30,000. The survey also collected data on networks and job referrals. The respondents were asked if they were referred to the job by friends, their spouse's friends, people who attended their college, people who attended their spouse's college, and the number of college friends in the same organization and industry. Demographic information such as marital status and number of children were also ascertained.

Of the 1,506 respondents, 748 individuals are either self-employed or earn a salary.

[7] This sample excludes the students admitted to public colleges based on reservation quotas for lower castes.

Those who are either self-employed or earn a salary are considered employed for the purpose of the analysis. Other possible choices include being a student, being unemployed and looking for work, being unemployed and not looking for work, home production, and other. In the sample of successfully located respondents, 40 percent are home makers, and 99.04 of these individuals are women. Among the formally non-employed, 79 percent are engaged in home production. Among the employed, 458 out of 748 individuals report their salary and 439 observations have non missing data for background characteristics.

Selection bias can result from selection into the sample, selection into employment, and selection into reporting the salary. The implications of selection issues for the results and robustness tests performed to address these issues are discussed in detail in Section 7. The main sample of analysis comprises individuals who are either self-employed or earn a salary and have reported their salaries. Table 1 provides the summary statistics. Table 2 provides summary statistics by college type. Appendix Table 1 provides summary statistics in the -5 to +5 interval of the Senior Secondary School Exam scores around the admission cutoffs. This table shows the individuals are similar on observable characteristics in narrow intervals around the cutoff in the main sample used in the analysis.

4 Estimation Strategy

4.1 Empirical Specification

I employ a regression discontinuity (RD) design to estimate the effect of attending public colleges on wages. Since admission to public colleges is based on a deterministic rule of Senior Secondary School Exams, I am able to compare outcomes across students with similar expected productivity(or ability) who are on the margin of the admission cutoff and hence attend public or private colleges due to small differences in their Senior Secondary School Examination scores. The application lends itself to a sharp design and the empirical model is as follows:

$$Y_i = \alpha X_i + \beta \, Public_i + f(S_i) + e_i \tag{1}$$

where Y_i is the outcome variable including salary and college exit test scores. X_i is a vector of individual characteristics including own demographics and family characteristics. $Public_i$ is an indicator variable that takes the value of 1 if the individual attends a public college and 0 otherwise. β is the parameter of interest and it indicates the effect of attending public colleges on the outcomes. $f(S_i)$ is a function of the Senior Secondary School Exam scores S_i. Robust standard errors are reported. I also show results from an ordered-logit empirical specification for salary brackets, because salary is recorded as a ordered categorical variable. I calculate the average marginal effect of public colleges on being in each salary bracket.

4.2 Sensitivity Analysis

I use both parametric and non-parametric functions of S_i to explore the robustness of the findings to functional-form assumptions. For the parametric specifications, I use linear, quadratic, and cubic control functions. For the non-parametric specifications, I follow Hahn, Todd, and van der Klaauw (2001) and use local linear regressions to estimate the left and right limits of the discontinuity, where the difference between the two is the estimated treatment effect. Bandwidth choice can also influence results and no widely accepted guidelines exist for choice of bandwidth. Therefore, for non-parametric analysis, I vary the bandwidth and show results for several choices. I also show results for the optimal bandwidth proposed by Imbens and Kalyanarman (2014). Finally, I use both triangular and rectangular kernels to show the results are not sensitive to the choice of the kernel.

5 Results

5.1 Main Results - Salary and College Exit Test Scores

Public colleges indeed follow admission rules. Figure 1 plots the percentage of students who attended public colleges in two percentage bins of normalized Senior Secondary School Exam scores. The top panel shows a polynomial fit and the bottom panel shows a linear fit. This figure clearly demonstrates that there is a sharp rise in the percentage of students who attended public colleges around the cutoff. The percentage rises from near 0 to around 90 percent. Figure 2 plots the regression functions from the local polynomial regression of the salary index on normalized Senior Secondary School scores. Salary is a categorical variable corresponding to different slabs. The highest value it takes is 6. The first panel uses a bandwidth of 1.5 and the bottom panel uses the optimal bandwidth as proposed by Imbens and Kalyanaraman (2014). Appendix Figure 1(a) shows confidence intervals around the regression function and Appendix Figure 1(b) shows the scatter plot of the average salary in 2 percentage point bins of the normalized Senior Secondary School Examination scores in addition to the regression functions. These figures show that salary exhibits a jump at the admission cutoff for public colleges.

The results depicted in these two figures are formalized, and Tables 3 to 7 report the estimation results. Table 3 shows the results of an ordinary least squares regression of salary on the public college indicator. Column (i) reports the coefficient from a simple regression. Pre-college demographic controls including gender, year of admission to college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation are added in column (ii). Column (iii) additionally controls for Senior Secondary School Exam scores. Across these specifications, the coefficient on public college is positive and highly statistically significant at the 1 percent significance level. Column (iv) controls for college exit test scores to show the results are robust to including the college exit test scores. The public college effect corresponds to a 1 category shift in salary, which is large. Table 4 shows the results from the parametric regression discontinuity analysis. Each cell reports the public college coefficient from a separate regression. Column (i) reports results from the full sample. Column (ii) re-

stricts the sample to 15 percentage points of the normalized Senior Secondary School Examination scores around the admission cutoff. Column (iii) restricts the sample to a 10 percentage- point interval, and column (iv) to a 5 percentage- point interval. The first row uses a linear control function of the Senior Secondary School Scores. The second row uses a quadratic and the third row uses a cubic. All regressions control for pre-college demographic characteristics mentioned previously. The results are remarkably similar across all these specifications and statistically significant at the 1 percent level.

In Table 5, I report the results from a non-parametric regression analysis. Each cell reports the public college coefficient from a separate local linear regression. Panel A shows the results for a triangle kernel, and Panel B shows the results from a rectangular kernel. In the absence of clear rules regarding what bandwidth to use, I show the results for a range of bandwidths. Column (i) uses a bandwidth of 10, column (ii) uses 7.5, column (iii) uses 5, and column (iv) uses the optimal bandwidth proposed by Imbens and Kalyanamraman (2014) (IK). In each panel, the first row shows the results without controlling for any other characteristics and the second row shows the results with the pre-college demographic controls. These results show a positive and statistically significant effect of public college attendance on salary. The results are not sensitive to the choice of the kernel or bandwidth.

Salary is a categorical variable. The index corresponds to six salary slabs. In Appendix Table 2, I report the ordered logit estimates of the impact of public college attendance on the probability of being in a given salary bracket. Each cell reports the marginal effect for the specific bracket. The first row shows the results without any controls. The second row shows results with demographic controls. The third row controls for pre-college demographic characteristics and the Senior Secondary School Exam scores. Public college attendance reduces the probability of being in the first, second, and third salary brackets, has no effect on being in the fourth bracket, and increases the probability of being in the fifth and sixth bracket. These effects are highly statistically significant. In the last row, the probability of being in the lowest bracket reduces by 4.2 percent and the probability of being in the highest bracket goes up 17 percent. These coefficients are large in magnitude.

The full sample IV estimate, where I instrument public college attendance with eligibility to attend (Senior Secondary School Examination Scores > the admission cutoff), is 1.43 with a standard error of 0.25. As with other approaches, this estimate is highly statistically significant at 1 percent significance level indicating that public colleges graduates receive a wage premium in labor markets.

5.2 Robustness Checks

The admission rules used to determine the cutoffs are only known internally and the tests are evaluated externally using a double-blind method. Hence, little scope exists for manipulation of Senior Secondary School Exam scores. I present evidence from the McCrary density test to highlight that the students do not manipulate their Senior Secondary School test scores. The results are shown in Appendix Figure 2. The distribution of the Normalized Senior Secondary School Exam scores on the left and right of the discontinuity are similar and exhibit no jump around the cutoff.

Another possible concern might be that the background characteristics of the individuals vary around the cutoff. This concern can lead to the spurious attribution of treatment effects to treatment when the results are caused by these other variables that exhibit a jump near the discontinuity. Appendix Table 1 shows that the control variables including demographic characteristics and family background are similar in the -5 to +5 interval of Senior Secondary School Exams scores around the public college admission cutoff. I also show that these variables are smooth around the cutoff graphically in Appendix Figure 3.

6 Mechanisms

The results shown so far establish that the labor-market rewards attending public college. Wages are higher for the public college graduates than for their private college counterparts. Four possible alternative mechanisms can explain these results.

First, the students may learn more in public colleges and this learning increases their productivity. Not only the teachers, but peers as well can contribute to such learning.

Second, the employers may use public colleges as a signal of quality as in the classical signalling hypothesis put forward by Spence (1973) and Weiss (1995). In equilibrium, this hypothesis will translate into higher wages for public college graduates, but the college would not contribute to the students' human capital. Suppose the employers form a prior that the average quality of students entering the public colleges is better than those entering private colleges. Then they would statistically discriminate in the favor of public college graduates without knowing the true quality of the marginally admitted student.[8]

The third hypothesis is that the public college graduates have a wide network of alumni who help them get better jobs, which pay higher wages. A large literature in labor shows that networks help individuals find jobs by reducing information asymmetry.[9] Thus, the college network may provide referrals for the students, and public college students have better access to such networks. The fourth explanation might be that the labor market rewards the potential connections that the students might have made in the college. If public college students are expected to be in important positions in government or the private sector, a firm may value a student who knows these key personnel. This is more relevant in a developing country such as India where connections can be vital for doing business.[10]I test these alternate hypothesis to discern why is there a labor market premium on attending public colleges.

[8]Note that a number of reasons can account for the absence of value added by the public colleges. MacLeod and Urquiola (2009) propose that students who enter prestigious institutions may not exert a high degree of effort while in college. Thus, marginally admitted students will perform just like their private counterparts on college exams, but the labor market will still favor the reputation of the college. If elite institutions are selective, students ought to experience positive peer effects as proposed by Epple and Romano (1998). Public college employees have a high degree of job security in India. They might not invest in teaching. So, teachers' lack of effort cancels out the gains from the peer effects. A work-in-progress paper addresses these mechanisms. For this study, in both these cases, public colleges can serve as a signal even if they do not contribute to the human capital of the marginally admitted student. The focus of this paper is on isolating what drives the returns to attending public colleges in labor markets, and not on shedding light on the production function of the colleges.

[9]Montgomery (1991) provides a review of this literature. Munshi (2003) shows that network referrals matter for job placement.

[10]Khwaja and Mian (2005) provide insights about financial benefits of political connections for firms in Pakistan.

6.1 Human Capital

So far, the results have shown a large robust effect of attending public colleges on salary earned post college. If the human capital theory of education is driving these results, we should observe a positive and large effect on college examinations as well. Note as explained 2.3, students of the left and right of the admission cutoff take identical college exit exams even though they attend different types of colleges. I test if the college exit test scores of the marginal students in public colleges are higher than the private counter-part for this sample and report the results in Table 6. I show the results from a parametric regression discontinuity design analysis. [11] Each cell again reports the results from a separate standardized regression. As before, column (i) reports results from the full sample. Column (ii) restricts the sample to 15 percentage points of the normalized Senior Secondary School Scores around the admission cutoff. Column (iii) restricts the sample to a 10 percentage point interval, and column (iv) to a 5 percentage point interval. The first row uses a linear control function of the Senior Secondary School Scores. The second row uses a quadratic and the third row uses a cubic. All regressions control for pre-college demographic characteristics. Since I show the standardized coefficients, I report the t-statistics in the brackets. This sample also bears out the findings of Rubinstein and Sekhri (2011). We do not see an effect of public college attendance on college exit test scores. None of the coefficients is significant at conventional significance levels.[12] The full sample instrumental variable estimate where public college is instrumented with eligibility is -0.03 with a t statistic of -0.32. [13]

[11] Non-parametric results are similar and have not been shown in the interest of brevity.

[12] One concern might be that the college exit tests do not capture differences in learning. Students just memorize the material by rote learning, expecting what the exam will ask, and thus the college exit exam scores are no different in public versus private colleges. In the survey, the students were asked if they learned anything in college. Appendix Figure 4 shows that self-assessment of learning in college is positive and increases with the Senior Secondary School Exam Scores.

[13] A growing number of studies in both developed and developing countries examine whether attending elite schools in K-12 setting improve test scores and find mixed evidence. See Mbiti and Lucas (2013) for a survey of these studies. In the context of a developing country, Mbiti and Lucas (2013) examine the impact of elite high schools in Kenya and find that elite schools do not result in better academic outcomes. Saavendra(2009) examines return to elite university education in Columbia and finds that differential college inputs lead to better academic outcomes.

6.2 Selectivity of Colleges

I first show that college selectivity as measured by the average quality of the cohort with whom you enter college (as defined by your college, stream of study, and year of admission) drives the public college effect on salary. Appendix Table 3 shows the results of the parametric regression discontinuity analysis. Each cell is the public college coefficient from a separate regression and the standard errors are clustered at the college-stream level. The specifications are similar to those in Table 4. I use the full sample, 15, 10 and 5 percentage point intervals of Senior Secondary School Exam scores around the cutoff, and three specifications for the control function- linear, quadratic, and cubic. For the sake of comparison, the first row in each panel repeats the results reported in Table 4 for comparison. The second row reports the coefficient on public college after controlling for the average Senior Secondary School Examination scores of your cohort. In comparing the first and second rows in each panel, we see the average quality of the cohort explains the public college effect. The coefficient changes from large and positive to small and statistically indistinguishable from 0. This result can be consistent with the signalling hypothesis or the connections valued by firms. But the average quality of the cohort should not matter for networks mediating referrals.

6.3 Other Applied Skills Acquired in College

The public colleges may provide inputs that result in better applied skills that the labor market rewards. According to a recent survey of employers' perspectives on the corporate workforce in United States, the top applied soft skills that the firms wanted in their employees were critical thinking, communication, team work, and collaboration, and professionalism.[14] Although we do not directly measure these soft skills, we can infer whether college students have a better applied skill set by observing their behavior. Survey questions measure whether the public college students are more informed, use technology better, have better team and leadership skills, and are more confident and less

[14]In collaboration, The Conference Board, Corporate Voices for Working Families, the Partnership for 21st Century Skills, and the Society for Human Resource Management conducted an in-depth study of the corporate perspective on the readiness of new entrants into the U.S. workforce. This report is based on the surveys conducted.

disruptive. I also examine whether they have higher a propensity to network. Table 7 shows the results from a parametric analysis in the -5 to 5 interval around the admission cutoff. No difference exists between (i) reading the newspaper, (ii) using the internet, (iii) helping non-friends with college work, (iv) lending notes to non-friends,[15] (v) winning awards in college, and (vi) being punished in college. However, the public college students do seem to have a higher propensity to network. The public college graduates spent more time with peers in their stream (college major). The coefficient is marginally significant at 10 percent. They also spent more time with people outside their stream and this coefficient is even larger than the one on 'own stream students'. They also report having more friends in college. This is indicative of the fact that public college students do acquire skills to network better. I also use the false discovery rate procedure proposed by Benjamini and Hochberg (1995) to test for the joint significance of the nine outcomes. Only hours spent with students out of stream is significant at 5 percent.[16] Thus, the public college students do tend to network with their out of stream peers.

6.4 Training, Occupation, and Sector

Public colleges can affect labor market outcomes by affecting choice of occupation, sector, and any other training. I use the survey questions and examine whether public college attendance affects if the students (i)acquire a diploma (training certificate) , (ii) earn a post graduate degree, (iii) enter professional specialization , or (iv) study or work abroad. I also examine whether the students who attend public college are more likely to be in rewarding jobs such as tertiary-sector jobs or skilled occupations. I test whether they are employed in public enterprizes and whether they have a higher job turn-over. Table 8 reports the results from a parametric analysis in a -5 to +5 window around the admission cutoff. None of these factors are statistically different from 0. These attributes do look fairly comparable across the private and public college graduates near the admission

[15] Almost everyone reports helping friends and lending them notes. I cannot examine the differential effect on helping friends due to lack of variation.

[16] The p-values used for the individual hypothesis for the false discovery rate are reported in the table.

cutoff.[17] Using the Benjamini and Hochberg (1995) false discovery rate procedure for testing the significance of these 8 outcomes, I find that all of these are jointly statistically insignificant at 5 percent level significance level.

6.5 Signalling- Dynamic Learning

Farber and Gibbons (1996) and Altonji and Pierret (2001) frameworks of dynamic learning by employers in a signalling framework implies that as employers learn more about the ability of the employee, the public college effect should diminish with experience. I conduct three tests to examine whether signalling is important. First, the employers would initially pay an average salary for the college cohort. But as the employers learn over time about the employees' ability, the dispersion in the unconditional salary should increase. The salary conditional on Senior Secondary School Exam Scores should converge. In other words, salary should converge near the admission cutoff with experience. Appendix Figure 5 shows the distribution of salary for 0-6 years of experience. In panel A, the dispersion of the unconditional salary does not increase with years of experience. The coefficient of variation is 35.3. In panel B, we do not see any evidence of convergence. The coefficient of variation is still 33.85.

In the second test, I determine whether higher Senior Secondary School Examination scores, which are a proxy for ability, are rewarded more over time. More formally, I test whether λ is positive or zero in the following extension of equation 1:

$$Y_i = \alpha X_i + \beta \ Public_i + \gamma \ Experience_i + \delta \ Public * Experience_i + \lambda \ S_i * Experience_i + f(S_i) + e_i \tag{2}$$

$\lambda > 0$ would imply that firms learn over time and use college type as a signal. I plot salary as a function of the Senior Secondary School Examination scores by experience in Appendix Figure 6. We do not observe a systematic pattern emerging. As graduates gain more experience, the slope is flat rather than positive. Table 9 reports the results

[17] Some of these features may be measured imprecisely. If anything, however they have a negative sign and hence cannot explain the positive public college wage premium.

of the regression analysis. I use a full sample parametric analysis with a linear control function. In column (i), we see a public college premium for salary. Experience is strong and positive and the squared term is small, negative, and statistically significant (column (ii)). The public college premium is still strong and positive. In column (iii), the interaction of public college and experience turns out to be statistically indistinguishable from 0. In column (iv), I interact Senior Secondary School exam scores with experience. The public college effect is strong and positive. The coefficient on the interaction is negative but small and not statistically distinguishable from 0.

The third test checks if the public college premium dissipates with time. This test checks if δ is zero in the RD frame work. If firms learnt over time then δ would drop to zero with experience. Appendix Figure 7 shows 6 panels plotting the public college premium at the admission cutoff by years of experience. We see that the premium persist over years. Hence we do not find conclusive evidence to support the signalling hypothesis in which dynamic learning occurs over 6-10 years of experience.

6.6 Network Referrals

The results in Appendix Table 3 suggest network referrals are not the main mechanism driving the results. I test for the network effect more directly using the survey data. I restrict the sample to the 5 percentage point interval of Senior Secondary School exam scores and look at the whether public college graduates are more likely to (1) be referred for a job by a friend, (2) get a job based on a friend's referral, (3) have more college alumni at their organization, and (4) receive a recommendation for a job from college alumni. I also examine if public college attendees are more likely to be referred for a job by a friend of the spouse, get a job based on a referral by spouse's friend, have more of the spouse's college alumni at the organization, and get a referral by the spouse's college alumni. The results are reported in Table 10. None of these factors are positive and statistically significant. Only one variable - recommended for a job by a friend- is influenced by the type of college attended, but the coefficient is negative and statistically significant. Private college graduates are more likely than public college graduates to receive a job referral from a friend.

6.7 Networks- Value of Connections

The survey asked the respondents how many college friends they have in the same industry in which they work. In order to directly evaluate whether the connections of the public college employees matter, I add the number of friends that an individual has in the industry to the specification. I also interact the number of friends with the public college indicator. Table 11 shows the results from a full sample parametric analysis with a linear control function. Column (i) shows that salary increases with the number of friends the individual has from the same college. The coefficient is positive and statistically significant. In column (ii), I add the interaction of number of friends from college and public college. The public college coefficient drops by one-third and becomes insignificant. However, the interaction is positive and significant. I interpret this result as evidence that the firms value their employees' connections. Columns (iii) and (iv), show that this effect is robust to controlling industry fixed effects and is not driven by public college graduates being channeled into specific industries. [18] In Appendix Table 4, I show results from an instrumental variable regression in which I instrument the number of college friends in the industry with the eligibility for public colleges. The wage premium associated with the college friends in the industry is high and significant. [19]

Results from Tables 7 and 11 indicate two facts. Public college students have more friends in college and spend more time with their peers and the firms favor employees with more connections and ability to network with these connections. More connections can put the employees at informational advantage or benefit them due to pure peer favors.

Alternate Interpretation: An alternate interpretation might be that underlying selection mechanisms by firms such that they only hire the inframarginal students (who

[18] I do not observe the rank or position of the friends from same college of the surveyed individuals. Hence I cannot address the important of the degree of influence. Many industries do have intermediate value addition, so connections can matter. For example, in textiles, one of the largest employer in the sample, firms deal in yarn manufacturing, dyeing, processing, weaving, garments, and so forth.

[19] The underlying empirical model is as follows: The structural relation is given by the equation, $W_i = \alpha_1 + \alpha_2\ F_i + \alpha_3\ X_i + e_i$. This is the second stage. W_i is the salary of individual i, F_i are individual i's number of college friends in the industry, X_i are the characteristics of the individual. The first stage is given by : $F_i = \beta_1 + \beta_2\ E_i^P + \beta_3\ X_i + e_i$. Thus the number of friends in the industry is instrumented by eligibility for public college attendance $(E)^P$.

would be smartest in their cohort) from the public colleges in their area of specialization. These students may be better trained, have a comparative advantage in the industry, and thus receive a high pay. The marginal students are hired in different industry. This could potentially generate the positive effects of friends in an industry on salary and wipe out the public college premium. In order to examine this possibility, I calculate the mean number of friends in industry in bins whose X axis is the normalized Senior Secondary School Examination scores and Y axis is the salary. If the explanation posited above was true, we should see more number of friends reported for inframarginal individuals who earn more. Appendix Figure 8 shows the plot. The scale represents the 5 quintiles of the distribution of mean number of friends in the industry. In this figure, the above hypothesis will translate into higher average number of friends reported in the upper right quadrant. Two facts emerge from this figure. First, we do see that people who earn more on the average report having higher number of friends. Second, however this is not skewed towards inframarginal students. The distribution is evenly balanced. Hence this selection mechanism is not driving the results.

7 Implications of Selection

As mentioned above, three main data problems may be a concern for selection. First, since the data are collected via a survey, selection into the sample could occur. However, the success rate of the survey does not differ among private and public college graduates. In a -5 to + 5 interval of the public college admission cutoffs, the rate of survey success is 33.4 percent in private colleges and 32.19 percent in public colleges. These rates are comparable on the margin of admission as show in Appendix Figure 9. If the sample selection rates in treatment and control groups are similar and if the monotonicity assumption holds, a comparison of treatment and control means is a valid estimate of the treatment effect (Lee, 2009).[20] I also check whether observable differences are present

[20]Monotonicity will imply attending public colleges cannot affect difficulty to locate respondents in either direction. That is - it cannot be that some public college graduates are more difficult to trace and some are very easy.

between the surveyed and non-surveyed graduates by college type in this window.[21] In Appendix Table 5, I compare the characteristics of the individuals who were successfully traced and surveyed to those who were not located by college type in a -5 to + 5 interval of the public college admission cutoffs. None of the characteristics are different except one. Fewer Science majors who graduated from public colleges were traced. If science majors earn less than other majors, their under-representation in public college salary sample can cause an upward bias in the results. This possibility seems unlikely. [22]

The second issue is that the salary is reported conditional on being employed. If public college attendance also affects the likelihood of employment, an increase in employment can influence salary. I examine whether having attended a public college affects the probability of the individual being employed. In Appendix Table 6, I show the results from a parametric regression discontinuity analysis.[23]Public college attendance does not affect probability of being employed in any of the specifications. Since probability of being employed is no different for public versus private college graduates in narrow intervals around the admission cutoff, the results are not biased by selection into employment. [24]

Finally, there could be selection into reporting the salary. Not every employed individual reported their salary. If salary were missing at random, the results will be unbiased. Imputing salary information is possible. Appendix Table 7 shows the differences in observable characteristics of the individuals who report their salaries to the characteristics of ones who did not.Individuals who report their salaries are marginally younger, took their Senior Secondary School Examinations from the central board of secondary exams, are males whose fathers are in business and they graduated from the commerce stream. If their incomes are higher than average, which is likely, their under-representation in the

[21]Students who were not traced in the survey look comparable to the ones who were successfully surveyed on important observable dimensions. Notably, their Senior Secondary School Exam Scores that sort them into public and private colleges are very similar and statistically indistinguishable. The full sample comparison is available from the author.

[22]In a regression determining the correlates of salary, being in science stream is uncorrelated with salary conditional on reporting and being employed. Results are available on request.

[23]Non-parametric RD analysis shows the same results, which are available upon request.

[24]The majority of the non-employed in the sample are women engaged in home production. In a +5 to -5 interval of Senior Secondary School Examination Scores around the admission cutoff, the results are robust to the two extreme-case scenarios- all women engaged in home production would have earned the highest value for salary and all women in home production would have earned the lowest level of salary observed in the data. Results are available upon request.

public colleges near the cutoff can generate an upward bias. If, however, their incomes are lower than average, their under- representation in private colleges can generate an upward bias. Therefore, we need to examine whether they are under-represented in the public colleges near the cutoff of admission. In an interval of -5 to +5 percentage points around the cutoff for admission, 24.8 percent individuals in public colleges do not report their salary. However, for private colleges, this number is only 10 percent. Appendix Figure 10 shows that the probability of reporting salary jumps down in public colleges at the cutoff of admission. This finding suggests the bias is in fact attenuating the results. I determine Lee's bounds for the estimated effect. Appendix Table 8 shows the bounds and the confidence interval for the estimated effect based on Imbens and Manski(2004). The confidence interval for the effect, [0.44331.9002] is fairly tight and does not contain 0. Lee's Bounds (lower bound of 0.73 and upper bound of 1.6) are highly statically significant. Neither confidence interval covers 0. In the labor markets, public colleges do yield a premium over private colleges.

8 Conclusion

Using a regression discontinuity design to address selection, this research demonstrates a substantial earnings advantage associated with public college attendance in India, although we observe no discernible effects of the type of college on learning outcomes. Three possible theories can explain these findings. The first hypothesis is derived from the classical signalling model of education. Public colleges in India are prestigious and admit the best students. Therefore, firms use college type to statistically discriminate. The signal value of public colleges results in better wages. The second possibility is that public college graduates have better alumni networks that help reduce information asymmetry and result in better labor market outcomes. The third explanation is that public college graduates have a network of friends holding important offices, and such relations warrant a premium in the labor market because they reduce the cost of doing business or result in direct or indirect rents to the firms.

The specific findings are that network referrals are not driving the public college

premium. Direct survey-based questions indicate network referrals are not responsible for the better labor market outcomes of public college graduates. The public college premium does not dissipate with experience, which is inconsistent with the dynamic learning models of signalling. If signalling were important, then as firms learn more about the quality of employees, they should rely less on college type as a signal. We do not however, observe this. We also do not observe firms learning more about ability of the employees over time. Public college students have a higher propensity to network, and have a better placed network. The number of college friends in the industry explains the public college premium, and public college students spend more time developing friendships with peers. Hence, the findings are consistent with the hypothesis that the firms value connections and pay a premium in wages for such connections. This premium in turn ascribes a reputation to the colleges, which might be an important determinant of the type of college that students attend. From policy perspective, if private colleges held networking events and internship programs to strengthen ties with businesses, they will be able to compensate for the lack of prestige in the labor market.

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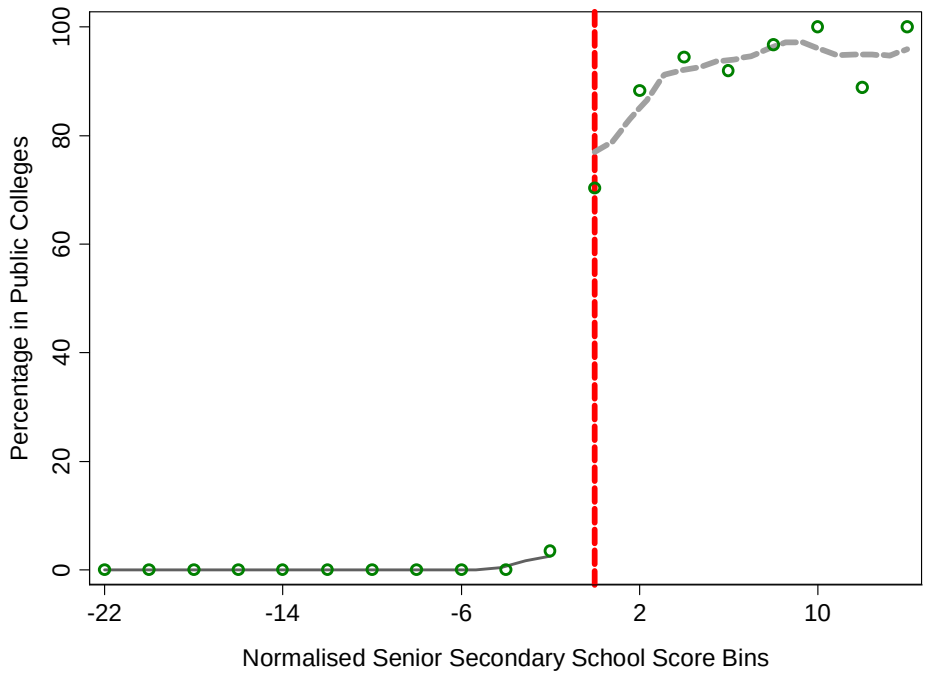


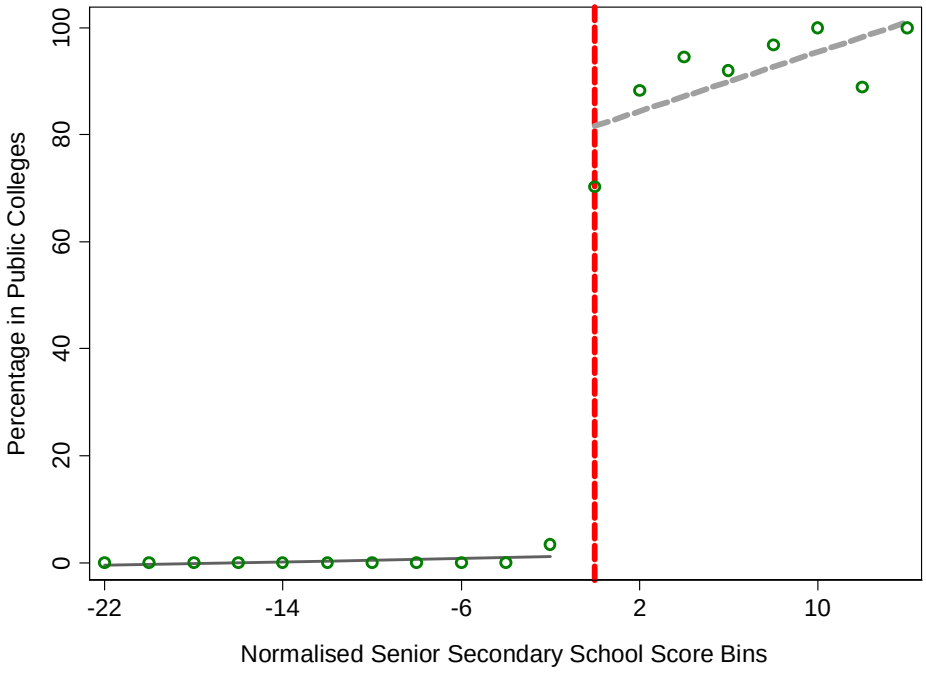
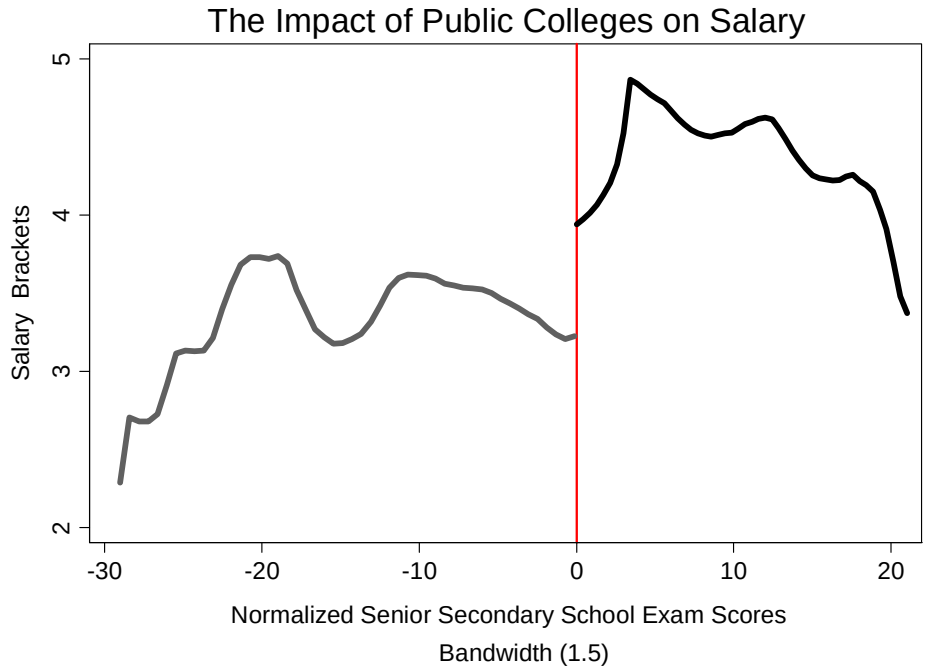


Figure 1: Discontinuity in Attending Public Colleges



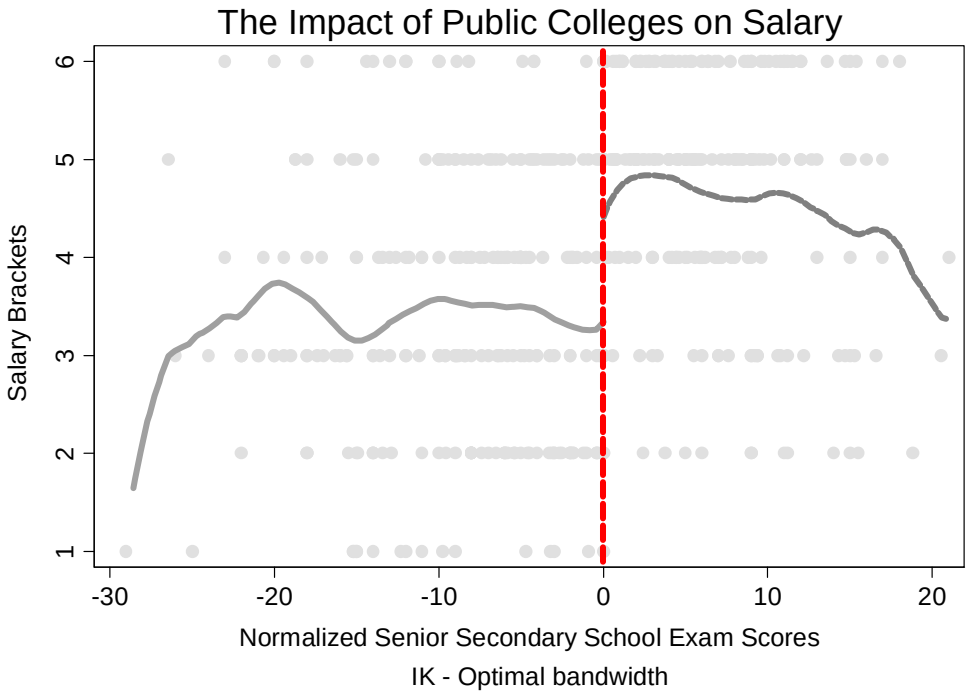


Figure 2: Discontinuity in Salary at the Public College Admission Cutoff

Table 1: Summary Statistics

	N	Mean	Std. Dev.
Salary	439	4	1.44
Senior Secondary School Exam Scores	439	66.57	10.09
Central Board of Secondary Education	439	0.25	0.43
Age at Starting College	439	18.03	0.9
Father's Occupation			
Government Service	439	0.08	0.27
Labor in Unorganized Sector	439	0.07	0.25
Professional	439	0.05	0.22
Service in Formal Sector	439	0.32	0.46
Agriculture	439	0.07	0.26
Business	439	0.3	0.45
Admission Year			
1999	439	0.21	0.41
2000	439	0.3	0.45
2001	439	0.25	0.42
2002	439	0.24	0.43
Male	439	0.4	0.5
Stream			
Commerce	439	0.24	0.43
Liberal Arts	439	0.51	0.5
Science	439	0.24	0.42
College Exit Test Scores	439	1255.18	274.93
Public Colleges	439	0.432	0.5

Table 2: Summary Statistics by College Type

	Public		Private		
	mean	std dev	mean	std dev	Difference
Salary	4.67	1.4	3.5	1.5	1.18***
Senior Secondary School Exam Scores	72.8	7.6	61.8	9	10.9***
Central Board of Secondary Education	0.32	0.46	0.2	0.4	0.12***
Age at Starting College	18	0.88	18.05	0.92	0.05
Father's Occupation					
Government Service	0.09	0.3	0.07	0.26	0.018
Labor in Unorganized Sector	0.057	0.23	0.08	0.27	0.02
Professional	0.03	0.18	0.06	0.25	0.03
Service in Formal Sector	0.38	0.46	0.27	0.44	0.1**
Agriculture	0.07	0.26	0.07	0.25	0.001
Business	0.24	0.43	0.32	0.47	0.08*
Admission Year					
1999	0.22	0.41	0.21	0.41	0.008
2000	0.34	0.47	0.24	0.43	0.09**
2001	0.22	0.41	0.26	0.44	0.03
2002	0.21	0.4	0.27	0.44	0.06
Male	0.57	0.5	0.266	0.44	0.31***
Stream					
Commerce	0.22	0.41	0.26	0.44	0.04
Liberal Arts	0.56	0.5	0.46	0.5	0.1**
Science	0.21	0.4	0.26	0.44	0.05
College Exit Test Scores	1302.8	275.97	1218.83	269	84***
Observations	190		249		

Table 3: OLS Estimates of the Effect of Public Colleges on Salary

	Dependent Variable: Reported Salary in 6 Categorical Brackets			
	(i)	(ii)	(iii)	(iv)
Public College	1.18***	1.08***	1.05***	1.07***
	(0.12)	(0.13)	(0.19)	(0.19)
Demographic Controls	No	Yes	Yes	Yes
Senior Secondary School Exam Scores	No	No	Yes	Yes
College Exit Test Scores	No	No	No	Yes
Observations	439	439	439	439
R-square	0.16	0.24	0.24	0.26

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Table 4: Parametric RDD Estimates of the Effect of Public Colleges on Salary

Dependent Variable: Reported Salary in 6 Categorical Brackets

	Public College Coefficients			
Senior Secondary School Exam Scores	**Full sample** (i)	**15 Point Interval** (ii)	**10 Point Interval** (iii)	**5 Point Interval** (iv)
Linear Control Function	1.05***	1.02***	0.95***	1.2***
	(0.19)	(0.2)	(0.2)	(0.24)
Quadratic Control Function	1.08***	1.04***	0.96***	1.18***
	(0.2)	(0.2)	(0.2)	(0.23)
Cubic Control Function	1.15***	1.08***	0.97***	1.2***
	(0.2)	(0.2)	(0.22)	(0.24)
Observations	439	384	309	167

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Table 5: Non-Parametric RDD Estimates of the Effect of Public Colleges on Salary

Dependent Variable: Reported Salary in 6 Categorical Brackets

	Public College Coefficients			
A: Kernel - Triangle	**Bandwidth=10**	**Bandwidth=7.5**	**Bandwidth=5**	**IK -Optimal Bandwidth**
Senior Secondary School Exam Scores	(i)	(ii)	(iii)	(iv)
Without Controls	2.2***	2.36***	2.37***	2.2**
	(0.48)	(0.6)	(0.8)	(0.94)
With Controls	1.86***	1.92***	1.47***	1.32**
	(0.43)	(0.5)	(0.5)	(0.55)
B: Kernel - Rectangular	**Bandwidth=10**	**Bandwidth=7.5**	**Bandwidth=5**	**IK -Optimal Bandwidth**
Senior Secondary School Exam Scores	(i)	(ii)	(iii)	(iv)
Without Controls	2.19***	2.23***	2.5***	1.76*
	(0.4)	(0.5)	(0.6)	(0.48)
With Controls	1.81***	1.87***	2.16***	0.98*
	(0.38)	(0.32)	(0.6)	(0.6)

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Table 6: Parametric RDD Estimates of the Effect of Public Colleges on College Exit Test Scores

Dependent Variable: College Exit Test Scores				
	Standardized Public College Coefficients			
Senior Secondary School Exam Scores	**Full sample** (i)	**15 Point Interval** (ii)	**10 Point Interval** (iii)	**5 Point Interval** (iv)
Linear Control Function	-0.01	-0.01	-0.04	-0.02
	[-0.45]	[-0.38]	[-0.95]	[-0.45]
Quadratic Control Function	-0.03	-0.031	-0.05	-0.03
	[-1.01]	[-0.80]	[-1.35]	[-0.65]
Cubic Control Function	-0.019	-0.02	-0.04	-0.008
	[-0.52]	[-0.55]	[-1]	[-0.17]
Observations	439	384	309	167

Notes:
Demogarphic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Brackets [] report t-statistics. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Soft Skills

Table 7: Parametric RDD Estimates of the Effect of Public Colleges on Soft Skills

	Sample restricted to the -5 to 5 Interval of Normalized Senior Secondary School Exams Scores				
	Read Newspaper	**Use Internet**	**Help Non-friends with College Work**	**Lend Notes to Non-Friends**	
Public College	0.05	0.07	0.027	-0.0008	
	(0.04)	(0.08)	(0.08)	(0.01)	
P -value	0.2	0.13	0.8	0.2	
N	157	159	157	157	157
	Win Any Awards in College	**Punished in College**	**Hours Spent with Students in Stream**	**Hours Spent with Students out of Stream**	**Number of Friends in College**
Public College	-0.09	-0.03	0.23*	0.52**	0.56*
	(0.11)	(0.07)	(0.13)	(0.2)	(0.33)
P -value	0.7	0.4	0.08	0.05	0.09
N	154	157	157	157	157

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Table 8: Parametric RDD Estimates of the Effect of Public Colleges

Sample restricted to the -5 to 5 Interval of Normalized Senior Secondary School Exams Scores

	Diploma	Post Graduate Degree	Professional Specialization	Studied or Worked Aboard
Public College	0.03	-0.14	-0.16	-0.01
	(0.09)	(0.1)	(0.1)	(0.03)
P-value	0.34	0.17	0.128	0.71
N	156	157	159	159

	Tertiary Sector	Skill Occupation	Public Sector	Number of Jobs held
Public College	0.005	0.07	-0.12	-0.18
	(0.08)	(0.08)	(0.09)	(0.15)
P-value	0.9	0.4	0.17	0.3
N	159	159	158	146

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Table 9: OLS Estimates of the Effect of Public Colleges on Salary

Dependent Variable: Reported Salary in 6 Categorical Brackets

	(i)	(ii)	(iii)	(iv)
Public College	1.08***	1.09***	1.6***	1.5***
	(0.19)	(0.19)	(0.42)	(0.4)
Experience		0.31***	0.38***	0.45
		(0.11)	(0.14)	(0.3)
Experience Square		-0.04***	-0.04**	-0.04**
		(0.01)	(0.01)	(0.01)
Public * Experience			-0.2	-0.2
			(0.2)	(0.22)
Public * Experience Square			0.01	0.01
			(0.02)	(0.02)
Senior Secondary Scores * Experience				-0.001
				(0.004)
Linear Senior Secondary Scores	yes	yes	yes	yes
Observations	419	419	419	419
R-square	0.23	0.25	0.25	0.27

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Network Effects: Job Referrals

Table 10: Parametric RDD Estimates of the Effect of Public Colleges on Referrals for Jobs

Sample restricted to the -5 to 5 Interval of Normalized Senior Secondary School Exams Scores

	Recommended for a job by a friend	Got a job on a referral by a friend	College alumni at Organization	College alumni recommended for a job
Public College	-0.16**	-0.03	0.027	-0.006
	(0.074)	(0.99)	(0.08)	(0.07)
N	164	148	136	135
	Recommended for a job by a friend of the spouse	**Got a job on a referral by spouse's friend**	**Spouse's College alumni at Organization**	**Spouse's college alumni recommended for a job**
Public College	0.028	-0.025	0.11	0.014
	(0.7)	(0.02)	(0.1)	(0.1)
N	135	116	120	117

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Public College Premium and Number of College Friends in the Industry

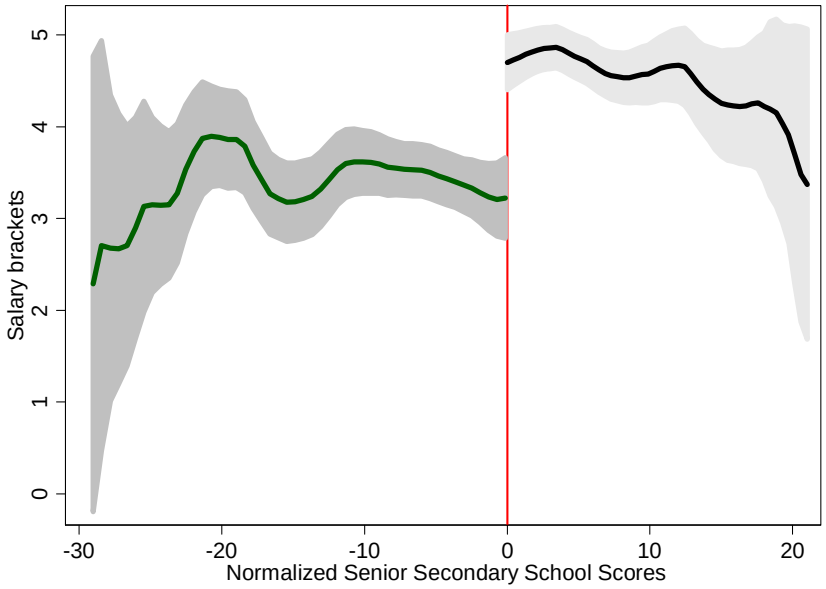
Table 11: OLS Estimates of the Effect of Public Colleges on Salary

Dependent Variable: Reported Salary in 6 Categorical Brackets

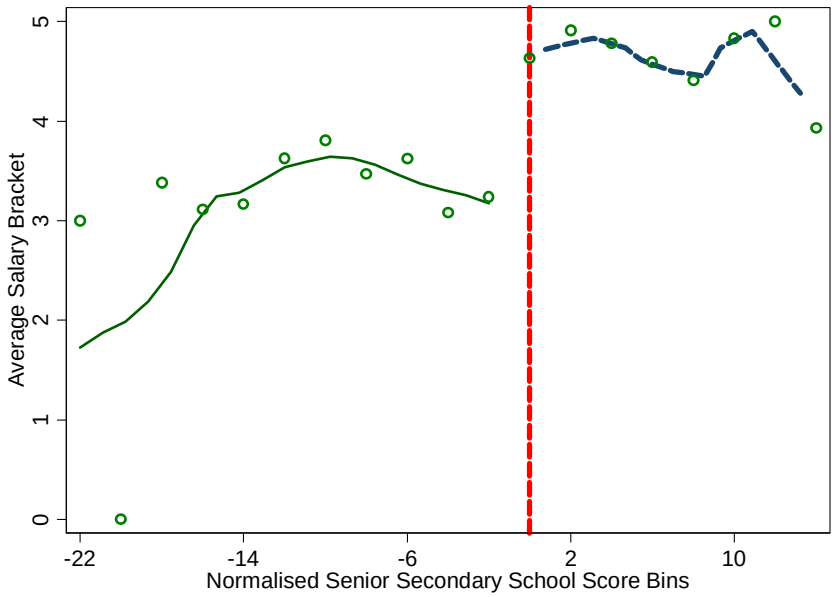
	(i)	(ii)	(iii)	(iv)
Public College	1.13***	0.57	1.14***	0.5
	(0.22)	(0.35)	(0.22)	(0.36)
Number of Friends from College in the same Industry	0.058**	0.008	0.05**	0.002
	(0.028)	(0.003)	(0.02)	(0.004)
Public College * Number of College friends in the Same Industry		0.1**		0.1**
		(0.05)		(0.05)
Industry Fixed Effects	No	No	Yes	Yes
Observations	358	358	354	354

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

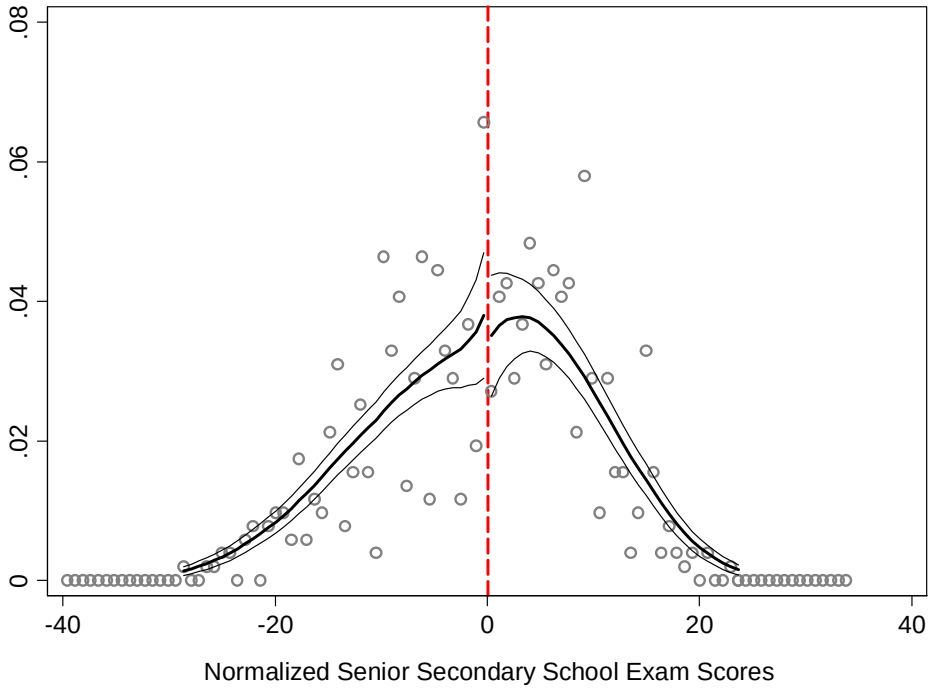
Online Appendix: Supplementary Material



Appendix Figure 1 (a): Discontinuity in Salary at the Public College Admission Cutoff with Confidence Intervals (bandwidth 1.5)

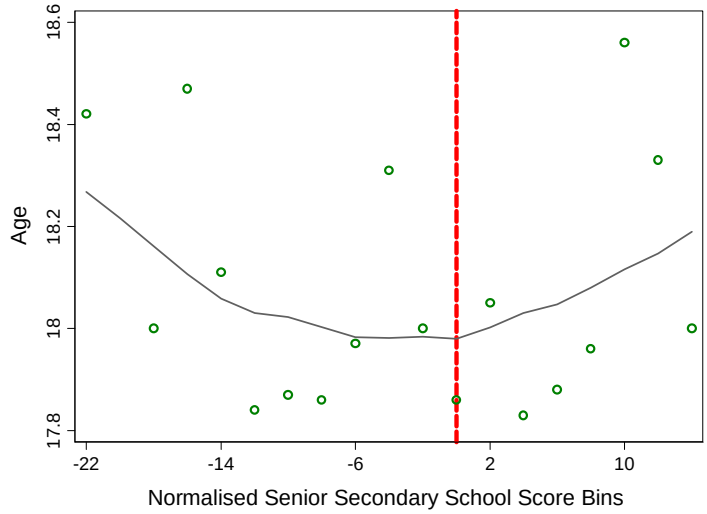


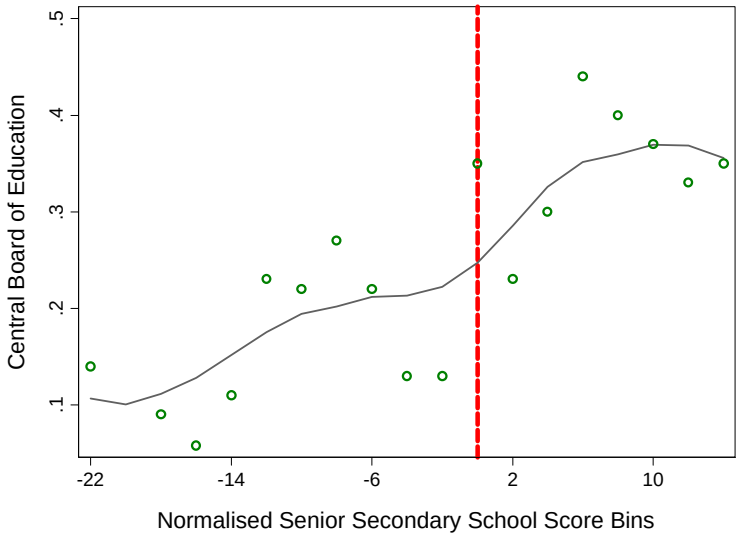
Appendix Figure 1 (b): Discontinuity in Salary at the Public College Admission Cutoff in 2 percentage bins of Normalized Senior Secondary School Examination scores

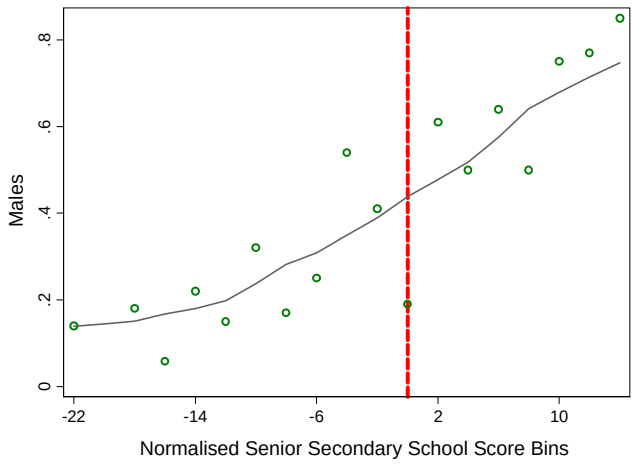


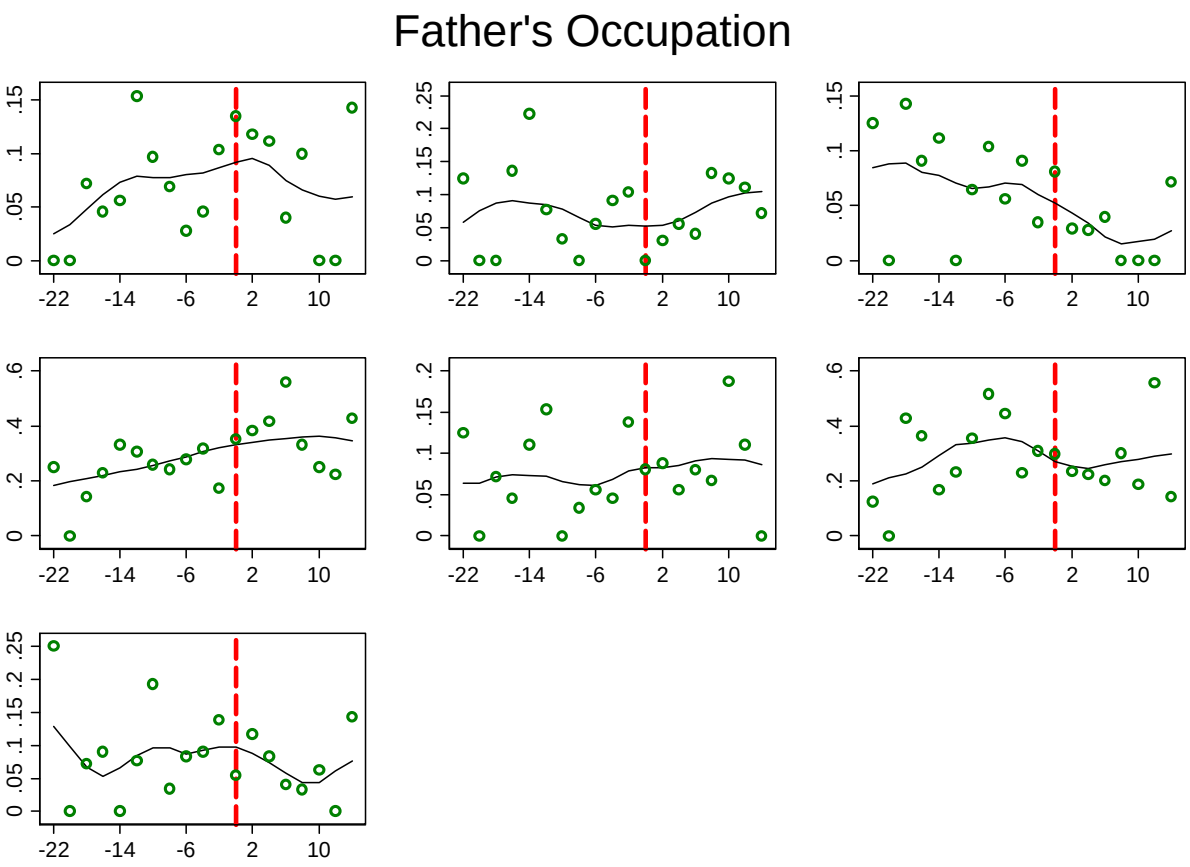
Appendix Figure 2: Smooth Density of Forcing Variable

Appendix Figure 3: Smooth Controls

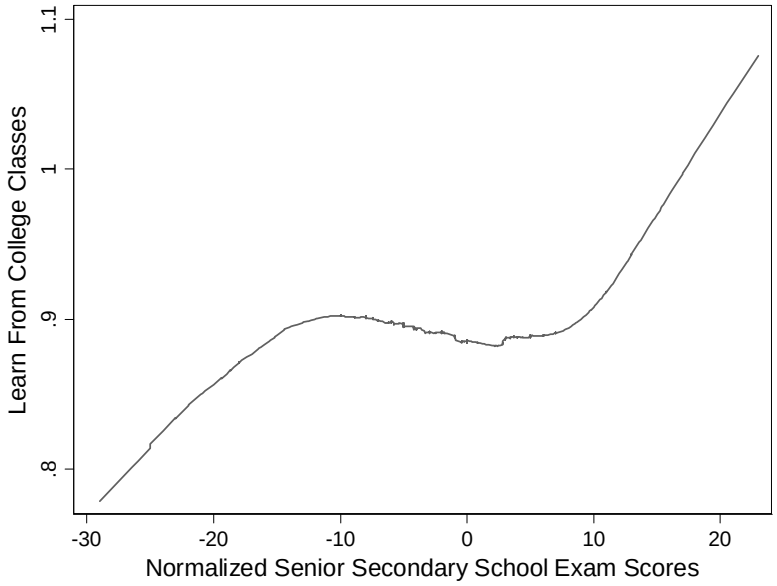




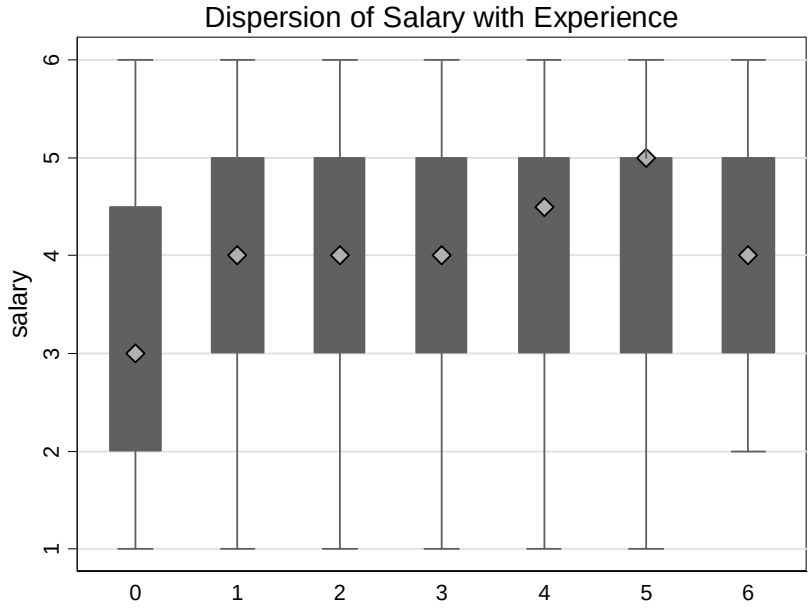




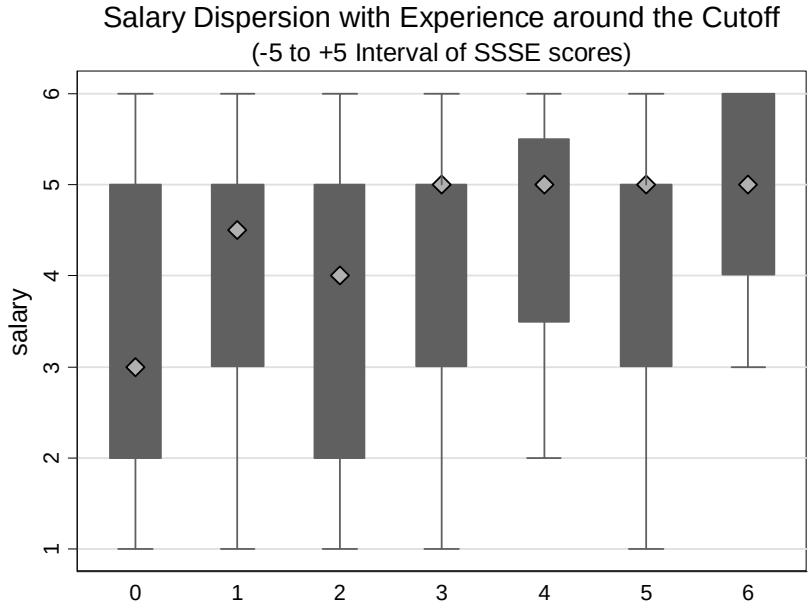
Appendix Figure 3: Smooth Controls continued



Appendix Figure 4: Self -Reported Assessment of Learning from College Classes

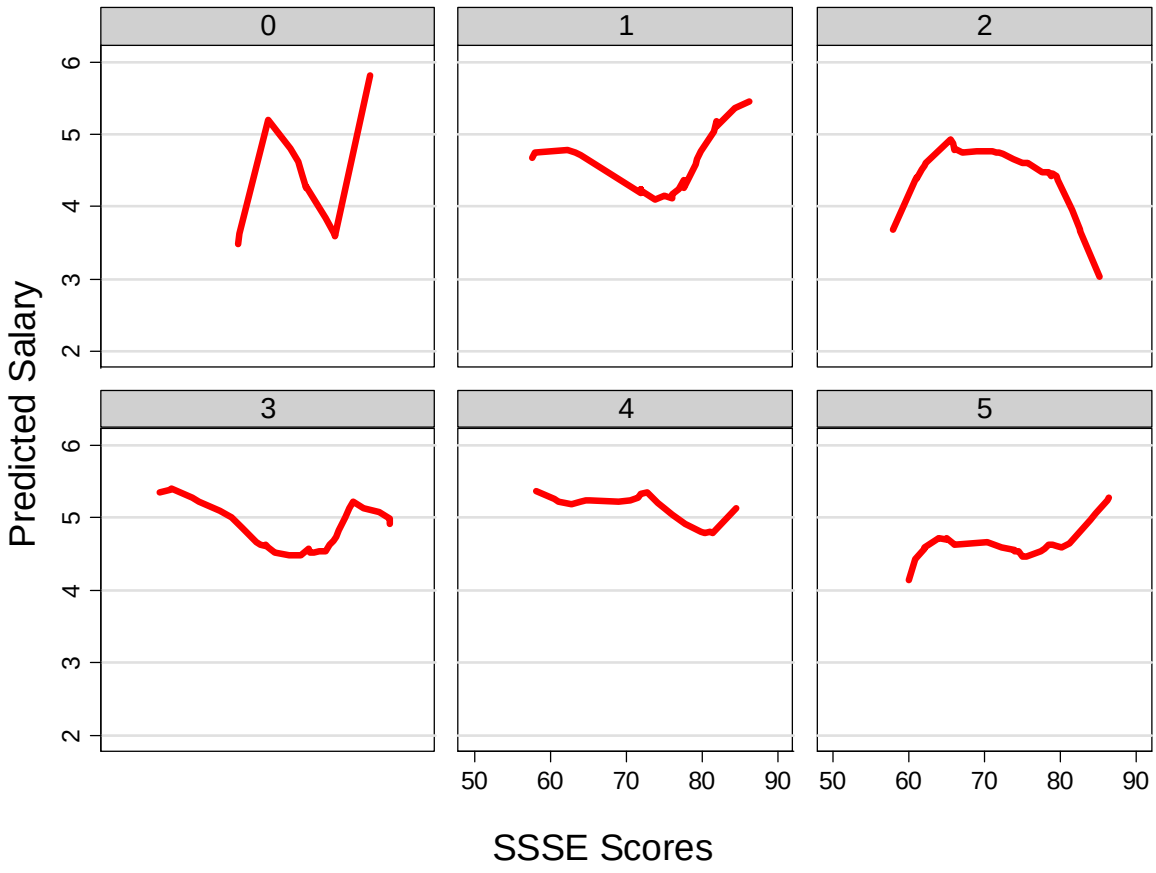


A: Coefficient of variation = 35.3

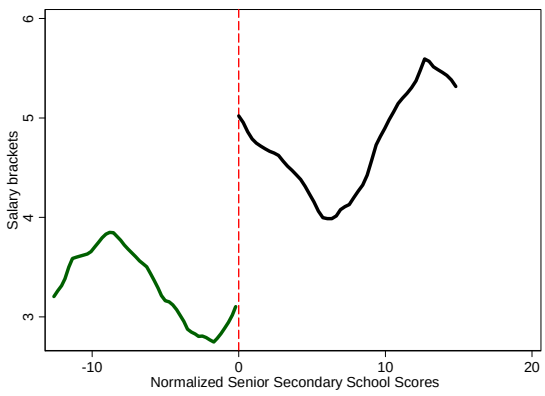


B: Coefficient of Variation = 33.85

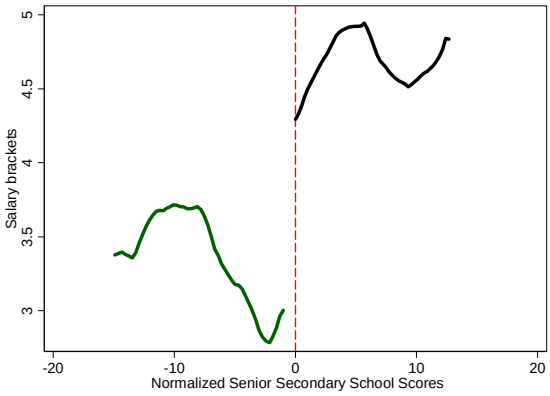
Appendix Figure 5: Panel A shows the Dispersion in Salary with Experience (0-6 years) for the Full sample. Panel B shows the Dispersion in Salary with Experience near the Admission Cutoff



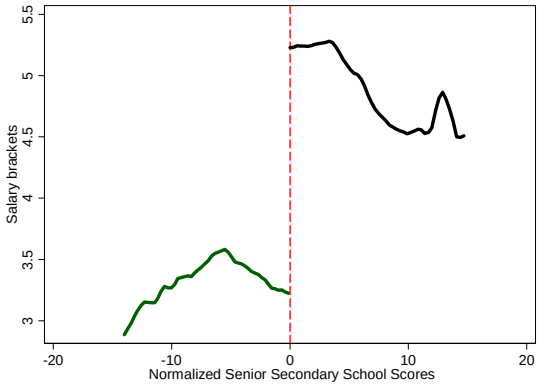
Appendix Figure 6: Salary as a function of SSSE Scores for Public Colleges by Years of Experience



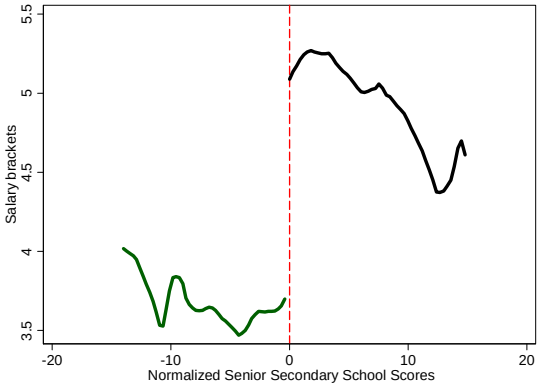
One Year of experience



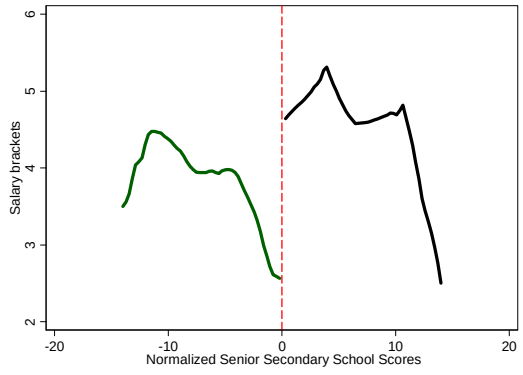
Two Years of Experience



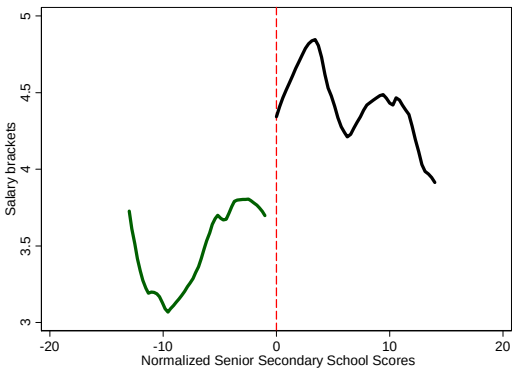
Three Years of Experience



Four Years of Experience

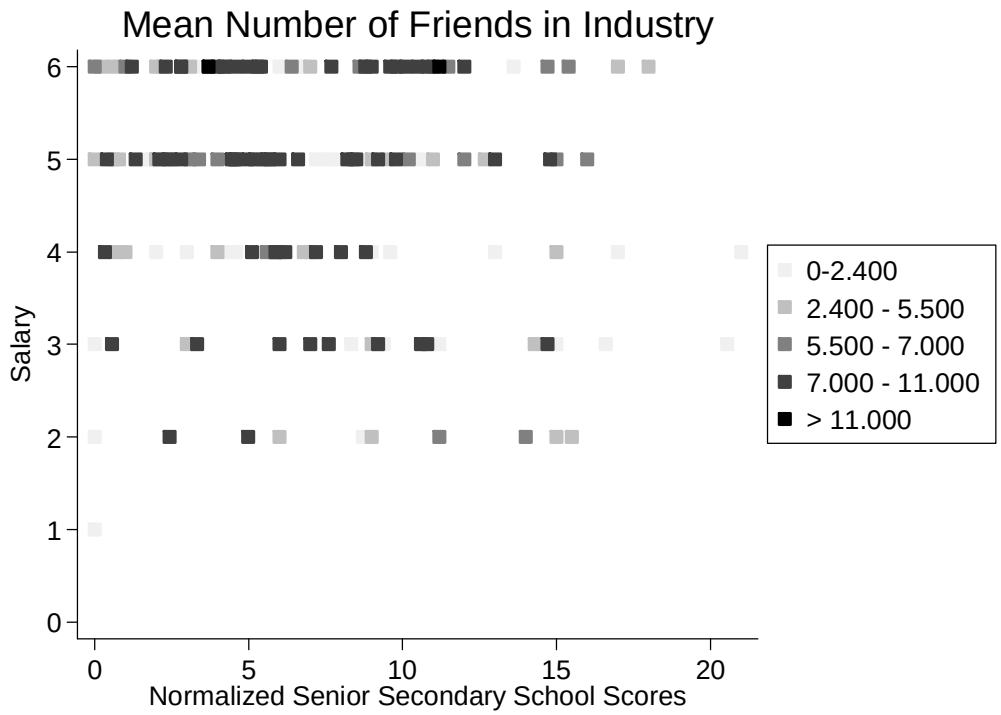


Five years of Experience

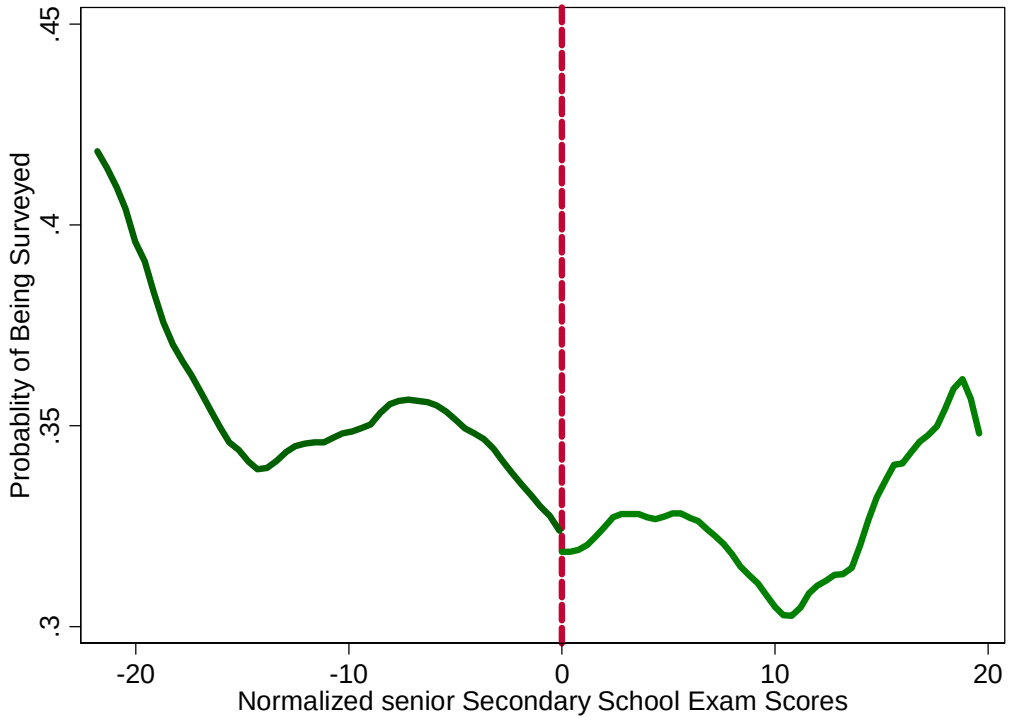


Six or More years of Experience

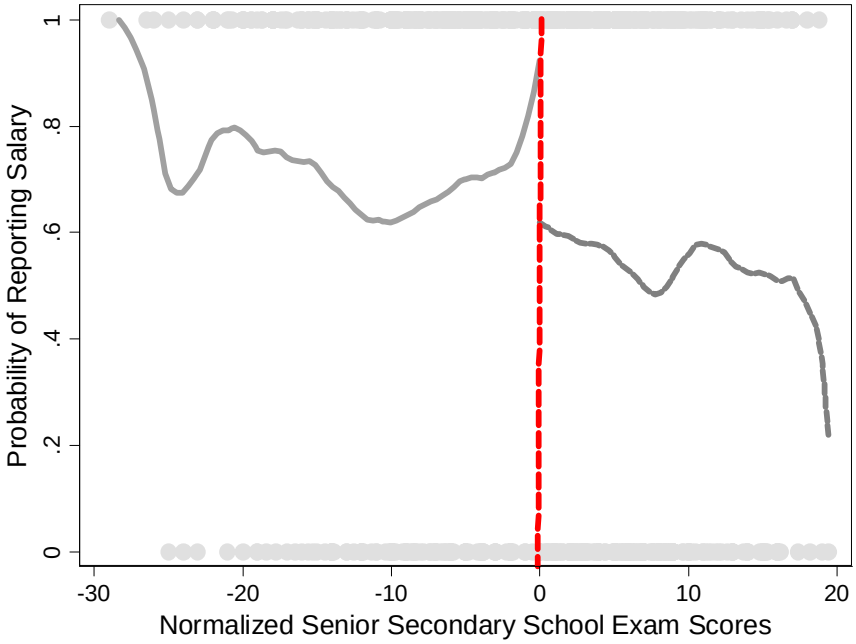
Appendix Figure 7 : Public Wage Premium by years of Experience



Appendix Figure 8: Binned Average Number of Friends in Industry with Normalized Senior Secondary School Examination Scores and Salary Brackets as Cartesian Co-ordinates



Appendix Figure 9: Probability of Survey Success



Appendix Figure 10: Discontinuity in Probability of Reporting Salary (IK bandwidth)

Appendix Table 1: Summary Statistics by College Type in -5 to 5 Interval of Senior Secondary School Normalized Scores

	Public		Private		
	mean	std dev	mean	std dev	Difference
Salary	5	1	3.55	1.44	1.36***
Senior Secondary School Exam Scores	70.4	8	67.26	7.4	3.2***
Central Board of Secondary Education	0.22	0.42	0.21	0.41	0.01
Age at Starting College	18	0.91	18	0.9	0.08
Father's Occupation					
Government Service	0.1	0.3	0.09	0.28	0.01
Labor in Unorganized Sector	0.03	0.02	0.06	0.02	0.03
Professional	0.063	0.24	0.05	0.23	0.006
Service in Formal Sector	0.35	0.48	0.23	0.42	0.11
Agriculture	0.075	0.266	0.09	0.29	0.014
Business	0.25	0.43	0.32	0.47	0.07
Admission Year					
1999	0.2	0.4	0.26	0.44	0.05
2000	0.37	0.48	0.19	0.4	0.18***
2001	0.3	0.45	0.26	0.44	0.03
2002	0.12	0.33	0.28	0.45	0.15**
Male	0.46	0.5	0.35	0.05	0.11
Stream					
Commerce	0.27	0.45	0.3	0.45	0.016
Liberal Arts	0.51	0.5	0.45	0.5	0.06
Science	0.2	0.4	0.25	0.43	0.047
College Exit Test Scores	1272.35	276	1247	271.2	25.27
Observations	79		88		

Appendix Table 2: Ordered Logit Estimation of the Impact of Public Colleges on the Probability of being in a Salary Bracket

	Dependent Variable : Salary Brackets					
	[1]	[2]	[3]	[4]	[5]	[6]
Average Marginal Effects						
Public Colleges						
No Controls	-0.044***	-0.15***	-0.13***	-0.03	0.14***	0.21***
	(0.01)	(0.016)	(0.02)	(0.019)	(0.017)	(0.038)
Demographic Controls	-0.044***	-0.145***	-0.11***	-0.013	0.14***	0.18***
	(0.01)	(0.016)	(0.02)	(0.017)	(0.017)	(0.038)
Demographic Controls and Senior Secondary School Exam Scores	-0.042***	-0.14***	-0.11***	-0.011	0.13***	0.17***
	(0.009)	(0.02)	(0.02)	(0.02)	(0.018)	(0.05)

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Appendix Table 3: RDD Estimates of the Effect of the Average Quality of the Students Admitted to Public Colleges on Salary

Dependent Variable: Reported Salary in 6 Categorical Brackets

Public College Coefficients from Parametric Regressions in Intervals around the Cutoff

	Full sample (i)	15 Point Interval (ii)	10 Point Interval (iii)	5 Point Interval (iv)
Control Function-Linear				
Without the Cohort Average Senior Secondary	1.05***	1.02***	0.95***	1.2***
School Examination Scores	(0.19)	(0.2)	(0.2)	(0.24)
Controlling Cohort Average Senior Secondary	0.3	0.3	0.34	0.2
School Examination Scores	(0.34)	(0.37)	(0.4)	(0.56)
Control Function-Quadratic				
Without the Cohort Average Senior Secondary	1.08***	1.04***	0.96***	1.18***
School Examination Scores	(0.2)	(0.2)	(0.2)	(0.23)
Controlling Cohort Average Senior Secondary	0.32	0.3	0.34	0.16
School Examination Scores	(0.34)	(0.37)	(0.4)	(0.56)
Control Function-Cubic				
Without the Cohort Average Senior Secondary	1.15***	1.08***	0.97***	1.2***
School Examination Scores	(0.2)	(0.2)	(0.22)	(0.24)
Controlling Cohort Average Senior Secondary	0.38	0.38	0.34	0.1
School Examination Scores	(0.35)	(0.38)	(0.41)	(0.6)
Observations	439	384	309	167

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study,board of education for Senior Secondary school, and father's occupation. Robust standard errors clustered at college-stream level are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college. *** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Public College Premium and Number of College Friends in the Industry

Appendix Table 4: Instrumental variable Estimates of the Effect of Number of College Friends in Industry on Salary

	Dependent Variable: Reported Salary in 6 Categorical Brackets	
	(i)	**(ii)**
Predicted Number of College Friends in Same Industry	1.6***	1.22**
	(0.55)	(0.06)
Covariates	No	Yes
Observations	371	358

Instrument used: Eligibility For Public Colleges

Notes:

Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis.

*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Appendix Table 5: Survey Success by College Type in -5 to 5 Interval of Senior Secondary School Normalized Scores

	Private			Public		
	Responded Found	Respondent not Found	Difference	Responded Found	Respondent not Found	Difference
Commerce	0.28 (0.02)	0.27 (0.01)	-0.01	0.3 (0.02)	0.25 (0.01)	-0.04
Science	0.17 (0.02)	0.22 (0.01)	0.04	0.11 (0.02)	0.18 (0.016)	0.07***
Father in Agriculture	0.05 (0.013)	0.086 (0.01)	0.03	0.06 (0.01)	0.06 (0.01)	0.0003
Father in Service in Formal Sector	0.19 (0.02)	0.23 (0.01)	0.047	0.27 (0.02)	0.3 (0.019)	0.025
Father in Service in Unorganized Sector	0.037 (0.01)	0.03 (0.007)	-0.006	0.015 (0.007)	0.03 (.007)	0.016
Admission year 1999	0.25 (0.025)	0.27 (0.018)	0.013	0.23 (0.02)	0.25 (0.018)	0.02
Admission year 2002	0.27 (0.02)	0.27 (0.018)	-0.006	0.18 (0.02)	0.16 (0.01)	-0.02
Age at Entering College	18.02 (0.09)	18.12 (0.15)	-0.1	17.93 (0.1)	18 (.09)	-0.15

Appendix Table 6: Parametric RDD Estimates of the Effect of Public Colleges on being Employed

Dependent Variable: Self Employed or Working for Salary

Public College Coefficients from Parametric Regressions in Intervals around the Cutoff

Senior Secondary School Exam Scores	**Full sample** (i)	**15 Point Interval** (ii)	**10 Point Interval** (iii)	**5 Point Interval** (iv)
Linear	0.05	0.06	0.03	0.06
	(0.03)	(0.04)	(0.04)	(0.05)
Quadratic	0.05	0.06	0.04	0.067
	(0.03)	(0.04)	(0.04)	(0.053)
Cubic	0.04	0.06	0.03	0.05
	(0.036)	(0.04)	(0.04)	(0.05)
Observations	1505	1285	1017	549

Notes:
Demographic controls include gender, year of admission in college, age at entering college, stream of study, board of education for Senior Secondary school, and father's occupation. Robust standard errors are reported in parenthesis. Public College is an indicator equal to 1 if the individual attended public college and 0 if the individual graduated from a private college.
*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Appendix Table 7: Characteristics of Individuals who report their salary and those who do not

	Salary Reported	Salary not Reported	Difference
Senior Secondary School Exam Scores	66.57	66.35	-0.21
	(0.48)	(0.63)	
Age at Entering Colleges	18.03	18.15	0.12*
	(0.046)	(0.04)	
Admission Year 1999	0.21	0.26	0.04
	(0.02)	(0.02)	
Admission Year 2000	0.29	0.3	0.01
	(0.02)	(0.02)	
Admission year 2001	0.24	0.02	-0.03
	(0.02)	(0.02)	
Admission year 2002	0.24	0.23	-0.017
	(0.02)	(0.02)	
Central Board of Secondary Education	0.31	0.25	0.06*
	(0.02)	(0.02)	
Male	0.4	0.78	0.38***
	(0.023)	(0.02)	
Father's occupation			
Government Service	0.08	0.04	-0.04**
	(0.01)	(0.01)	
Labor in Unorganized Sector	0.07	0.05	-0.02
	(0.01)	(0.01)	
Professional	0.05	0.02	-0.03**
	(0.01)	(0.008)	
Service in Formal sector	0.3	0.25	-0.067**
	(0.02)	(0.02)	
Agriculture	0.07	0.06	-0.007
	(0.01)	(0.01)	
Business	0.3	0.36	0.07**
	(0.02)	(0.03)	
Streams			
Commerce	0.24	0.35	0.1***
	(0.02)	(0.03)	
Liberal Arts	0.51	0.57	0.06*
	(0.02)	(0.03)	
Science	0.24	0.06	-0.17***
	(0.02)	0.01	

*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent

Appendix Table 8: Bounded Effect of Public Colleges on Salary

Dependent Variable: Reported Salary in 6 Categorical Brackets

	Full sample	**-5 to +5 Interval around cutoff**
Number of Observations	748	274
Number of Observations with Non Missing Salary	458	171
Trimming Proportion	0.1865	0.1947
Confidence Interval for the Treatment Effect [95%]	**[0.443 1.9]**	**[0.503 2.3]**
Lower Bound		
Coefficient	**0.73*** **	**0.96*** **
Standard Error	(0.17)	(0.27)
95% confidence Interval		
Upper Bound		
Coefficient	**1.6*** **	**1.86*** **
Standard Error	(0.17)	(0.27)
95% confidence Interval		

*** indicates significance at 1 percent level, ** at 5 percent and * at 10 percent