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Traditional Institutions Meet the Modern World: Caste, Gender and Schooling Choice in a Globalizing Economy *

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Abstract

This paper addresses the question of how traditional institutions interact with the forces of globalization to shape the economic mobility and welfare of particular groups of individuals in the new economy. We explore the role of one such traditional institution - the caste system - in shaping career choices by gender in Bombay using new survey data on school enrollment and income over the past 20 years. Bombay's labor market was historically organized along rigid caste lines; such restrictions on mobility can be welfare enhancing when network externalities are present. But there was a large change in the returns to different occupations in the 1990s. We find that male working class - lower caste - networks continue to channel boys into local language schools that lead to the traditional occupation, despite the fact that returns to non-traditional white collar occupations rose substantially, suggesting the possibility of a dynamic inefficiency. In contrast, lower caste girls, who historically had low labor market participation rates and so did not benefit from the network, are taking full advantage of the opportunities that became available in the new economy by switching rapidly to English schools. Thus, caste continues to play a particular role in shaping schooling choices in the new economy of the 1990s. But the overall increase in English schooling in recent years, and the growing mismatch in education choices and hence occupational outcomes between boys and girls in the same caste, suggest that the remarkably resilient caste system might finally be starting to disintegrate.

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1 Introduction

The collapse of the former Soviet Union, followed by the economic and financial liberalization of the 1990s, has restructured and "globalized" many economies throughout the world. One consequence of this restructuring, which has been widely observed, is that some groups have taken advantage of the new benefits afforded by globalization, while others appear to have been left behind. This paper addresses the question of whether and how old institutions clash with the forces of globalization in shaping the response of particular groups of individuals to the new economy. Informal institutions, such as community networks, are generally believed to play an important role in low-income countries by facilitating economic activity when markets function imperfectly (Townsend 1994, Fafchamps and Lund 2000). Less well understood is how such institutions affect the transformation of economies undergoing change, affecting in turn the distribution of benefits from macroeconomic structural reform. Although traditional institutions may have served a useful purpose when they were first put in place, it is possible that they may constrain the response to new opportunities when the structure of the economy changes unexpectedly.[1]

One example of a traditional institution is the caste system in India. We study the role of the caste system in shaping career choices by gender in a dynamic urban context, using new data on schooling choices and income covering the past 20 years in Bombay city, the industrial and financial center of the Indian economy. Bombay is a useful and important setting in which to study the role of institutional rigidities in a dynamic context as the Bombay labor market was historically organized along caste lines, with individual sub-castes or *jatis* controlling particular occupational niches over the course of many generations. Chandavarkar (1994: 122,223), for instance, describes how "[caste] clusters formed within particular trades and occupations ... [this] occupational distribution reflected neither caste vocation nor the inheritance of special skills. It was produced partly by exclusionary practices by which social groups, once they obtained a foothold in a particular occupation, would not admit an outsider."[2] A particularly important feature of these caste networks is that they were

[1] While these traditional institutions might have enhanced welfare in a second-best world, they were very likely associated with static inefficiencies of their own prior to the restructuring. For example, Fafchamps (2002) and Banerjee and Munshi (2003) show how network segmentation along community lines could impose significant efficiency costs with respect to investment by traders in Africa and small manufacturing units in South India respectively.

[2] In prior work on caste in the economics literature, caste is treated as an individual characteristic like ethnicity or race that is one of many determinants of human capital investment or income in India (e.g., Behrman 1988). In contrast, we study how the caste system operates as a community network, providing employment assistance to its members, which could in turn result in the persistence of occupational distributions within castes over many generations.

most active in working class occupations dominated by *lower caste men*. Women historically did not participate in Bombay's labor market and so did not benefit from the caste networks, but both men and women scrupulously adhered to the social rule of endogamous marriage within the *jati*.

Although Bombay was a predominantly industrial city for a hundred years, starting from the last quarter of the nineteenth century, the liberalization of the Indian economy in the 1990s saw a shift in the city's economy towards the corporate and financial sectors. We study how members of different *jatis*, by gender, responded to these changes in the returns to different occupations, and we will show that the historical pattern of networking within the *jati* continues to shape gender-specific, individual responses to these new opportunities in ways that will importantly affect the future distributions of incomes, independent of pre-school human capital effects or credit constraints.[3]

Our strategy in this paper is to assess how schooling choice, measured by the language of instruction, varied across *jatis*, across boys and girls within *jatis*, and over time. We focus on schooling choice because most adults were already locked in to their occupations when the unexpected economic changes occurred. Schooling choice is an important determinant of future occupational outcomes in the Bombay economy and thus reflects the contemporaneous perceptions of expected occupational returns. University education in Bombay is entirely in English, but children choose between English and Marathi (the local language) as the language of instruction in primary and secondary school at the time they enter primary school. Schooling in Marathi channels the child into working class jobs, while more expensive English education significantly increases the likelihood of obtaining a coveted white-collar job. If the economic liberalization of the 1990s effectively increased white-collar incomes, and by extension the returns to English education, then (future) occupational mobility can be identified from changes in the choice of the language of instruction made by parents of school-age children.[4] Examination of the changing patterns of schooling choice by *jati* and gender thus permits an assessment of the interactions between traditional institutions and the new realities of globalization.

Our empirical analysis is based on a survey of 4,700 households belonging to the Maharashtrian

[3]A recent literature has shown that historical institutions have long run consequences for growth in low-income countries (Acemoglu, Johnson and Robinson 2001; Banerjee and Iyer, 2002). These empirical findings, however, do not provide insight into the mechanisms underlying such persistence. In our analysis, we show how caste-based job networks can preserve existing occupational distributions even in the face of the increasing returns to individual occupational mobility that accompany globalization.

[4]Prior work on schooling enrollment in India has ignored this important dimension of schooling, which affects importantly schooling attainment and economic mobility (Jacoby and Skoufias 1997; Kochar, 2002). These studies examined rural households. In 1990, approximately 28% of rural village schools provided instruction in a local language (other than English or Hindi).

community and residing in Bombay's Dadar area and a survey of the schools in the locale that we conducted in 2001-2002. The household survey was based on a stratified random sample of all students who attended 28 of the 29 secondary schools in Dadar, which run from grade one to grade 10, over a twenty year period, 1982-2001.[5] The sample of households covers 59 *jatis*, and schooling decisions for the 20 cohorts of children who were attending or had attended the 28 neighborhood schools over that period. English is the language of instruction in 10 schools in Dadar, while Marathi is the language of instruction in the remaining 18 schools.

The survey data suggest that the returns to English education, for given years of schooling, increased in the 1990s. Based on retrospective information on the annual earnings of the parents of the sampled children obtained from the survey, we estimated the returns to English and the returns to years of schooling at five points in time from 1980 through 2000 for working adults between the age of 30 and 55.[6] Figures 1 and 2 provide the estimated returns to schooling attainment and schooling language, for men and women, respectively, in each time period. As can be seen, the returns to years of schooling increased only mildly over time for both men and women. In contrast, the English premium increased sharply from the 1980s to the 1990s for both sexes, rising from 15% in 1980 to 24% in 2000 for men and from approximately 0% in 1980 to 27% in 2000 for women. The returns to English for men increase from the mid-1980s, which is most likely due to the decline around that time in manufacturing jobs in Bombay, but continue to rise through the 1990s.

The times-series data on enrollments in English- and Marathi-medium schools also suggest that the changes in the returns to English significantly affected schooling choice for both boys and girls, across *jatis* and over time. Figure 3 and Figure 4 display the changing proportions of students enrolled in English schools for the 20 entering cohorts from 1982 (cohort=1) to 2001 (cohort=20) for three caste groupings - low, medium and high - and by gender.[7] The figures were constructed using the Epanechnikov kernel function to nonparametrically regress schooling choice (1=English medium; 0=Marathi

[5]One school refused to provide us with information on its students and will be ignored in all the discussion that follows. Details of the survey are provided below

[6]The details of the estimation procedure are provided in the Appendix. The estimates of the returns to English and the returns to schooling (with standard errors) are provided in Table A1.

[7]Children enter first grade at the age of six and complete tenth grade at the age of 15, so the current age of the students in our sample, with only a few exceptions, ranges from six to 25. Students in Bombay typically do not change the language of instruction midstream or switch schools after they enter first grade. High castes include all the Brahmin *jatis*, as well as a few other elite *jatis* (CKP and Pathare Prabhus). Low castes include formerly untouchable and backward castes (Scheduled Castes, Scheduled Tribes, and Other Backward Castes, as defined by the government of India). Medium castes are drawn mostly from the cultivator *jatis*, such as the Marathas and the Kunbis, as well as other traditional vocations that were not considered to be ritually impure.

medium) on the cohort variable for each caste group, taking into account the strong intergenerational state-dependence with respect to the language of instruction within the family.[8] Although *jatis* define the relevant boundary for the labor-market networks and form the relevant social unit in our analysis,[9] we aggregate the sub-castes for expositional convenience in these figures.

Figures 3 and 4 show that enrollment rates in English-medium schools have grown substantially over time for both boys and girls and for all castes. However, the trajectory is much steeper for the 10 most recent cohorts, who would have entered school in the post-reform 1990s. Thus, the increase in the returns to English observed in Figure 1 and Figure 2 appears to have shifted schooling choice towards English education. The figures also indicate substantial differences in English schooling between castes at the beginning of the period, reflecting in part the circumstances of the colonial period. The high castes in particular gained access to clerical and administrative jobs under the British, while the lower castes were confined for the most part to working class jobs. Consistent with the view that Marathi education channels students into working class jobs, and that English education increases the likelihood of obtaining a white-collar job, we see in Figure 3 and Figure 4 that high-caste boys and girls currently 25 years old (the oldest cohort) were much more likely to have been schooled in English, and that this caste difference in schooling persists over the next 10 cohorts. But while the caste-gap narrows dramatically for the girls in the 1990s, there is no convergence for the boys. Thus it appears that caste continues to play a role in shaping schooling choices in the new economy of the 1990s, but only for boys. The key question is why the lower-caste boys seemingly fail to take advantage of the new economic opportunities.

The explanation for the observed pattern in Figure 3 that we pursue in this paper is based on network externalities. It is commonly observed that working class occupations, which tend to be dominated by men, are associated with higher levels of networking. For example, Rees (1966) found that informal sources accounted for 80% of all hires in eight blue-collar occupations versus 50% of all hires in four white-collar occupations in an early study set in Chicago. Similarly, 68% of blue-collar workers and 38% of white-collar workers reported having received help finding a job in Gore's (1970)

[8]There is a very high degree of state dependence in schooling choice across generations. In particular, if both parents have been schooled in English, it is very unlikely that the child will be sent to a Marathi school. Details of the nonparametric estimation procedure are provided in the Appendix and parametric estimates of the schooling regression (with standard errors) are provided in Table A2.

[9]As Morris (1965: 76) emphasizes in his historical account of the Bombay labor market, "for any analysis of labor recruitment [in Bombay] ... it is entirely inappropriate to lump into larger groups because of similarity of name, function, social status, or region-of-origin subcastes that are not endogamous."

study of migrants in Bombay. These studies focus on men, the primary occupants of blue-collar jobs. And among the household heads in Dadar, 68% of the men in working class jobs found employment through a relative or a member of the community, while the corresponding statistic for white-collar workers was 44%. These differences in the level of networking across broad occupational categories might arise because the information and enforcement problems that give rise to networks are more acute in the working class jobs. Once the (working class) network is in place, there is a positive externality associated with participation in the network, and hence with the traditional occupational choice in the *jati*. This externality could give rise to restrictions on occupational mobility - labor market networks, organized at the level of the *jati*, then channel boys into particular (traditionally male) occupations and hence towards particular schooling choices.[10] We will show that although these restrictions might have been welfare-enhancing and indeed equalizing when they were first put in place, such restrictions may result in dynamic inefficiencies when the structure of the economy changes.

The paper is organized in six sections. The next section provides a brief description of the institutional setting. In section 3 we lay out a model of schooling choice when caste-based networks are active, which incorporates within-caste heterogeneity in ability. The model is used to explain the persistence of occupational choice and hence schooling choice within castes, and why networks attempt to constrain mobility in the face of economic change. The model also provides predictions for which castes restrict mobility and which individuals within castes will first exit the traditional occupations as the economy changes, which has implications for the selectivity of school choice. Section 4 describes the data and presents basic descriptive statistics that support the assumptions of the model. Section 5 tests the theory, assessing the role of caste networking in determining school choice and the selectivity in terms of pre-school human capital of those who exit the traditional occupations. Alternative explanations of school choice and thus occupational state dependence are also considered, including credit constraints, caste differences in pre-school human capital, preferences for (or advantages of) the parental occupation, and differences in school quality. Section 6 concludes.

The results in this paper provide empirical support for the view that historical occupation patterns kept in place by caste-based networks continue to shape occupation patterns for the boys in the new economy. Although our results indicate that differences in family income and in pre-school human capital help explain differences in schooling choice across castes, these factors cannot by themselves

[10]These restrictions may take the form of a conformist working class culture, observed in many economies, that tends to be resistant to change (Kohn, 1977, is the classic reference in the large sociological literature on class, values, and conformity).

explain why groups that have traditionally been occupied in working class jobs remain in those jobs despite rising individual returns to non-traditional occupations. In contrast, the lower-caste girls who historically kept away from the labor market, and so have no network ties to constrain them, take full advantage of the opportunities that become available in the new economy. The growing disparities in school choices between boys and girls within the traditional *jatis* not only suggest a new balance of economic opportunities by gender, but also could threaten the long-run stability of the caste system, which is based on endogamous marriages within the sub-caste. A complete understanding of the development process must thus not only take account of the initial conditions and the role of pre-existing institutions in shaping the response to modernization and globalization, but must also consider how these traditional institutions are shaped in turn by the forces of change.

2 The Institutional Setting

2.1 A Brief History of Bombay City

Bombay's economic history begins in the last quarter of the eighteenth century when it replaced Surat as the largest trading port and the center of commerce on the West Coast of India (Chandavarkar 1994, Katzenstein 1979). Bombay's first cotton-textile mill was established in 1851, and from the late nineteenth century onwards this industry dominated the city's economy. The 1921 census indicates that this one industry employed as much as 16.2% of the male population of the city (Chandavarkar 1994). But other industries started to expand from the 1930s onwards, and by the 1961 census, manufacturing accounted for 41% of Bombay's employment (D'Monte 2002).

Although manufacturing continues to play an important role in the city's economy, the past two decades have seen a steady decline in the importance of this sector. The textile industry, which had dominated the economy from the last quarter of the nineteenth century up till the middle of the twentieth century, began to decline after a crippling strike shut down the mills for eighteen months in 1982-83. More industries began to leave Bombay in the 1990s, as real estate prices rose and the industrial wage gap between the city and the rest of the country widened (D'Monte 2002). But apart from its manufacturing base, Bombay has also historically dominated India's commercial and service sector. The city is the center of trade, banking, insurance and financial services, publishing, and advertising in India. The decline in manufacturing and the removal of controls on industrial licensing and foreign investment in 1991 gave a further boost to this sector, sharply increasing wages

in corporate jobs, and commercial occupations in general. This exogenous shock to the local economy serves as the point of departure for our analysis.

Although Bombay is located in the modern Indian state of Maharashtra, the city was largely established by outsiders. It was only with industrialization in the mid-nineteenth century that the mills and manufacturing companies started to recruit Maharashtrian labor from the Konkan coast and the interior Deccan region on a massive scale (Morris 1965). The Pathare Prabhus, who had lived in Bombay from early times, and later several Maharashtrian Brahmin castes, found administrative and clerical jobs under the British. With the formation of the linguistic state of Maharashtra with Bombay as its capital in 1960, the Maharashtrian community also quickly gained control of local political power and state government jobs (Katzenstein 1979). But the Maharashtrian community was historically conspicuously absent from trade and commerce, the major source of recent economic opportunities. The question is how did different groups within this community respond to these new opportunities, as observed in the schooling choices of their children?

2.2 Bombay's Labor Market

Bombay's industrial economy in the late nineteenth century and through the first half of the twentieth century was characterized by wide fluctuations in the demand for labor (Chandavarkar 1994). It is well known that such frequent job turnover can give rise to labor market networks, particularly when the quality of a freshly hired worker is difficult to assess and performance-contingent wage contracts cannot be implemented. One scheme to organize these networks (Munshi 2003) uses incumbent workers to search for fresh hires; incumbent workers will typically have built up a reputation within the firm, and so they have the incentive to bring back high quality recruits to maintain that reputation (and the economic rents that go with it). The presence of such recruitment networks has indeed been documented by numerous historians studying Bombay's economy prior to independence in 1947 (Chandavarkar 1994, Morris 1965, Burnett-Hurst 1925). These networks appear to have been organized around the jobber, a foreman who was in charge of a work gang in the mill, factory, dockyard, or construction site, and more importantly also in charge of labor recruitment.[11] The jobber is almost ubiquitous in the Indian industrial system, but the fluctuations in labor demand gave his role particular prominence in Bombay.

[11]The jobber was known as the *mukadam* in the mills and the factories, *maistry* in the construction industry, and the *serang* in the shipping industry.

Given the information and enforcement problems that are associated with the recruitment of short-term labor, it is not surprising that the "jobber had to lean on social connections outside his workplace such as his kinship and neighborhood connections" (Chandavarkar 1994: 107). Here the endogamous subcaste or *jati* served as a natural social unit from which to recruit labor, because marriage ties strengthen information flows and improve enforcement. This widespread use of caste-based networks led to a fragmentation of the Bombay labor market along social lines. The presence of caste clusters in the textile mills, for example, has been well documented. Gokhale's (1957) survey of textile workers in the 1950s showed that Maratha and Kunbi (both middle caste) men were evenly distributed throughout the mill, while Harijan (low caste) men were employed for the most part in the spinning section. Consistent with the presence of local (jobber-specific) networks, the caste clusters that were observed in particular mills often differed from the general pattern for the industry as a whole. The same sort of caste-based clustering has been documented among Bombay's dock workers (Cholia 1941), construction workers, and in the railway workshops (Burnett-Hurst 1925), in the leather and dyeing industries, and in the Bombay Municipal Corporation and the Bombay Electric Supply and Transportation Company (Chandavarkar 1994).

Most historical accounts of caste-based networking in Bombay's labor market are situated prior to independence in 1947. But a few studies conducted over the subsequent decades suggest that these patterns tended to persist over many generations. Patel (1963) surveyed 500 mill workers in the Parel area, close to the site of our study, in 1961-62 and found that 81% of the workers had relatives or members of their *jati* in the textile industry. 50% of the workers got jobs in mills through the influence of their relatives and 16% through their friends, many of whom would have belonged to the same *jati*. Similarly Dandekar (1986) traced the evolution of a network of Jadhavs (a particular subcaste) from Sugao village in Satara district to one jobber who went to Bombay in the 1930s, working first on the docks and later in the textile mills. In 1942, 67% of the Jadhav migrants from that village were working in the textile mills and 4% in other factories. By 1977, 58% were in textile mills and 10% were in other manufacturing industries, suggesting little change in occupational patterns over a 35 year period.

A noticeable feature of historical descriptions of caste-based networks in Bombay is that they were restricted to working class jobs. This is not surprising, because the information and enforcement problems that give rise to such networks tend to be more acute in those occupations. Further, most studies of caste-based networks in Bombay focus on male workers. Women were conspicuously absent

from Bombay's labor force, particularly in the working class jobs (Morris 1965). We will later see that female labor force participation is low in our sample of households as well, and that when women do enter the workforce they tend to find clerical and professional jobs, which are less networked. These historical patterns of labor force participation by gender will later help explain the schooling choice dynamics, for boys and girls, that we saw in Figure 3 and Figure 4.

2.3 The School System

The British were not committed to providing mass education when they first began to colonize India on a large scale in the eighteenth century. The few schools and colleges that were set up were based in the major cities and taught entirely in English; the objective at this stage was to create an Indian elite that would assist the British in administering the country (Nurullah and Naik 1947, Kamat 1985). But by 1850, missionary societies and some princely states not directly under the control of the British had begun to establish a network of rural schools that taught in vernacular (local) languages. And with Sir Charles Wood's Despatch of 1854, the British government finally assumed responsibility for the education of the entire population (Dakin, Tiffen and Widdowson 1968).

Over the next century, education which had previously been restricted to a few business communities and the Brahmin castes spread to the middle castes, with an accompanying shift in the language of instruction away from English. The Education Commission accepted Indian languages as a legitimate medium of instruction for all grades in 1902 (Dakin, Tiffen and Widdowson 1968), and by independence in 1947, a large fraction of Indian schools taught in the local language (Kamat 1985). But university education, at least in the major metropolitan areas, was always in English, and schooling in the local language was sometimes seen to put the prospective college student at a disadvantage. Thus, English and local language schools coexisted in the major cities.

Dadar was historically a suburb of Bombay - today with the expansion of the city, it lies at its center - and schools were established relatively late in the area. The average establishment year for the 18 Marathi schools in Dadar is 1947. The corresponding year for the 10 English schools is not much later, 1959, and all the schools in the area have now been operating for many decades. Our analysis highlights the medium of instruction as the salient feature of schooling choice. It is possible that the choice of the language of instruction merely proxies for school quality. Marathi schools can be private or municipal (government), while the English schools can be missionary or secular. These differences in the management lead to fairly wide variation in the availability of resources within each

type of school. However, on average English-medium and Marathi-medium schools look very similar in terms of the facilities, attention and resources each student receives, and teacher qualifications.

In parallel with the household survey, we carried out a survey of schools, based on a questionnaire filled out by school principals. This questionnaire elicited information on a variety of school characteristics, as well as recent student performance on the standardized school leaving examination (common to both Marathi and English schools), which allows us to compare the two types of schools as well as the students across the schools. Table 1, Panel A, describes school infrastructure and faculty qualifications in the English and Marathi schools. The average student-teacher ratio, class size, number of students per desk, computers per student, and the proportion of teachers with B.Ed. degrees and higher (postgraduate) degrees, are each very similar and statistically indistinguishable for the two types of schools.[12]

Despite the increase in the demand for English education in the last 10 years, as seen in Figures 3 and 4, no new schools were added in this period in Dadar. The English language schools accommodated this increased demand by adding divisions in each grade, increasing the number of desks in each classroom, and by doubling students on each desk. Because the supply of schools was effectively fixed, we would expect the English schools to extract some economic rents from this increased demand through higher fees and schooling costs in general. In contrast, fees in the Marathi schools are subsidized by the state government. Our household survey collected information on school fees and other expenses (transportation, coaching classes, textbooks, uniforms, and stationary) in the last year. Table 1, Panel B shows that school fees are currently significantly higher in the English schools (2,000 versus 900 Rupees), as are other expenses (5,000 versus 3,000 Rupees).

One other difference between the schools is in the performance of the students on the Secondary School Certificate (S.S.C.) school-leaving examination. Table 1, Panel C reports student performance on this exam over a five year period, 1997-2001. Students in the English schools perform much better on this standardized test in terms of the percentage that pass, receive a first class, and a distinction.[13] As seen in Panel A the school infrastructure and the qualifications of the teachers do not vary by the language of instruction. We will show below that these substantial differences in test performance can be explained by differential selection by ability into English and Marathi schools, an implication of our network model of school choice.

[12] A probit regression of school language medium on the set of school characteristics in Table 1, Panel A, indicates that the joint set of characteristics is not significantly different across the school types.

[13] Scores above 35% are required to pass, scores above 60% are required for a first class, and above 75% for a distinction.

3 A Simple Model of Schooling Choice

Our first objective in this section is to show how exogenous, historically-determined occupational differences across otherwise identical *jatis* persist when network externalities are present. Because occupational choice translates into schooling choice, this explains the initial caste-gap that we observe for the boys in Figure 3 (the model that we lay out in this section applies to the boys, as we will show later that labor market networks are most active among the men). However, we will show that *jatis* should start to converge once the returns to English grow sufficiently large, which is inconsistent with what we observed in that Figure. Our second objective in this section will consequently be to show how network externalities could give rise to endogenous social restrictions on occupational mobility, and by extension schooling choice, preventing convergence across social groups in a changing economic environment.

3.1 Population, Community Structure, and Market Structure

Consider a population with a continuum of individuals. Each individual i is endowed with a level of ability $\omega_i \in \left\{0, \frac{1}{2}, 1\right\}$. He lives for two periods, studying in the first period and working in the second period. Schooling choice is restricted to instruction in English or Marathi, the local language. Occupational choice is restricted to white-collar and working class jobs. Education in English is required to obtain a white-collar job, but is more expensive than Marathi education. Occupational choice is based on the wage that the individual will receive in the white-collar and the working class job, net of the pecuniary cost of schooling in English and Marathi respectively. Each individual then makes his schooling decision based on the type of job that he (correctly) anticipates he will occupy in the subsequent period. If he expects to hold a white-collar job then he will study in English, if not he will study in Marathi which is less costly.

Each individual is born into a community or *jati*. There is a large number of communities in this economy, and we normalize so that the measure of individuals in each cohort of a *jati* is equal to one. The distribution of ability within each cohort does not vary over time or across *jatis*.[14] Within each *jati*-cohort there is a measure P_L of low types (with ability $\omega = 0$) and a measure P_M of medium types (with ability $\omega = 1/2$).

On the demand side of this labor market, firms operate competitively in both the working class and

[14]We will relax this assumption in the empirical work by allowing for heterogeneity in ability across em jatis.

the white-collar sectors. Firms make zero profit, and the wage offered to a worker will thus be equal to his (expected) productivity, which in turn is determined by his (expected) ability. In the white-collar sector, the worker's wage, net of schooling costs, is specified to be $\theta\omega_i$. Here θ represents the returns to ability in the white-collar job, which in our set up also reflects the returns to English education. Although the white-collar worker's ability can be observed perfectly, the nature of the production technology prevents working class firms from directly observing their employees' ability before they commence work. We take it that the firm is unable to specify a performance-contingent wage contract, and so must base its wage on the potential employee's expected ability. Here the firm will use the measure of the employee's *jati* that has studied in Marathi, and hence is available for employment in the working class job, to infer the potential employee's ability. In our model, the working class wage, net of the cost of schooling, is specified to be P, the proportion of the *jati*-cohort that studied in Marathi. We will verify below that this statistic is positively correlated with the worker's ability in equilibrium, which will in turn map into his productivity.

An alternative mechanism linking the working-class wage to P is based on competition between *jatis* for scarce working class jobs. The level of referrals that the *jati* can generate is increasing in the measure of its members that seek working class employment, which in turn leads to higher working class employment levels on average in the *jati* (as in Munshi 2003). The expected working class wage is thus increasing in the proportion of the *jati*-cohort that studied in Marathi.

3.2 The Schooling Equilibrium

We now proceed to derive the different schooling equilibria that can be sustained in this set up. Each individual chooses the occupation, and hence the language of instruction, that maximizes his net return. This return depends on his ability, as well as the proportion of his *jati*-cohort that choose to be schooled in Marathi in equilibrium, as described above. On the demand side of the labor market, firms set a wage that reflects the worker's (expected) ability.

To begin with, we specify the returns to English education prior to the economic liberalization of the 1990s to be $\theta < 1$. Under conditions that we specify below, with three levels of ability, three equilibria can be sustained: (1) only low types choose Marathi education, (2) low and medium types choose Marathi education, (3) everyone in the *jati* chooses Marathi education.

It is easy to verify that no one in the *jati* wants to deviate from equilibrium 3 when $\theta < 1$, because the white-collar occupation offers a lower return than the working class occupation even to the highest

type. In equilibrium 2, medium types (and hence low types) prefer Marathi schooling, since they do better in working class jobs, under the following condition:

Condition 1: $\frac{\theta}{2} < P_L + P_M < \theta$.

This condition also ensures that high types will not deviate from English schooling, since they strictly prefer the white-collar jobs. Finally, low types get $P_L > 0$ in equilibrium 1, so they do not wish to deviate. Medium types get $\theta/2$ in this equilibrium, so they will not deviate as long as

Condition 2: $P_L < \frac{\theta}{2}$.

Exogenous historical circumstances determine the initial equilibrium of a *jati*. Because interactions within a single cohort in the *jati* determine the equilibrium that it will settle into in any given period, equilibrium selection within the same *jati* over time must be specified. We assume that the previous period's equilibrium serves as a natural focal point when multiple equilibria are available. If the previous period's equilibrium cannot be sustained, then the *jati* will move to the equilibrium that requires the smallest change in schooling decisions. This equilibrium selection criterion would arise, for example, if there is state dependence in schooling decisions within a *jati*. A *jati* in which Marathi is the predominant schooling choice cannot switch completely into English from one year to the next: Parents must help their children with school-work, and this is not possible if they were schooled in Marathi. Older siblings will also be enrolled in Marathi schools, and it is always more convenient to send all siblings to the same school.[15]

Notice also that the ability distribution among those who choose Marathi schooling grows less favorable as we move sequentially from equilibrium 3 to equilibrium 1. While we do not explicitly map ability into productivity in the working class sector, this nevertheless tells us that our specification of the wage function in that sector is generally appropriate.[16]

3.3 Equilibrium Dynamics (Without Restrictions on Mobility)

Having derived the different (static) equilibria that can be sustained in this set up, we proceed to model the economic liberalization of the 1990s as an increase in θ, which reflects the returns to English. We assume that individuals correctly predict the level of θ that will be realized in the subsequent period

[15] Our data will later reveal strong intergenerational state dependence in the language of instruction.

[16] The relationship between the proportion of the *jati* educated in Marathi, P, and average ability is clearly non-linear. We take it that the ability-productivity relationship results in a linear relationship between P and productivity, and hence wages.

when they make their schooling decision, so the equilibrium can be solved independently for successive cohorts during this period of change, just as we did above. Once θ reaches one, high types will switch to English to prepare themselves for white-collar jobs, and equilibrium 3 can no longer be sustained. However, equilibrium 2 is still feasible if $2(P_L + P_M) > 1$, from Condition 1. Under the equilibrium selection rule described above, this implies that all *jatis* in equilibrium 3 will shift to equilibrium 2.

But once θ reaches $2(P_L + P_M)$, it is easy to verify from Condition 1 that the medium types will deviate as well and choose English education; *jatis* in equilibrium 2 will switch to equilibrium 1 and the convergence process is complete. The process just described can be easily extended to the general case with N types. As θ grows, high types will deviate in *jatis* in which they were previously schooled in Marathi, followed sequentially by lower types. The number of equilibria that can be sustained thus shrinks over time, until all *jatis* converge.

Types will deviate sequentially, and the reduction in the number of available equilibria occurs in steps, as long as (i) the measure of the deviating type is not too large, and (ii) the difference in ability between the deviating type and the next lower type is sufficiently large. For example, sequential deviation once θ reaches one in the three-type case requires that $2(P_L + P_M) > 1$. This condition is more easily satisfied when the measure of deviating high types is small, which implies with three types that $P_L + P_M$ will be large. Further, if ability for the medium types were specified to be $1/4$ rather than $1/2$, then it is easily verified that the preceding condition would be replaced by $4(P_L + P_M) > 1$, which is more easily satisfied once again.

If the condition for sequential deviation is not satisfied, then initial deviation could induce subsequent deviation, giving rise to a cascade. With three types, such a cascade would be characterized by a simultaneous shift from both equilibrium 3 and equilibrium 2 to equilibrium 1 when θ reached one. Although convergence would be faster in this case, deviation would continue to be (weakly) ordered by ability. This description of the convergence process provides us with our first testable implication:

Proposition 1 *Consider two* jatis *that start with a different proportion of their members in the working class occupation. An individual drawn at random from the* jati *that started with a greater proportion of its members in the working class occupation is at least as likely to be educated in Marathi as an individual drawn randomly from the other* jati*, at any point in time.*

For the general case with N types, it is easy to derive conditions (as above) under which a total of N equilibria can be sustained. These equilibria, $n \in \{1, ..., N\}$, can be ranked by the proportion of

types $T_n \in \left\{\frac{1}{N}, ..., 1\right\}$ that choose Marathi schooling. For each equilibrium n, there exists a θ_n such that the equilibrium can be sustained for all $\theta < \theta_n$. Thus, for equilibrium $n = N$, $T_N = 1$ and $\theta_N = 1$. With equilibrium $n = N - 1$, $T_{N-1} = \frac{N-1}{N}$ and $\theta_{N-1} \geq \theta_N$, with the weak inequality accounting for the possibility of a cascade when θ reaches one. More generally, for any $n > n'$, we have $T_n > T_{n'}$, and $\theta_n \leq \theta_{n'}$.

Now consider two individuals drawn randomly from *jatis* in the n, n' equilibria, as above, and assume to begin with that $\theta < \theta_n$. The individual belonging to the *jati* in equilibrium n is more likely to be schooled in Marathi than the individual belonging to the *jati* in equilibrium n' as long as $\theta < \theta_n$. If $\theta_n < \theta_{n'+1}$, then he will continue to show a greater propensity to be schooled in Marathi until θ reaches $\theta_{n'+1}$.[17] But thereafter, the two individuals are equally likely to be schooled in Marathi. If θ is monotonically increasing over time, then the implications for schooling choice across *jatis* just derived in terms of θ map directly into implications for schooling choice across *jatis* over time.

Our result depends on the sequential nature of the deviation process, with the highest types switching to English first, followed by lower types as θ increases. Once any two *jatis* converge, they will follow the same schooling trajectory because apart from their initial conditions they are otherwise identical. *Jatis* that start with a higher proportion of working class jobs ultimately catch up with, but never surpass, those *jatis* that began ahead of them, providing us with our first result.

3.4 Equilibrium Dynamics (With Endogenous Restrictions on Mobility)

We saw above that initial differences in occupational choice across otherwise identical *jatis* could persist due to the externality associated with the working class occupation. This persistence is obtained despite the fact that there is no direct interaction across cohorts in the labor market. While these network externalities provide us with an explanation for the caste-gap in Figure 3, the model as laid out above cannot explain the absence of convergence in that Figure. Indeed, the preceding discussion tells us that *jatis* that begin with different proportions of their members in working class jobs will ultimately converge. We now show that the existence of network externalities can give rise to restrictions on occupational mobility that are welfare-enhancing. Such restrictions will prevent or slow down convergence.

To understand why restrictions on mobility might emerge, we first define a social welfare function.

[17] With our three-type example, suppose that $n = 3$ and $n' = 2$. Since $\theta_n = \theta_{n'+1}$ in this case, the two *jatis* will converge when θ reaches $\theta_n = 1$. In contrast, if $n = 3$ and $n' = 1$, and $2(P_L + P_M) > 1$, then $\theta_n < \theta_{n'+1}$ and the two *jatis* will converge when θ reaches $\theta_{n'+1}$.

Assume that this function places equal weight on all members of the *jati*. Now the welfare in a *jati* situated in equilibrium 3, in which everyone studies Marathi, is simply the unweighted average of all the payoffs from the working class occupation, $W = 1$. When $\theta = 1$ we know that this *jati* will shift to equilibrium 2 if Condition 1 is satisfied, in which case $W = (P_L + P_M)^2 + (1 - P_L - P_M)$. The new welfare level is a weighted average of $P_L + P_M < 1$ and 1, and so welfare must unambiguously decline when the equilibrium shifts. As noted in Section 2, there was intense competition for scarce working class jobs historically in Bombay. Because larger numbers improve the *jati*'s competitiveness, and increase the working class wage in general, it is easy to see why social restrictions on occupational mobility could emerge endogenously.

What is the mechanism through which such restrictions are implemented? There is an old and extensive sociological literature that studies the link between class, values, and conformity (e.g., Kohn 1977). The general view in this literature is that middle class parents tend to encourage self-direction in their children, whereas working class parents emphasize obedience and conformity: "The lower men's social position, the more rigidly conservative their view of man and his social institutions and the less their tolerance of nonconformity" (Kohn 1977: 80). These differences in values are attributed in turn to differences in the type of occupations that the middle class and the working class are engaged in.

The model that we lay out in this section provides a particular explanation for the link between working class occupations and a working class culture that is resistant to change, motivated by the externality associated with job networks. "Male cliques," have been seen to play a particularly important role in working class communities (Komarovsky 1967), shaping the aspirations and ultimately the labor market outcomes of young men. In our view, these cliques are, of course, nothing but the network. The fact that the lower-caste girls in our sample do not display a similar resistance to change can be attributed to the gender-specific nature of these job networks.

Social restrictions that prevent the shift to the new equilibrium can be welfare-enhancing for small and medium changes in θ, because they preserve the externalities that the network provides. But they could give rise to substantial inefficiencies if they continue to persist when θ grows large. For example, it is easy to verify that the social restrictions described above for equilibrium 3 will be inefficient once θ reaches $1 + (P_L + P_M)$.

A welfare calculation that identifies the presence of such a dynamic inefficiency is beyond the scope of this paper, but it is possible to test for the presence of these social restrictions under the

maintained assumption that the ability distribution is the same across *jatis* and that no other market imperfections, such as credit constraints, are present.

Proposition 2 *Consider two* jatis *that start with a different proportion of their members in the working class occupation. Schooling choice will converge across the* jatis *as the returns to English grow, and the effect of initial conditions on schooling choice will decline over time, unless restrictions on occupational mobility are in place.*

For the general case with N types and N equilibria, recall that an equilibrium in which n types choose Marathi education can be sustained as long as $\theta < \theta_n$. Now consider two *jatis* that start in equilibrium n and equilibrium n'; $n > n'$, and hence $\theta_n \leq \theta_{n'}$. Equilibrium n cannot be sustained once θ crosses θ_n, and without restrictions on deviation the two *jatis* will converge when θ reaches $\theta_{n'+1}$. If θ is increasing monotonically over time, then the convergence described above in terms of θ occurs over time as well.

The convergence across *jatis* that we just described is driven by the fact that deviation to English is ordered by ability across all *jatis*; with our three-type example, *jatis* in which high types choose Marathi must lose those types first, before medium ability individuals in other *jatis* can deviate, when θ starts to grow. Once we allow for social restrictions, this ordering by ability is no longer necessarily obtained. Social restrictions are likely to be stronger in *jatis* that are more heavily networked, in which case convergence might never occur. For instance, it is possible with the three types that *jatis* in equilibrium 3 might remain stable as θ grows, while *jatis* in equilibrium 2 shift to equilibrium 1. Differences in initial conditions persist in this case.

The sequential-equilibrium model also has implications for the dynamics of selection, by ability, into English and Marathi schools. Within any *jati*, the average ability of the English students must be greater than average ability among the Marathi students. Taking the average across all *jatis*, this implies that average ability must be greater among the English students at any point in time. This observation is consistent with the significantly higher test scores obtained by students in the English schools in Table 1, despite the fact that English and Marathi schools appear to be similar in terms of the resources available per student and the qualifications of the teachers. But how does the ability distribution *within* the English and Marathi schools change over time? Without social restrictions, deviation to English education is ordered by ability, so as θ grows there is a steadily worsening pool of

Marathi students. *Jatis* that begin with a greater proportion of their members in working class jobs have higher ability among the Marathi students, but their shift into English, and hence the decline in ability, must also be more rapid, because all *jatis* ultimately converge. With social restrictions, heavily networked *jatis* continue to have a superior ability distribution within Marathi schools, but now there could be no convergence in ability among Marathi students across *jatis*.

Although the model implies that the quality of the Marathi students unambiguously declines over time as the returns to English increase, the change in the quality of the pool of English students is ambiguous. Average ability among the English students is greater than average ability among the Marathi students at any point in time, but among the Marathi students it is those with the highest ability that deviate as θ grows. For example, in the three-type case with no social restrictions, some *jatis* (in equilibrium 2) have only high ability children in English schools, while other *jatis* (in equilibrium 1) have both medium and high ability children in English schools to begin with. This implies that the quality of the English pool must improve when θ reaches one, assuming sequential deviation, because only the high types from *jatis* in equilibrium 3 deviate at that point. But average ability drops below its initial level when θ reaches $2(P_L + P_M)$, because medium and high types in all *jatis* switch into English schools at that point. With social restrictions, the change in ability within the English schools becomes even more difficult to predict.

4 The Household Data

4.1 The Survey

To examine the role of caste networks in shaping mobility during a period of change we carried out a household survey based on a stratified (by caste) random sample of all students who attended the 28 secondary schools in Dadar over a 20 year period, 1982-2001. This design provides information for the periods before and after the major Indian economic reforms. A total of 101,567 students were currently enrolled in the schools (grades 1 to 10) or studied in grade 10 over the previous 10 years, 1991-2000. We drew the roll numbers of 20,596 students randomly from these 20 cohorts, and recovered their names and addresses from the school records. Restricting attention to Maharashtrians residing in Dadar and the immediately adjacent neighborhoods of Mahim, Matunga, Wadala, Prabhadevi, and Parel, we were left with 8,092 eligible students to serve as the sampling frame for the survey. The student's name is typically a good indicator of the caste, and we wanted close to one thousand upper

castes in the sample, so all 1,082 students from this population who appeared to be upper castes were selected for the survey. We drew randomly from the remaining students in the sampling frame until the target sample size was reached. The upper castes account for 17.5% of the final sample of 4,945 observations, which is slightly higher than the 13.4% that we began with in the sampling frame.

The research team interviewed the parents of the selected students at their residences. The survey instrument elicited detailed subcaste information from the respondents and included sections on grandparents' education and occupation, parents' education and occupational and income histories (at five year intervals from 1980 to 2000), as well as the student's and siblings' subsequent education, occupation, income and marriage outcomes (where relevant). Information on transfers, assistance in finding jobs, and ties to the community was also collected.

82.5% of eligible households provided completed schedules. This is a relatively high response rate, especially given that some of our addresses were 20 years old. But we might still have obtained a selective sample of households, for a number of different reasons. First, households residing in Dadar who sent their children to study outside the area would be missing from the sample. Second, households who moved out of the area would be among the 17.5% of the respondents who did not complete the survey. And third, students from the first 10 cohorts who did not reach the tenth grade, and current students who have dropped out, would be missing from the sample.[18] In Section 5.1 we will discuss how our identification strategy is unlikely to be undermined by these potential sources of bias.

4.2 Descriptive Statistics: Caste, Occupational Networks and Schooling

The data provide empirical support for three features of the model of schooling choice laid out in Section 3. First, the occupational distribution, a product of historical circumstances, varies by caste, and persists across generations, particularly among the men. Second, working class jobs are associated with a higher level of referrals (networking). And third, working class jobs are associated with lower levels of English schooling.

The survey elicited information on parental occupations at five year intervals from 1980 to 2000. For the grandparents, we simply asked for the main occupation over the individual's working life.

[18] With regard to the last source of bias, the survey data do not indicate any significant selectivity with respect to two observable characteristics. Based on t-tests and Kolmogorov-Smirnov tests we could not reject the hypotheses that the sex-ratio of students and the distributions of parental incomes differed across the most recent eight cohorts (grades one through eight), in which there have been relatively few drop-outs, and the rest of the older cohorts, in which post eighth-grade drop-outs could be a potential problem.

The 90 occupations in the data were divided by roughly increasing levels of human capital into seven aggregate categories: unskilled manual, skilled manual, organized blue-collar, petty trade, clerical, business, and professional. We further classified unskilled manual, skilled manual, and organized blue-collar as working class occupations. Clerical, business, and professional were classified as white-collar occupations. Petty trade is treated as an intermediate unclassified occupation.

Table 2 describes the occupational distribution across broad caste categories (low, medium, high), separately for the employed fathers, based on information in 1995, and the paternal grandfathers of the students in the sample. Columns 1-3 of Table 2 indicate that lower-caste fathers are much more likely to be employed in working class occupations (53% and 43%) as compared with high-caste fathers (18%).[19] The same cross-caste pattern is obtained for individual occupations within the working class and white-collar classifications, with the exception of clerical jobs. Notice also that the cross-caste patterns for the two major occupations, organized blue-collar and professional, are particularly striking for the fathers.

The comparison of the fathers in Columns 1-3 with the grandfathers in Columns 4-6 suggests that there is little change in the basic occupational distribution, measured by the percentage of working class jobs, across the generations within broad caste categories. The major difference is that farming is listed as the primary occupation for a large proportion of lower caste grandfathers, which suggests that many of the lower caste fathers are first-generation migrants.[20] There appears to have been a switch from farming to manual jobs, clerical jobs, and professional jobs. But the percentage of blue-collar jobs remains stable across the generations. For the high castes, the major change across generations is the decline in blue-collar and clerical jobs, and the increase in professional occupations.

Although most men are employed, we see that labor force participation for the women in Table 3 is relatively low but is growing. Only 15% of high caste grandmothers worked; while just over half of high caste mothers entered the labor force. Among the lower castes, the percentage employed remains stable at 20% across the generations, but notice that farming is listed as the primary occupation for a large number of working grandmothers. This suggests that urban employment must have increased sharply for the lower-caste women as well.

[19] Note that we only use working class and white-collar occupations when computing this statistic.

[20] A parent or grandparent will only list farming as their primary occupation if they were residing outside Bombay, in their home village. Not surprisingly, farming is rarely reported as the father's primary occupation. But it is for a substantial fraction of the grandfathers (19% for the low caste and 27% for the medium castes), which tells us that roughly one-quarter of the lower caste fathers are first-generation migrants. Migrants are by definition newcomers in the labor market, and so will be more susceptible to the information problems that generate a need for the caste networks.

The occupational distribution across castes for the mothers in Table 3, Columns 1-3, displays a pattern similar to that for the fathers. Lower-caste women are much more likely to be employed in working class occupations (44% and 32%) as compared with high caste women (9%). However, there is an important difference between men and women - although the large difference within the working class occupations for the men was in access to blue-collar jobs for the lower castes, for women the major difference is in access to unskilled manual jobs; many of the lower caste women work as sweepers and domestic servants.

Columns 1-3 and Columns 4-6 suggest that there has been, in contrast to the men, significant intergenerational change for women within the castes. Among the high-caste women there has been an increase in the proportion of clerical jobs and a decline in the proportion of professional jobs. This is most likely because only the highest ability women of the older generation (grandmothers) would have entered the labor force. For the lower castes, women have evidently shifted out of farming into unskilled manual jobs (particularly among the medium castes), skilled manual jobs, clerical jobs, and professional jobs. The decline in the percentage of working class jobs among the lower caste women, across a single generation, is particularly dramatic. This contrasts with the stability of the occupational distribution for the men, for all castes, that we noted earlier, consistent with the view that labor networks are weak among the women.

Table 4 indicates that, as assumed in the model, working class occupations are associated with a higher level of job referrals (networking) and a lower level of English schooling. Column 1 shows that 68% of the working class men received help from a relative or member of the community in finding their first job (or starting their first business if self-employed), which is significantly higher than the 44% of men in the white-collar jobs who received a referral. The corresponding statistics for the women in Column 3 reveal essentially the same pattern, although the level of referrals for the women is generally lower than that for the men, perhaps because the networks for female jobs are less developed.

Table 4, Columns 2 and 4, show that there is also a clear distinction between working class and white-collar jobs with respect to the language of instruction in secondary school. The percentage of men in working class jobs that attended secondary school in English is just over 1%, compared with the 6% of men in white-collar jobs. A similar pattern is obtained for the women in Column 4.

The results that we have just described suggest that the level of referrals and English schooling are negatively correlated across occupations within a generation. Figure 5 displays this relationship

in more detail by ranking occupations in ascending order of the percentage of men schooled in English. It is evident from the figure that the level of referrals for the men and English schooling are almost perfectly negatively correlated. Notice also that the negative correlation is sharpest for the organized blue-collar and professional jobs, which dominate the working class and white-collar occupations respectively. Figure 6 repeats the exercise for women, where we see a replication of the negative relationship between referrals and English schooling.

Table 2 and Table 3 suggest that lower-caste men and women are much more likely to hold working class jobs. Table 5 combines these results with the results in Table 4 to describe referrals and English schooling across castes. Not surprisingly the table indicates that a much higher proportion of lower caste men received referrals, and that such men are much less likely to have been schooled in English. In contrast, although lower caste women are also much less likely to be schooled in English, the level of referrals is statistically indistinguishable across castes. Although we noted earlier that lower caste women who work are more likely to hold working class jobs, which are associated with more referrals, we also saw that lower caste women are less likely to enter the labor force. These two opposing effects appear to cancel each other, leaving little variation in the level of referrals across castes for the women. The level of referrals is low in any case, especially when compared with the corresponding level for the men, and we will later establish that labor market networks are effectively available for the men only.

Tables 2 through 4 provide support for the basic assumptions of the model with respect to the variation in the occupational distribution across castes and its persistence, the relationship between the occupational distribution and the level of referrals, and the relationship between the occupational distribution and English schooling. The data also suggest, however, that the modelling assumption that the ability distribution is the same across castes (or *jatis*) does not appear to be supported empirically. Individual ability is determined in part by investments in pre-school human capital so that the occupation that a particular *jati* gets locked into, as a consequence of historical circumstances, can affect future occupational choice via human capital effects. Children in a wealthy, educated *jati* that have had access to white-collar jobs for many generations will be nurtured very differently from children in a *jati* that was historically confined to manual jobs. Table 5 reports the mean years of schooling and monthly income separately by caste for men and women. As expected, high caste mothers and fathers have significantly more years of schooling and significantly higher incomes. This suggests that empirically pre-school human capital could vary across broad caste categories, and across *jatis*, as well. When estimating the effect of the historical occupational distribution on the

child's schooling choice we will consequently take account of the possibility that the occupational distribution could be correlated with the ability distribution in the *jati*.

5 Empirical Analysis

5.1 Specification and Identification

The first implication of the model is that occupation choices should persist over time (across generations) when labor market networks are active. Because occupational choice maps into schooling choice, we will test whether schooling choice in the current generation is determined by the occupational distribution in the student's *jati* in the previous generation. There are 90 occupations listed in the data, and our first challenge is to construct a statistic that parsimoniously describes the occupational distribution in the *jati*. We saw in the previous section that occupations ranked in ascending order by their requirement of human capital were decreasing in the level of referrals, and increasing in English schooling, almost without exception. The level of referrals and English schooling were consequently seen to be negatively correlated, at the level of the broad caste category, within a single generation. Given the underlying occupational basis for this relationship, we would expect to find this negative correlation between English schooling and referrals at the *jati* level as well. When networks are active, this negative relationship should hold *across generations*; boys belonging to *jatis* with a higher level of referrals will be less likely to be schooled in English.

Note that we could as well have used the level of English schooling in the previous generation as our measure of the occupational distribution in the *jati*. The advantage of using the referrals is that they also reflect the degree of state dependence in occupational choice across generations; we would expect such state dependence to be greater in heavily networked *jatis*.[21] For both reasons discussed above, a student belonging to a *jati* characterized by a higher proportion of referrals will be more likely to be schooled in Marathi when networks shape occupational choices across generations. The schooling regression that we estimate is consequently specified as

$$Pr(E_{ij} = 1) = \alpha R_j + X_{ij}\beta + \omega_j, \tag{1}$$

[21] With the three-type example discussed in Section 3, restrictions on mobility are required for equilibrium 3 (all types choose Marathi) when θ reaches one, and for equilibrium 2 (low and medium types choose Marathi) when θ reaches $2(P_L + P_M) > 1$. Restrictions are thus more likely to be in place in more heavily networked *jatis* at any point in time. Moreover, both low and medium types are interested in maintaining equilibrium 3 when θ reaches one, whereas only the low types have an incentive to sustain equilibrium 2 when θ reaches $2(P_L + P_M)$. The restrictions in more heavily networked *jatis* are consequently also more likely to be binding.

where $E_{ij} = 1$ if individual i belonging to *jati* j is schooled in English, $E_{ij} = 0$ if he is schooled in Marathi. R_j is the proportion of men in *jati* j that received a referral. Following the discussion above we expect to find $\alpha < 0$ if networks are active. X_{ij} includes the parents' language of schooling to reflect state dependence in schooling choice, which motivated the equilibrium selection rule in Section 3, and ω_j measures the average ability (defined below) in the *jati*.

An identification problem arises when R_j and ω_j are correlated. Although *jatis* might have been the same to begin with, we noted in the previous section that their members now have very different characteristics (income and education), depending on the type of occupation that the *jati* has historically been engaged in. These differences could result in different levels of pre-school human capital in the current generation, which would independently determine schooling choices. In addition, given imperfections in credit markets, liquidity constraints could prevent students from attending more expensive English schools and this determinant of schooling choice could vary across *jatis* with different levels of income. With this broad definition of ability, a traditionally working-class *jati* could be associated with high R_j and low ω_j, in which case a family effect would be erroneously interpreted as a network effect because less able individuals with lower family resources independently select into Marathi schools.

Our solution to this identification problem exploits the fact, documented in Table 4, that networks are concentrated in working class jobs dominated by men. Recall from Table 5 that the levels of referrals for women were relatively low, consistent with the significant change in the occupational distribution across generations for women indicated in in Table 3. Thus, although the networks might affect schooling choice for the boys, they should have had little or no impact on the girls. The model in Section 3, then applies to boys only. Instead of using variation in the level of referrals across *jatis* to identify the presence of networks, as in equation (1), we proceed instead to exploit this gender difference in the access to job networks by pooling both sexes in the schooling regression to identify the presence of the network *within* the *jati*:

$$Pr(E_{ij} = 1) = (\alpha - \tilde{\alpha})R_j \cdot B_{ij} + X_{ij}\tilde{\beta} + X_{ij} \cdot B_{ij}(\beta - \tilde{\beta}) + \gamma B_{ij} + f_j \tag{2}$$

where $\tilde{\alpha}$, $\tilde{\beta}$ represent the effect of the network and parents' language of schooling on the girls. B_{ij} is a dummy variable that takes a value of one for boys and zero for girls. The advantage of pooling the boys and girls is that the schooling regression can be estimated with *jati* fixed effects, $f_j \equiv \tilde{\alpha}R_j + \omega_j$.

Although we can no longer identify α directly, we can obtain a consistent estimate of $\alpha - \tilde{\alpha}$, the coefficient on the $R_j \cdot B_{ij}$ interaction term. For the special case with exclusively male networks, $\tilde{\alpha} = 0$ and the coefficient on the interaction term identifies network-based occupational persistence for the boys directly. More generally, the coefficient on the interaction term provides a conservative estimate of the effect of caste-based networks on schooling choices for the boys.

The identifying assumption in this estimation strategy is that unobserved ability ω_j does not vary by gender *within* a *jati*. Boys and girls in an endogamous *jati* certainly share the same genetic stock. And liquidity constraints will equally apply to both boys and girls within the *jati*. But ability also includes pre-human capital. In an economy where men and women historically performed very different roles, the parental and societal inputs that boys and girls received in childhood might have been very different, which could have translated into gender differences in our measure of ability that vary with R_j.

The existence of a boy-girl ability differential within the *jati* implies that there is an additional term in the residual of the schooling regression. Let this term be $\phi_j \cdot B_{ij}$. If the gender ability-differential ϕ_j is correlated with R_j, then the coefficient on the $R_j \cdot B_{ij}$ term could be biased even when *jati* fixed effects are included in the regression. We can directly verify that the $\phi_j \cdot B_{ij}$ term is uncorrelated with $R_j \cdot B_{ij}$ by looking at the relationship between the standardized school-leaving test score and the determinants of school choice, replacing schooling choice with the test score as the dependent variable in equation (2). The school leaving test score, given to both English-medium and Marathi-medium school students, will reflect the student's pre-school human capital and the quality of the school attended. English and Marathi schools, however, were seen to be very similar in terms of the infrastructure and the qualifications of the teachers in Section 2.3. If the ability differential ϕ_j is uncorrelated with the level of referrals R_j, then $R_j \cdot B_{ij}$ should have no effect on the test score, even when it strongly affects schooling choice.

Finally, in Section 4.1 we listed three potential sources of sampling bias, generated by missing households. First, particular households might school their children outside the Dadar area. Second, particular households might have moved from Dadar over the past 20 years. Third, children from particular households might have dropped out of school. This selection could in principle lead to differential ability across *jatis*. The *jati*-fixed effects procedure takes into account any differences in unobservables at the *jati* level, including differences that arise due to sampling selectivity.[22]

[22] Caste discrimination in the labor market could also lead to differences in schooling choices across *jatis*. But historically

5.2 Caste-based Networks and Schooling Choice

Table 6, Column 1 reports the estimates of the schooling choice regression, equation (1), for the boys. As noted, the sample covers 20 cohorts of students aged six to 25, who entered school between 1982 (cohort=1) and 2001 (cohort=20). The student's cohort (1 to 20), the level of referrals in his *jati*, and the father's and the mother's language of instruction in secondary school, are included as regressors. The level of referrals in the *jati* incorporates two effects; more heavily networked *jatis* tend to be working class, with a greater propensity to school their children in Marathi, and more heavily networked *jatis* are also characterized by greater occupational persistence across generations. Although we cannot disentangle these effects, note that if networks were absent, then there would be no occupational persistence across generations, and the referrals coefficient in the schooling choice regression would be zero.

The cohort term is included in this regression to account for the increase in the returns to English over time. While the linear cohort effect that we specify in Table 6 is clearly restrictive, we verify below that the estimated referral coefficient is unchanged when we allow for more flexible cohort effects. The referrals coefficient is also specified to be constant over time in Table 6, and we will also subsequently relax this restriction. For now, we see that the referral coefficient is negative and significant; children belonging to (historically) working class and more heavily networked *jatis* are less likely to be schooled in English, consistent with the first implication of the model. The cohort effect is positive and significant, implying a shift into English over time, which is consistent with the increase in the returns to English that we saw in Figure 1. Finally, the results imply that a boy is much more likely to be schooled in English if his parents were educated in that language, verifying the state dependence in schooling choice which is an important feature of our model.

Table 6, Column 2 includes variables that measure the determinants of the student's pre-school human capital as well as the budget constraint, which could independently determine schooling choices. The parents' years of education, conditional on their language of instruction in secondary school and the level of referrals in the *jati*, are likely significant determinants of children's pre-school human capital. The family's access to own resources is measured by the total income of the father and the

there does not appear to have been a policy of caste selection by the employers in any industry. The jobber was most likely responsible for the specific caste concentrations that emerged in individual manufacturing units in Bombay (Morris 1965). There is in any case no reason why such discrimination would vary by caste (and hence by the level of referrals R_j) *and* by gender.

mother at the time when the child entered school.[23] Inclusion of these variables results in a substantial decline in the network effect, suggesting that the level of referrals was previously proxying to some extent for unobserved ability, but it remains negative and significant. The coefficient on the cohort variable is quite stable. And the coefficients on the additional regressors all have sensible signs; the boy is more likely to be schooled in a more-expensive English-medium school if his father or mother are more educated, or if the family is wealthier. Occupational persistence in Bombay thus in part arises due to human capital effects.

The estimates for girls are reported in Columns 3 and 4 in Table 6. Column 3 reports the estimates based on equation (1); Column 4 reports the estimates from the augmented specification that adds the parents' years of schooling and family income as additional regressors. The estimated cohort effects, and the coefficients on parents' language of instruction, parents' education, and family income are similar to those for boys in Columns 1 and 2. However, the referral coefficient becomes negligible for the girls in Column 4 once the observed determinants of pre-school human capital and access to own family resources are included. One explanation for this result is that girls receive help from the women, not the men, in their *jati*. But we saw in Table 5 that the level of referrals for the women is very low, across all castes. Although not reported, we also found no correlation between referrals and schooling choice, for both boys and girls, when we replaced the level of referrals for the fathers with the level of referrals for the mothers.

The results that we have just described are consistent with the view that caste-based networks, net of individual and family characteristics, affect schooling decisions for the boys, but not for the girls. But up to this point, we have only controlled for unobserved ability with a limited number of family characteristics. A more robust identification strategy estimates the schooling regression with *jati* fixed effects, as in equation (2). These estimates are reported in Column 5 of Table 6. As noted, only the referral-boy interaction coefficient, and not the linear referral coefficient, can now be identified. The coefficient on this term is negative and significant, and very similar to the referrals coefficient for the boys in Column 2. Recall from equation (2) that the coefficient on the referral-boy interaction term provides us with a direct estimate of the referral coefficient for the boys if the referral coefficient for the girls is zero. The result that we obtained earlier for the girls in Column 4 suggests that this might well be the case.

[23] We use the income in 2000 for students current aged 6-10, the income in 1995 for students 11-15, the income in 1990 for students 16-20, and the income in 1985 for students 21-25.

The coefficient on the cohort variable in Column 5, which now measures the cohort effect for the girls, is similar to what we obtained previously for both boys and girls in Columns 1-4. The coefficient on the cohort-boy interaction term, which measures the difference in the cohort effect for boys and girls, is consequently small and statistically insignificant. The boy dummy itself is positive and significant, reflecting the historically higher levels of English schooling among the men. This is most likely because the very large proportion of women who stayed outside the workforce in previous generations would have been schooled in Marathi, which is less expensive.

We have argued throughout this paper that the persistence of occupational patterns across generations is due to the presence of networks organized at the level of the *jati*. But an alternative explanation is that occupations get passed down at the family level, from father to son. We account for such occupational persistence at the level of the family in Table 6, Column 6, by including a full set of (90) dummies for the student's father's occupation, in addition to the regressors listed above. The set of paternal occupational dummies is statistically significant, suggesting that persistence in occupational choice additionally operates at the family level. However, comparing Column 5 and Column 6, we see little change in any of the estimated coefficients. There is still an independent, *jati*-level source of occupational persistence.

Although the labor market in Bombay was historically organized by caste, the region of origin (within Maharashtra) also has been seen as determining the scope of the network (Chandavarkar 1994). To allow for this finer partition of the network, we divide Maharashtra into 4 regions: Bombay, Konkan, Deccan, and Other. Our survey elicited information on where the grandparents grew up. We use this response, for the paternal grandfather, to assign an origin region for each student. The Deccan (in interior Maharashtra) and the Konkan (along the coast), were the main source regions for the supply of labor to Bombay under the British. We find that Bombay is listed as the origin region for 27% of the grandfathers, the Konkan for 42% of the grandfathers, the Deccan for 20% of the grandfathers, and that the remaining 11% of the grandfathers came from other parts of the state. Replacing the *jati* by the *jati*-region as the boundary of the network in Table 6, Column 7, the point estimates are almost identical to what we obtained earlier in Column 5. There are 59 *jatis* in our sample, and with four regions this leaves us with a very large number of *jati*-region units in Column 7. Not surprisingly, there is wide variation in the size of these units. To check the robustness of our results to the size of the network, we dropped very large networks (more than 250 observations) and very small networks (less than 10 observations). The estimated referral coefficient based on this

substantially reduced sample, reported in Column 8 of Table 6, is close to what we obtained with the full sample.[24]

The regression specifications with *jati* fixed effects in Table 6, Columns 5-8, did not include family characteristics. Table 7, Column 1, includes parents' language of schooling, both uninteracted and interacted with the boy dummy, as additional regressors. Subsequently, Table 7, Column 2 adds parents' years of schooling and family income, also uninteracted and interacted with the boy dummy. The coefficients on these additional regressors are similar to what we obtained previously in Table 6, Columns 1-4, and the interactions with the boy dummy are (with one exception) small and statistically insignificant. Although the referral coefficient differs by gender, family characteristics do not appear to have a differential effect on boys' and girls' schooling choice in this setting - we cannot reject the joint hypothesis that the set of family characteristics interacted with the boy dummy has no effect on schooling choice. The boy dummy continues to be positive and significant, and the cohort effects are similar to what we obtained in Table 6, Columns 5-8. Most importantly, the referral coefficient in Table 7 is hardly affected by the inclusion of all these additional regressors and is close to what we obtained in Table 6, Columns 5-8.[25] Previously we saw that without fixed effects the introduction of father's education and family income sharply reduced the referral coefficient for both boys and girls in Table 6, Columns 1-4. In contrast, we see that the estimated referral coefficient is robust to the inclusion of additional regressors once the *jati*-fixed effects are included in the schooling regression.

5.3 Caste-based Networks and Student Performance

The identification of the influence of the network on schooling choice for the boys, based on the fixed-effects specification, relies on the assumption that the pre-school human capital difference between boys and girls does not vary with the level of referrals in the *jati*. Although parental schooling and income will be the same within a family for boys and girls and the results in Table 7 indicate that within *jati* variations in parental resources and human capital do not differentially affect the schooling

[24] It is possible to trim the sample even further - restricting attention to networks between 50 and 150 observations - without affecting the estimated network effects.

[25] This result helps rule out the possibility that boys and girls with the *same* pre-school human capital are schooled differently even when networks are absent. Men and women historically had access to very different labor market opportunities in Bombay, which would be reflected in the schooling choices (including the language of instruction) that parents make for their children. If the difference in opportunities by gender varies across *jatis* with different levels of ability, then $R_j \cdot B_{ij}$ in equation (2) could spuriously affect schooling choice, yet have no effect on test scores if pre-school human capital for the boys and girls is the same. We saw that the parents' language of schooling, educational attainment, and family income, controlled quite effectively for unobserved ability in Table 6. The fact that these family characteristics do not have a differential effect by gender on schooling choice is consequently reassuring; only the referral effect varies by gender, presumably as a consequence of the differential access to the job network.

choices of boys and girls, gender differences in human capital investment could nevertheless vary by *jati*.

To obtain direct evidence on human capital differences by gender and *jati*, we use the survey information on performance on the school-leaving S.S.C. examination to directly measure human capital. Our view of the *jati* network is that it shapes schooling choices, but has no effect on subsequent school performance; students will perform to the best of their ability once they are enrolled in a particular school.[26] We noted in Section 2.3 that English and Marathi schools look very similar in terms of infrastructure and teacher qualifications. The large difference in student performance between the English and Marathi schools in Table 1, Panel C is thus presumably due to selection, and we do not expect the network to have a causal effect on test performance. Any relationship between job referrals at the *jati* level and test scores must therefore be due to pre-school human capital differences. Similarly, once we include *jati* fixed effects, any relationship between the referrals-boy interaction term and test scores must be due to gender differences in pre-school human capital across *jatis*.

The basic specification of the student performance regression is the same as the regressions reported in Table 6 and Table 7, except that schooling choice is replaced by the student's test score as the dependent variable. We restrict attention to the first 10 cohorts (age 16-25), which have already attained school-leaving age, in these regressions. 17% of the students aged 16-25 in the sample failed the S.S.C. examination (scored less than 35%), so we first look at the effect of the referrals on the student's probability of success, before turning to the test score conditional on having passed the exam.

Exam success is specified to be the dependent variable in Table 8, Columns 1-4, while the test score is the dependent variable in Columns 5-8. Column 1 restricts attention to boys, and includes the cohort, the parental background variables, and the level of referrals in the *jati* as regressors. The cohort effect is absent, suggesting that there has been little change in school performance over time, but the referral coefficient is negative and marginally significant. Subsequently we repeat the exercise just described for the girls (Table 8, Column 2). The cohort effect is again absent, and the coefficient on referrals is negative but not statistically significant. The S.S.C. exam is not particularly challenging, and the results in Columns 1-2 suggest that failure might have more to do with idiosyncratic characteristics, than with family or community background. However, the results that we report in Table 8, Columns

[26] We could imagine that students who anticipate entering working class occupations in the future put less effort into their studies and so perform less well in school. But if this were true, then referrals would be negatively correlated with test scores for the boys, but not for the girls, which is inconsistent with what we report below.

4-5 for the test scores among the large proportion of students who passed the examination indicate that students in the high-referral *jatis* have significantly lower scores. The distribution of pre-school human capital thus does not appear to be the same across *jatis*, even with controls for individual parental characteristics.

To assess whether pre-school human capital varies systematically by gender across *jatis*, we pool boys and girls and estimate the test performance regression with *jati* fixed effects. The fixed-effects estimates are reported in Table 8, Column 3 for the pass rate and in Table 8, Column 6 for the test score conditional on passing. For both dependent variables neither the cohort effect, the cohort-boy interaction, nor the boy dummy is statistically significantly different from zero. More importantly, the coefficient on the referral-boy interaction term is small and statistically insignificant.

The negative referral coefficients in Columns 1-2 and 4-5 imply that *jatis* with more referrals are associated with lower ability. However, the negligible referral-boy coefficients in Columns 3 and 6 rule out a correlation between the level of referrals in a *jati* and a boy-girl differential in human capital, providing direct support for the identifying assumption in the fixed effects schooling choice regression.[27]

5.4 Schooling Choice over Time

The second implication of the model laid out in Section 3 is that *jatis* will converge over time, as the returns to English grow, unless restrictions on occupational mobility are in place. Convergence implies that the effect of the initial conditions, measured by the level of referrals among the fathers, should grow less important as a determinant of children's schooling decisions over time. To assess the persistence of the occupational distribution effect on schooling we create four cohort categories that evenly divide the 20 cohorts, and then estimate the referral coefficient separately for each category.

We begin with a benchmark *jati*-fixed effects regression, which maintains a constant referral coefficient but relaxes the restriction imposed thus far that cohort effects are linear, by including the cohort categories in Table 9, Column 1. The estimated negative referral-boy coefficient is unaffected by the inclusion of the flexible cohort effect and remains very similar to the results shown in Tables 6 and 7. Inclusion of the family background variables, uninteracted and interacted with the boy dummy, as additional regressors again has no effect on the estimated referral coefficient (Column 2).

[27] An alternative explanation for the negligible referrals-boy coefficient in Columns 3 and 6 is that English schools and Marathi schools are in fact of different quality, and that this quality differential is exactly offset by the boy-girl ability differential. Such a knife edge result is unlikely to be obtained in practice.

Table 9, Column 3, allows for the changes in the referral coefficient across cohort categories. All the referral-boy-cohort coefficients are negative and significant except for the coefficient on the first cohort category which is slightly less precisely estimated. The referral coefficient is actually increasing for the later cohorts, and we can easily reject the convergence hypothesis which implies a decline in the referral effect over time. Once more, the estimated referral coefficients are robust to the inclusion of the family background variables as regressors (Column 4). Rejection of the convergence hypothesis is consistent with the patterns in Figure 3 and suggests that restrictions on social mobility are in place for boys in high-referral *jatis*.

5.5 Selection into Marathi Schools over Time

The model laid out in Section 3 also has implications for the compositional change in the students who attend Marathi schools over time by *jati*: First, the pre-school human capital of boys entering Marathi schools should decline on average as the returns to English grow. Second, when there are no restrictions on mobility put in place to exploit network externalities, the distribution of pre-school ability among the boys entering Marathi schools will converge across all *jatis* over time. It is possible that such convergence across *jatis* will be absent when restrictions are in place. Note that the model has no prediction for selection by ability into English schools.

We do not have a direct measure of pre-school human capital. However, the results in Tables 8 suggest that, net of income, parental schooling has a positive and significant effect on school performance. In particular father's schooling has a significant positive effect on test scores for boys and girls, and the effects do not differ significantly by the gender of the child. We thus use the father's schooling level as a proxy for pre-school ability.[28] The question we address is whether boys with more educated fathers increasingly exit Marathi schools and whether and how the rate of decline in the pre-school ability of boys entering Martahi schools varies by *jati*.

To test the implications for school selectivity described above, we estimate regressions on the sub-sample of boys entering Marathi schools of the form:

$$E(S_{ij} \mid E_{ij} = 0) = \kappa + \lambda R_j + \mu C_{ij} + \nu R_j \cdot C_{ij} + \psi \omega_j \tag{3}$$

where S_{ij} is boy i in *jati* j's father's years of schooling and C_{ij} is the boy's cohort. R_j measures the level of referrals in the *jati* and ω_j measures pre-school ability in the entire *jati*; these terms reflect

[28]The results reported below are essentially the same if we replace father's schooling by mother's schooling.

the fact that pre-school ability conditional on selection into Marathi is in general a function of ability in the *jati* and the level of referrals. The cohort terms reflect the change in this selection process over time. The model, which ignores the variation in ability ω_j across *jatis*, predicts that $\lambda > 0$, $\mu < 0$, $\nu < 0$ without restrictions and (possibly) $\nu > 0$ with restrictions.

Because the major shift into English schooling occurred in the 1990s, we first estimated equation (3) for the boys in cohorts 11-20. The estimates are reported in Table 10, Column 1. The cohort coefficient is negative and significant as predicted, which implies that the pre-school human capital of the boys who entered Marathi schools was declining substantially in the 1990s. The coefficient on the referrals-cohort interaction term is positive, consistent with the results in Table 9 showing that restrictions on mobility in the high-referral networks were still in place during this period - the more-able boys in high-referral *jatis* were shifting to English-medium schools at lower rates.

The referral coefficient is negative and significant, consistent with the results in Table 8, which indicate that *jatis* with higher referrals R_j have lower ability ω_j; the negative $R_j - \omega_j$ correlation appears to dominate the positive selection $\lambda > 0$ effect in this case. But this tells us that the positive referrals-cohort coefficient that we reported above might also be spurious. To assess the robustness of the results in Column 1, we add *jati* fixed effects, which subsume $\kappa + \lambda R_j + \psi\omega_j$, in Table 10, Column 2. The referral coefficient λ is no longer identified, but the estimated cohort and referral-cohort coefficients are very similar to the results in Column 1.

The within-*jati* estimates allow ability to vary across *jatis* but assume that ability is constant over time (both within and across generations). The level of parental schooling could, however, also depend on the access to education, which might have changed over time. If there was convergence in the access to education across *jatis* in the parent generation, then that could explain the positive referrals-cohort coefficient in Columns 1-2 without requiring networks to be active. One test to rule out this alternative interpretation of our result would be to estimate the school selectivity regression for girls rather than boys; we have already seen that the network has no effect on schooling choice for the girls, and so both the cohort and the referrals-cohort effect should be absent. In contrast, if the referrals-cohort term is picking up convergence in (fathers') schooling levels across *jatis*, then this coefficient should be positive and significant for the girls as well.

Table 10, Column 3 reports the basic selectivity regression for the girls attending Marathi schools with cohort, referrals-cohort, and referrals included as determinants of father's schooling, while Table 10, Column 4 repeats this regression with *jati* fixed effects. The referrals coefficient in Column 3 is

again negative (but insignificant), consistent with the lower levels of ability in high-referral *jatis*. The cohort coefficient is positive but insignificant. More importantly, the referrals-cohort coefficient is small in magnitude and statistically insignificant - the point estimate is actually negative - consistent with the results obtained earlier that girls in families belonging to high-referral *jatis* are not restricted in their mobility.

An alternative strategy to control for the confounding effect of changes in access to schooling among the fathers across *jatis* and over time pools boys and girls in the selectivity regression, which can then be estimated with a full set of *jati* dummies interacted with the cohort variable:

$$E(S_{ij} \mid E_{ij} = 0) = (\mu - \tilde{\mu})C_{ij} \cdot B_{ij} + (\nu - \tilde{\nu})R_j \cdot C_{ij} \cdot B_{ij} + f_j + g_j \cdot B_{ij} + h_j \cdot C_{ij} \tag{4}$$

where $\tilde{\mu}$, $\tilde{\nu}$ are the coefficients on the cohort variable and the referrals-cohort interaction for the girls, and B_{ij} is a boy dummy as before. The fixed effects, f_j which subsume $\tilde{\kappa} + \tilde{\lambda}R_j + \psi\omega_j$, allow for the possibility that ability varies across *jatis*. The fixed effects interacted with the boy dummy $g_j \cdot B_{ij}$, which subsume $(\kappa - \tilde{\kappa})B_{ij} + (\lambda - \tilde{\lambda})R_j \cdot B_{ij}$, also allow ability to vary by gender across *jatis*, although we ruled this out in Table 8. Finally, the fixed effects interacted with the cohort variable $h_j \cdot C_{ij}$, subsume $\tilde{\mu}C_{ij} + \tilde{\nu}R_j \cdot C_{ij}$ and control for changes in access to schooling for the fathers both across *jatis* and over time.

For the special case with $\tilde{\mu} = 0$, $\tilde{\nu} = 0$, as is consistent with the model, the estimated coefficients in equation (4) should match the cohort coefficient and the referrals-cohort coefficient when equation (3) is estimated with *jati* fixed effects for boys only. Table 10, Column 5 suggests that this is indeed the case; the cohort-boy coefficient is negative and significant and the referrals-cohort-boy coefficient is positive and significant, and the point estimates are very similar to the corresponding coefficients in Columns 1-2. These results confirm that in the most heavily-networked *jatis* high-ability girls were exiting to English-medium schools at significantly faster rates than were boys.[29] The 0.1 quantile - 0.9 quantile of the referrals distribution ranges from 0.2 to 0.7. The point estimates in Column 5 thus suggest that over the period of the 90's the gap in father's schooling between boys and girls schooled in Marathi grew by 2.3 years in the highest-referral *jatis* (at the 0.9 quantile level). In contrast, the ability-differential measured by the difference in the father's schooling between boys and

[29]The negative cohort-boy coefficient implies that the boy-girl pre-school human capital differential is declining over time, independent of the influence of the male job network. This may be due to differences in labor force participation or changes in the returns to English by gender (as in Figures 1 and 2).

girls, declined by as much as 5 years in the low-referral *jatis* (at the 0.1 quantile level) over the same period. This increasing mismatch in ability levels between the sexes within *jatis* and school types could have important implications for the future stability of the caste system, which relies on endogamous marriage, as discussed below.

Table 10, Columns 6-10 reports the estimates of the selectivity equations for the first 10 cohorts of students, who entered school in the 1980s. Schooling choices were stable over this period and thus we do not expect to find changing selectivity effects for the boys or the girls. As before, the referrals coefficient, in Column 6 and Column 8, is negative and significant, reflecting the persistent differences in ability across *jatis*. However, as expected and in contrast to the cohorts making schooling choices in the post-1990's new economy, the cohort effect and the referrals-cohort effect, both uninteracted and interacted with the boy dummy, are insignificant in the pre-reform period. Disparities in ability across gender and caste groups within schools were evidently stable in the pre-reform period.

6 Conclusion

As modernization proceeds around the world, there is a perception that indigenous pre-existing institutions may importantly shape the course of the development process across different countries. Yet little is known about how such institutions actually affect the transformation of economies undergoing change or their impact on the economic mobility of particular groups of individuals. This paper examines the role of one long-standing traditional institution - the Indian caste system - in shaping career choices by gender in a rapidly globalizing economy.

We have found that male working class networks, organized at the level of the sub-caste or *jati*, continue to channel boys into traditional occupations despite the fact that returns to non-traditional (white collar) occupations have risen substantially during the post-1990s reform period. In contrast, girls, who have had historically low labor-market participation rates and few network ties to constrain them, appear to be taking full advantage of the opportunities that have become available in the new economy. It is generally believed that the benefits of globalization have accrued disproportionately to the elites in developing countries. In this setting we find instead that a previously disadvantaged group (girls) might surpass boys in educational attainment and employment outcomes in the future in the most heavily networked *jatis*.

Although we have focused on how traditional institutions shape the responses of particular groups

of individuals to the new opportunities that accompany globalization, our findings suggest that these institutions are likely to be affected in turn by the forces of change. In our setting, an individual schooled in English no longer needs the traditional caste network; indeed, it has been remarked that "the English educated form a caste by themselves" (M.P. Desai, 1952, quoted in Dakin, Tiffin and Widowson, 1968: 24). Simple statistics on marriage and migration that we computed for the elder siblings of the students in our sample would appear to support the view that English education will ultimately undermine the caste network. Among the 792 married siblings in our sample, 11.8% married outside their *jati*. This contrasts with the parent generation in which only 3.6% of the partners were not members of the same *jati*. Schooling in English appears to be contributing to this increase in inter-caste marriage, as 31.7% of the English-educated married outside their *jati* versus only 9.7% of the Marathi-educated. And among the 750 siblings who are currently employed, 41.7% of the English-educated work outside Maharashtra versus only 11.0% of the Marathi-educated (these differences between the Marathi educated and the English educated are statistically significant at the 5% level). Both marriage outside the *jati* and out-migration weaken caste ties and the caste network. Increasing exposure to the modern economy through English education, and the mismatch in educational choices and future occupational outcomes between boys and girls in the same *jati* that we have documented, suggest that the forces of modernization could ultimately lead to the disintegration of a system that has remained firmly in place for thousands of years.

7 Appendix

To estimate the returns to schooling attainment and medium of instruction, separately for men and women in each of the five time periods, we used a specification of the wage regression given by:

$$\ln(W_{it}) = \alpha_t E_i + \beta_t S_i + \gamma A_{it} + \delta_t + \epsilon_{it}$$

where W_{it} is individual i's real income in period t (nominal income normalized by the consumer price index in that year), E_i, S_i measure the language of instruction and the years of schooling for that individual, A_{it} measures his or her age in that period, δ_t is a set of time period dummies, and ϵ_{it} is a mean-zero disturbance term. α_t, β_t measure the returns to English and the returns to education in each period, and δ_t measures secular changes in earnings over time. Table A1 reports the estimated coefficients that are displayed in Figures 1 and 2. As can be seen, the coefficient on the years of schooling is very precisely estimated in each time period for both men and women. The coefficient on English schooling is also significant at the 5 percent level in each period except 1980 for the men and 1980 and 1985 for the women. An F-test rejects the hypothesis that the English coefficients are the same across the times periods. The time period dummies, which reflect the returns to Marathi schooling once the English schooling dummies are included, are small and insignificant in the 1980s, but significant and increasingly negative in the 1990s. Because Marathi schooling channels the individual into working class jobs, this result suggests that working class wages declined over the 1990s in real terms.

To describe the dynamics of schooling choice nonparametrically in Figures 3 and 4, while taking into account intergenerational state dependence within the family, we ran a first stage parametric regression of schooling choice on the cohort variable, interacted with the broad caste categories, as well as the father's and the mother's language of education in secondary school. We constructed the cohort variable based on the year in which the child entered school; for example, cohort=1 for individuals who are currently 25 years old and entered school in 1982, cohort=20 for six year olds who entered school in 2001. This first stage regression is reported in Table A2. The dependent variable in the second stage nonparametric regression is schooling choice net of the estimated parental education effect from the first stage (this two-step procedure is based on Porter 1996). Less than 3% of parents in the sample had gone to an English medium school, although this figure was above 12% in the high castes.

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Figure 1: Returns to English and Schooling by Year, 1980-2000 - Men Aged 30-55

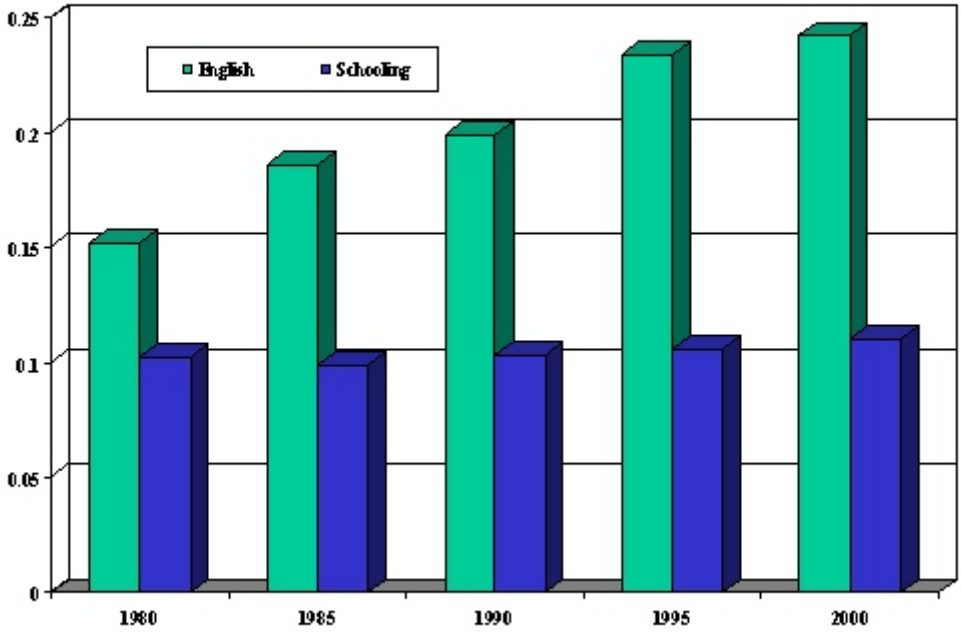

Figure 2: Returns to English and Schooling by Year, 1980-2000 - Women Aged 30-55

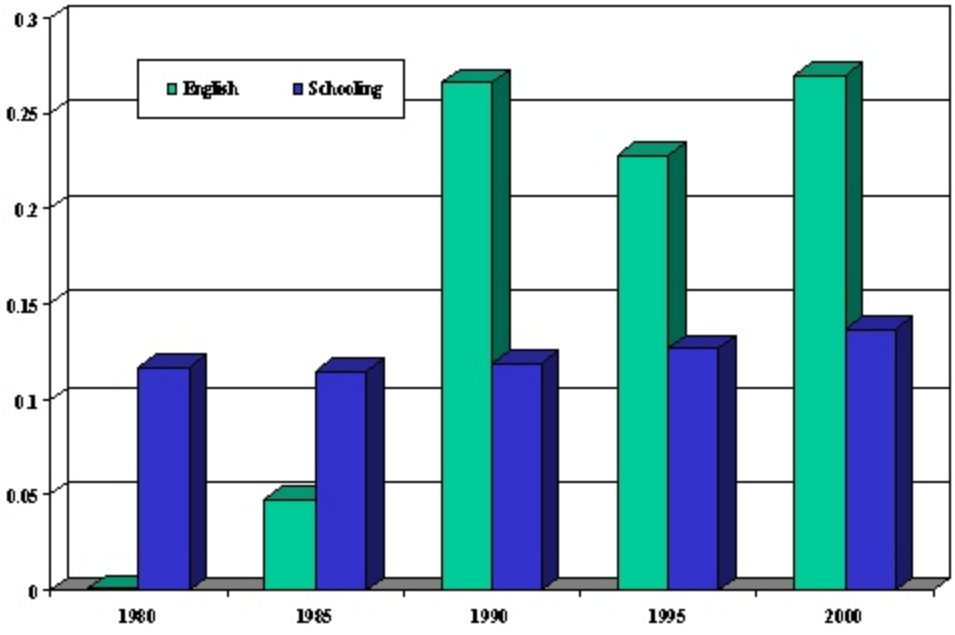

Figure 3: English Schooling - net parental education effect - Boys

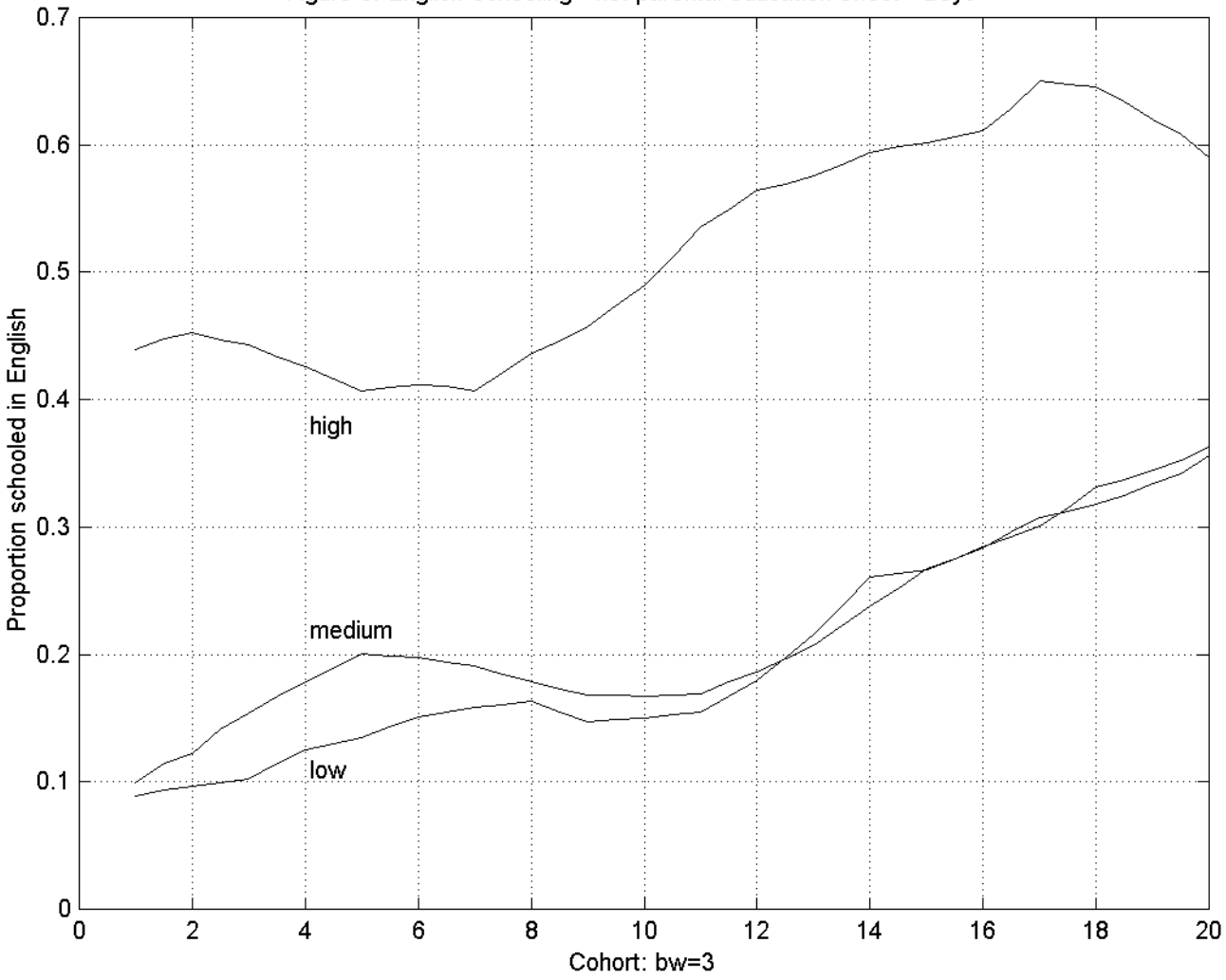

Figure 4: English Schooling - net parental education effect - Girls

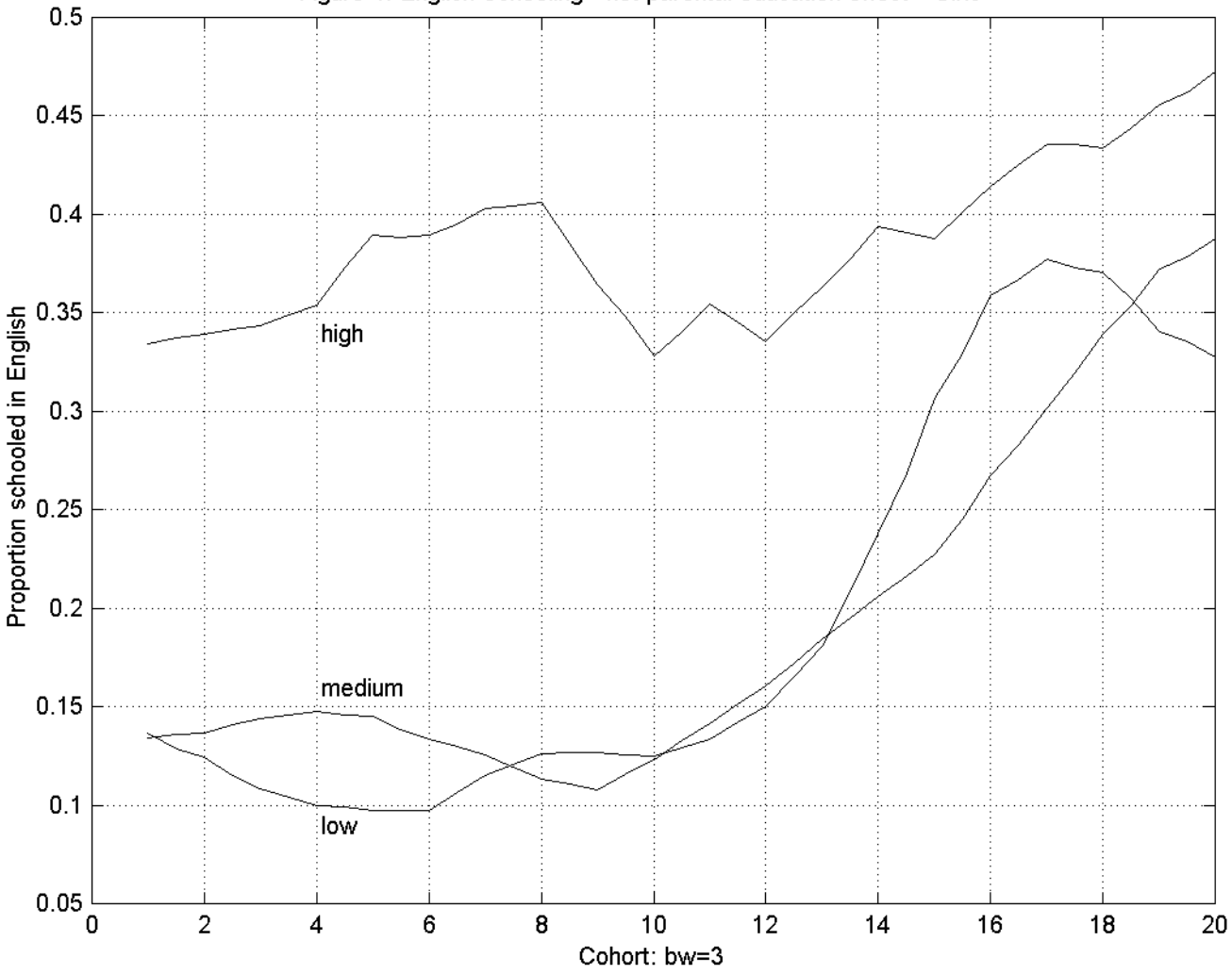

Figure 5: Percent of Men that Received Job Referrals and Studied in English, by Occupation

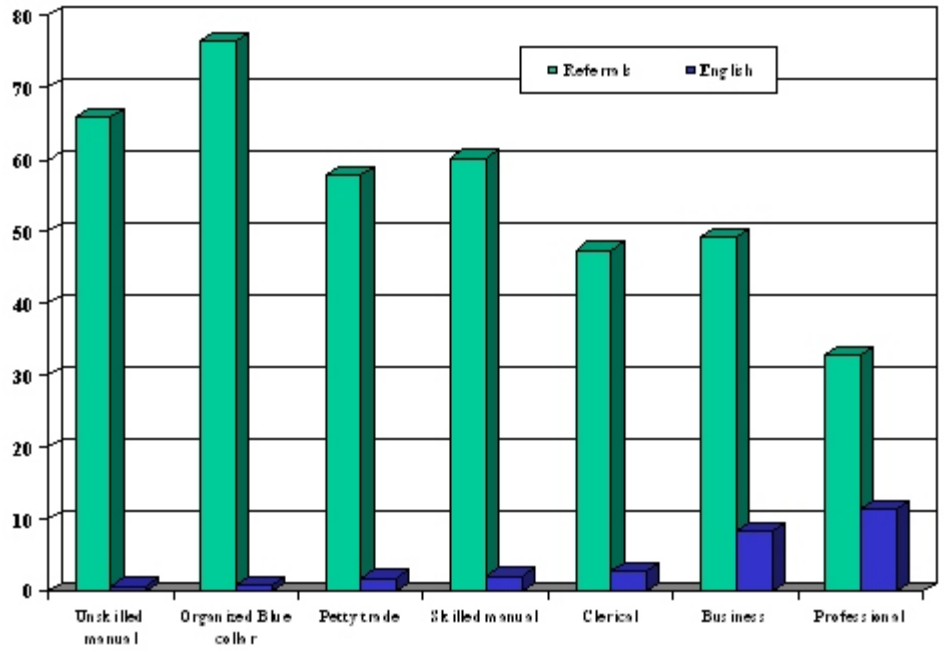

Figure 6: Percent of Women that Received Job Referrals and Studied in English, by Occupation

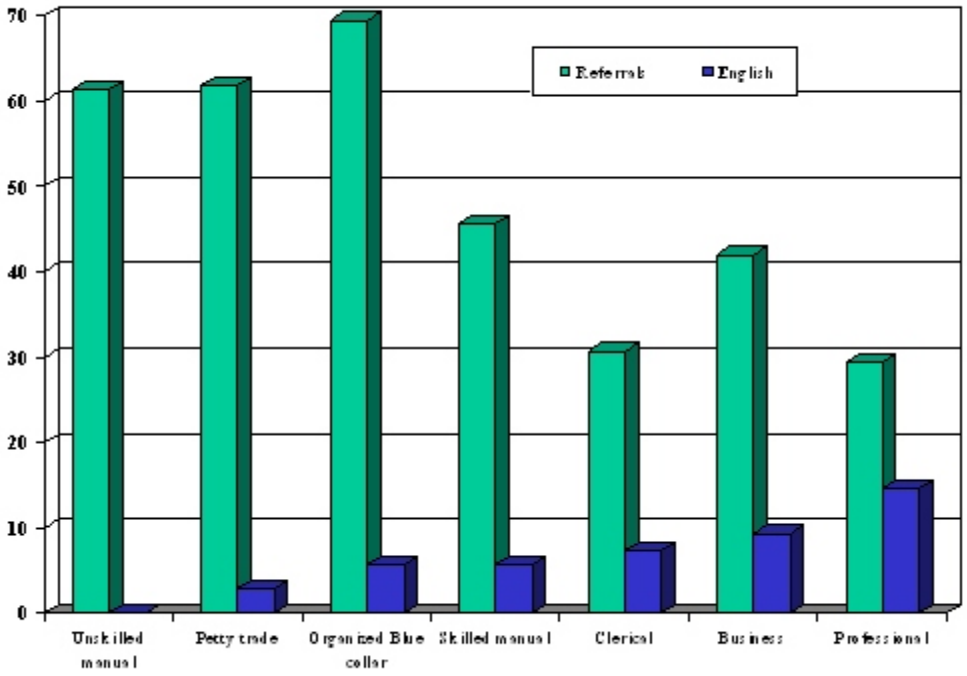

Table 1: School Characteristics and Student Performance

School type:	English medium	Marathi medium
	(1)	(2)
Panel A: School characteristics (secondary section)		
Student-teacher ratio	36.71	35.76
	(2.40)	(2.17)
Class size	61.90	62.28
	(3.69)	(3.15)
Students per desk	2.40	2.36
	(0.10)	(0.11)
Proportion of teachers with B.Ed.	0.72	0.70
	(0.07)	(0.05)
Proportion of teachers with higher degree	0.08	0.10
	(0.03)	(0.03)
Computers per student	0.02	0.02
	(0.004)	(0.005)
Student enrollment in secondary section	1528.40	1059.00
	(360.64)	(175.73)
Panel B: School expenses		
Fees	2.14*	0.89*
	(0.06)	(0.04)
Other expenses	4.90*	3.13*
	(0.16)	(0.05)
Panel C: S.S.C. school leaving exam results (1997-2001)		
Percentage passed	92.59*	51.62*
	(2.04)	(5.95)
Percentage first class among passed	36.2*	24.23*
	(1.69)	(3.35)
Percentage distinction among passed	23.94*	6.90*
	(3.92)	(1.87)
Number of schools	10	18

Note: standard errors are in parentheses.

* denotes rejection of the equality of means for the two types of schools with greater than 95% confidence.

Panels A and C use data from the school survey, Panel B uses data from the household survey.

School expenses are measured for the past year (2000-2001) in thousands of Rupees.

Other school expenses include transportation, coaching classes, textbooks, uniforms, and stationary.

Scores above 35% are required to pass S.S.C., scores above 60% are required for first class, and above 75% for distinction.

Table 2: Occupational Choice by Caste - Men

Relationship to student:	fathers			grandfathers		
Caste:	low	medium	high	low	medium	high
	(1)	(2)	(3)	(4)	(5)	(6)
Employment (%)	97.37	97.31	99.06	98.87	98.86	99.28
Occupational Distribution (%)						
Unskilled manual	11.09	7.84	4.41	9.00	3.63	2.10
Skilled manual	17.35	13.70	10.21	11.67	6.72	8.42
Organized blue-collar	22.87	19.22	2.90	22.89	24.23	7.67
Petty trade	4.00	4.51	2.52	3.11	3.20	3.34
Clerical	28.09	36.64	20.81	22.22	23.79	28.84
Business	7.95	8.79	15.51	6.11	4.72	13.00
Professional	8.30	8.79	43.51	5.56	6.18	33.66
Farming	0.35	0.51	0.13	19.44	27.53	2.97
Percent working class	53.64	42.91	18.01	56.24	49.92	19.42
(standard error)	(1.18)	(1.17)	(1.73)	(1.29)	(1.34)	(1.75)
Total number of observations	1,860	1,774	793	1,866	1,934	839

Note: occupational distribution is computed using employed individuals only.
Employment for fathers is computed as of 1995. Statistics in Columns 4-6 are reported for paternal grandfathers.
Working class = 1 if unskilled manual, skilled manual, organized blue-collar, 0 if clerical, business professional.

Occupational categories

Unskilled manual : daily wage labor, deliveryman, servant, hotel worker, helper, cleaner/sweeper, porter, assistant, watchman, fisherman, gardener, barber, cobbler (chambhar), unskilled laborer, seaman.

Skilled manual : machine operator, plumber, welder, technician, electrician, mechanic, carpenter, fitter/turner, tailor, painter, film developer, goldsmith, artist, priest, lab assistant, skilled worker, traditional healer (vaidhya), computer operator.

Organized blue collar : mill worker, factory worker, peon, Bombay Port Trust (BPT) worker, Bombay Electric Supply and Transportation (BEST) worker, Bombay Municipal Corporation (BMC) worker.

Petty trade : hawker, storeman (storekeeper), salesman, agent, shopkeeper.

Clerical : supervisor, driver, police, clerk, conductor, stenographer, postmaster, receptionist, foreman/draftsman, secretary.

Business : self business, medical representative, transporter, marketing, consultant, employer, contractor, politician (social worker/leader), merchant.

Professional : tuitions, teacher, programmer, engineer, officer, manager, doctor, lawyer, nurse, lecturer, vice-chancellor, librarian, superintendant, director, principal, architect, salaried employee (service), chartered accountant, big business

Farming : farmer, agricultural laborer.

Table 3: Occupational Choice by Caste - Women

Relationship to student:	mothers			grandmothers		
Caste:	low	medium	high	low	medium	high
	(1)	(2)	(3)	(4)	(5)	(6)
Employment (%)	20.56	20.01	51.23	19.31	18.59	15.57
Occupational Distribution (%)						
Unskilled manual	29.95	16.94	2.36	24.65	7.18	3.13
Skilled manual	8.82	8.47	6.15	1.70	1.44	3.13
Organized blue-collar	4.01	4.92	0.47	8.50	4.31	0.78
Petty trade	3.74	3.83	1.18	1.13	0.57	0.00
Clerical	31.55	40.71	46.34	4.25	2.30	19.53
Business	4.55	2.46	3.78	2.27	1.44	3.91
Professional	17.38	22.68	39.72	5.10	8.62	67.97
Farming	0.00	0.00	0.00	52.41	74.14	1.56
Percent working class	44.44	31.53	9.09	75.00	51.14	7.14
(standard error)	(2.22)	(2.25)	(2.06)	(3.19)	(4.36)	(3.64)
Total number of observations	1,887	1,954	857	1,885	1,953	854

Note: occupational distribution is computed using employed individuals only.

Employment for mothers is computed as of 1995. Statistics in Columns 4-6 are reported for paternal grandmothers.

Working class = 1 if unskilled manual, skilled manual, organized blue-collar, 0 if clerical, business professional.

Occupational categories were defined in Table 2.

Table 4: Referrals and Schooling by Occupation

Relationship to student:	father		mother	
Outcomes and choices:	percentage that received referrals	percentage that studied in English	percentage that received referrals	percentage that studied in English
	(1)	(2)	(3)	(4)
Occupation				
Unskilled manual	65.95	0.80	61.29	0.00
Skilled manual	60.13	2.24	45.56	5.56
Organized blue-collar	76.43	0.91	69.44	5.56
All working class	68.44	1.36	57.69	2.24
(standard error)	(1.11)	(0.28)	(2.80)	(0.84)
Petty trade	57.89	1.75	61.76	2.94
Clerical	47.41	2.89	30.56	7.26
Business	49.29	8.53	41.86	9.30
Professional	32.77	11.38	29.25	14.47
All white-collar	43.76	6.20	30.64	10.13
(standard error)	(1.02)	(0.49)	(1.60)	(1.05)
Number of observations	4,515	4,513	1,215	1,215

Note: statistics are computed using employed individuals only. Farmers are also excluded.

A parent is said to have received a referral if a relative or member of the community found him/her a job.

A parent is said to have studied in English if he/she studied in that language in secondary school.

Occupational categories were defined in Table 2.

Table 5: Referrals, English Schooling and Parental Characteristics by Caste

Relationship to student:	father			mother		
Caste:	low	medium	high	low	medium	high
	(1)	(2)	(3)	(4)	(5)	(6)
Percentage that received referrals	60.58	58.02	37.25	13.50	12.13	19.16
	(1.14)	(1.13)	(1.70)	(0.80)	(0.79)	(1.19)
Percentage that studied in English	2.16	1.90	12.47	1.35	1.42	12.93
	(0.44)	(0.44)	(0.66)	(0.42)	(0.41)	(0.62)
Years of schooling	9.63	10.22	13.82	8.03	8.73	13.49
	(0.08)	(0.08)	(0.11)	(0.09)	(0.09)	(0.13)
Monthly income (in thousands of Rs.)	1.92	1.99	4.61	0.23	0.30	1.37
	(0.08)	(0.08)	(0.12)	(0.03)	(0.03)	(0.04)
Number of observations	1,852	1,896	835	1,852	1,896	835

Note: Standard errors are in parentheses.

Statistics are computed using all parents in the sample, regardless of whether they are employed or not.

A parent is said to have received a referral if a relative or member of the community found him/her a job.

A parent is said to have studied in English if he/she studied in that language in secondary school.

Table 6: Caste-based Networks and Schooling Choice

Dependent variable:	English schooling							
Network boundary:	jati						jati-region	
Sample:	boys only		girls only		boys and girls			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Referrals	-1.060	-0.377	-0.646	0.124	--		--	--
	(0.164)	(0.148)	(0.160)	(0.167)				
Referrals - boy	--	--	--	--	-0.398	-0.486	-0.389	-0.458
					(0.091)	(0.104)	(0.079)	(0.083)
Cohort	0.013	0.009	0.013	0.009	0.017	0.019	0.016	0.018
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Cohort-boy	--	--	--	--	-0.002	-0.003	-0.002	-0.002
					(0.002)	(0.002)	(0.002)	(0.003)
Boy	--	--	--	--	0.270	0.331	0.265	0.327
					(0.049)	(0.059)	(0.049)	(0.059)
Father studied in English	0.320	0.236	0.388	0.309	--	--	--	--
	(0.037)	(0.033)	(0.037)	(0.026)				
Mother studied in English	0.351	0.220	0.441	0.269	--	--	--	--
	(0.041)	(0.028)	(0.071)	(0.045)				
Father's years of education	--	0.023	--	0.020	--	--	--	--
		(0.004)		(0.003)				
Mother's years of education	--	0.023	--	0.026	--	--	--	--
		(0.003)		(0.003)				
Family income	--	0.005	--	0.009	--	--	--	--
		(0.005)		(0.003)				
Occupation dummies	No	No	No	No	No	Yes	No	No
R^2	0.173	0.274	0.146	0.272	0.163	0.265	0.200	0.228
Number of observations	2,405	2,286	2,228	2,093	4,635	4,414	4,635	2,622

Standard errors are in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each jati or jati-region.

English schooling = 1 if the child is sent to an English school, 0 if he/she is sent to a Marathi school.

Referrals are measured at the level of the jati in Columns 1-7, by jati and region in Columns 8-9. There are 59 jatis and 4 regions (Bombay, Konkan, Deccan, Other).

Referrals measures the proportion of fathers in the social unit who received a referral.

Boy = 1 if the student is a boy, 0 if girl.

Family income is measured in thousands of Rs.

Column 6 includes a full set of 90 father's occupation dummies.

Column 1-2: schooling choice for boys.

Columns 3-4: schooling choice for girls.

Columns 5-8: schooling choice for both boys and girls. Use both jati and jati-region as the social unit. Social unit dummies are included in all these regressions.

Column 8 excludes very small (less than 10 observations) and very large (more than 250 observations) social units.

Table 7: Within-Jati Schooling Choice, Including Parental Characteristics

Dependent variable:	English schooling	
Additional regressors:	parents' language of schooling	parents' language of schooling + measures of ability
	(1)	(2)
Referrals - boy	-0.348	-0.464
	(0.089)	(0.105)
Cohort	0.014	0.010
	(0.002)	(0.002)
Father studied in English	0.361	0.301
	(0.034)	(0.026)
Mother studied in English	0.389	0.259
	(0.059)	(0.043)
Father's years of education	--	0.021
		(0.003)
Mother's years of education	--	0.024
		(0.003)
Family income	--	0.007
		(0.003)
Boy	0.232	0.297
	(0.051)	(0.077)
Cohort-boy	-0.0005	-0.001
	(0.002)	(0.002)
Father studied in English - boy	-0.080	-0.091
	(0.039)	(0.044)
Mother studied in English - boy	-0.069	-0.044
	(0.053)	(0.042)
Father's years of education - boy	--	0.002
		(0.005)
Mother's years of education - boy	--	-0.001
		(0.004)
Family income - boy	--	-0.003
		(0.005)
R^2	0.207	0.299
Number of observations	4,633	4,379

Standard errors are in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each jati.

English schooling = 1 if the child is sent to an English school, 0 if he/she is sent to a Marathi school.

Referrals measures the proportion of fathers in the jati who received a referral.

Boy = 1 if the student is a boy, 0 if girl.

Family income is measured in thousands of Rs.

Sample includes boys and girls.

Table 8: Student Performance

Dependent variable:	exam success			test scores conditional on passing		
Sample:	boys only	girls only	boys and girls	boys only	girls only	boys and girls
	(1)	(2)	(3)	(4)	(5)	(6)
Referrals	-0.196	-0.136	--	-23.151	-23.650	--
	(0.101)	(0.116)		(5.045)	(4.080)	
Referrals - boy	--	--	-0.116	--	--	-0.734
			(0.109)			(5.761)
Cohort	-0.004	-0.004	-0.005	-0.505	-0.180	-0.190
	(0.004)	(0.003)	(0.003)	(0.134)	(0.204)	(0.223)
Boy	--	--	0.070	--	--	3.794
			(0.085)			(4.357)
Father studied in English	-0.053	-0.163	-0.105	4.901	2.323	1.847
	(0.040)	(0.088)	(0.083)	(1.397)	(3.711)	(4.028)
Mother studied in English	-0.031	-0.014	0.024	3.312	-2.596	-2.772
	(0.017)	(0.021)	(0.038)	(2.200)	(1.905)	(1.632)
Father's years of education	0.028	0.014	0.014	0.929	0.765	0.812
	(0.006)	(0.006)	(0.006)	(0.195)	(0.225)	(0.238)
Mother's years of education	0.009	0.026	0.024	0.617	1.074	0.984
	(0.004)	(0.007)	(0.006)	(0.221)	(0.199)	(0.200)
Family income	-0.001	-0.002	-0.001	0.260	0.122	0.107
	(0.001)	(0.001)	(0.001)	(0.118)	(0.076)	(0.076)
R^2	0.149	0.175	0.228	0.322	0.334	0.354
Number of observations	1,010	939	1,949	849	775	1,624

Standard errors are in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each jati.

Exam success = 1 if the child passed on the school leaving examination, 0 if he/she failed.

Test scores are based on a maximum score of 100 points.

Referrals measures the proportion of fathers in the jati who received a referral.

Boy = 1 if the student is a boy, 0 if girl.

The sample is restricted to cohorts 1-10, who are past the school-leaving age.

Family income is measured in thousands of Rs.

Columns 1-3 use exam success as the dependent variable.

Columns 4-6 use test scores conditional on passing as the dependent variable.

In each case we run regressions separately for boys, girls, and then with both boys and girls.

Column 3 and Column 6 also include cohort, father/mother studied in English, father's/mother's years of education, and family income, interacted with boy.

Table 9: Schooling Choice over Time

Dependent variable:	English schooling			
Additional regressors:	without family characteristics	with family characteristics	without family characteristics	with family characteristics
	(1)	(2)	(3)	(4)
Referrals - boy	-0.426	-0.478	--	--
	(0.090)	(0.106)		
Referrals-boy-cohort1	--	--	-0.269	-0.416
			(0.168)	(0.167)
Referrals-boy-cohort2	--	--	-0.352	-0.333
			(0.100)	(0.112)
Referrals-boy-cohort3	--	--	-0.523	-0.540
			(0.145)	(0.143)
Referrals-boy-cohort4	--	--	-0.607	-0.665
			(0.256)	(0.238)
Cohort 1	-0.261	-0.161	-0.261	-0.161
	(0.031)	(0.032)	(0.030)	(0.032)
Cohort 2	-0.231	-0.146	-0.231	-0.146
	(0.031)	(0.028)	(0.031)	(0.028)
Cohort 3	-0.161	-0.121	-0.161	-0.121
	(0.030)	(0.023)	(0.030)	(0.023)
Boy	0.236	0.261	0.338	0.364
	(0.065)	(0.091)	(0.156)	(0.149)
Cohort 1 - boy	0.033	0.031	-0.152	-0.106
	(0.038)	(0.037)	(0.209)	(0.169)
Cohort 2 - boy	0.052	0.031	-0.090	-0.153
	(0.042)	(0.035)	(0.174)	(0.151)
Cohort 3 - boy	0.041	0.041	-0.007	-0.030
	(0.032)	(0.024)	(0.117)	(0.114)
R^2	0.164	0.301	0.164	0.301
Number of observations	4,635	4,379	4,635	4,379

Standard errors are in parentheses.
Standard errors are robust to heteroscedasticity and clustered residuals within each jati.
English schooling = 1 if the child is sent to an English school, 0 if he/she is sent to a Marathi school.
Referrals measures the proportion of fathers in the jati who received a referral.
Boy = 1 if the student is a boy, 0 if girl.
Cohort 1: age 6-10, Cohort 2: age 11-15, Cohort 3: age 16-20, Cohort 4: age 21-25.
Column 2 and Column 4 include family characteristics, separately and interacted with the boy dummy.
Family characteristics include parents' language of schooling and years of education, and total family income.
Jati dummies are included in all regressions. Sample includes boys and girls.

Table 10: Selection into Marathi Schools over Time

Dependent variable:	father's years of education									
Cohort:	11-20					1-10				
Sample:	boys		girls		boys and girls	boys		girls		boys and girls
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cohort	-0.697	-0.577	0.423	0.219	--	0.153	0.240	-0.543	-0.087	--
	(0.230)	(0.155)	(0.230)	(0.189)		(0.191)	(0.146)	(0.326)	(0.156)	
Cohort-boy	--	--	--	--	-0.792	--	--	--	--	0.117
					(0.252)					(0.232)
Referrals-cohort	1.430	1.204	-0.596	-0.280	--	-0.147	-0.258	1.054	0.310	--
	(0.400)	(0.260)	(0.376)	(0.311)		(0.323)	(0.250)	(0.554)	(0.270)	
Referrals-cohort-boy	--	--	--	--	1.469	--	--	--	--	-0.231
					(0.414)					(0.415)
Referrals	-30.991	--	-3.651	--	--	-10.256	--	-18.624	--	--
	(6.894)		(6.866)			(2.035)		(2.793)		
Jati dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
R^2	0.106	0.205	0.138	0.205	0.215	0.136	0.254	0.184	0.278	0.285
Number of observations	839	839	815	815	1,654	866	866	851	851	1,717

Standard errors are in parentheses.

Standard errors are robust to heteroscedasticity and clustered residuals within each jati.

Referrals measures the proportion of fathers in the jati who received a referral.

Column 5 and Column 10 include jati dummies, jati-boy dummies, and jati-cohort dummies.

All regressions are restricted to students in Marathi schools.

Table A1: The Returns to Schooling Attainment and English

Dependent variable:	log(income)	
Parent:	father	mother
	(1)	(2)
Age	0.017	0.030
	(0.001)	(0.004)
Period 2	0.048	0.077
	(0.058)	(0.197)
Period 3	-0.003	0.018
	(0.070)	(0.215)
Period 4	-0.293	-0.372
	(0.076)	(0.225)
Period 5	-0.495	-0.700
	(0.081)	(0.229)
Education - period 1	0.102	0.117
	(0.007)	(0.017)
Education - period 2	0.099	0.115
	(0.005)	(0.009)
Education - period 3	0.103	0.119
	(0.004)	(0.006)
Education - period 4	0.106	0.127
	(0.003)	(0.006)
Education - period 5	0.110	0.137
	(0.003)	(0.005)
English - period 1	0.152	-0.054
	(0.157)	(0.287)
English - period 2	0.186	0.048
	(0.093)	(0.140)
English - period 3	0.199	0.266
	(0.060)	(0.095)
English - period 4	0.234	0.228
	(0.051)	(0.084)
English - period 5	0.242	0.270
	(0.051)	(0.071)
R^2	0.285	0.419
Number of observations	13,638	3,068

Standard errors are in parentheses.
Standard errors are robust to heteroscedasticity and correlated residuals for each individual parent.
Income is measured in Rupes per year.
Period 1: 1980, Period 2: 1985, Period 3: 1990, Period 4: 1995, Period 5: 2000.
The sample is restricted to working individuals between the age of 30 and 55 in each period.
Education is measured by the number of years of schooling.
English = 1 if English was the medium of instruction in the parent's secondary school, 0 otherwise.

Table A2: The Dynamics of Schooling Choice by Caste

Dependent variable:	English schooling	
Sample:	boys	girls
	(1)	(2)
Cohort	0.014	0.005
	(0.004)	(0.003)
Cohort - low caste	0.0007	0.012
	(0.004)	(0.004)
Cohort - medium caste	-0.002	0.009
	(0.004)	(0.004)
Low caste	-0.306	-0.314
	(0.051)	(0.049)
Medium caste	-0.262	-0.283
	(0.051)	(0.050)
Father studied in English	0.315	0.396
	(0.045)	(0.048)
Mother studied in English	0.337	0.426
	(0.048)	(0.049)
R^2	0.170	0.151
Number of observations	2,405	2,228

Standard errors are in parentheses.
The broad caste categories are low, medium and high.