Federal Reserve Bank of New York
Staff Reports

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Adeline Delavande
Basit Zafar

Staff Report No. 683
August 2014

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JEL classification: D81, D84, I21, I23

Abstract

We investigate the determinants of students' university choice, with a focus on expected monetary returns, non-pecuniary factors enjoyed at school, and financial constraints, in the Pakistani context. To mitigate the identification problem concerning the separation of preferences, expectations, and markets constraints, we combine rich data on individual-specific subjective expectations about labor market and non-pecuniary outcomes, with direct measures of financial constraints and students' stated school choice both with and without financial constraints. Estimates from a life-cycle model show that future earnings play a small (but statistically significant) role. However, non-pecuniary features, such as a school's ideology, are major determinants. Data on students' choices without financial constraints allow for the out-of-sample validation of the model, which shows a strikingly good fit. Our results demonstrate that 37 percent of students are financially constrained in their choice of university, and that implementing policies relaxing financial constraints would increase students' average lifetime subjective expected utility by 21 percent. From a methodological standpoint, we find that ignoring non-pecuniary factors, uncertainty related to employment and drop-out, or direct measures of financial constraints yields biased estimates—a result that underscores the importance of having data on these elements for understanding university choice in any context.

Key words: school choice, credit constraints, subjective expectations

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Delavande: University of Essex (email: aldela@essex.ac.uk). Zafar: Federal Reserve Bank of New York (e-mail: basit.zafar@ny.frb.org). The authors thank Elizabeth Brown, Maricar Mabutas and, in particular, Victoria Gregory for outstanding research assistance. For helpful comments, they thank Peter Arcidiacono, Sonia Bhalotra, Zach Bleemer, Lance Lochner, Chris Taber, Todd Stinebrickner, Luis Vasconcelos, and Matthew Wiswall, as well as seminar and conference participants at Duke University, the 2013 AALIMS-Rice University Conference on Political Economy of the Muslim World, the Institute for Fiscal Studies, Nova School of Business and Economics, the University of Essex, the University of Mannheim, the 2013 Political Economy and Public Services Workshop at the University of Bristol, the 2014 Workshop on Subjective Expectations and Probabilities at the University of Essex, and the 2014 University of Essex Economics Development Workshop. The authors acknowledge an enormous debt to their local field teams and participating institutions. Funding for data collection through a RAND Independent Research and Development grant is also gratefully acknowledged. Delavande acknowledges funding from the Economic and Social Research Council Research Centre on Micro-social Change. The views expressed in this paper are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

1 Introduction

Higher education participation has expanded considerably worldwide in the last 50 years, moving in the direction of a mass system of education. The enrolment rate in tertiary education reaches numbers as high as 96% in Australia, 72% in the US and 71% in South Korea, with entry rates exceeding 50% for 24 of the 42 countries in the OECD and G20 (OECD, 2013; Lee, 2009). As a result of this expansion, higher education systems are undergoing changes, such as the growth of for-profit universities in the US, the emergence of a vibrant private sector in many developing countries, and the creation of universities by religious organizations in Latin America and Asia (Chakrabarti and Grigsby, 2013, Task Force on Higher Education and Society, 2000). High school graduates, therefore, have a very wide range of options of higher education institutions available to them, which differ in terms of quality, cost and other important characteristics. In this paper, we estimate a life-cycle utility model of university choice to investigate the determinants of the choice of higher education institutions, and quantify their relative importance.

We focus on the role of expected monetary returns, non-pecuniary factors enjoyed at school, and financial constraints in university choice, conditional on participation in higher education. Understanding the relative role of preferences, expectations (or information sets) and market structures is challenging with the type of data on school attendance and family background typically available (e.g., Cunha and Heckman, 2007). The reason for this challenge is a threefold identification issue. First, expectations about future earnings are usually not observed. Making inference on the decision-making process based on choice data and maintained assumptions on earnings' expectations is problematic since observed choices might be consistent with several combinations of expectations and preferences (e.g., Manski, 1993, 2004). Second, students' expectations about non-pecuniary outcomes enjoyed while at school are also usually not observed, and as a result rarely taken into consideration directly. Finally, typically available data do not provide a direct way of identifying which students are credit constrained (e.g., Lochner and Monge-Naranjo, 2012).

In this paper, we use new data on (i) subjective expectations about labor market outcomes, (ii) subjective expectations about non-pecuniary outcomes, (iii) individual-specific choice sets reflecting each student's budget constraint, and (iii) stated school choice with and without financial constraints to circumvent those identification issues, and estimate a life-cycle utility model of university choice. We survey male students of college-going age in two urban centers in Pakistan, who are currently enrolled in different types of colleges and are pursuing a bachelors-equivalent degree. Students are provided with a hypothetical scenario of school choice, and asked to rank five different existing universities in terms of their preference of enrolling in them (assuming guaranteed admissions), conditional on their current financial status as well as conditional on no school costs. The schools provided in the choice scenario cover the higher education spectrum in Pakistan, rang-

ing from expensive Western-style elite (private) universities with high labor market returns at one end to free religious institutions (Madrassas) at the other, with public universities somewhere in the middle. We use these data to estimate the preference parameter for (log) consumption and for non-pecuniary factors, and to examine how enrollment would change absent financial constraints.

The Pakistani higher education system that we consider is diverse, which is useful to analyze school choice. Our setting is also ideal because of the similarity of Pakistan's education system to the rest of South Asia. The region accounts for around 25% of the world's population, with 37% of the population under the age of 18 in 2011. Our substantive conclusions are therefore relevant for a quarter of the world population for whom demand for higher education, driven by demographic pressure and rising income, is growing substantially (Economist Intelligence Unit (EIU), 2013). Moreover, because students in other parts of the world face similarly an increasingly diverse range of higher education institutions, our methodological contribution is relevant to other developing countries and, similarly, to developed countries.

We find considerable variation in students' beliefs for the outcomes considered across the different schools, as well as significant heterogeneity in beliefs across individuals within each school. The subjective belief data, however, paint a sensible picture. For example, students believe on average that age 30 earnings conditional on working and graduating from a Western-style university are substantially higher than those conditional on graduating from a Madrassa. We use the stated school choice and the elicited subjective expectations to estimate our model of school choice. The estimates indicate that expected earnings are a significant determinant of the type of university chosen. However, the elasticity of school choice with regards to earnings is not very high, and varies between 0.08-0.13. The order of magnitude is similar to that found in educational choices in developed countries (Arcidiacono, 2004; Beffy et al., 2011; Wiswall and Zafar, forthcoming). With respect to school-specific outcomes, we find that both parents' approval of the choice and the alignment of school's teachings with own ideology are very important drivers of the choice, and that students are willing to give up more than 35% of age 30 consumption to improve the likelihood of these outcomes by 5 percentage points.

We take advantage of the richness of the data to assess the validity of our structural model. We use the preference parameters from our choice model estimated using the stated school choice under current financial status and predict student's school choice if school costs were set to zero. We can then compare those predictions to respondents' stated school choice under the hypothetical scenario of no school costs. This is similar in spirit to assessing the validity of a structural model using out-of-sample estimation (e.g., Todd and Wolpin, 2006; Galiani et al., 2012). We, however, do not compare the predictions to a different sample, but rather to the same sample in a different state of the world (one without school costs). This test relies on the assumption that students are able to correctly predict what they would do absent school costs. The distribution of enrollment

generated by the model is strikingly similar to the stated choice distribution under no school costs. This strengthens the credibility of the data quality and the modeling assumptions. It also gives us greater confidence in using the model to simulate alternative policies.

We use our estimated parameters to simulate the impact of several sets of policies on students' welfare and enrollment. We find that relaxing financial constraints by providing students with either loans or free schooling (financed by a tax on earnings during students' later working lives) would increase students' welfare substantially, with an average (median) gain equal to 21% (8%) in lifetime subjective expected utility. Such reforms would cause more than a third of the students to switch schools. Overall, this suggests that financial constraints play a significant role in the intensive margin of university choice in a setting like Pakistan, where well-functioning credit markets are lacking, and borrowing or lending is not possible for schooling. We find limited impacts on utility and enrollment of a policy that provides information about objective earnings associated with the different school types to students. This is because most students accurately perceive the relative ranking of schools in terms of earnings. We also find that a reform that introduces secular subjects to the Madrassa curriculum – a reform currently underway in Pakistan – would have limited impact on the choices of students. Finally, making the schools more homogenous in terms of their ideological blend, together with relaxing financial constraints, lead to even larger gains than relaxing constraints alone. Note that these policy experiments abstract away from general equilibrium effects.

From a methodological point of view, we show that rich data on expectations and financial constraints are essential to make credible inference on university choice. For example, in our study, ignoring non-pecuniary outcomes increases the elasticity of school choice to expected earnings by a factor of 1.6. This is because expectations about non-pecuniary factors are correlated with expectations about monetary returns. Assuming that those non-pecuniary factors are orthogonal to monetary returns and can be left in the residual (which is what is implicitly done in studies that do not have direct information on those factors) is incorrect -at least in our setting- and would likely yield biased estimates of choice responsiveness to earnings in many other contexts (see Wiswall and Zafar, forthcoming, for a similar concern in the US). Similarly, ignoring uncertainty related to drop-out and unemployment increases the elasticity of school choice to expected earnings by a factor of 1.7. Finally, if instead of using our direct measures of financial constraints we use proxies that are generally used in the literature to measure constraints (such as parents' income or wealth), we obtain preference parameters for non-monetary factors that are biased upwards, which as a result yield earnings choice elasticity estimates that are biased downwards by about 25%. This underscores the advantage of collecting direct measures of financial constraints instead of inferring them indirectly.

Our empirical analysis uses respondents' stated school choice, rather than actual choice, which

is becoming common in many fields (Louviere et al., 2000). Comparisons of revealed and stated preference data show that both data sets produce comparable utility parameters (e.g., Adamowicz et al., 1994, Ben-Akiva and Morikawa, 1990, Hensher and Bradley, 1993). Stated choice also relates strongly to subsequent actual choice (e.g., Delavande and Manski, 2010). In our context, using stated choice is advantageous because we rely on respondents' expectations elicited at the time of the choice in a hypothetical scenario that we seek to explain; this is equivalent to a situation in which respondent's expectations are elicited *before* they make their educational decision. This greatly mitigates the issue of the endogeneity of expectations one would face when explaining school choice made prior to the elicitation of expectations. Yet, we further evaluate the potential endogeneity concern due to learning and ex-post rationalization by exploiting the variation in students' duration of enrollment. The underlying assumption is that this concern is likely to be more serious for students who have been attending an institution for a longer period. Reassuringly, we estimate similar preference parameters for students with different durations of enrollment.

This paper relates to various strands of the literature on educational choice. Our paper belongs to a long tradition of work seeking to determine whether expectations about future earnings (or about returns to schooling) influence college attendance, college major or occupation choice (e.g., Willis and Rosen, 1979, Berger, 1988, Flyer, 1997, Arcidiacono, 2004, Buchinsky and Leslie, 2010, Beffy et al., 2012). The prior literature has relied on various types of assumptions (such as myopic or rational expectations) for the mapping between realized earnings and expected earnings. However, existing research from both developed and developing countries' settings has found that individuals tend to be misinformed about the returns to schooling (e.g., Betts, 1996, Jensen, 2010, Wiswall and Zafar, 2013). This has prompted some empirical work on educational choice using expectations data about future earnings (e.g., Giustinelli, 2010, Zafar, 2011a).[1] In the last 20 years, subjective expectations have increasingly been asked in surveys, yielding meaningful data in both developed and developing countries: for example, expectations have been shown to vary with observable characteristics in the same way as actual outcomes (see Manski, 2004, and Delavande, 2014, for a review), and expected outcomes have been found to be strongly associated with future outcomes at the individual-level (Dominitz, 1998, Delavande and Rohwedder, 2011). More recently, these data have been shown to be useful to make inference about decision-making in various domains (e.g., Delavande, 2008, Lochner, 2007, Stinebrickner and Stinebrickner, 2014, Wiswall and Zafar, forthcoming, Zafar, 2013). Importantly, in the educational context, expectations have been shown to be important predictors of schooling choices, above and beyond other

[1] A related line of research, surveyed in Cunha and Heckman (2007), has been to use panel data on earnings combined with college choice information, and a framework in which one can identify (i) components of the life-cycle earnings that are forecastable and acted on at the time of the schooling decision is made, and (ii) components that are not forecastable. The papers reviewed in Cunha and Heckman (2007) estimate that, for a variety of market structures and preferences, over 50% of the ex-post variance in returns to college is forecastable.

standard determinants of schooling (Jacob and Wilder, 2011; Beaman et al., 2012). Admittedly, having expectations data does not free the researchers from any assumptions. For example, identification in our empirical model requires assumptions about expected earnings' growth.

Related to our work, Arcidiacono et al. (2012) and Wiswall and Zafar (forthcoming) use earnings' expectations to estimate a life-cycle model, focusing on major choice in the US. Attanasio and Kaufmann (forthcoming) examines the role of expectations about returns to schooling and of perceptions of labor market risks in the decision to continue further education (that is, the extensive margin) in Mexico. We complement these papers by: (1) directly taking into consideration non-pecuniary outcomes (such as ideology) and additional sources of uncertainty (e.g., regarding dropping out and employment) which are then embedded into a structural model; (2) looking specifically at the role of financial constraints; (3) conducting an out-of-sample validation of our structural model, and (4) providing the first evidence for understanding university choice on the intensive margin in a developing country setting.

Our paper also relates to a large literature investigating the role of credit constraints in higher education (see Lochner and Monge-Naranjo, 2012, for a review). As mentioned above, this is a challenging task given that most standard data sources do not provide a direct way of identifying which students are credit constrained. The literature has adopted various approaches to deal with this difficulty.[2] Similar in spirit to Stinebrickner and Stinebrickner (2008), our study design bypasses this identification issue by asking students directly which schools are in their budget constraints. This allows us to identify precisely which students are financially constrained in their school choice. Furthermore, our structural model also enables us to provide evidence on the importance of credit constraints by simulating various policies that would relax those constraints.[3]

Our paper also builds upon a line of research on the role of non-pecuniary outcomes on educational choice (e.g., D'Haultfoeuille and Maurel, 2013, Jacob and Lefgren, 2007, Stinebrickner and Stinebrickner, forthcoming). For example, Zafar (2013) – using the approach of directly incorporating such elements in the utility function, as we do here – find that enjoying studying the coursework and gaining approval of parents is instrumental in the choice of majors in the US context. Moreover, educational choice elasticities with respect to earnings are typically low (e.g., Beffy et al., 2012, Wiswall and Zafar, forthcoming), suggesting similarly that non-pecuniary fac-

[2]One approach focuses on looking at the role of income (or wealth) on college attendance (and college quality), after controlling for the student's ability and other family background (e.g., Belley and Lochner, 2007, Cameron and Heckman, 1998, Carneiro and Heckman, 2002, Lowenheim, 2011). Another approach uses differential returns to schooling for constrained and unconstrained students (e.g., Lang, 1993, Card, 1999, Cameron and Taber, 2004). A third approach estimates structural life-cycle schooling models and evaluates various policies, including relaxing borrowing constraints (e.g., Keane and Wolpin, 2001, Cameron and Taber, 2004).

[3]The literature has largely focused on developed contries. An exception is Kaufman (2012) who studies the importance of credit constraints in university attendance in Mexico and uses, like the current study, subjective expectations data on future earnings. Her results suggest the existence of credit constraints. Other papers in developing countries include Gurgand et al. (2012) for South Africa and Soulis (2011) for Chile.

tors are important. In a developing country setting, we also find non-pecuniary factors to be very important.

This paper is organized as follows. We provide an overview of the South Asian and Pakistani education systems in Section 2. Section 3 outlines a model of school choice. Section 4 describes the study design and data collection methodology. We examine heterogeneity in subjective beliefs about earnings and other school-specific outcomes, and stated school choice in Section 5. Section 6 reports estimates from a structural life-cycle utility model of school choice and provides a methodological discussion of the usefulness of the subjective data, while section 7 presents our policy experiments. Finally, Section 8 concludes.

2 The Educational System in South Asia

2.1 Higher Education in South Asia

The higher education system is organized similarly across South Asia, with flagship universities at the top of the hierarchy and lower-tier universities absorbing remaining demand (EIU, 2013). The soaring demand for higher education has led to the growth of private universities since the mid-80s (notably in India, Afghanistan, Bangladesh and Pakistan), accompanied with a shift of the costs of tuition away from the state and onto students, and uneven quality of education. Only Nepal and Sri Lanka have yet to start the privatization of their higher education system, but there is a general recognition across South Asia for the need of new financing models that require universities to at least partially finance their own activities. Pakistan has already engaged in this transition: dependence on public funding is limited and universities are increasingly funded through fees and commercial ventures. Forty-five percent of Pakistani universities are private, a rate between that of Bangladesh and Afghanistan (both at 62%) and India (33%) (EIU, 2013). The substantive growth of the sector has been to some extent at the expense of quality and a resulting low employability of graduates.

Another common feature is the possibility to acquire higher education outside the university system described above and in Madrassas (Islamic religious schools). The madrassas in Muslim South Asia teach a curriculum known as *Dars-i-Nizami*, which runs from seven to nine years after the completion of the elementary level and covers subjects such as (Arabic) grammar, rhetoric, Islamic history, and mathematics. The materials for these subjects are texts dating to before the 14th century. A key feature of Madrassas is that they are generally free.

2.2 Education in Pakistan

Our empirical analysis focuses on Pakistan. Education is compulsory for children aged 5 to 16 years and delivered in a public school system in addition to a growing private education sector and a religious education sector.[4]

Higher education takes place in universities. In 2011, the enrollment rate for students between the ages 17-23 was 5.1% (Higher Education Commission Pakistan, 2012). There are now 138 universities in the country, of which 75 are public and 63 private (Higher Education Commission Pakistan, 2012). In addition to the recognized private institutions, a large number of illegal private universities operate throughout the country. Both public and private universities have their own entrance exams which are based on the SAT. Colleges may also base admission decisions on the Intermediate/Higher Secondary School Examination and/or a personal interview. As explained above, it is also possible to continue higher education within the Madrassa system. Advanced study within the Madrassas produces an Alim (Islamic scholar and/or teacher), a degree which is considered as equivalent to a Master's degree in Arabic and Islam by the University Grants Commission. Estimating Madrassas' enrollment is challenging because fewer than a third are registered (Rashid, 2000). However, Ahmad (2004) estimates that there are about 6,000 secondary and higher Madrassas, educating about 600,000 students. Since Madrassas are free, it is commonly believed that they may offer a viable alternative for families unable to afford more expensive schools (Singer, 2001).[5]

Our study focuses on three types of higher education institutions that represent distinct parts of the higher education spectrum in Pakistan. At one end, we have Western-style universities that are similar to American colleges. They provide a liberal arts curriculum, classes are taught in English, and have mixed-gender campuses. These are private institutions that charge expensive fees, and cater to primarily wealthy students. Islamic Universities (IU), which are somewhere in the middle of the spectrum, provide a liberal arts curriculum combined with Islamic teachings and courses. These universities have segregated campuses for males and females, and classes are taught in Arabic or English. These institutions tend to be public and, therefore, are accessible to low and middle income groups. Finally, at the other end of the spectrum are Madrassas (M). Madrassas do not impart any vocational training, and most of their graduates go on to work in the religious sector.

While returns to schooling are high in a developing country context like Pakistan (Jaffry et

[4]These three sectors provide education in four stages: primary (with a participation rate of 62%), middle (with a participation rate of 35%), secondary (with a participation rate of 23%), and intermediate/higher secondary (with a participation rate of 9%) (Lynd, 2007).

[5]The empirical evidence regarding this is mixed: popular media and anecdotal evidence argues that the poorest families send their children to Madrassas (Rahman, 2004; Tavernise, 2009). Andrabi et al. (2006), however, argue against the hypothesis that poverty drives individuals to Madrassas: In their sample, they find little difference between poor and rich households in the choice of religious schooling.

al., 2007), the returns do differ by the type of school, with lower returns associated with public schooling (relative to private) and for Islamic education (Berman and Stepanyan, 2004; Asadullah, 2009). Data from the late 70s however show that unemployment was typically low after graduating from a Madrassa (Ahmad, 2004).

3 Model

In this section, we develop a simple model of school choice. A student lives for $T+1$ periods. In period $t=0$, the first period of his life, student i acquires education. At the beginning of the period, he chooses a school s where he enrolls. At the end of the period, he leaves school by either graduating or dropping out, and enters the labor market where he stays till period $t=1,...,T$. In our set-up, the student's most important decision is the choice of school. The choice is important not only because it affects the stream of future earnings (and thus consumption) but also because of the following three individual- and school- specific factors that the student values: a^1_{is}, whether the school's teachings are consistent with i's ideology; a^2_{is}, whether parents approve of the school, and; a^3_{is}, i's rank at the time of graduation from the school. In addition, i cares about whether the school is located in a different town as the one he currently resides in, which is indicated by l_{is}. For tractability, we assume that the utility function is additively separable, linear in the school outcomes and location, and logarithmic in consumption. Thus, the utility of individual i from attending school s is given by:

$$U_{is} = \sum_{j=1}^{3} \alpha_j a^j_{is} + \delta l_{is} + \theta \sum_{t=0}^{T} \beta^t \ln(c_{it}) + \gamma_s + \varepsilon_{is},$$

where α_j is the utility value of outcome a^j_{is}, δ is the utility value of the school's location, β is the time preference discount factor, c_{it} is i's consumption at time t, θ is the utility value of log consumption, γ_s is a school-specific constant, and ε_{is} is a random term which is individual- and school-specific and unobservable to the econometrician. We incorporate only non-pecuniary factors enjoyed in school in the utility function; there could be other school-specific non-pecuniary factors associated with the workplace (for example, if schools had distinct mappings to occupations, and students had tastes for certain occupations), which would be embedded in the random term in the current framework. Consistent with the lack of well-functioning credit markets in Pakistan, there is no borrowing or lending possible so student i will consume his earnings y_{it} at every period from $t=1$ to T. At time $t=0$, i needs to finance his schooling out of his parent's earnings y_{i0} and he faces expected costs C_{is} if he enrolls in school s. His per-period budget constraints are

therefore given by:

$$\begin{array}{c} c_{i0} + C_{is} \leq y_{i0} \\ c_{it} = y_{it} \text{ for } t = 1 \text{ to } T. \end{array} \tag{1}$$

Because he cannot borrow to finance the school cost, student i solves his maximization problem by restricting his choice set to schools for which the period zero budget constraint $c_{i0} + C_{is} \leq y_{i0}$ is not violated; that is, schools for which the costs do not exceed parents' income. Let S_i denote the set of schools s that satisfy i's period 0 budget constraint.

A key feature of the model is that, at $t = 0$, the student faces uncertainty about the school-specific outcomes as well as lifetime earnings associated with each choice. For example, i may be unsure about the type of teaching taking place in a school, how good he would be compared to other students, and the future labor market earnings if he were to graduate from a particular school. Student i possesses beliefs about the distribution of these events, conditional on each school s. We denote this distribution by $G_{is}(\{a^j\}_{j=1}^3, \{y_t\}_{t=1}^T)$. The distributions of future events $G_{is}(.)$ represent "unresolvable" uncertainty as these events will not have occurred at the time of school choice. Student i chooses the school among his feasible choice set which maximizes his subjective expected utility subject to his budget constraints, that is, he solves:

$$\max_{s \in S_i} \int \left\{ \sum_{j=1}^{3} \alpha_j a^j + \delta l_{is} + \theta \ln(y_{i0} - C_{is}) + \theta \sum_{t=1}^{T} \beta^t \ln(y_t) + \gamma_s + \varepsilon_{is} \right\} dG_{is}(\{a_j\}_{j=1}^3, \{y_t\}_{t=1}^T), \tag{2}$$

Subject to budget constraint (1).

Because of the separability assumption of the utility, only marginal beliefs matter in solving this maximization problem. We denote by $P_{is}(a^j)$ the marginal probability about the binary factors $a_{is}^j, \{j = 1, 2\}$, and let $E_{is}(a^3)$ be i's expected graduation rank if he enrolls in school s. Regarding future earnings, student i is uncertain about whether he would successfully graduate or whether he would drop-out if he enrolls in school s; about whether he would find a job in each of these cases, and; about what his earnings would be for each of these scenarios. Student i therefore possesses the following school-specific subjective probabilities: the probability $P_{is}(d)$ of dropping out from s if i enrolls in school s; the probability $P_{is}(\text{job} \mid d)$ of finding a job if he drops out after enrolling in school s; and the probability $P_{is}(\text{job} \mid g)$ of finding a job if he graduates from school s after enrolling in school s. He also possesses subjective expectations Y_{isht} about his labor earnings at time t if he enrolls in school s and either drops out ($h = d$) or graduates ($h = g$).[6] We assume for simplicity that $P_{is}(\text{job} \mid d)$ and $P_{is}(\text{job} \mid g)$ are time-invariant. Since unemployment benefits do not exist in Pakistan, we normalize earnings to 1 if a student is not employed.

[6]For ease of exposition, we initially assume there is no uncertainty in earnings conditional on employment. We relax this assumption later in the empirical analysis. Note that the specification assumes that students cannot transfer between schools, and that students enter the labor market after either graduating or dropping out of school.

Equation (2) can now be written as:

$$\begin{aligned}&\max_{s\in S_i}\{\textstyle\sum_{j=1}^{2}\alpha_j P_{is}(a^j)+\alpha_3 E_{is}(a^3)+\delta l_{is}+\theta\ln(y_{i0}-C_{is})\\&+\theta\textstyle\sum_{t=1}^{T}\beta^t\left[(P_{is}(d)P_{is}(job\mid d)\ln(Y_{isdt})+(1-P_{is}(d))P_{is}(job\mid g)\ln(Y_{isgt})\right]\\&+\gamma_s+\varepsilon_{is}\}.\end{aligned}\tag{3}$$

The goal is to infer the parameters of the utility function. As mentioned above, we relax the conventional approach of assuming a mapping between beliefs and realizations of outcomes (such as earnings, and ability) for the school that is chosen as well as the schools that are not chosen, and instead collect data on students' subjective expectations about school-specific outcomes. Identification of the empirical choice model is discussed in section 6.

4 Study Design

This section describes our sample, data collection methodology, and survey design.

4.1 The Sample

Our study was conducted in two Western-style universities, one Islamic University (IU), and four Madrassas (M), all located in Islamabad/Rawalpindi and Lahore between May and October 2010.[7] The Islamabad/Rawalpindi metropolitan area is the third largest in the country with a population of about 4.5 million, and Islamabad is Pakistan's capital. Lahore is the capital of the Punjab province and the country's second largest city with about 10 million inhabitants.

The institutions in our sample are among the five largest and best-regarded institutions in the relevant category in each city. Among all the institutions we contacted, one University and one Madrassa declined participation. We sampled the higher-level students in the four Madrassas since they are similar in age to university students, and are pursuing the Madrassa equivalent of a Bachelor's degree. Though participation was voluntary, almost everyone in the Madrassas participated in the study. At the other institutions, a random sample of students was selected to participate based on a listing of students provided by the registrar's office. Average response rate at the universities was about 70%. Our full sample consists of 2,347 male students.

The two Western-style universities in our sample differ in their selectivity, reputation, and cost. We classify the more expensive, selective and reputable university as "Very Selective University"

[7] We excluded public secular universities for the study, since they tend to be large and have separate campuses for each of the broad fields of study. Surveying a representative set of students in such schools would not have been feasible.

(VSU), with the other university classified as simply "Selective University" (SU). VSU, as we show below, tends to draw students from a higher socioeconomic segment of the population than those who attend SU. Since the four Madrassas in our sample are similar in terms of their student body composition, we pool the data across the four Madrassas. We discuss the data collection procedure in Appendix A.1.

4.2 Sample Characteristics

Table 1 presents the characteristics of students at the four institution groups. As indicated by the low p-values of a F-test for the equality of the means of the characteristics across the schools (reported in the last column), there is substantial sorting in terms of observables into these institutions.

As we move across the columns from VSU towards M in Table 1, the average socioeconomic characteristics deteriorate. For example, the monthly parental income of VSU students is nearly twice that of SU students, about 4.5 times that of students at IU, and about 10 times that of M students. Similar patterns emerge with regards to parents' education and asset ownership: the proportion of students with at least one college-educated parent declines from 90% for VSU students to about 12% for M students. The students also differ in the type of high school they attended, with 75% of the VSU students having attended a private school compared to only 10% of the M students.

Students from the various groups also report different levels of self-reported religiosity. Students were asked to rate how religious they considered themselves on a scale from 0 (not religious at all) to 10 (very religious). As one may expect, religiosity increases as we move across columns of Table 1: The average religiosity is 5.3 for VSU students and 9.2 for M students.

Regarding the financing of educational expenses, Table 1 shows that the education expenses are covered largely by parents and family (80%, on average). We also see that M students are more likely than their counterparts to rely on loans/aid that need to be repaid, and on personal savings/earnings.

5 Description of Expectations and Preferences

In this section, we describe students' choice set, university stated choice, and analyze basic patterns of the subjective expectations questions. Appendix A.2 presents the exact wording of some relevant questions from the survey instrument.

5.1 Stated Choice and Choice Set Data

For the purposes of understanding school choice, we asked respondents to consider the following hypothetical situation:

"The following questions below ask you to consider some hypothetical enrollment choices assuming that you did not start your degree at your current institution. Suppose that you were guaranteed admission in:

the Bachelor's degree program at Very Selective University

the Bachelor's degree program at Selective University

the Bachelor's degree program at Islamic University

the Alim course at Madrassa-City1

the Alim course at Madrassa-City 2

Suppose further that you were guaranteed admission only at those 5 institutions. We ask you to think about where you would choose to go..."

In the questionnaire, students saw the actual name of each of the institutions. The school the student was currently enrolled in was included in the list. And, depending on the city the student was in, two or three of the five schools were located in the student's current city. As mentioned above, the institutions we chose are among the five-largest in their relevant category in their respective city. However, to make sure that students were familiar with them, we provided students with a 2-sentence description of each school.

Students were then asked various questions about where they would choose to enroll. First, they were asked to rank (from the most preferred to the least) the institutions belonging to the *constrained* choice set according to their preference for enrolling in them. We determine the set of schools that a student can afford to attend financially (i.e., the constrained choice set S_i from Section 3) as follows. Students were asked the maximum education-related expenses that they and their family can cover, and the perceived net costs for each of the five institutions. Schools for which the perceived net costs did not exceed the reported maximum expenses that the student (and their family) can pay are then defined as being in the student's constrained choice set. Since the student's current institution was included in the list of schools, the student's constrained choice set includes at least their current school.

Second, students were told to consider a scenario where all expenses would be covered: "*As before, suppose that you are guaranteed admission in each of these five schools, and that you are provided WITH financial aid such that ALL your expenses (tuition, boarding, room, etc.) are paid for at each institution*." In this scenario, all 5 schools are part of all students' choice set. We call this the *unconstrained* choice set. Students were then asked to rank all 5 institutions in terms of their preference for enrolling in them. Note that in both scenarios above, students are told that they are guaranteed admissions into each of the institutions. Therefore, the hypothetical situation

abstracts from any concerns related to admissibility.

We describe below the stated choice data. To facilitate the reading of the tables and description of results, we use the acronyms VSU, SU, IU and M when referring to the schools where students are currently enrolled, and we use the full names (Very Selective University, Selective University, Islamic University and Madrassa City 1, or Madrassa City 2) when referring to the hypothetical set of schools that students could enroll in.

5.1.1 Constrained Choice

Panel A of Table 2 shows the statistics related to the constrained choice set and choice. Only about 41% and 54% of the students report being able to afford attending Very Selective University and Selective University, respectively. On the other hand, more than 84% of students report being able to cover the costs of attending Madrassas. This is consistent with the actual high costs of attending the universities, and practically no tuition at Madrassas (as also indicated in column (6) of Table 6 that reports expected cost). As we move across the columns, the proportion of students who can attend each school type generally decreases; this variation is quite sensible since Table 1 shows that socioeconomic characteristics of students deteriorate moving from VSU to M. Table A2 further shows that there is sensible variation in the affordability of the various schools by various demographic characteristics. For example, 67% of students from the highest parent's income tercile report that the Very Selective University is in their constrained choice set, versus only a quarter of students from the lowest tercile.

The top panel of Table 2 also shows the proportion of students who rank each of the schools as their top choice. As indicated by the p-values in the last column of the table, there is substantial variation in proportion of students across the various schools who rank each choice the highest. For example, Very Selective University is ranked highest by 89% of VSU students, 19% of SU students, 8% of IU students, and less than 1% of M students. This variation is likely a result of either differences in preferences and/or feasibility of the choice. Only 44% of SU students say they can afford Very Selective University. By construction, therefore, at least 56% of SU students could not have ranked Very Selective University the highest. In fact, we see that the median number of schools ranked by students is only 2 (out of five) for M students– the median M student reports being able to afford only the two Madrassas (and hence only ranks them). Similarly, the median IU student only ranks three schools, and the median SU student ranks four schools. This indicates that affordability plays an important role in students' choices.[8]

[8]A notable observation in the top panel in Table 2 is that 25% of the students do not rank their own school as their first choice. One reason for a different choice may be the fact that some students were unable to gain admission to their preferred school (while the hypothetical scenario asks students to assume that they have been admitted to all the schools considered). Other reasons include the possibility that students have learned new information about the various schools since they made their choice (see Stinebrickner and Stinebrickner, 2014 and forthcoming, for the role

5.1.2 Unconstrained Choice

The lower panel of Table 2 reports the unconstrained choice of the students. Comparing the first column in the lower panel to that in Panel A, we see that the proportion of students assigning the highest rank to VSU more than doubles to 36%, while the proportions for the other schools are lower (all these proportions are significantly different from their corresponding values in Panel A at the 1% level, using a Chi-square test).

Two patterns are of note in this panel. One, we see that amongst SU and IU students, the proportion who assign the highest rank to Very Selective University is substantially higher than the proportion who rank their current institution the highest. Absent school costs and assuming guaranteed admissions, the majority of SU and IU students (74% and 58%, respectively) would enroll in Very Selective University. Second, while the increase in M students who rank Very Selective University is small (from 0.18% to 1.7%), there is a large jump in the proportion of students who now rank Islamic University the highest (12% compared to 1% in the presence of school costs).

The panel also reports the proportion of students who switch their top-ranked school with the waiver of costs: We see that 38% of the students would choose a different school, were it not for school costs.

5.2 Expectations about Future Earnings

Students were asked two sets of earnings expectations, conditional on each school. First, respondents were asked about their *own* age 30 earnings conditional on graduation as well as dropping out from each of the schools (and conditional on working), as those expectations are the relevant ones for their decision-making process (see Section 3). However, expectations about self earnings may differ from objective measures of earnings of current graduates for several reasons: respondents may, for example, have private information about themselves that justifies having different expectations, or they might think that future earnings' distributions will differ from the current ones. Because of this, and in order to investigate whether students are aware of differential labor market outcomes to each of these schools, we also collected their beliefs about the average earnings at age 30 of a typical working male graduate of each of these institutions. We refer to these as beliefs about *population* earnings. Students were also asked about the probability of being employed conditional on graduating as well as dropping out from each of those schools. We describe each of these expectations in turn.

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of learning). Likewise, the switching behavior may arise if parents were instrumental in students' actual choice, which may not be reflected in the hypothetical choice. We discuss this in Section 6.4.

5.2.1 Expectations about Population Earnings

Table 3 shows the mean, median, and standard deviation of respondents' beliefs about the average earnings of current age 30 graduates from each of the schools and for the entire sample. Each column shows the beliefs held by students from a given institution. In column (1), which pools students from all institutions, we see that the mean belief about monthly population earnings varies between Rs. 17,600 for Madrassa graduates to Rs. 46,000 for Very Selective University graduates. Selective University and Islamic University graduates are believed to have earnings that are somewhere in the middle. Median earnings beliefs also follow a similar pattern. The last row of the table shows that we can reject the equality of the beliefs about average earnings for graduates across the five schools choices. There is, however, considerable heterogeneity in beliefs as indicated by the large standard deviation in beliefs about the population means. For example, for Very Selective University graduates, the overall median earnings are Rs. 40,000, while the 10th percentile is Rs. 9,000 and the 90th percentile is Rs 80,000. The table also reports the response rates: they are above 99%, indicating that missing data are not an issue.

Columns (2)-(5) of the table present the average population beliefs, as reported by students currently enrolled in the four school types. The level of earnings reported by students in the four schools differ quite substantially for each of the five school choices- the last column of the table reports the p-value of a test for the equality of the mean average population beliefs reported by the students in the different schools for each of the school choices, and we reject the null hypothesis of equality in each case. However, despite differences in levels, beliefs about *relative* population earnings for the different school types are similar for students enrolled in each of the schools, with students expecting average earnings to be the highest for Very Selective University graduates, and the lowest for Madrassa graduates.

The first five columns of Table 3 indicate that students expect labor market returns associated with the five school types to differ significantly. A relevant question for policy-makers is whether these perceptions are accurate. To investigate that, one would need to know the "true" population earnings. However, these data do not exist, since none of these schools follow their graduates over time and collect data on their labor marker outcomes. In order to shed light on how well-informed students are, we instead conducted a poll of a handful of administrators at each of these schools, and asked them about the average earnings of their recent graduates.[9] These statistics are reported in column (6) of the table. While these data are based on small sample sizes and on perceptions of administrators, they are still informative. The median earnings beliefs of the students (in column 1) are very similar to the medians reported by the school administrators. More importantly, both sources of data yield a similar ranking of schools based on earnings. This suggests that students'

[9] A separate survey was designed for the school administrators. This was filled out by 4 administrators at each of VSU, SU, M-City1, and M-City2, and by 3 administrators at IU.

perceptions about relative earnings are fairly accurate.

Another point of note in Table 3 is that students enrolled in SU and IU report substantially higher earnings for graduates of their own schools, than their counterparts; their perceptions also tend to be less accurate when compared to those of the administrators. On the other hand, M students report substantially lower earnings for Madrassa graduates than their counterparts, and also seem to have more accurate perceptions.

5.2.2 Expectations about Own Future Earnings

The top panel of Table 4 reports the average, median, and standard deviation of expected age 30 own earnings. As in Table 3, each column shows the beliefs held by students from a given institution. Pooling all students in column (1), we see that expectations about own earnings follow the same pattern as expectations about population beliefs, with students believing their earnings will be highest if they graduate from Very Selective University, and lowest if they graduate from a Madrassa. A comparison of the first column with population beliefs (in column (1) of Table 3) shows that expectations about own and population earnings are very similar. We find a significant correlation of 0.713 between own and population earnings expectations in our sample (Spearman rank; p-value = 0.000), suggesting that own earnings expectations are based in part on the individuals' beliefs about the population distribution of earnings. This high correlation also suggests that if respondents are misinformed about the distribution of population earnings, they will have biased own earnings expectations. Panel B of Table 4 shows respondents' own earnings expectations at age 30 conditional on enrolling in each of the schools, but dropping out without a degree. Respondents report significantly lower earnings on average in this case.

Appendix B.1 describes these expectations in more detail. Overall, we see that, conditional on working, students expect different labor market returns to each of these schools. They expect on average higher earnings from having a university degree (than from dropping out). In addition, they expect higher average returns conditional on dropping out from a university, than from a Madrassa degree.

5.2.3 Graduation and Employment Expectations

Earnings conditional on graduating and working need to be discounted by the probability of employment conditional on graduating and the probability of graduating. Similarly, earnings conditional on dropping out and working need to be discounted by the probability of employment conditional on dropping out and the probability of dropping out (see Section 3). Students were asked the probability that they would graduate from each school conditional on enrolling, and all the relevant employment probabilities at age 30.

Table 5 shows the average probabilities for all these outcomes.[10] Regarding the probability of graduating, students believe they are on average more likely to graduate from the school they are currently enrolled in, indicative of positive sorting into institutions along this dimension. M students, for example, expect to be twice as likely to graduate from a Madrassa than from a Very Selective or Selective University.

Regarding age 30 employment, VSU, SU and IU students report a higher average probability of having a job conditional on graduating from a non-Madrassa institution as opposed to graduating from a Madrassa, and all have a higher average probability of employment conditional on graduation from Very Selective University. M students, however, report a higher probability of age 30 employment conditional on graduating from a Madrassa. The probability of employment conditional on dropping out follows a similar pattern, with levels generally about 20-25 percentage points lower. Again, there is substantial heterogeneity in beliefs within each institution, as well as across school choices. Figure A3 shows SU students' distribution of employment probability conditional on graduating from each of the choices. We see substantial heterogeneity in this belief for a given choice. Furthermore, the belief distribution conditional on graduating from Very Selective University first order stochastically dominates the other four distributions.[11]

The last panel of Table 5 shows the age 30 expected log earnings (corresponding to $t = 10$ in Section 3) given by $[(P_{is}(d)P_{is}(job \mid d)\ln(Y_{isd10}) + (1 - P_{is}(d))P_{is}(job \mid g)\ln(Y_{isg10})]$. Section 3 highlights that this is a potential determinant of school choice. For non-M students, Very Selective University stands out as the school yielding the highest age 30 expected log earnings. Note that M students view Madrassas as yielding the highest age 30 expected log earnings; this is despite the fact that they view earnings at Madrassas to be substantially lower (see the top panel of Table 4); and because they anticipate a higher likelihood of graduating and of being employed conditional on enrolling in a Madrassa.

5.3 Beliefs about Other School-Specific Factors

Besides data on labor market outcomes, we also collected data on beliefs of students for other factors that may affect the likelihood of a student choosing that school. The set of factors that we include are: (1) alignment of the school's teachings with own ideology, (2) graduation rank, (3) parents' approval of the choice, and (4) monthly *net* expenses (including tuition). Students were

[10] A notable feature of the table is that almost all students are able and willing to answer these questions. The response rate in the top 3 panels exceeds 98%, while the response rate for expected log earnings (which is derived from several beliefs) exceeds 94%.

[11] While about 20 percent of SU students believe that there is a greater than 80 percent chance of being employed at age 30 were they to graduate from either Madrassa, more than 60 percent of them believe that to be the case if they graduate from Very Selective University (and about 40 percent of them believe that to be the case if they graduate from either Selective University or Islamic University).

asked for their beliefs about each of these factors, conditional on having enrolled in each of the five different school choices.[12] Table 6 reports the average beliefs for these outcomes. We describe them in more detail in Appendix B.2.

We should point out that an advantage of eliciting subjective beliefs is that one can also elicit quantitative beliefs about non-pecuniary outcomes (such as parents' approval)– data on which are otherwise not available. Generally such outcomes are subsumed in the residual term. In addition, Table 6 highlights the advantage of eliciting beliefs for binary outcomes (such as parents' approval) as probabilistic expectations since simple binary responses would be unable to unmask this heterogeneity entirely. On the whole, analysis of the subjective expectations indicates that students perceive significant differences across the school choices along the various dimensions. Moreover, there is substantial heterogeneity in beliefs of students enrolled *within* a school, as well as *across* schools.[13]

6 Empirical Results

We first discuss identification of the choice model outlined in Section 3, and then discuss the estimation results.

6.1 Model Specification and Identification

We estimate the parameters of the utility function described in Section 3 using the subjective data described in the previous section. Because of survey time limitations, we were forced to ask a limited set of questions, and could not ask respondents to report their earnings for all post-graduation periods.[14] Since we ask students for expected earnings (conditional on school drop-out as well as graduation) and employment probability for age 30 only, we make some functional assumptions about how earnings evolve over the life-cycle, and in addition assume that the growth rate of earnings is the same for all schools and graduation outcomes, and that unemployment

[12] Graduation rank was elicited on a 1-100 scale, where 1 meant the best rank. To provide easier interpretation, we re-scaled the graduation rank beliefs such that 100 represents highest rank and 1 represents lowest rank. Other beliefs were elicited as percentages. See Appendix A.

[13] We also see a strong positive correlation between the various subjective beliefs in Table A1. For example, the correlation between beliefs about parents' approval and beliefs about alignment of the school's teachings with one's ideology (pooled across all school choices) is 0.66, and the correlation between age 30 expected log earnings and beliefs about alignment of the school's teachings with one's ideology is 0.50.

[14] Note, that we do not explicitly model any of the choices during or after school (such as, choice to take particular courses in school, how many hours to work, whether to pursue a post-graduate degree); however, these choices should be implicitly factored into the beliefs that are reported by the students.

probabilities are time-invariant.[15] In particular, we assume that labor earnings in year t grow exponentially at a yearly rate of g_t, as follows: $Y_{isht} = (Y_{isht-1})^{g_{t-1}}$, for all schools s and $h = \{d, g\}$ and $t > 1$. We can therefore rewrite time t earnings as a function of age 30 earnings, Y_{ish10}, as follows:[16] $Y_{isht} = (Y_{ish10})^{\frac{\prod_{l=1}^{t-1} g_l}{\prod_{l=1}^{9} g_l}}$. Student i's maximization problem in equation (3) as a function of age 30 labor earnings is then:

$$\begin{aligned}
&\max_{s \in S_i} \{ \textstyle\sum_{j=1}^{2} \alpha_j P_{is}(a^j) + \alpha_3 E_{is}(a^3) + \delta l_{is} + \theta \ln(y_{i0} - C_{is}) \\
&+\theta \textstyle\sum_{t=1}^{T} \beta^t \left[(P_{is}(d) P_{is}(job \mid d) \frac{\prod_{l=1}^{t-1} g_l}{\prod_{l=1}^{9} g_l} \ln(Y_{isd10}) + (1 - P_{is}(d)) P_{is}(job \mid g) \frac{\prod_{l=1}^{t-1} g_l}{\prod_{l=1}^{9} g_l} \ln(Y_{isg10}) \right] \\
&+\gamma_s + \varepsilon_{is} \},
\end{aligned} \tag{4}$$

which is equivalent to

$$\begin{aligned}
&\max_{s \in S_i} \{ \textstyle\sum_{j=1}^{2} \alpha_j P_{is}(a^j) + \alpha_3 E_{is}(a^3) + \delta l_{is} + \theta \ln(y_{i0} - C_{is}) \\
&+\theta^* \left[(P_{is}(d) P_{is}(job \mid d) \ln(Y_{isd10}) + (1 - P_{is}(d)) P_{is}(job \mid g) \ln(Y_{isg10}) \right] + \gamma_s + \varepsilon_{is} \},
\end{aligned} \tag{5}$$

where $\theta^* = \theta \sum_{t=1}^{T} \beta^t \left[\frac{\prod_{l=1}^{t-1} g_l}{\prod_{l=1}^{9} g_l} \right]$. Note that, equation (5) implicitly assumes that there is no uncertainty in Y_{ish10} for $h = \{d, g\}$, that is, the student knows with certainty his earnings at age 30 if he enrolls in school s and either drops out or graduates. We relax this assumption later in Section 6.4, using information on the subjective distribution of earnings that students expect to have. The utility parameters $\{\alpha_j\}_{j=1}^{3}$, δ, θ, θ^*, and γ_S are the ones to estimate. In order to ensure strict preferences between choices, the ε_{is}'s are assumed to have a continuous distribution.

Under the assumption that the random terms $\{\varepsilon_{is}\}$ are independent for every individual i and choice s, and that they have a Type I extreme value distribution, the probability that student i

[15] Those assumptions could be relaxed by asking respondents their beliefs about future earnings and employment at various points in time, as in Wiswall and Zafar (forthcoming), who ask US college students for earnings expectations and employment likelihood for earnings at multiple points over the lifecycle (right after college - age 22, age 30, and age 45). Doing so, obviously, increases survey time and respondent burden.

[16] Assuming that students reach age 30 in period $t = 10$ is without loss of generality.

chooses school s, π_{is}, in the hypothetical constraint case is:

$$\pi_{is} = \frac{\exp(\widetilde{U}_{is})}{\sum_{s \in S_i} \exp(\widetilde{U}_{is})}, \tag{6}$$

where $\widetilde{U}_{is}$ is the expected utility maximized in equation (5), net of ε_{is}.

As mentioned earlier, respondents were asked to rank all the schools in their choice set. The ranking data provide additional information that can also potentially be used for estimation of the model parameters. Under the assumption of standard logit, the probability of any ranking of alternatives can be written as a product of logits (Luce and Suppes, 1965).[17] This expression follows from the Independence of Irrelevant Alternatives (IIA) property embedded in the Type 1 extreme value distribution assumption.

Under these assumptions, the parameters of interest, $\{\alpha_j\}_{j=1}^3$, θ, θ^*, and γ_S, are identified off of the variation in expectations across individuals and schools when we consider the constrained choice. As outlined in section 5, there is substantial heterogeneity in the subjective data. Finally, the schools that students were asked to rank in the hypothetical scenario were located in two cities, and so the variation in the schools' locations identifies δ; in the empirical model l_s is simply a dummy that equals 1 if school s is in a city different from i's location where he takes the survey, and zero otherwise.

Note that students were also asked for their stated school choice under the scenario of no cost (unconstrained choice). This gives us an additional opportunity to estimate the parameters of the utility function. In the unconstrained case, however, $\ln(y_{i0} - C_{is})$ becomes $\ln(y_{i0})$ for *all* schools in i's unconstrained choice set, and the parameter θ is therefore not identified. Our preferred estimation is based on the constrained choice scenario since it also identifies the current period consumption parameter. However, the downside is that estimates based on the constrained choice set do not use respondents with only one choice in their choice set.[18] We therefore also conduct some validation exercises based on estimation using the unconstrained choice set where all students have 5 schools in their choice set (see Appendix C).

Our survey was conducted with students currently enrolled in college. This implies that the preferences parameters we estimate will only be representative of those currently enrolled. Also, our sample is not a random sample drawn from the universe of university students. Manski and Ler-

[17] For example, consider the case where an individual's choice set is $\{a, b, c, d\}$. Suppose he ranks the alternatives b, d, c, a from best to worst. Under the assumption that the ε_{iS}'s are iid and Type I distributed, the probability of observing this preference ordering can be written as the product of the probability of choosing alternative b from $\{a, b, c, d\}$, the probability of choosing d from $\{a, c, d\}$, and the probability of choosing c from the remaining $\{a, c\}$. If $U_{ij} = \beta x_{ij} + \varepsilon_{ij}$ denotes the utility i gets from choosing j for $j \in \{a, b, c, d\}$, then the probability of observing $b \succ d \succ c \succ a$ is simply: $\Pr(b \succ d \succ c \succ a) = \frac{\exp(\beta x_{ib})}{\sum_{j \in \{a,b,c,d\}} \exp(\beta x_{ij})} \cdot \frac{\exp(\beta x_{id})}{\sum_{j \in \{a,c,d\}} \exp(\beta x_{ij})} \frac{\exp(\beta x_{ic})}{\sum_{j \in \{a,c\}} \exp(\beta x_{ij})}$.

[18] 28.5% of students (671 of the 2,347) have only one school in their constrained choice set.

man (1977) show that, with choice-based sampling, maximum likelihood estimators are consistent under the logit functional form assumption and if the model includes a choice-specific constant (the inconsistency being confined to the estimates of these constants). The specification in (5) already includes choice-specific constants, γ_s.[19]

6.2 Baseline Model Estimates

Column (1) of Table 7 presents the maximum-likelihood estimates using the preferred choice in the constrained case. The relative magnitudes of the first three estimates show the importance of the school-specific outcomes in the choice. The estimates for teaching aligned with ideology and parents' approval are positive and statistically different from zero at 1%, suggesting that they are significant determinants of school choice. The estimate of school location, δ, is also very precise and negative, suggesting that students have a strong preference for schools located in the same city as their current location. Finally, the coefficient on age 30 expected log earnings is positive and significantly different from zero, suggesting that lifetime earnings are also an important factor in school choice. The coefficient on graduation rank is close to zero and not precisely estimated. Similarly, while the coefficient on current period consumption is positive, it is economically small and not very precisely estimated.[20] Column (2) of the table reports the maximum-likelihood estimates based on the ranking data, and results are qualitatively similar to those reported in the first column based on choice data; one exception is the coefficient on graduation rank which is now positive and statistically significant at 5% (but still small).

It is interesting to assess whether the estimates for $\theta^*$and θ imply reasonable values for the discount factor and earnings growth. The estimated $\theta^*$and θ are consistent with a discount factor of $\beta = 0.989$ and a constant value for $g = 1.001$. This value for g implies an average annual growth rate of 1% for a starting salary of Rs. 30,000 and a resulting salary (assuming a working lifespan of 40 years) of Rs. 45,194. This 50% increase in salary over the working lifetime is consistent with what is observed for males's real wages in the Pakistan Labour Force Survey for 2006-07 (Irfan, 2008).[21]

6.2.1 Model Fit and "Out-of-sample" Validation

Next, we assess the fit of the estimated model and compare the predicted choice to the stated choice in the data. The first column of Table 8 shows the proportion of respondents in our sample who rank

[19]Because we estimate our model based on stated preference, we implicitly assume that students were surveyed in their stated top ranked institution.

[20]This small value for θ is consistent with the fact that people's consumption is very low, making log consumption large and negative.

[21]Slightly lower values for the discount factor β yields higher but plausible values for average annual earnings growth.

the school the highest in the constrained case. Column (2) and (3) report the predicted probabilities of school choice using the estimated parameters from our model based on the preferred choice and the ranking data, respectively (that is, estimates from the first and second columns of Table 7). The model fits the choice probabilities quite well, with only slight deviations between predicted model probabilities and those from the stated choice data. For example, 17.8% of the students state that Very Selective University is their preferred school, while the model based on choice data predicts that 18.4% of the students would choose it.

Using the fact that we asked students to report their school choice both with and without financial constraints, we next evaluate our model fit by conducting an exercise similar in spirit to an "out-of-sample" validation test. In particular, we use the estimates from our choice model based on the constrained stated school choice (that is, estimates in the first and second columns of Table 7) and predict students' school choice when school costs are set to zero. We can then compare these predictions to students' unconstrained stated school choice. This out-of-sample estimation does not compare the predictions for a different sample, but rather for the same sample in a different state of the world (i.e., one without school costs). Our test relies on the assumption that students are able to correctly predict what they would do in the counterfactual state of no school costs. We believe this is a plausible assumption since the counterfactual scenario that students are asked to consider is a well-defined scenario that directly relates to their lives and to a decision they recently made. Our test differs from standard out-of-sample tests, where the model predictions are tested to realizations data on another (but supposedly similar) sample in a "known" state of the world in which the experiment is actually performed.

We find that the enrollment distribution generated by the predictions based on the model that uses the constrained choice is very similar to that directly reported by students under the unconstrained stated choice set (that is, comparing column 5 of Table 8 with column 4). For example, 35.9% (respectively 14.8%) of the students state that they would enroll in Very Selective University (resp. Islamic University) without school costs, while the model predicts an average probability of enrollment of 37.2% (respectively 15.4%). We take this as strong evidence in favor of the model specification and data quality.

The predictions based on ranking data, reported in column (6) of the table, seem to fit the stated choices less well. We use a weighted squared loss criteria to assess the fit of the model prediction (i.e., $\sum_{i=1}^{5} w_i \left(w_i - p_i\right)^2$, where w_i is the enrollment in school i derived from stated choice and p_i is the model-based predicted enrollment). According to the weighted squared loss criteria (reported in the last row of the table), estimates based on the choice data perform better than the those based on the ranking data in both the unconstrained case and in this out-of-sample validation. Therefore, estimates based on the choice data are our preferred benchmark, and we use those for further analysis (qualitative results are unchanged if we instead use estimates based on

ranking data).

6.2.2 Choice Elasticity

We next investigate what our model estimates imply about the responsiveness of school choice to changes in self earnings. For each school, we increase beliefs regarding own earnings at age 30 (conditional on both graduating as well as drop-out) by 1 percent. Based on the assumptions in our empirical model, any change in age 30 earnings will also impact life-cycle earnings. To assess how much more likely students would be to choose each school due to this increase in earnings, we compute choice elasticities (i.e., the percentage increase in the predicted probability of choosing a school given a 1 percent increase in future earnings at that school).

The first column of Table 9 shows the average response to earnings changes, based on model estimates using the preferred choice data. The mean elasticity is about 0.11%, and changes little depending on the school choice. Our results of a relatively low response to changes in earnings is consistent with other studies of schooling choice (Arcidiacono, 2004; Beffy et al., 2011; Wiswall and Zafar, forthcoming). For example, Beffy et al. (2011), using data on French students, estimate earnings elasticities of between 0.09-0.12 percentage points, depending on the major.

We also estimate the responsiveness of school choice to changes in unemployment risk. For each school, we increase the beliefs regarding being employed (conditional on graduating as well as drop-out) by 1 percent. We find substantive responsiveness of students to changes in employment prospects: the mean elasticity is 0.76%, that is, students are on average 0.76% more likely to choose a school if the employment prospects associated with that school increase by 1%. While the response is inelastic, the estimate is substantially larger than our earnings elasticity estimates, and suggests that employment prospects are an important factor in school choice.

6.2.3 Interpreting the Estimates

We can gain insight into the magnitude of the estimated parameters by translating the differences of utility levels into age 30 consumption that would make the student indifferent between giving up age 30 consumption and experiencing the outcome considered. Say, we are interested in determining the willingness to pay (WTP) to experience outcome a_j with probability P_2 instead of probability P_1, other things being equal. Based on our empirical model in (5), this implies the following indifference condition:

$$\alpha_j P_1(a_j) + \theta^* \ln(c_{10}) = \alpha_j P_2(a_j) + \theta^* \ln(c_{10} + WTP)$$

The WTP is then $[\exp(\frac{\alpha_j(P_2(a_j)-P_1(a_j))}{\theta^*}) - 1]c_{10}$.[22] So, for example, increasing the chance of

[22] c_{10} is the age 30 consumption. For this exercise, we assume there is no uncertainty regarding employment or

gaining parents' approval by 5 percent points, that is, $P_2 = P_1 + 0.05$, would yield a WTP of 0.357, based on the estimates in column (1) of Table 7. That is, students are on average willing to give up 35.7% of their age 30 consumption to increase the chance of gaining parents' approval of their school choice by 5 percentage points.

The first column of Table 10 reports the willingness to pay estimates for the various outcomes, based on estimates using choice data. Bootstrap standard errors are reported in parentheses in the table. The first three cells are estimates of WTP to increase the three school-specific outcomes, $\{a_j\}_{j=1}^3$, by 5 percentage points. Students are willing to give up 41% in age 30 consumption to increase the chance of the school's teachings being consistent with their own ideology by 5 points. The estimates also show that students need to be compensated by an increase of 20% in age 30 consumption to attend a school that is in a city different from their current location. Note that the large WTP for ideology is not driven by M students, as we obtain similarly large WTP if we estimate the model excluding them (not shown in table).

With the exception of the WTP for graduation rank (which is imprecise and small), these estimates are very large and imply that students gain significant utility from each of these non-pecuniary outcomes, and that they are important drivers of school choice.

6.3 Methodological Results

We now discuss the advantage of having subjective expectations data and direct information on financial constraints from a methodological point of view.

6.3.1 Advantage of Subjective Data on Non-pecuniary Outcomes

The previous section highlights how important non-pecuniary outcomes are in the decision process. To emphasize the advantage of subjective data for the non-pecuniary outcomes, we estimate the model by excluding the two most important outcomes (parents' approval; alignment of the school's teachings with one's ideology). They are now subsumed in the ε_{is} term in equation (5). Estimation of this "restricted" model assumes that the random terms are independent for every individual and choice. Column (1) of Table A3 reports the estimates of this model. Estimates are qualitatively similar to those in the baseline model (reported in the first column of Table 7). However, estimates from the different models cannot really be compared since they are relative to the model-specific scale parameter. Instead, we report the choice elasticity based on the restricted model in column (2) of Table 9. We see that the choice elasticity estimates, while still inelastic, are 1.6 times larger than those based on the baseline model (column (1) of the table). This should not be surprising, because Table A1 shows that beliefs about the non-pecuniary outcomes are in fact positively correlated

graduation. That is, $c_{10} = Y_{g10}$.

with earnings expectations. Since the non-pecuniary outcomes are now subsumed in the error term (which implicitly includes tastes), and estimation assumes that the error term is independent, the choice elasticity estimates are biased upwards. This shows that modelling assumptions which assume that tastes are orthogonal to the other elements of the model are likely to yield biased estimates, and that one should account for non-pecuniary outcomes.[23]

6.3.2 Advantage of Data on Direct Measures of Financial Constraints

Absent direct measures on respondents' constraints (in terms of the feasible choice set), researchers typically use proxies such as family background (for example, wealth and income) to capture financial constraints.[24] To emphasize the advantage of collecting data on direct measures, we re-estimate the model under the scenario where we did not have direct measures. For this purpose, we estimate the model using the constrained choice but we (1) assume that all the five schools are in the respondents' choice set, and (2) use measures of family background as proxies for constraints (we use indicators for parents' wealth; parents' income; parents' education, separately). This requires interacting the school-specific constant term, γ_s, in equation (5) with these measures of family background.

For example, in the specification that uses parents' income, we interact γ_s with dummies for parents' income terciles. This introduces 8 new terms (four school dummies interacted with the highest and middle income terciles, respectively) in the estimation. Binding credit constraints in this case would manifest themselves as students from the lower income terciles having a disutility for the more expensive school, relative to their higher income terciles (with increasing disutility for the more expensive schools, and for the lower terciles). This is exactly what we find. Each of the eight interaction terms have the correct sign and relative magnitudes, with seven of them being significant at the 1% level.

Column (2) of Table A3 reports the estimates for the case where parents' income is interacted with the school-specific constant (the γ_s terms and the interactions are not reported). Column (3) of Table 9 reports the choice elasticities of this model. We see that the choice elasticity estimates are now nearly 25% lower than those based on the baseline model which uses direct measures of constraints (column (1) of the table). This is not entirely surprising: including schools with higher returns in the student's choice set which are otherwise not feasible and hence not chosen by the student would lead us to conclude lower choice elasticities than the true unbiased estimates.

[23] This can either be done by directly incorporating non-pecuniary outcomes in the model, as we do here, or by differencing out tastes using exogenous changes in choices and expectations, say through an information experiment, as in Wiswall and Zafar (2013, forthcoming).

[24] In the best case scenario, researchers also control for past academic achievement/cognitive ability. We are not able to do so here but this is less of an issue in this context because our hypothetical scenario guarantees admissions to all schools.

Column (2) of Table 10 also shows that the WTP for the other factors implied by this model are substantially higher than those from the baseline model. Our conclusion that choice elasticity (WTP) estimates are biased downward (upward) hold, regardless of the proxy that we use to measure financial constraints. This leads us to conclude that using indirect measures of constraints may not substitute for eliciting direct measures of constraints, and may yield unbiased estimates.

6.3.3 Advantage of Subjective Data on Unemployment and Drop-out Uncertainty

Existing work evaluating the role of future earnings on educational choices generally abstracts from the uncertainty that may be associated with these earnings, in particular the risk of unemployment or dropping out. We evaluate in our context how our conclusions would change if we had instead assumed that students would graduate with probability 1 and be employed with probability 1. Equation (5) then becomes:

$$\max_{s \in S_i} \{ \sum_{j=1}^{2} \alpha_j P_{is}(a^j) + \alpha_3 E_{is}(a^3) + \delta l_{is} + \theta \ln(y_{i0} - C_{is}) + \theta^* \ln(Y_{isg10}) + \gamma_s + \varepsilon_{is} \}$$

Column (3) of Table A3 reports the estimates, and column (4) of Table 9 reports the choice elasticities of this model. We see that the choice elasticity estimates, while still inelastic, are 1.7 times larger than those based on the baseline model (column (1) of the table). This is largely because expected future earnings are higher if we ignore unemployment and drop-out uncertainty, so a 1-percent increase in earnings represents a larger increase in absolute terms compared to the case without uncertainty. Moreover, the WTP for teachings aligned with ideology and parental approval implied by the model ignoring drop-out and employment uncertainty are larger than the ones from the baseline model (column 3 of Table 10). This is because, when we ignore this uncertainty, many students (in particular M students) seem to choose a school that has lower log earnings than other schools, resulting in an even larger utility weight for non-pecuniary outcomes.[25]

6.4 Robustness checks

This section reports a series of validation checks showing the robustness of our results to various specifications and samples.

[25] For example, earlier in Tables 4 and 5, we see that M students expect substantially lower earnings at Madrassas conditional on working, but assign a higher likelihood of graduating and employment conditional on enrolling in a Madrassa.

6.4.1 Ex-post Rationalization and Learning

Since our sampling strategy is choice-based and students have been studying at their current school for a while, one concern may be that students' subjective beliefs are biased, say due to cognitive dissonance (Festinger, 1957)– i.e., students may report beliefs that rationalize their choices. This would introduce systematic non-classical measurement error in beliefs, which would bias the model estimates. The patterns in the data, however, indicate that this bias is unlikely to be large. For example, a non-trivial proportion (25%) of students rank a school different from their current school as their most preferred choice under their current credit constraints. Furthermore, this proportion is similar (23%) among students in later years (that is, those beyond the first year in their current institution) for whom ex-post rationalization concerns are arguably stronger. We also see that 38% of students switch their most preferred school from the constrained to the unconstrained case (Table 2); the corresponding proportion of students in later years who switch is again similar (35%). Students seem also aware of the different value-added of the institutions, as reported by a similar relative ranking of self earnings beliefs across respondents enrolled in different schools (the various columns in Table 4). Furthermore, previous research in the context of educational choices of US students has found little evidence of students tilting their beliefs about expected outcomes in favor of the options they had chosen (Zafar, 2011b; Arcidiacono et al., 2012).

Another concern is that students have had the opportunity to learn about the institution they are currently enrolled in (Stinebrickner and Stinebrickner, forthcoming). This would be problematic if we were using those revised beliefs to make inference on the institution they are currently attending, but in our application, we do not use the current institution as the choice for the estimation. Rather we ask students their *current* school preferences, and estimate the choice model based on their *current* school preferences and *current* beliefs. As pointed out above, a non-trivial proportion of students rank a school different from their current school as their most preferred choice in our hypothetical scenarios.

Yet, to address these potential concerns, we exploit the variation in students' duration of enrollment in their school. If ex-post rationalization of beliefs and learning is a concern, it is likely to be more serious for the group of students who have been attending an institution for a longer period. Column (4) of Table A3 presents estimates for the choice model based on choice data in which we interact all the variables with a dummy for being beyond the first year of attendance at the current institution. Other than the school location parameter, none of the interacted terms are statistically significantly different from zero at conventional levels, suggesting that we obtain preference estimates that are not statistically different for the two groups. If beliefs of one group were systematically biased, we would have obtained different preferences estimates.

Overall, this suggests endogeneity of beliefs is unlikely to be a serious concern in our data.

6.4.2 Uncertainty in Age 30 Earnings

The empirical model in equation (5) assumes that the only uncertainty with regards to labor market earnings is about the likelihood of finding a job, conditional on graduating and dropping out. Conditional on being employed, students are assumed to know their earnings with certainty. We now relax this assumption. Our survey elicited students' subjective probability that their age 30 earnings conditional on working exceeds two thresholds, for the case of both graduating as well as dropping out of each of the schools.[26] We fit these two data points to an individual-specific beta distribution, and obtain the parameters of the 2-parameter beta distribution.[27]

The first four columns of Table A4 present statistics (the mean, median and standard deviation) of the average and the standard deviation of the fitted beta distributions for each school, conditional on graduating and dropping out. Two patterns are of note. First, the ordering of the schools in terms of expected earnings is identical to that presented in Table 4 that shows the point estimates; the means of the expected earnings from the fitted distribution tend to be somewhat larger than the average point estimates though. Second, students exhibit substantial uncertainty about their future earnings, as reflected by the large standard deviations of the beta distributions.

For our estimation, the term $\ln(Y_{ish10})$ where $h = \{g, d\}$ in equation (5) now becomes $E(\ln(Y_{ish10}))$.[28] Estimates based on the preferred choice data and using $E(\ln(Y_{ish10}))$ based on the fitted distribution instead of the point estimates (that is, $\ln(Y_{ish10})$), are presented in column (3) of Table 7. The estimates are almost identical to those obtained in the baseline model (shown in the first column), suggesting that not accounting for earnings uncertainty does not bias our model estimates. This is because, despite the uncertainty faced by respondents, $E(\ln(Y_{ish10}))$ based on the fitted distribution and $\ln(Y_{ish10})$ based on the point estimates tend to be very similar (as shown in the last four columns of Table A4). Column (5) of Table 9 and Column (4) of Table 10 also show that the choice elasticities and WTP based on these estimates are very similar to those obtained from the baseline model.

We discuss three additional robustness checks in Appendix C. First, we test whether estimates based on the stated *unconstrained* choice yields similar WTP and elasticities as the one we obtained using the stated constrained choice. As outlined in section 5.1, our survey instrument also asked

[26] See Appendix A.2 for the exact wording.

[27] There are a total of 23,470 (2,347 respondents x 5 school choices x {graduate, drop out}) distributions to fit. We are unable to fit the data points in 4,625 (19.7%) of the cases. 1,071 cases are unfitted because the responses violate the monotonicity property of a cumulative distribution function, while in the remaining cases, the respondent assigns the same probability to the two thresholds. In these cases, we use the respondent's point estimate in the estimation (results are robust to dropping these observations). Overall, 16.1% of the students violate monotonicity at least once.

[28] The beta distribution has a closed-form solution for this expectation, $E(\ln(Y_{ish10})) = [\psi(\alpha) - \psi(\alpha + \beta)](c - a) + a$, where ψ is the digamma function, $[a, c]$ is the support of the distribution, and α and β are the parameters of the beta distribution (obtained from fitting the data points). We set a to zero, and c to Rs. 200,000 for non-Madrassa students, and Rs. 100,000 for Madrassa students (results are robust to other parameterizations).

students for their ranking of schools for the unconstrained choice set, in which case all five schools are in the respondent's choice set. We show that the estimates using the stated unconstrained choice data yield WTP estimates strikingly similar to those derived from the constrained choice set. This provides again strong evidence in favor of both the model specification and the credibility of the data. Second, we show that allowing for heterogeneity in preferences for future consumption yields choice elasticity and average WTP estimates similar to those derived from the baseline estimates. Third, we investigate the robustness of our results to the IIA property, exhibited by the standard logit model, and show that our baseline model estimates are robust to different model specifications.

7 Policy Experiments

In this section, we use the estimated preferences parameters (based on our baseline mode, reported in column (1) of Table 7) to evaluate the implications of four types of policies: one that relaxes financial constraints, another that disseminates information about the objective returns to school types, a third that entails a reform of the curriculum taught in Madrassas, and a final one that entails making the schools more homogenous in terms of their ideological blend. We investigate how these policies influence school enrollment and welfare of the students.

The first column of Table 11 shows the proportion choosing each of the five schools in the constrained case, which is our benchmark. In order to compute the possible welfare gains of instituting a policy, we compute the difference in the utility gained from the school chosen in the policy experiment ($s_i^{*u} = \arg\max_{s \epsilon S_i^p} U_{is}$, where S_i^p is i's feasible choice set under policy p), and the school chosen in the constrained case ($s_i^{*c} = \arg\max_{s \epsilon S_i} U_{is}$). We report both the percentage increase in utility, and the percent change in age 30 log earnings that would generate a similar increase in utility**.** Our simulations are made under the assumption that the only schools available are the ones we consider in the hypothetical choice scenarios, and that all students can gain admissions to all schools. We also abstract away from general equilibrium considerations in these simulations; for example, if a large number of students switch to Western-style Universities, the labor market returns to such schools may adjust. We do not take such factors into account in the policy experiments; the simulations are only designed to illustrate the importance of each of the factors – financial constraints, information frictions, and non-pecuniary factors – in school choice.[29]

[29] In the hypothetical scenarios, students are making their school decision alone but certainly take into consideration parental preferences since we find that parental approval matters importantly in their decision (Section 6.2). Therefore, this aspect of intra-household decision-making is captured to some extent in our framework. Our survey also included a question asking respondents about who made the choice of their current school. 66% of the respondents report having made the choice of their current school jointly with someone else. We find that these students are also *less* likely to report a school different from their current school in the constrained case, than their counterparts who made

7.1 Relaxing Financial Constraints

Columns (2)-(4) of Table 11 report students' choices (in Panel A) and welfare gains (in Panel B) for 3 different policy experiments that relax credit constraints to varying extents. Column (2) is based on a policy where students have the option to borrow to finance their school costs at 3% and repay the loan over a 40-year period when they are working; column (3) reports estimates based on a free schooling policy funded by income tax paid by the students over a 40-year period when they are working and earn more than Rs 20,000 per year;[30] and column (4) reports estimates where students from lower-income households (defined as below-median sample household income) are given a tuition subsidy equivalent to IU's tuition (more precisely, the sample perceived average of IU's tuition) that are paid out of a tax imposed on all students during their working lives when they earn more than Rs 20,000 per year.[31]

A policy that provides student loans to finance schooling (column 2) yields very different enrollment and leads to substantial welfare gains. Enrollment at Very Selective University more than doubles, while enrollment at Selective University halves. Enrollment at the three remaining schools decreases. It is interesting to note that the enrollment distribution is very similar to the one provided by students in the unconstrained case which is equivalent to free schooling (presented in column (4) of Table 8). When student loans are available, 37% of the students would choose a school different from the one in the constrained case. Panel A of Table A6 shows the schools chosen by the students under the loan policy, conditional on the school they would be under the constrained case. About 73% of the students choosing a Madrassa in the constrained case would still remain at a Madrassa, even if school financing were available, 12% would go to Islamic University and the same proportion would go to Very Selective University. With student loans available, the big "switchers" are the students from Selective University (69% of whom would switch to Very Selective University), followed by Islamic University students (38% of whom would switch to Very Selective University). Panel B of Table 11 shows that this policy, relative to the baseline constrained case, leads to an average life-time utility gain of 20.6% (and a median gain of 8.9%). Converting this average utility gain into changes in age 30 log earnings, we see that it is equivalent

the choice by themselves (22% versus 30%). This bodes well for the credibility of our policy simulations, since it suggests that decision-making in the hypotheticals replicate, at least to some extent, students' actual decision-making processes.

[30] This is similar in spirit to the income-based repayment scheme in the US, and public student loan repayment in the UK, for which students make repayment only if their income is above a given threshold. We choose the Rs. 20,000 threshold since average (perceived) earnings conditional on graduating from Madrassas (whose graduates tend to be from the poorest families) are below it (see Table 4). Results are qualitatively similar to other choices of this threshold.

[31] For the experiments in columns (2) and (3), credit constraints are entirely eliminated, and hence S_i^p includes all 5 schools. To determine the set of feasible schools for the experiment in column (4), we use information on the maximum amount that the individual's family can pay to finance college. Schools, whose tuition does not exceed this amount plus the potential subsidy in the experiment, are in the individual's choice set.

to a 56% increase in age 30 log earnings.[32] The last row of Table 11 shows the mean loan that students take out in this case is Rs. 58,700 annually, which is remarkably similar to the average parent's monthly income in our sample (Table 1).

Note that there may be psychological aversion to taking out a loan (Field, 2009, Stinebrickner and Stinebrickner, 2008), especially in this context where charging interest is forbidden by Islamic law, or aversion to taking out debt because of either fixed costs or self-control problems (Cadena and Keys, 2013, Marx and Turner, 2014). In that case, the gains in the policy considered in column 2 are likely to be an upper bound. We, therefore, consider a policy that is instead re-labeled as a tax on later lifetime labor earnings of students. In column (3) of Table 11, we show the impact of such a policy that provides free schooling paid out of a tax on earnings. This policy yields enrollment and mean/median welfare gains that are almost identical to those in the student loans case. However, about 9% of the students would now be made worse off by this tax (relative to the constrained case).[33] The annual subsidy that students take to finance their optimal schooling choice in this case is Rs. 71,880, higher than that in the policy of free schooling in column (2).

A subsidy provided to lower-income students (column (4)) would increase enrollment at Very Selective University by about 6 percentage points. Enrollment at Selective University and the two Madrassas would reduce slightly. If we look at the transitions in the lower panel of Table A6, we see that while the direction of switching behavior is qualitatively similar to the one under a loan policy (as shown in the top panel of Table A6) – with students shifting towards Very Selective University (and Madrassa students shifting toward Islamic University as well) – the extent of switching is less in this case. For example, now only 7% of Madrassa students would switch to Very Selective University, versus 12% in the case of student loans. The reason for the muted transitions in this case is that the subsidy does not cover the full cost of attending the more expensive schools, making it outside of the choice set of some students who would like to switch to them. The average lifetime utility gain for this policy, while smaller than the gains under student loans or free schooling, is still substantial (12.3%). About a quarter of the students would however be worse off under this policy, due to the tax on labor earnings (and the redistribution).

All the experiments above assume that each school can increase its capacity based on students'

[32]Because of the curvature in the utility for consumption, the marginal utility of income is not high. Hence the monetary equivalent of these welfare changes tend to be large.

[33]Note that in this policy, current period consumption goes up for every student since there are no school costs. Some students might now switch to schools with higher utility, while some would continue to remain in the school they choose in the constrained case. For this latter group of students, some could be worse off if the utility gain from increase in current period consumption does not offset the utility loss from lower future earnings (because of taxes). As one would expect, students who are generally worse off are more likely to be those who (can afford and) choose Very Selective University in the constrained case, and now continue to choose it but have to pay a tax. In fact, we find that nearly two-thirds of the students who are made worse off by this policy are those who choose Very Selective University in the constrained case. Furthermore, nearly 60% of these students have all five schools in their constrained choice set.

demand, which is a strong assumption. We now relax this by conducting two additional experiments. The first one is free schooling paid out of a tax (similar to column (3)) under the assumption that Very Selective University can only increase costlessly its capacity by 20%. The second one assumes the construction of another Very Selective University (with the same capacity as the current one), at a cost of USD 60 million paid out of a tax,[34] combined with the free schooling policy (also paid out of a tax, similar to column 3).

Column (5) of Table 11 shows that, under the 20% capacity constraint assumption, Very Selective University would increase enrollment until full capacity and that average lifetime utility gain would be 13.4%.[35] The construction of a new Very Selective University yields enrollment and average lifetime gains that are very similar to those under free schooling paid out of a tax (column 3). However, because of the higher tax rate implied by this policy (of nearly 47%), more people (16%) would be made worse-off.

These experiments reveal substantial utility gains as a result of relaxing financial constraints. The largest gains come from policies that either provide free schooling financed out of a tax or facilitate the provision of student loans.

7.2 Providing Earnings Information

Given a large literature that shows that students may be misinformed about the returns to schooling and that providing objective information about returns may impact choices (Jensen, 2010; Nguyen, 2010; Wiswall and Zafar, 2013, forthcoming), we next investigate whether such information dissemination has an impact in our context. If students' self earnings beliefs are based, in part, on their perceived population beliefs, and their population beliefs are inaccurate, then such an intervention can have large effects. We implement this policy as follows: we assume the median student's population earnings beliefs $Y^{Median}_{pop,\,sh10}$ (that is, beliefs about age 30 earnings of an average graduate or drop-out of each of the various schools, reported in Table 3) is an unbiased estimator of the true average population earnings. Given the statistics in Table 3, and how similar those medians are to the average earnings reported by the school administrators (column 6), this is a reasonable assumption. We then purge each student's self beliefs of the forecast error in their self population beliefs, such that $Y^{*}_{ish10} = Y_{ish10}\frac{Y^{Median}_{pop,\,sh10}}{Y_{pop,\,ish10}}$.[36] Y^{*}_{ish10} is then individual i 's beliefs about own age 30 earnings if he had information about the true population earnings. We plug in Y^{*}_{ish10} instead

[34] This estimate is based on the cost of a new state of the art university, Habib University, being constructed in Karachi, Pakistan, which is scheduled to open in Fall 2014, in partnership with Texas A&M. Source: http://www.nation.com.pk/karachi/17-Feb-2013/habib-university-to-begin-operations-in-fall-of-2014.

[35] Since many more students prefer Very Selective University, we sort students in terms of their utility from enrolling in it, and assign the students with the highest utility from Very Selective University, until it reaches full capacity.

[36] We skip the derivation steps here. Interested readers are instead referred to Arcidiacono et al. (2011), who implement a similar policy experiment.

of Y_{ish10} in equation (5), and use the model estimates in column (1) of Table 7, to determine the school that yields the highest expected utility for the individual. To compute the welfare gains, we also use those earnings for the constrained case.

Column (7) of Table 11 reports the results based on this policy experiment. We see that the proportions of students choosing each of the schools are similar to those in the first column, and that the average (median) utility gain is 4.5% (2.3%). The limited change in enrollment may be the result of the inability of students to move due to financial constraints. We therefore combine, in column (8), a policy where students are provided with both a schooling subsidy paid out of tax (as in the policy in column 3) and with information about returns to schooling. However, we see that both the school enrollment and average utility gain are again nearly identical to those under a school subsidy policy shown in column (3). Overall, this suggests that providing information on earnings does not have a large impact on students' school choices in this context.

These results may at first be surprising, given that students have substantial heterogeneity in beliefs. However, there are two main factors driving them. First, as seen in Section 6.2.2, choice elasticities with respect to earnings are quite small. Second, most students accurately perceive the relative ranking of schools in terms of earnings. Since, to a large extent, relative earnings are important for school choice, the additional information provided by the policy has little impact on final outcomes. Hence, in this sample of students – a selective group motivated enough to pursue a bachelors-equivalent degree – only limited gains can be achieved from an intervention that disseminates information about objective returns.

7.3 Reforming the Madrassa curriculum

Madrassas have received considerable attention recently, especially since 9/11. Despite scant research, claims made by policy makers and in the popular press suggest that they may be responsible for fostering militancy, Islamic extremism, international terrorism and violence. As a result, the US has been encouraging Madrassa reform in the Muslim world, especially in Pakistan where Madrassas are thought to be linked to the Taliban (The 9/11 Commission, 2004; Fair, 2008). As explained in Section 2, the majority of Madrassas do not impart any secular or vocational training. A reform program aiming at introducing secular subjects into the Madrassa curriculum was launched, with US support, by the Government of Pakistan in 2002. However, it has failed to win support from most Madrassas.[37] However, the reform is generally well-perceived in the general population. In a survey we conducted in the two cities of our study site, 60% of the respondents fully supported

[37]By 2008, fewer than 300 of the 16,000 registered madrassas were estimated to have joined the reform program (Bano, 2007). Moreover, in a survey conducted by Ahmad (2009), 91.5% of Madrassa teachers and 77.1% students agreed with the statement that the present system of Madrassa education in Pakistan is adequate and does not need any changes.

the government's plan to reform Madrassas that would require them to include secular subjects in the curriculum.[38] This sentiment is similar to that found in Fair, Ramsay, and Kull (2008), where two-thirds of their sample reportedly supports Madrassa reform.

We investigate how such a reform could potentially influence enrollment at Madrassas among students currently pursuing a Bachelors degree. The thought experiment is that the reform would make the expected earnings and probability of employment of Madrassa graduates equal to those of Islamic University graduates. Therefore, we replace every student's beliefs about earnings and employment conditional on graduating or dropping out from a Madrassa with those conditional on graduating or dropping out from Islamic University. The results are presented in column (9) of Table 11. We see it has limited impact on enrollment, relative to the constrained case. We may have expected some switching, particularly among IU or SU students, because costs are thought to be quite lower at the Madrassas (Table 6). However, the lower cost does not seem to compensate the other school-specific factors of ideology and parental approval. Such a reform could however prompt young people who have decided not to pursue tertiary education to enroll in a Madrassa, but that is something we cannot investigate with our data.

7.4 Homogenizing Schools' Ideology

Finally, we investigate the impact of another thought experiment which makes the schools more homogenous in terms of their ideological blend. For this simulation, we make the ideology of all schools equal to those of Islamic University (that is, we replace each student's beliefs about the school's teachings being consistent with their own ideology with the student's beliefs of the ideology of Islamic University being consistent with their own, and use the model estimates in column (1) of Table 7 to determine the school that yields the highest expected utility for the individual). In column (10), we see limited impact of this experiment on students' enrollment (which continues to be similar to that in the constrained case). The gains from this intervention are also modest. The limited change in enrollment may be the result of the inability of students to move due to financial constraints. In column (11), we therefore combine this thought experiment with a policy of free schooling paid out of a tax (as in the policy in column 3). We see that the school enrollment is now different from the case of a school subsidy policy shown in column (3), with an increase of 5.5 percentage points in the enrollment at VSU, and a decline of 7 percentage points in the 2 Madrassas' enrollment. The mean and, in particular, median utility gains are also higher than those in column (3). This suggests that making schools more homogenous in terms of their appeal to the

[38] Respondents were asked whether they support the plan to reform the Madrassas, requiring Madrassas to register with the government and to spend more time in class on subjects like math and science on a scale from 0 to 10, where 0 means absolutely oppose and 10 means absolutely favor. 60% of the respondents reported 10, and 78% reported 8 or more.

broader population, and relaxing constraints, are likely to lead to even larger gains. Notably, the mean annual subsidy that students receive in this case is the highest in this policy experiment, due to a larger shift toward the more expensive schools.

8 Conclusion

The choice of a higher education institution plays a major role in determining the employability and earnings of university students, both in the developed and developing world. This paper investigates the role of expected monetary returns, non-pecuniary factors enjoyed at school, and financial constraints in the choice of higher education institutions, in the context of urban Pakistan. This context is relevant because the higher education system in Pakistan is similar to the rest of South Asia, a region where a quarter of the world population lives and also one of the most youthful. As South Asian countries develop their industry and services sectors, the role of higher education in training a skilled workforce is becoming critical. In this environment, we find financial constraints to be important in determining students' university choice, conditional on going to university. In particular, lifting those constraints by introducing policies such as student loans (or free schooling financed out of taxes on labor earnings) would increase average lifetime subjective expected utility by 21% and lead more than a third of the students to choose a different institution. Non-monetary outcomes enjoyed at school play a very large role in students' choice. While future earnings matter, their role in determining university choice is only marginal. Interestingly, our estimates of choice elasticity with respect to earnings are of similar magnitude to what have been found for the US or France in studies analyzing major choice.

Our results have important policy implications for the design of programs aiming at improving students' human capital and their future labor market prospects in South Asia. Relatively inexpensive policies such as student loans or subsidies paid out of taxes (by the students) would have large positive impacts on students' welfare in a country like Pakistan. We also find that providing information on earnings would have a limited impact on enrollment and welfare. Our results, however, should not be interpreted as implying that there are generally few gains from information campaigns that disseminate information on school returns in a country like Pakistan with low higher educational enrollment. Our results suggest that such information campaigns should instead be targeted to populations where misinformation is likely to be more prevalent.

We should note that our simulations have several limitations. First, because our sample is restricted to university students, we cannot conclude how participation in higher education would change based on the policies we consider. Given the large effect of relaxing financial constraints in our sample, availability of student loans or university tuition subsidies may also have an impact on the extensive margin and increase overall participation in higher education; we, therefore, specu-

late that the welfare gains are likely to extend beyond university students. Second, our hypothetical scenarios are conditional on students being granted admissions into each of the institutions. While this allows us to cleanly identify preference parameters and isolate the role of financial constraints, in real-world situations, many of the students attending less selective schools are likely to be underprepared to gain admissions into selective schools, such that financial constraints may not be the only binding factor in their choice. In that case, our study provides an upper-bound for the role of financial constraints on university choice conditional on going to university. Finally, our policy simulations do not account for general equilibrium effects, which are likely to matter if such policies are implemented at an aggregate scale.

Our approach illustrates the potential of using "direct" methods to identify financially constrained individuals, and of using a rich set of subjective expectations in choice models to make inference on preferences based on minimal assumptions. We also show how eliciting stated choice under different counterfactual scenarios can be a powerful tool to conduct the out-of-sample-type validation of structural models. In our application, having stated choice data with and without financial constraints allows us to validate our assumptions and model, and strengthens the credibility of our results. Furthermore, our findings reveal that ignoring some of the uncertainty that students face (e.g., regarding unemployment and drop-out), ignoring non-pecuniary factors, and using proxies of financial constraints (instead of direct measures) yield biased estimates of the preference parameters and the choice elasticities with respect to earnings. This suggests that those should be taken into consideration when trying to understand educational choices, and that we need richer data than those typically available to make credible inference about decision-making.

Finally, we believe our methodological conclusions are relevant for the broad literature on school choice, since the choices that university-going students are confronted with in Pakistan include the kinds of schools that a typical student in a developed or developing country has to choose from. In today's context, where students are being confronted with radically expanding choices – due to, for example, the growth of for-profit universities in the US, and the emergence of a private and religious sector in higher education in many developing countries – we strongly advocate for the collection of such data.

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Table 1: Sample Characteristics

	All	VSU	SU	IU	M	F-test[a]
	(1)	(2)	(3)	(4)	(5)	(6)
Number of respondents	2347	247	511	444	1145	
Age	21.9	20.7	21.6	21.9	22.2	0.000
	(2.9)	(3.7)	(2.3)	(2.5)	(3.0)	
% with at least one college-educated parent	38.7	90.3	67.5	45.3	12.2	0.000
Parents' monthly income (in 1000s Rs)	58.6	186.9	97.3	41.9	19.8	0.000
	(123.6)	(228.1)	(146.8)	(52.2)	(59.7)	
% with above median income	45.0	92.3	80.6	53.2	15.8	0.000
% Parents own:						
home	84.2	91.5	86.9	81.5	82.5	0.001
television	57.3	89.9	83.4	79.3	29.9	0.000
cellphone	77.9	90.3	80.0	79.5	73.6	0.000
computer	47.6	82.6	70.1	59.5	25.1	0.000
car	36.1	81.8	67.1	40.8	10.4	0.000
Religiosity (0-10)[b]	7.5	5.3	5.9	6.3	9.2	0.000
	(2.4)	(1.6)	(1.9)	(1.7)	(1.6)	
% Attended private school before University	35.8	74.9	69.1	41.9	10.1	0.000
Percentage of first-year students	21.0	69.2	30.1	34.9	1.1	0.000
Proportion of expenses coming from:						
parents & family	0.80	0.85	0.83	0.78	0.78	0.006
	(0.28)	(0.31)	(0.24)	(0.28)	(0.29)	
loans/aid which must be repaid	0.06	0.02	0.06	0.06	0.07	0.038
	(0.15)	(0.07)	(0.16)	(0.16)	(0.14)	
grants/aid which need not be repaid	0.06	0.07	0.04	0.08	0.05	0.001
	(0.14)	(0.23)	(0.10)	(0.17)	(0.13)	
personal savings and earnings	0.09	0.07	0.07	0.07	0.10	0.078
	(0.18)	(0.23)	(0.15)	(0.16)	(0.20)	

Table reports the mean of the continuous variables, with standard deviations in parentheses.
[a] p-value of a F-test for equality of the means of the row variable across the four institutions (that is, columns (2)-(5)).
[b] Self-reported religiosity on a scale of zero (not religious at all) to 10 (very religious).

Table 2: Ranking of Schools and Credit Constraints

	All	VSU	SU	IU	M	p-value[a]
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: With School Costs						
Proportion who can afford:						
Very Selective University	.41	1	.44	.39	.29	0.000
Selective University	.54	.61	1	.57	.3	0.000
Islamic University	.59	.68	.67	1	.37	0.000
Madrassa-City1	.84	.83	.84	.88	.83	0.085
Madrassa-City2	.87	.85	.87	.85	.88	0.257
Chi-square test[b]	0	0	0	0	0	
Proportion who rank school the highest:						
Very Selective University	.15	.89	.19	.083	.0009	0.000
Selective University	.12	.026	.47	.069	.0009	0.000
Islamic University	.19	.022	.18	.72	.014	0.000
Madrassa-City1	.24	.039	.076	.087	.41	0.000
Madrassa-City2	.31	.022	.094	.041	.57	0.000
Chi-square test	0	0	0	0	0	
Number of schools ranked:						
Mean	2.6	3.6	3.2	3	2	0.000[c]
Median	[2]	[4]	[4]	[3]	[2]	
Standard deviation	(1.3)	(1.5)	(1.4)	(1.2)	(1)	
Proportion who switch highest-ranked school from current school:						
	.25	.11	.53	.28	.13	0.000
Panel B: No School Costs						
Proportion who rank school the highest | no school costs						
Very Selective University	$.36^{+}$	$.80^{+}$	$.74^{+}$	$.58^{+}$	$.017^{+}$	0.000
Selective University	$.041^{+}$	$.081^{+}$	$.087^{+}$	$.045^{+}$	$.0097^{+}$	0.000
Islamic University	$.15^{+}$	$.047^{+}$	$.097^{+}$	$.31^{+}$	$.12^{+}$	0.000
Madrassa-City1	$.20^{+}$	$.030^{+}$	$.046^{+}$	$.054^{+}$	$.37^{+}$	0.000
Madrassa-City2	$.25^{+}$	.038	$.032^{+}$	$.011^{+}$	$.48^{+}$	0.000
Chi-square test	0	0	0	0	0	
Proportion who switch highest-ranked school from Panel A to Panel B:						
	.38	.21	.63	.56	.23	0.000
Number of students	2347	247	511	444	1145	

[a] p-value of Chi-square test for equality of the proportion of the row variable across the four schools.

[b] p-value of a Chi-square test for equality of the proportions across the different school choices, within a school.

[c] p-value of a t-test for equality of the mean number of schools ranked by students across the four schools.

The table also reports a Chi-square test for the equality of proportions who rank a school highest conditional on no school costs, and the proportion who rank the school highest conditional on costs. + denotes sign. at 1%.

Table 3: Population Beliefs - Perceived Age 30 Monthly Earnings (in 1,000 Rs.) of Male Graduates of Different School Types

	All	VSU	SU	IU	M	Obj. Value[a]	F-test[b]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Beliefs about age 30 earnings of male graduates of (in 1,000 rupees):							
Very Selective University	46.0 [40] (47.9)	43.3 [38] (33.5)	70.0 [60] (73.1)	59.9 [50] (37.0)	30.3 [25] (31.1)	38.8 [41.3] (10.9)	0.000
Selective University	36.2 [30] (49.1)	39.9 [35] (25.1)	45.9 [35] (75.4)	42.0 [40] (29.9)	28.8 [20] (42.5)	30.9 [30.3] (11.2)	0.000
Islamic University	34.6 [30] (44.3)	35.0 [30] (21.7)	47.1 [35] (68.7)	43.2 [40] (24.2)	25.5 [20] (37.5)	26.0 [25.0] (3.6)	0.000
Madrassa-City1	17.6 [15] (22.8)	30.3 [23] (23.6)	22.0 [20] (20.3)	18.0 [16] (10.6)	12.8 [10] (25.5)	9.4 [8.8] (1.8)	0.000
Madrassa-City2	17.8 [15] (17.2)	29.4 [25] (21.3)	22.0 [20] (15.3)	18.6 [18] (11.7)	13.1 [10] (17.1)	15.0 [15.0] (4.1)	0.000
Number of respondents	2347	247	511	444	1145	-	
Response rate[c]	99.4	99.2	100	99.5	99.2		
F-test[d]	0.000	0.000	0.000	0.000	0.000		

Standard deviations reported in parentheses and median in squared brackets.
[a] Objective value refers to the survey responses of the administrators of the institutions.
[b] p-value of a F-test for equality of the means of the row variable across the four institutions (that is, columns (2)-(5)).
[c] Percent of responses with non-missing data for ALL variables in the column.
[d] p-value of a F-test for equality of the means of earnings associated with the different school types, as reported by students within an institution (the column).

Table 4: Age 30 Self Monthly Earnings Beliefs Cond. on Working, in 1,000 Rupees

	All	VSU	SU	IU	M	F-test[a]
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Beliefs about own age 30 earnings | Graduating:						
Very Selective U	46.2	52.1	68.1	60.8	29.3	0.000
	[40]	[45]	[60]	[50]	[25]	
	(36.2)	(31.5)	(40.4)	(35.9)	(25.6)	
Selective U	32.8	34.2	42.0	39.6	25.6	0.000
	[30]	[30]	[35]	[35]	[20]	
	(21.9)	(22.3)	(21.4)	(20.9)	(19.9)	
Islamic U	33.7	45.5	40.6	44.1	24.1	0.000
	[30]	[40]	[35]	[40]	[20]	
	(24.5)	(26.3)	(23.4)	(24.2)	(20.7)	
Madrassa-City1	15.5	20.3	21.4	17.5	11.0	0.000
	[12]	[20]	[20]	[15]	[9]	
	(11.4)	(12.2)	(11.3)	(9.5)	(10.1)	
Madrassa-City2	17.0	27.6	21.6	18.9	12.1	0.000
	[15]	[20]	[20]	[18]	[10]	
	(13.8)	(20.1)	(12.6)	(11.4)	(11.1)	
Response rate[b]	97.3	93.9	97.7	98.0	96.3	
F-test[c]	0.000	0.000	0.000	0.000	0.000	
Panel B: Beliefs about own age 30 earnings | Drop-out:						
Very Selective U	24.7	33.1	35.3	28.5	16.8	0.000
	[20]	[28]	[30]	[25]	[11]	
	(29.0)	(23.2)	(38.3)	(20.2)	(25.6)	
Selective U	20.1	28.6	25.1	20.4	15.9	0.000
	[15]	[25]	[20]	[20]	[10]	
	(24.4)	(19.3)	(27.9)	(12.8)	(26.2)	
Islamic U	21.4	24.2	26.0	24.9	17.3	0.001
	[15]	[20]	[20]	[20]	[10]	
	(46.0)	(20.7)	(37.6)	(49.6)	(51.2)	
Madrassa-City1	12.9	19.6	16.5	10.9	10.6	0.000
	[10]	[10]	[10]	[10]	[7]	
	(24.4)	(21.6)	(23.8)	(8.4)	(28.7)	
Madrassa-City2	13.1	20.9	15.5	11.4	11.2	0.000
	[10]	[15]	[10]	[10]	[8]	
	(18.7)	(22.2)	(21.7)	(10.3)	(18.5)	
Response rate	99.5	98.0	100	99.3	99.6	
F-test	0.000	0.000	0.000	0.000	0.000	
# of respondents	2347	247	511	444	1145	

Standard deviations reported in parentheses and median in squared brackets.
[a] p-value of a F-test for equality of the means of the row variable across the four schools (columns (2)-(5)).
[b] Percent of respondents with non-missing data for ALL variables in that column.
[c] p-value of a F-test for equality of the means of earnings associated with the different school types, as reported by students within a school (the column).

Table 5: Beliefs about Labor Market-related Outcomes, across School Choices

	All	VSU	SU	IU	M	Obj. Value[a]	F-test[b]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Prob. of completing degree:							
Very Selective University	58.5	78.0	76.4	73.4	40.4	95.0	0
Selective University	58.2	57.8	82.9	71.6	42.0	75.3	0
Islamic University	68.1	48.2	75.9	88.0	61.1	87.7	0
Madrassa-City1	69.4	40.5	66.2	64.2	79.0	61.3	0
Madrassa-City2	71.3	35.5	67.3	63.1	83.8	83.3	0
Response rate	0.994	0.984	1	0.994	0.994		
F-test[c]	0	0	0	0	0		
Prob. of having a job at age 30 | graduate:							
Very Selective University	69.4	74.4	89.5	85.4	53.1	68.3	0
Selective University	63.4	63.2	77.2	73.3	53.3	88.5	0
Islamic University	69.3	53.7	76.1	80.1	65.3	96.7	0
Madrassa-City1	63.6	36.1	55.8	51.3	77.8	92.5	0
Madrassa-City2	65.8	38.4	56.3	52.1	81.3	88.8	0
Response rate	0.997	0.997	1	1	0.995		
F-test	0	0	0	0	0		
Prob. of having a job at age 30 | dropout:							
Very Selective University	48.0	47.2	57.6	48.7	43.5		0
Selective University	43.3	41.6	46.5	39.5	43.7		.001
Islamic University	46.4	35.3	45.0	45.6	49.7		0
Madrassa-City1	45.7	29.6	35.7	32.9	58.5		0
Madrassa-City2	47.5	30.6	35.9	33.6	61.8		0
Response rate	0.997	0.991	1	0.998	0.997		
F-test	0	0	0	0	0		
Age 30 expected log earnings:							
Very Selective University	8.2	9.2	11.1	10.1	5.9		0
Selective University	7.3	7.0	9.6	8.3	5.9		0
Islamic University	8.1	5.9	9.0	9.9	7.5		0
Madrassa-City1	7.1	4.1	6.2	5.6	8.7		0
Madrassa-City2	7.4	4.4	6.3	5.7	9.2		0
Response rate	0.971	0.942	0.996	0.977	0.964		
F-test	0	0	0	0	0		
Num of respondents	2347	247	511	444	1145		

Table reports the mean statistics.
[a] Objective value refers to the survey responses of the administrators of the school.
[b] p-value of a t-test for equality of the mean of the row variable across the four schools (columns (2)-(5)).
[c] p-value of a t-test for equality of mean of the variable across the different choices, within a school.

Table 6: Beliefs about Various School-related Outcomes, across School Choices

	All	VSU	SU	IU	M	Obj. Value[a]	F-test[b]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Prob. of teachings consistent with ideology:							
Very Selective University	52.5	72.2	69.3	66.8	35.2		0
Selective University	50.8	59.0	68.0	60.6	37.4		0
Islamic University	64.2	47.1	66.1	76.8	62.1		0
Madrassa-City1	67.3	32.0	53.4	56.9	85.2		0
Madrassa-City2	68.7	31.6	54.4	56.4	87.9		0
Response rate	0.999	1	1	0.999	0.998		
F-test[c]	0	0	0	0	0		
Prob. of Parents' approval for:							
Very Selective University	59.4	77.1	81.5	74.9	39.5		0
Selective University	57.2	62.7	81.5	67.0	41.3		0
Islamic University	68.5	51.0	69.3	88.6	64.0		0
Madrassa-City1	64.0	27.8	48.4	49.8	84.3		0
Madrassa-City2	67.0	32.1	52.1	48.3	88.5		0
Response rate	0.998	1	1	1	0.996		
F-test	0	0	0	0	0		
Graduation rank for:							
Selective University	68.0	66.9	66.3	70.2	68.1		0.19
University	70.1	63.0	75.2	72.3	68.5		0
Islamic University	76.1	66.0	73.4	81.0	77.5		0
Madrassa-City1	74.4	55.1	67.2	67.1	84.7		0
Madrassa-City2	74.6	55.0	67.8	66.8	84.9		0
Response rate	0.998	1	1	1	0.996		
F-test	0	0	0	0	0		
Average Monthly net expenses (in 1,000 rupees) for:							
Very Selective University	27.1	42.0	35.7	25.5	20.6	15.5	0
Selective University	20.1	36.6	21.0	17.4	17.4	18.4	0
Islamic University	16.6	30.0	21.5	12.7	13.1	9.3	0
Madrassa-City1	7.5	16.1	12.8	6.6	3.8	1.6	0
Madrassa-City2	7.2	16.0	10.4	7.5	3.8	1.7	0
Response rate	0.973	0.935	0.986	0.986	0.97		
F-test	0	0	0	0	0		
Num of respondents	2347	247	511	444	1145		

Table reports the mean statistics.
[a] Objective value refers to the survey responses of the administrators of the school.
[b] p-value of a t-test for equality of the mean of the row variable across the four schools (columns (2)-(5)).
[c] p-value of a t-test for equality of mean of the variable across the different choices, within a school.

Table 7: Maximum Likelihood Estimates based on Constrained Choice Set

	Choice Data	Ranking Data	Uncertainty in earnings	Heterogeneity in preference
	(1)	(2)	(3)	(4)
Teachings aligned with ideology	2.571***	2.721***	2.575***	2.594***
	(0.350)	(0.212)	(0.349)	(0.350)
Parents' approve of choice	2.184***	2.368***	2.180***	2.183***
	(0.288)	(0.186)	(0.286)	(0.288)
Graduation Rank	-0.153	0.413**	-0.117	-0.155
	(0.329)	(0.203)	(0.324)	(0.328)
Distance from current town[a]	-0.905***	-0.439***	-0.900***	-0.905***
	(0.0799)	(0.0469)	(0.0796)	(0.080)
ln(Current period consumption)	0.0078	0.0143*	2.456	0.010
	(0.013)	(0.00843)	(6.073)	(0.013)
Age 30 expected ln(earning)	0.247***	0.203***	0.257***	0.306***
	(0.027)	(0.017)	(0.029)	(0.042)
Age 30 expected ln(earning)				-0.100*
$\times$ 1(Parent Income Above Median)				(0.052)
Number of Choice Scenarios	2182	5207	2182	2182
Number of students	2182	2182	2182	2182

Maximum likelihood estimates. Standard errors in parentheses.
***, **, * denote significance at 1%, 5%, and 10% levels, respectively.
Ideology and parents' approve are elicited on a 0-100 scale, and normalized to 0-1.
Graduation rank is on a 1-100 scale, where 100 is the best rank (normalized to 0.01-1).
[a] Dummy that equals 1 if the school is in a town different from the respondent's current location.

Table 8: Model Fit

	Stated Constrained Choice[a]	Predicted constrained choice		Stated Unconst. Choice	Predicted choice with free schooling	
		Choice Data[b]	Ranking Data[c]		Choice Data	Ranking data Data
	(1)	(2)	(3)	(4)	(5)	(6)
Probability of choice						
Very Selective Uni	17.82%	18.43%	15.29%	35.85%	37.22%	28.09%
Selective University	10.72%	12.90%	14.25%	4.51%	6.34%	9.96%
Islamic University	19.03%	16.64%	18.47%	14.75%	15.35%	19.72%
Madrassa-City1	24.01%	21.82%	21.30%	20.14%	18.24%	18.04%
Madrassa-City2	28.42%	27.49%	28.11%	24.74%	20.84%	22.18%
Weighted squared loss		*3.060*	*4.327*		*5.367*	*29.081*

[a] Proportion of students who rank the school the highest in the constrained case.
[b] Based on stated choice data estimation of the unconstrained model.
[c] Based on rank data estimation of the unconstrained model.

Table 9: Earnings Choice Elasticity, Constrained Model

	Choice Data	No non-pec. Outcomes[a]	Indirect Constraints Measures[b]	No job and dropout Uncertainty[c]	Uncertainty in Earnings[d]	Unconst. Choice Data[e]
	(1)	(2)	(3)	(4)	(5)	(6)
For a 1% in earnings, %Δ in Prob of choosing:						
All	0.113%	0.179%	0.081%	0.193%	0.121%	0.121%
Very Selective Uni	0.083%	0.110%	0.090%	0.146%	0.127%	0.091%
Selective University	0.132%	0.204%	0.087%	0.224%	0.137%	0.146%
Islamic University	0.129%	0.202%	0.088%	0.202%	0.140%	0.140%
Madrassa-C1	0.110%	0.186%	0.073%	0.200%	0.100%	0.116%
Madrassa-C2	0.110%	0.190%	0.068%	0.193%	0.098%	0.111%

The table shows the average percent change in the probability of choosing each school with a 1% increase in age 30 earnings associated with that school.
[a] Model excludes the non-pecuniary outcomes (ideology; parents' approval).
[b] Model which uses constrained stated choice data, but assumes all schools are in respondent's choice set, and includes income tercile dummies, also interacted with school-specific constants.
[c] Model ignoring uncertainty in drop-out and employment.
[d] Model estimates based on using the subjective earnings distribution (fitted using an individual and school-specific Beta distribution).
[e] Model uses the unconstrained choice and full choice set for estimation.

Table 10: Willingness to Pay, based on Constrained Model Estimates

	Choice Data	Indirect Measures of Constraints	No job/ dropout Uncertainty	Uncertainty in Earnings	Unconst. Choice Data
	(1)	(2)	(3)	(4)	(5)
Teachings aligned w/ ideology	0.406***	0.534***	0.528***	0.394***	0.416***
	(0.079)	(0.072)	(0.182)	(0.078)	(0.039)
Parents' approve of choice	0.357***	0.494***	0.464***	0.346***	0.321***
	(0.066)	(0.069)	(0.175)	(0.067)	(0.038)
Graduation Rank	-0.031	0.222***	0.035	-0.023	0.062
	(0.090)	(0.073)	(0.128)	(0.080)	(0.049)
Distance from current town	-0.201***	-0.493***	-0.250	-0.191***	-0.150***
	(0.036)	(0.093)	(0.345)	(0.039)	(0.018)

The table shows the proportion of age 30 earnings the respondent is willing to forgo for:
(a) a 5 percentage point increase in beliefs about teachings aligned with ideology.
(b) a 5 percentage point increase in beliefs about parents' approving of the choice.
(c) a 0.05 point increase (on a 0.01-1 scale) in expected graduation rank.
(d) attending a school in a town different from one's current location.
Bootstrap standard errors in parentheses.
***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Table 11: Choices and Utility Changes for Different Policy Experiments

	Const. Case	Financing available	Free schooling with tax	Subsidy for Below-med inc, w/ tax	Increased capacity + Policy (3)	Const. of new VSU + P (3)	Info	Info + P. (3)	Madr. Reform	IU Ideol.	IU Ideol. + P. (3)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A											
Proportion Choosing school:[a]											
Very Selective Uni	0.180	0.379	0.383	0.242	0.216	0.380	0.190	0.383	0.191	0.199	0.436
Selective University	0.144	0.065	0.065	0.128	0.122	0.066	0.133	0.065	0.128	0.135	0.079
Islamic University	0.184	0.157	0.157	0.186	0.189	0.157	0.171	0.156	0.164	0.17	0.155
Madrassa-City1	0.201	0.186	0.184	0.206	0.193	0.185	0.225	0.186	0.237	0.222	0.157
Madrassa-City2	0.291	0.213	0.21	0.238	0.279	0.211	0.281	0.21	0.279	0.274	0.172
Panel B[b]											
Utility change (%)[c]		20.58	20.94	12.35	13.40	20.42	4.45	20.73	6.06	6.95	22.50
		[8.90]	[9.03]	[5.96]	[9.27]	[8.82]	[2.27]	[8.97]	[3.31]	[3.38]	[13.77]
∆Utility as %∆ age		55.64	56.60	33.37	36.21	55.19	11.45	53.90	17.61	17.53	57.24
30 log earnings[d]		[24.07]	[24.40]	[16.12]	[25.05]	[23.83]	[5.83]	[23.32]	[9.62]	[8.54]	[35.04]
Proportion switch[e]		0.37	0.37	0.23	0.28	0.37	0.13	0.37	0.17	0.16	0.46
Prop. with utility loss		0	0.09	0.25	0.09	0.16	0	0.10	0	0	0.08
Tax Rate[f]		-	12.7%	2.0%	2.0%	46.8%	-	13.5%	-	-	17.2
Mean Loan/Subsidy (Rs)		58707	71876	4203	46442	71097	-	70628	-	-	85574

[a] Students assigned to the school which gives maximum utility, based on the model estimates and feasible choice set.
[b] Mean reported in first row, median in square brackets.
[c] Percent increase in utility as a result of the chosen school in the policy experiment, relative to the baseline constrained choice. Mean reported in first row, median in square brackets.
[d] Utility gain as a percent change in age 30 log earnings. Mean reported in first row, median in square brackets.
[e] Proportion of students who choose a school in the policy experiment that is different from the choice in the constrained case.
[f] The tax rate on labor market earnings to cover the cost of the policy.

APPENDICES (NOT FOR PUBLICATION)

A Fieldwork Information

A.1 Data Collection

Data collection was conducted by the Survey Center affiliated with the Islamic University. To signal credibility of the study to the students, members of the staff of the institution at which data was being collected were also hired for the data collection. The survey sessions were conducted in groups of 50-100 students in a classroom of the student's institution. The rooms were large enough to ensure respondent anonymity. An anonymous questionnaire was given to each participant, read out by a member of the survey team and projected on a computer projector. The survey instrument was administered in Urdu at all institutions except VSU where it was conducted in English, since students there are more used to reading and writing in English. The survey took about 90 minutes to complete. The survey instrument was anonymous and no identifying information was collected from the respondents. Students were compensated Rs. 200 (~USD 2.5) for completing the survey, and were additionally compensated for some experiments embedded in the survey (average compensation for which was Rs. 600). The total average compensation of Rs. 800 (~USD 10) was substantial in the context of our setting.[39] Delavande and Zafar (2011, 2012 and 2013) use data drawing from the same survey.

A.2 (Selective) Survey Questions

We present below the wording for several relevant expectations questions.

Choice set: Students were asked the maximum education-related expenses that they and their family can cover: "*What is the maximum MONTHLY expenses (including tuition, room and board) that you and your family would be able to pay for you to be enrolled in school without any external financial aid?*"

And, for each of the five institutions, students were asked about perceived net costs: "*What do you think are the MONTHLY expenses (including tuition, room and board) that you would incur ON AVERAGE (net of any financial help such as scholarships, loans and grants that you could secure) if you are enrolled in the institutions listed below?*"

[39] The 2009 per capita GNI at purchasing power parity in Pakistan was $2,710, compared to $46,730 in the US. This means the average compensation of USD 10 corresponds to 0.4% of the GNI per capita. The US equivalent would be approximately USD 170.

Schools for which the perceived net costs did not exceed the maximum expenses that the student reports that he (and his family) can pay are then defined as being in the student's constrained choice set.

Expectations about population earnings: *"Consider a typical male student who graduates from each of the institutions below and who is working at age 30. Think about the kinds of jobs that will be available to him. How much do you think he could earn per MONTH on AVERAGE at the age of 30 at these jobs?"*

Expectations about own future earnings conditional on graduation: *"Consider the hypothetical situation where you graduate from each of the institutions listed below. Look ahead to when you will be 30 years old and suppose that you are working then. Think about the kinds of jobs that will be available to you. How much do you think you could earn per MONTH on AVERAGE at the age of 30 at these jobs?"*

Expectations about own future earnings conditional on droping-out: *"Consider the hypothetical situation where you are enrolled in each of the institutions listed below, and you DROP OUT of that institution without completing the degree. Look ahead to when you will be 30 years old and suppose that you are working then. Think about the kinds of jobs that will be available to you. How much do you think you could earn per MONTH on AVERAGE at the age of 30 at these jobs?"*

Uncertainty in own future earnings: *"Consider the hypothetical situation where you graduate [drop out] from each of the institutions listed below. In the previous question, we asked you to think about your average monthly earnings at age 30 if you were working and if you were to graduate [drop out] from each of the institutions. However, for some people, it may be hard to predict how much they would earn at age 30. In this question, we ask you to think about the percent chance (or chances out 100) that your earnings at age 30 will be above certain thresholds if you are working. What do you think is the percent chance that your monthly earnings at age 30 will be above Rs. L1, if you graduated [dropped out] from "institution X"? And, What do you think is the percent chance that your monthly earnings at age 30 will be above Rs. L2, if you graduated [dropped out] from "institution X"?"*

L1 and L2 were the same for each of the school choices, but for meaningful variation in responses across and within individuals, they varied across the schools that the survey was conducted in. For M students, L1 and L2 were set to Rs. 15,000 and Rs. 30,000, respectively. For VSU students, they were set to Rs. 25,000 and Rs. 75,000, respectively. And, for SU and U students, they

were set to Rs. 20,000 and Rs. 50,000.

Probability of employment conditional on graduation: *"Consider the hypothetical situation where you graduate from each of the institutions listed below. Look ahead to when you will be 30 years old. What do you think is the percent chance (or chances out of 100) that you would have a job at the age of 30?"*

Beliefs about ideology: *"Consider the situation where you decided to enroll as a student in each of the institutions listed below. What do you think is the percent chance (or chances out of 100) that the materials taught to you at each of these institutions would be consistent with your own ideology and thinking?"*

Beliefs about parents' approval: *"Consider the situation where you decided to enroll as a student in the institutions listed below. What do you think is the percent chance (or chances out of 100) that your parents would approve of you studying at each of them?"*

Beliefs about graduation rank: *"Consider the situation where you decided to enroll as a student in the institutions listed below. What do you think your rank would be out of 100 students at each of the institutions when you graduate? (rank of 1 would mean that you would be the top student at the institution, while 100 would mean that you would be ranked last at that institution)"*

B Expectations Data

B.1 Expectations about Own Future Earnings

The top panel of Table 4 reports expected age 30 own earnings beliefs. Response rates exceed 94%. Own earnings expectations of students in each of the schools follow the same pattern as expectations about population earnings. We see again that, while relative earnings are similar across institutions, the levels are quite different.

Like the population expectations, there is substantial heterogeneity in own earnings expectations, as seen in the large standard deviations (relative to the means). For example, median own expected earnings for the overall sample conditional on graduating from Very Selective University are Rs. 40,000, while the 10th percentile is Rs. 10,000 and the 90th percentile is Rs. 88,000. Figure A1 presents VSU students' belief distribution of age 30 earnings, conditional on graduating from each of the five schools. There is considerable dispersion in earnings beliefs conditional on each choice. The earnings distributions conditional on graduating from the non-Madrassa schools are

similar, with fat right tails. On the other hand, the earnings distributions conditional on graduating from a Madrassa are concentrated to the left (right skewed). Figure A2, which reports earnings beliefs conditional on graduating from Islamic University, highlights the heterogeneity in beliefs across students enrolled in the different schools: the modal belief of Madrassa students is significantly lower than that of other students, while the distribution of VSU students is less concentrated.

Panel B of Table 4 shows respondents' own age 30 earnings expectations conditional on enrolling in each of the schools, but dropping out without a degree. Respondents report significantly lower earnings on average in this case: for example, average expected earnings conditional on dropping out of Very Selective University are only half as much as those conditional on graduating from there (Rs. 24,700 versus Rs. 46,200; difference statistically significant with p-value <0.001). Notably, students on average expect to have better labor market outcomes were they to enroll and then drop out from any of the non-Madrassa institutions, than if they were to graduate from a Madrassa (one exception being VSU students). Moreover, M students do not expect very different labor market returns, conditional on completing a Madrassa degree or not: average beliefs reported by Madrassa students conditional on a degree from Madrassa-City1 are Rs. 11,000, and conditional on enrolling and dropping out of Madrassa-City1 are Rs. 10,600 (difference not statistically significant; p-value = 0.2131).

B.2 Beliefs about Other School-Specific Factors

Table 6 reports the average beliefs for several school-specific factors. The response rates to these questions exceed 97 percent. Within each panel, we see that the average beliefs for the outcome conditional on the five school choices differ significantly (as can be seen by the low p-values of the F-tests in the last row of each panel), and that there are significant differences in average beliefs for a given school choice across students of the different schools (as shown by the low p-values of the F-tests in the last column).

We also see that students tend to have more favorable beliefs about the likelihood of the outcomes, conditional on being enrolled in their current school. For example, students in each of the schools (columns 2-5) report the highest average beliefs for parents' approval and graduation rank for the school they are currently enrolled in. This indicates that students are positively sorting into schools along these dimensions. The means reported in Table 6 mask the heterogeneity in students' beliefs, both within institution as well as across the schools. Figure A4, for example, shows the dispersion in students' beliefs about teachings at Madrassa-City1 being consistent with their own ideology. We see that only 20 percent of M students assign a probability of less than 70 percent to this outcome; on the other hand, nearly 95 percent of the students at VSU, and about three-quarters of the students at SU and IU assign a probability of less than 70 percent to the teachings

at Madrassa-City1 being consistent with their own ideology.

C Robustness checks

Estimation based on unconstrained stated choice We now test whether estimates based on the stated *unconstrained* choice yield WTP and elasticities similar to those obtained using the stated constrained choice. Since school costs are set to zero in the unconstrained case, the current period consumption ($y_{i0} - C_{is}$) does not vary across choices, and so the parameter θ is not identified. However, one advantage of using the unconstrained choice set is that all students have 5 schools in their choice set; as mentioned earlier, 671 students have only one choice in their choice set in the constrained case, i.e., they state they can afford only the school they are currently enrolled in (72% of those are M students)- those students (nearly a third of our sample) do not contribute to the identification of the parameters when using the constrained choice data. So the unconstrained choice scenario has the advantage of using data on all respondents.

For all identified parameters, we should generally get estimates similar to those obtained from the constrained choice set. Column (5) of Table A3 shows the maximum likelihood estimates of (5) based on the preferred choice data in the unconstrained case. The estimates on the school-specific outcomes are qualitatively similar to those based on the constrained ranking data (reported in column (1) of Table 7). The model estimates imply an earnings choice elasticity of 0.121 (Column (6) of Table 9), compared to the elasticity estimate of 0.113 based on constrained choice. Column (5) of Table 10 also shows that the estimates yield WTP estimates strikingly similar to those derived from the constrained choice set.

Allowing for Heterogeneity in Preferences for Future Consumption The baseline model in equation (5) does not allow for heterogeneity in preferences. However, if individuals have declining marginal utility of consumption, and preferences are separable in consumption and non-pecuniary outcomes, then the value of pecuniary outcomes will be higher for individuals from low-income households. Such heterogeneity, if not accounted for, may bias the model estimates presented so far.

To investigate this, we allow for heterogeneity in students' preference parameter for age 30 consumption as follows. We assume that the utility parameter on age 30 consumption is given by $\theta^* = \theta_1^* + \theta_2^* \times 1(\textit{High Income})$, where $1(\textit{High Income})$ is a dummy that equals 1 if the respondent's parental income is above the sample median. From Table 1, we know that there is substantial heterogeneity across students. For example, 92% of VSU students have above-median income, compared to 16% of M students. If non-pecuniary outcomes are a normal good, an individual from a low-income family will value the income profiles associated with the schools more than other

students will. That is, we expect the estimate of θ_2^* to be negative. Column (4) of Table 7 presents the maximum likelihood estimates of this enriched model. Looking at the column (4) estimates, we see that the coefficients of the set of outcomes for which heterogeneity is not considered are almost identical to those in the baseline specification (reported in the first column of the table). The estimate of θ_1^* is positive and precise. The estimate of θ_2^* is negative as anticipated, statistically significant at 10% and of a magnitude of a third compared to θ_1^*. With this specification, we obtain choice elasticity and average WTP estimates that are nearly identical to those reported in the first column of Tables 9 and 10 (not shown).

Relaxing the IIA assumption The standard logit model exhibits the IIA property, which implies proportional substitution across alternatives. We next relax this assumption by estimating three additional models which do not rest on the IIA assumption: a multinomial probit model and two different nested models.[40] The estimates of the multinomial probit model, reported in the first two columns of Table A5, generate similar WTP estimates as the baseline estimates from the logit model, suggesting similar estimated preference parameters based on the two models. Moreover, the elasticities with respect to earnings are also very similar (0.12%, on average).

One particular concern may be that we have two Madrassas for whom students provide very similar expectations. We therefore next estimate a nested logit model with four nests: the first nest is Madrassa, which includes the two Madrassas in the two different cities, the second nest is Islamic University, the third nest is Selective University, and the last nest is Very Selective University. Columns (3) and (4) of Table A5 show the results. Estimates of WTP produced by the nested model are similar to those produced by the baseline model. Moreover, the elasticities are also very similar (0.108%).

Finally, because the two Western-style universities share common characteristics (such as similar curriculum and gender-mixed campuses), we also estimate a nested logit model with 3 nests: the first nest is Madrassa (which includes the two Madrassas in the two different cities), the second nest is Islamic University only, and the third nest is Selective University and Very Selective University. The WTP produced by this nested model (last two columns of Table A5) as well as the elasticity estimates (0.109%, on average) are again similar to those produced by the baseline model.

[40] When we test for IIA using a Hausman-McFadden (1984) test, we do reject IIA. However, this test has been shown to have inadequate size property (Cheng and Long, 2007). Cheng and Long (2007) further report that, in a variety of substantive applications, commonly-used IIA tests often reject IIA when the alternatives seem distinct and that they do not reject IIA when the alternatives can reasonably be viewed as close substitutes, and that they are therefore not appropriate to test for IIA.

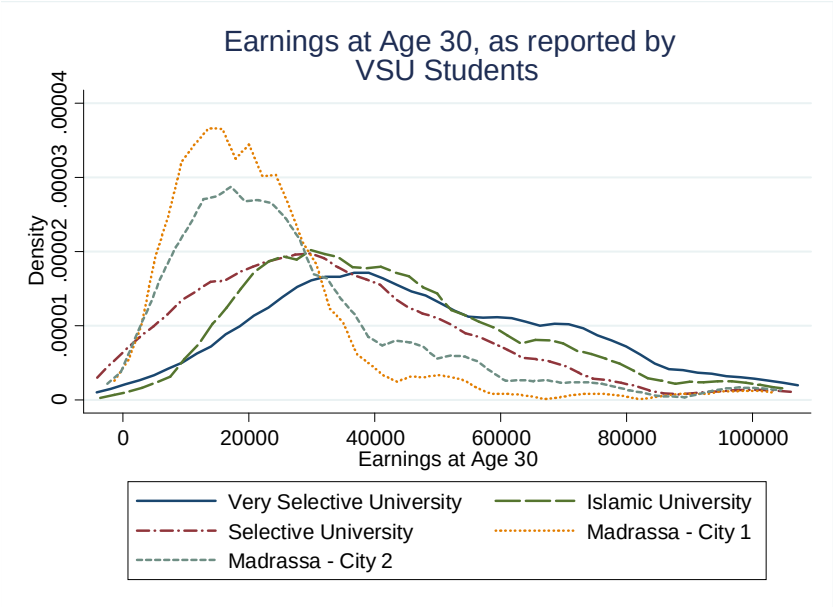

Figure A1: Earnings distribution as reported by VSU students, conditional on graduating from each of the five schools.

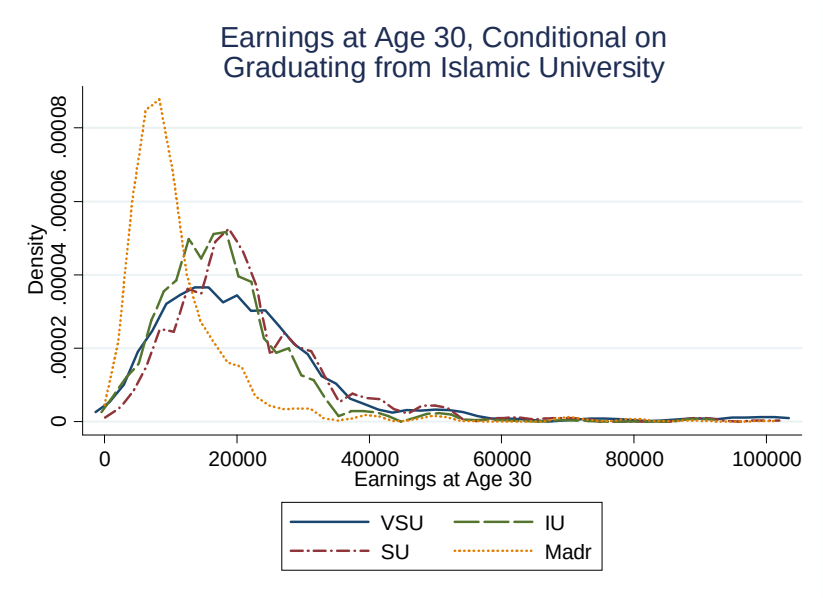

Figure A2: Earnings distribution conditional on graduating from Islamic University, as reported by students in the four school types.

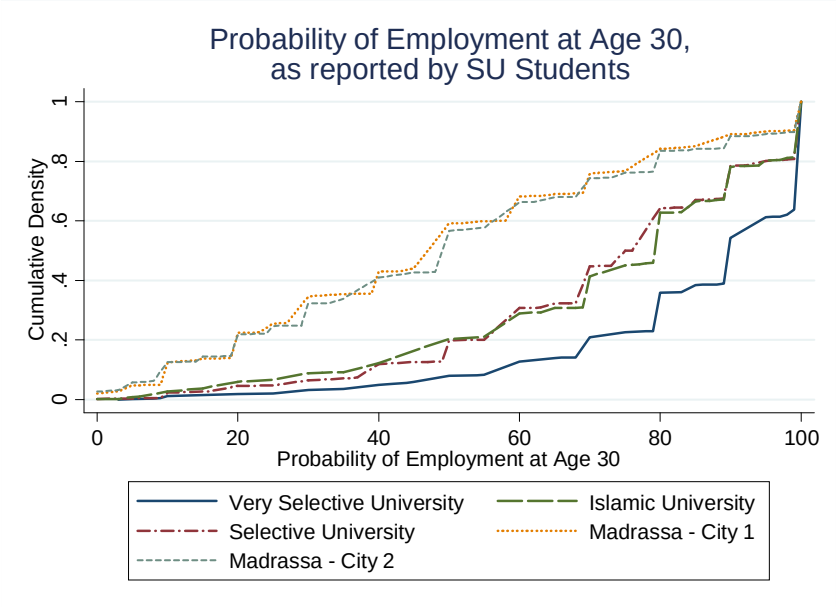

Figure A3: SU students' belief distribution of being employed at age 30, conditional on graduating from each of the five school choices.

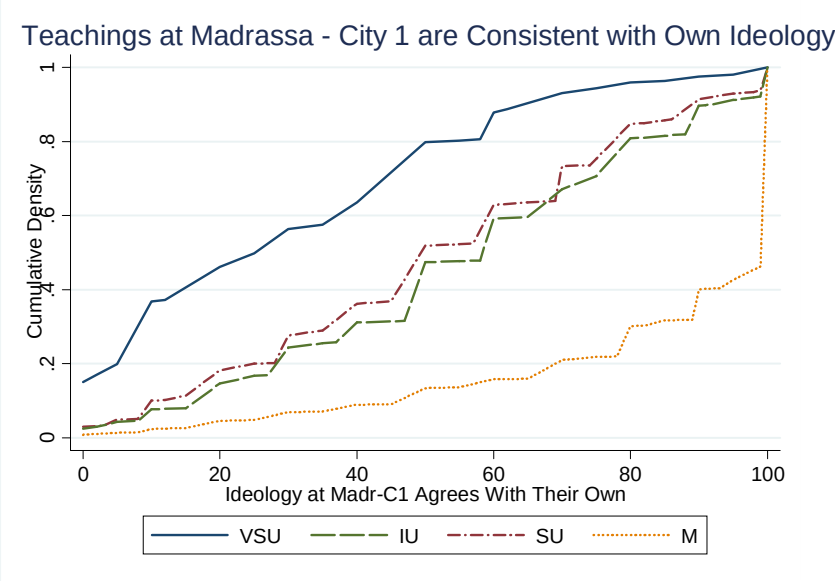

Figure A4: Students' belief distribution of teachings at Madrassa-City1 being consistent with own ideology.

Table A1:Correlation between Subjective Beliefs

	Ideology	Parents' approval	Graduate position	Exp. ln(earnings)	Distance	Ln(Current Consump)	Pr(empl.)	Pr(dropout)
Ideology	1							
Parents' approval	0.6564***	1						
Graduate position	0.2480***	0.2236***	1					
Exp. ln(earnings)	0.5003***	0.5205***	0.1719***	1				
Distance	-0.0366***	-0.0812***	0.0052	-0.0540***	1			
ln(cur. period cons.)	0.0499***	0.0246***	-0.0183**	-0.0290***	-0.0246***	1		
Pr(employment)	0.5270***	0.5341***	0.1874***	0.9799***	-0.0444***	-0.0233**	1	
Pr(dropout)	-0.5872***	-0.5419***	-0.2451***	-0.5692***	0.0456***	-0.0584***	-0.5687***	1

***,**,* denote significance at the 1, 5, and 10% levels, respectively.

Table A2: Affordability of the Various School Choices, by Demographics

	All	Parents' Income			Parents' Education		Parents' Wealth	
		High[a]	Middle	Low	College[b]	No-College	Higher[c]	Lower
Very Selective Uni	0.414	0.667	0.336	0.248	0.564	0.319	0.591	0.327
Selective University	0.537	0.804	0.52	0.293	0.718	0.422	0.742	0.438
Islamic University	0.585	0.768	0.639	0.344	0.718	0.501	0.737	0.512
Madrassa-City1	0.841	0.898	0.867	0.758	0.867	0.825	0.862	0.83
Madrassa-City2	0.869	0.915	0.857	0.841	0.868	0.87	0.868	0.871

Table reports the proportion of students who report having the given school (row) in their constrained choice set.
[a] Respondents in the highest tercile of the parents' income distribution are coded as "high".
[b] Parents' education equals college if either parent of the respondent has a college degree.
[c] Respondents who report that their parents own at least 5 from the following items: television; cellphone; internet access; computer; car; bicycle; motorbike. About 35% of the sample falls in this category.

Table A3: ML Estimates for Various Models

	No non-pecuniary Outcomes	Indirect Constraint Measures	No job/dropout Uncertainty	Interacted w/ Beyond 1st Year	Unconst. Choice Data
	(1)	(2)	(3)	(4)	(5)
Teachings aligned with ideology	-	2.687***	3.194***	2.675***	2.895***
		(0.257)	(0.326)	(0.560)	(0.220)
Parents' approve of choice	-	2.399***	2.654***	1.781***	2.035***
		(0.216)	(0.269)	(0.444)	(0.180)
Graduation Rank	0.455^{+}	0.885***	0.153	-0.376	0.320^{+}
	(0.279)	(0.251)	(0.311)	(0.492)	(0.213)
Distance from current town[a]	-1.066***	-1.411***	-0.952***	-0.039	-0.750***
	(0.0770)	(0.0718)	(0.0780)	(0.166)	(0.0563)
Age 30 expected ln(earnings)	0.389***	0.176***	0.243***	0.219***	0.265***
	(0.0246)	(0.0198)	(0.0847)	(0.0436)	(0.0174)
ln(Current Period Consumption)	-0.003	0.0569***	0.005	0.016	
	(0.012)	(0.0101)	(0.013)	(0.021)	
Teachings aligned with ideology x beyond 1st Year				-0.070	
				(0.730)	
Parents' approve of choice x beyond 1st Year				0.760	
				(0.585)	
Graduation Rank x beyond 1st Year				0.586	
				(0.661)	
Distance from current town[a] x beyond 1st Year				-1.110***	
				(0.190)	
Age 30 expected ln(earnings) x beyond 1st Year				0.042	
				(0.0542)	
ln(Current Period Consumption) x beyond 1st Year				-0.010	
				(0.025)	
Number of students	2182	2182	2182	2182	2182

Maximum likelihood estimates, based on choice data. Standard errors in parentheses.
***, **, *, $^{+}$ denote sig. at 1%, 5%, 10%, and 15% levels, respectively.
Ideology and parents' approval normalized to 0-1. Graduation rank is on a 1-100 scale (normalized to 0.01-1).
[a] Dummy that equals 1 if the school is in a city different from the respondent's current location.
(1) Restricted model excludes the non-pecuniary outcomes (ideology; parents' approval)
(2) Model uses constrained stated choice data but assumes all schools are in respondent's choice set, and includes income terciles, also interacted with school-specific constants.
(3) Model ignoring uncertainty in drop-out and employment.
(4) Model that uses constrained choice, and includes interactions of all variables with a dummy "beyond 1st year" that equals 1 for students in year 2 or later.
(5) Model that uses the unconstrained choice and full choice set.

Table A4: Descriptive Statistics for the Beta Distributions for Age 30 Earnings

	E(earnings)[a]		Standard Dev.		E(ln(earnings)) under Beta assump.		ln(earnings) with no uncertainty in earnings	
	Grad	Drop-out	Grad.	Drop-out	Grad.	Drop-out	Grad.	Drop-out
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
All	36.5	24.5	20.2	15.4	10.0	9.6	9.9	9.4
	[30.2]	[18.7]	[15.8]	[12.3]	[10.1]	[9.5]	[9.9]	[9.4]
	(23.2)	(15.9)	(13.1)	(9.8)	(0.69)	(0.60)	(0.93)	(0.97)
Very Selective University	50.2	31.3	27.8	19.8	10.3	9.9	10.3	9.9
	[43.2]	[20.1]	[21.2]	[14.2]	[10.3]	[9.6]	[10.3]	[9.9]
	(31.9)	(21.8)	(15.9)	(13.2)	(0.71)	(0.55)	(0.76)	(0.72)
Selective University	45.0	27.1	26.3	17.8	10.2	9.7	10.4	9.7
	[41.8]	[19.1]	[22.2]	[13.2]	[10.3]	[9.5]	[10.3]	[9.8]
	(26.7)	(18.2)	(15.5)	(11.8)	(0.71)	(0.58)	(0.68)	(0.66)
Islamic University	43.4	25.1	25.8	16.7	10.2	9.7	10.2	9.6
	[41.0]	[16.9]	[22.2]	[12.4]	[10.2]	[9.4]	[10.3]	[9.6]
	(25.5)	(16.6)	(14.4)	(11.1)	(0.68)	(0.56)	(0.75)	(0.68)
Madrassa-City 1	27.9	22.5	14.2	13.4	9.9	9.6	9.5	9.1
	[27.9]	[19.2]	[13.3]	[12.0]	[10.0]	[9.5]	[9.6]	[9.2]
	(13.4)	(13.2)	(7.1)	(6.8)	(0.60)	(0.63)	(1.1)	(1.1)
Madrassa-City 2	26.4	20.5	13.5	12.4	9.8	9.5	9.5	8.9
	[25.7]	[16.9]	[12.3]	[10.8]	[9.9]	[9.4]	[9.6]	[9.1]
	(13.6)	(11.9)	(7.2)	(6.6)	(0.63)	(0.61)	(0.96)	(1.2)

[a] Earnings and standard deviation are in Rs 1,000.

Table A5: Relaxing the IIA Assumption

	Multinomial Probit		Nested Logit - 4 nests		Nested Logit - 3 nests	
	ML Estimates	WTP	ML Estimates	WTP	ML Estimates	WTP
	(1)	(2)	(3)	(4)	(5)	(6)
Teachings aligned with ideology	2.093*** (0.371)	0.464	3.078*** (0.358)	0.489	3.009*** (0.350)	0.492
Parents approve of choice	1.667*** (0.304)	0.391	2.135*** (0.293)	0.373	2.034*** (0.289)	0.368
Graduation rank	0.056 (0.244)	0.016	-0.140 (0.310)	-0.031	-0.107 (0.299)	-0.024
Distance from current town	-0.827*** (0.164)	-0.279	-0.706*** (0.080)	-0.167	-0.687*** (0.0793)	-0.167
ln(Current consumption)	0.002 (0.010)		0.008 (0.012)		0.008 (0.012)	
Age 30 expected ln(earnings)	0.168*** (0.032)		0.229*** (0.026)		0.222*** (0.026)	
Tau*: VSU			1.000		-	
Tau*: VSU+SU			-		0.763*** (0.115)	
Tau*: SU			1.000		-	
Tau*: IU			1.000		1.000	
Tau*: Madr			0.660*** (0.0681)		0.640*** (0.0671)	

Standard errors in parentheses. ***, **, * denote sig. at 1%, 5%, and 10%, levels, respectively.
* Tau is the dissimilarity parameter which measures the degree of correlation of the random terms within each nest.

Table A6: School Choices, under the Policy Experiments

	Very Selective University	Selective University	Islamic University	Madr City 1	Madr City 2
School chosen in Constrained Case:	*School chosen under:*				
	Panel A: School Financing Available				
Very Selective University	78.16	9.32	6.78	2.20	3.54
Selective University	69.33	18.18	5.59	2.28	4.62
Islamic University	38.46	5.07	45.31	7.86	3.31
Madrassa	11.72	2.97	12.18	33.65	39.47
	Panel B: Subsidy for below-median Income				
Very Selective University	80.54	7.78	6.16	2.02	3.49
Selective University	8.03	69.27	7.45	4.70	10.54
Islamic University	15.17	4.96	66.69	9.22	3.95
Madrassa	7.03	2.53	10.93	36.69	42.82