

Expectations in education[☆]

7

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7.1 Introduction

Subjective expectations have long been important primitives in microeconomic models of decision-making under uncertainty and intertemporal behavior, including but not limited to educational choices and other forms of human capital investment and accumulation.¹ Nowadays, the expression “subjective expectations” is also commonly used to refer to an increasingly available and popular type of survey data meant to measure those primitives. This chapter reviews the economic literature on *subjective expectations as data in the domain of education*, with a focus on high-income countries.²

There was a time when survey data on subjective expectations related to education and its consequences for the individual were scant and when the sole idea of eliciting subjective expectations about the returns to schooling from subjects involved in making educational choices was largely considered radical and unfeasible among economists.³

In a seminal paper titled “*Adolescent Econometricians: How Do Youth Infer the Returns to Schooling?*”, Manski (1993) examines the implications for contemporary human capital research of the scarcity of interpretable data on youth’s perceptions of the returns to schooling. This lack of data had caused two fundamental and interrelated identification problems. “*The first problem is that, not knowing how youth perceive the returns to schooling, one cannot infer their decision processes from*

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¹ For a historical introduction to expectations in microeconomics, see Carter and Maddock (1984). For early models of human capital decisions under uncertainty, see Weiss (1972), Levhari and Weiss (1974), Groot and Oosterbeek (1992)’s extension of the Becker–Mincer model, and Altonji (1993).

² See Chapter 9 in this Handbook for evidence on low and middle income countries.

³ Scholars in other social sciences have a longer tradition of collecting and analyzing subjective data. Dominitz and Manski (1999) review the different cultures of research on subjective expectations.

their schooling choices. (...) The most one can do is infer the decision rule conditional on maintained assumptions on expectations. (...) The second problem is that, not knowing youth's decision processes, one cannot infer the objective returns to schooling from data on realized outcomes. (...) Hence, one can only infer the objective returns to schooling conditional on the validity of expectations assumptions." (Manski (1993), pp. 44–45).⁴

The paper concludes that the question posed in the title could not be answered at the time of writing and that progress would be possible only if economists opened up to the possibility of collecting interpretable subjective data on expectations and/or preferences. While recognizing that the enterprise may be especially challenging in the education context – as it would require elicitation of choice-conditioned forecasts from adolescent respondents – the paper closes unequivocally: “*We shall not know whether this is feasible until we try.*” (Manski (1993), p. 56).

Shortly after, Dominitz and Manski (1996) developed a computer-assisted self-administered interview protocol for survey elicitation of subjective expectations and used it to measure subjective earnings expectations, schooling expectations, and population earnings beliefs from high school students and college undergraduates in Madison, Wisconsin.

The survey featured a number of important innovations over earlier studies of students' expectations. Because a primary goal of the study was to characterize students' perceived uncertainty, the survey measured respondents' *subjective distributions* about own and population earnings by eliciting the probability that earnings exceed multiple thresholds, rather than eliciting a single moment (say, expected mean earnings). Because another important goal was to learn how students perceive the returns to schooling, the survey asked respondents their earnings expectations *under hypothetical scenarios* about their school attainment, in addition to their unconditional expectations. Because the study also aimed at collecting expectations that could be compared both within and between students, the survey elicited respondents' subjective probabilities on a *numerical scale of percent chance*, instead of a nominal probability scale.

Finding that respondents' were willing and able to give meaningful answers, the authors concluded that measuring youth's perceptions of the returns to schooling was both feasible and promising. Many more studies of students' expectations followed as a result.

A remarkable example is the [Berea Panel Study \(BPS\)](#), launched by Ralph and Todd Stinebrickner shortly after the Dominitz and Manski (1996)'s study. By following two cohorts of Berea College freshmen for up to 14 years, and by collecting rich information on the expectations and realizations of participants' education and labor market outcomes during and after college, the BPS has become a landmark among existing surveys of students' expectations.

⁴ The first problem refers to the difficulty of performing empirical revealed preference analysis when the available data consists of a single distribution of choices within a population of heterogeneous individuals; observing one choice per individual does not reveal the distribution of underlying primitives, since multiple configurations of preferences and expectations may be consistent with a given choice. The identification problem gets harder with intra-family decision-making, peer interactions, or heterogeneous choice sets, all of which are relevant concerns in models of schooling decisions (Giustinelli and Manski, 2018). The second problem is a direct consequence of selection; it “*arises because the youth who choose to enroll in school are those who expect schooling to have favorable outcomes for them. If the expected outcomes are related to the objective ones, then the outcomes experienced by youth who choose to enroll in school differ from those that nonenrollees would experience if they were to enroll. (...) [Any] effort to infer the objective returns to schooling from observations of realized outcomes requires at least some knowledge of the way youth make their schooling decisions.*” (Manski (1993), p. 45).

Over the years, different studies have experimented with different survey modes and question formats, have elicited percent-chance expectations from youth of varying ages and backgrounds in different countries, and have expanded the scope of the outcomes and scenarios posed. Expectations for nonmonetary benefits and costs of schooling have been increasingly collected and analyzed along with those for monetary returns and costs. Most studies have collected expectations at one point in time from a single group of respondents, usually college students and less frequently younger students. Occasionally, expectations have been collected longitudinally, as in the Berea Panel Study (BPS) and in Zafar (2011b, 2013)'s survey of Northwestern University (NU)'s undergraduates, or within field experiments, as in Wiswall and Zafar (2015b,a)'s survey of New York University (NYU)'s undergraduates. Sporadically, they have been elicited from multiple subjects, as in Giustinelli (2016)'s survey of Italian 9th-graders and their parents.

These data have been used to study the perceived monetary and nonmonetary returns to schooling of youth and their families, to estimate random utility models of schooling decisions under uncertainty, and to investigate how students form expectations and update them to arrival of new information.⁵

The present chapter surveys this literature, while complementing in scope and content earlier reviews addressing the role of expectations for human capital.⁶ The chapter focuses on the vast empirical evidence accumulated since Dominitz and Manski (1996). The working paper version (Giustinelli, 2022) additionally provides a motivating analytical framework, information and discussions about survey elicitation, and further empirical evidence for each section. It also collects a list of nearly 50 surveys of expectations related to education in its Supplementary Appendix.⁷

Section 7.2 deals with expectations of monetary returns, risks, and costs of schooling. Section 7.3 covers expectations of nonmonetary outcomes and educational expectations. Section 7.4 reviews studies of schooling decisions with expectations data. Section 7.5 covers studies of expectations formation and updating in education. Section 7.6 summarizes key findings and discusses avenues for future research.

7.2 Survey expectations about monetary outcomes of schooling

7.2.1 Are elicited earnings expectations meaningful?

Early expectations studies have evaluated the informativeness and quality of survey expectations by investigating the prevalence and predictors of item nonresponse, by checking the coherence of expectations reports with respect to probability rules, by comparing expectations with realizations for the

⁵ The economic literature on survey expectations related to education and labor earnings (e.g., Dominitz and Manski (1996, 1997), Dominitz (1998, 2001), Fischhoff et al. (2000), Dominitz et al. (2001)) has been the cradle of the broader expectations literature reviewed by Manski (2004, 2018) and multiple chapters in this Handbook. The former has especially contributed to the transition from a first phase of largely exploratory and descriptive studies to a still ongoing second phase where survey expectations have been used to test economic theories, estimate formal models of decision-making and/or learning, and perform counterfactual analyses (e.g., van der Klaauw (2012), Arcidiacono et al. (2012, 2020), Stinebrickner and Stinebrickner (2012, 2014a,b), Zafar (2012, 2013), Wiswall and Zafar (2015b,a), Giustinelli (2016), Kapor et al. (2020)).

⁶ These include Heckman et al. (2006), Hartog and Diaz-Serrano (2014), Altonji et al. (2016), Giustinelli and Manski (2018), and Patnaik et al. (2020b).

⁷ For further evidence and discussions on elicitation and measurement of expectations not specific to education, see Chapters 1, 4, and 26 in this Handbook. For use of survey expectations in microstructural models not specific to education, see Chapter 21 in this Handbook.

same or comparable individuals, and by investigating whether expectations covary with respondents' characteristics and other observables as do realizations (Manski, 2004).

Early quality assessments are sometimes performed in the survey pretest phase. For example, Dominitz and Manski (1996) held multiple debriefing sessions with pretest respondents. These sessions revealed that students generally understood the questions well, could articulate meaningful answers, and greatly enjoyed the interactive features of the software. At the same time, these preliminary discussions also revealed some critical issues with the interpretation of specific questions. For example, when reporting expectations of their own future earnings, pretest respondents tended to condition on being employed full-time even though the scenario did not specify future employment. Dominitz and Manski addressed these issues during the design phase by appropriately revising the text and wording of the relevant questions.

The consistency checks and error screens embedded in Dominitz and Manski (1996)'s CASI protocol did ensure that students' final responses were logically consistent. Nevertheless, the authors took advantage of their software capturing the entire sequence of responses and revisions given by each student to investigate the internal coherence of the students' initial responses. They focused on three types of errors: (1) reporting a probability outside the unit interval; (2) reporting a sequence of probabilities violating monotonicity of the cumulative distribution; (3) reporting a probability inconsistent with the previously reported median. None of the respondents made the first type of error, but some made errors of the second or third type. The analysis reveals three main patterns. First, (3) errors were more common than (2) errors. Second, the error rates in the early sections of the survey were higher than the error rates in later sections, suggesting that respondents tend to learn. Third, investigation of person-specific patterns of responses across questions revealed that some respondents are more error-prone than others. Additionally, Dominitz and Manski (1996) find little bunching of responses.⁸

Wiswall and Zafar (2015a) quantify the extent of measurement error in the earnings expectations of NYU students and assess the impact of measurement error on inference. Under the maintained assumption of classical measurement error, they estimate a reliability ratio of 0.984 (equal to 1 minus the noise-to-signal ratio), implying a minimal attenuation bias in their estimates of about 1.6%.

The majority of surveys eliciting earnings expectations from students has focused on college-going or older students. A smaller but increasing number of studies has elicited earnings expectations from high school students.⁹ A natural question is whether elicitation from younger students presents special challenges. Wolter (2000) appears to be the only study, after Dominitz and Manski (1996), to have elicited earnings expectations from both high school and university students and finds no systematic differences by age or type of school attended.

Using a similar survey instrument fielded online among high school Dutch students, Mazza and Hartog (2011) document a high prevalence of early quitters, which they attribute to the online mode. Conditional on not quitting in the early part of the survey, the authors do not find differential nonre-

⁸ Bunching of probability reports at 0% and at multiples of 5% or 10% may be an indication of rounding, a nonclassical form of measurement error. For evidence and methods on rounded probabilities, see Manski and Molinari (2010), de Bresser and van Soest (2013), Kleijnans and van Soest (2014), Gong et al. (2019, 2020), Giustinelli et al. (2020, 2022), and Chapter 26 in this Handbook.

⁹ See Menon Eliophotou (1997b,a), Wolter (2000), Menon Eliophotou (2008a,b), Mazza and Hartog (2011), Hastings et al. (2015, 2016), Huntington-Klein (2015, 2016), Belfield et al. (2020), Boneva and Rauh (2021), Boneva et al. (2022a), and Briel et al. (2022).

sponse rates to the questions eliciting earnings expectations vis-à-vis other questions. When investigating response mistakes, the authors find that, *ceteris paribus*, male students, immigrant students, and students with a low-education background are more likely to be early quitters and make significantly more mistakes.

In a sample of Italian 14-year-olds and their parents, Giustinelli (2016) finds that the majority of survey participants were unable or unwilling to report their expectations about the student's future earnings under alternative schooling scenarios, but they were able and willing to provide subjective probabilities about other track-specific outcomes.¹⁰ On the other hand, Belfield et al. (2020) and Boneva and Rauh (2021) do not report of any particular issue with elicitation from younger respondents in the UK.

7.2.2 Patterns and heterogeneity of earnings expectations

Dominitz and Manski (1996) analyze the empirical distributions of the median and interquartile range (IQR) of respondents' subjective belief distributions about their future earnings at ages 30 and 40 under three attainment scenarios: (1) unconditional on schooling, (2) conditional on obtaining a high school diploma (for high school respondents) or terminating school after the current semester (for college respondents), and (3) conditional on obtaining at least a bachelor's degree. They find limited variation in the median and IQR by gender and schooling, but substantial heterogeneity within groups. Furthermore, the authors find that students expect their earnings to increase with age, especially under the scenario of obtaining a bachelor's degree.

Among US college seniors enrolled in a randomly selected set of courses at the College of Business of Florida International University in Miami, Carvajal et al. (2000) find that female students expect lower mean earnings than their male peers.

Brunello et al. (2004) analyze the earnings expectations of students specializing in Economics or Business from 26 universities across Europe, spanning Austria, Finland, Germany, Greece, Italy, Portugal, Sweden, Switzerland, and the UK. Like Carvajal et al. (2000), they focus on expected mean earnings. Like Dominitz and Manski (1996), they elicit expectations about students' own future earnings at two points in time (at labor market entry and after 10 years on the job) and under two attainment scenarios (the student obtains a college degree and the counterfactual in which the student had not continued onto college after high school). The authors find that female students expect significantly lower college and high-school earnings than male students, *ceteris paribus*. The implied gender difference widens when expectations about earnings after 10 years on the job are considered, consistent with females expecting to enter jobs with lower relative earnings growth. Students in their second and third year of college expect lower college wages at labor market entry than freshman students, but these differences shrink when considering expectations for earnings after 10 years on the job. Students who expect to take longer than required to complete college have lower expected college wages than their counterparts, but similar expected high school wages, for both horizons. Students with a more educated mother have higher expected earnings after college and high school. Students who rank themselves

¹⁰ The majority of students reported being clueless about the order of magnitude of monthly salaries, while a minority gave estimates based on their parents' earnings. Some parents left written notes, expressing their perceived difficulty of providing meaningful earnings forecasts and stating that they did not regard future earnings as an important factor for the choice of high school track.

above the average in their class and those who report having acquired information about earnings from personal sources or from the daily or weekly press have higher expected college earnings. On the other hand, students who report having chosen their university based on costs or by an external assignment have lower earnings expectations. Finally, students from countries that have higher wages and those enrolled in more selective universities have higher expectations.

Moving to younger students, Mazza and Hartog (2011) uncover five main patterns in their data on expected median earnings of Dutch high school students. First, earnings expectations display higher variation within groups than between groups, as in Dominitz and Manski (1996). Second, female students expect significantly lower median earnings than male students, consistent with findings of most expectations studies except Dominitz and Manski (1996). Third, for the scenario in which the student does not continue to university, the expected median varies by attended high school tracks. Fourth, expected median earnings following university are generally higher than those from going to work right after high school. Fifth, the subjective earnings distributions shift upward with hypothesized work experience, suggesting that respondents are aware of the increasing wage profile over the life cycle.

Other studies have elicited earnings expectations under hypothetical scenarios specifying alternative fields of study (e.g., college majors), rather than attainment levels. For example, Arcidiacono et al. (2012) elicit expectations about earnings 10 years after graduation under alternative major-career combinations in a sample of male undergraduates attending Duke University. First, the way in which students' subjective probabilities of entering each career vary across majors suggests that some careers are perceived to be tied to certain majors (e.g., Science), whereas other careers less so (e.g., Business). Second, also students' earnings expectations vary systematically across majors. For example, majoring in Science or Engineering is perceived to lead to higher earnings in Science and Health careers, while majoring in Economics is perceived to lead to higher earnings in Business. Third, students in later years tend to report lower earnings expectations than students in earlier years, irrespective of their major. The authors attribute this to students learning over time. Fifth, students' earnings expectations are consistent with income sorting in choice of majors.

Reuben et al. (2017) document a large, and increasing with age, gender gap in expected future earnings of NYU undergraduates, amounting to 31% lower expected earnings at age 30 and 39% lower expected earnings at age 45. These figures are partly attributable to gender differences in major/career choices, since male students are more likely to select high-earning majors such as Business and less likely to select low-earning majors such as Humanities than female students. However, the authors also show that a large gap remains when analyzing students' earnings expectations for all majors, including the unchosen ones. On average across all majors, female students expect to earn 19% less than men at age 30 and 23% less at age 45.¹¹

7.2.3 Perceived monetary returns to schooling

Earnings differentials across schooling levels and fields of study are large and well documented.¹² What do youth believe about the monetary returns to schooling?

¹¹ Using experimental measures of competitiveness, overconfidence, and economic preferences, the authors show that, conditional on the chosen major, gender differences in competitiveness and overconfidence explain nearly 20% of the gender gap in earnings expectations.

¹² For example, Card (1999), Heckman et al. (2006), Altonji et al. (2016), and Psacharopoulos and Patrinos (2018).

Dominitz and Manski (1996) show that students share a common belief that the monetary returns to a college education are positive and heterogeneous in magnitude, for example, increasing with age.¹³ These results have been repeatedly confirmed by subsequent studies (e.g., Menon Eliophotou (1997b,a), Wolter (2000), Botelho and Costa Pinto (2004), Brunello et al. (2004), Webbink and Hartog (2004), Mazza and Hartog (2011), Schweri et al. (2011), Belfield et al. (2020), Boneva and Rauh (2021), Boneva et al. (2022b)).

Botelho and Costa Pinto (2004) find that, *ceteris paribus*, female students expect significantly lower monetary returns to a college education than male students and that, irrespective of gender, senior students expect lower returns than freshman students. Moreover, the authors find that students expect for themselves returns that are above average, with this tendency being stronger among male and freshman students.

Brunello et al. (2004), too, find that female students expect lower college wage premia at both labor market entry and after 10 years, but the difference is statistically significant only for the latter case. The authors additionally find that older students have lower expected college wage premia, conditional on year of enrollment. Students from countries that have higher college wage premia have higher perceived college wage premia, but only based on their subjective expectations about earnings after 10 years on the job.

Among younger UK students, Belfield et al. (2020) find that female and low socioeconomic (low-SES) students report, on average, lower expected earnings across all schooling scenarios (high school, sixth form, and university). However, in multivariate regressions both female and low-SES students hold significantly higher perceived monetary returns to university and insignificantly higher perceived monetary returns to sixth form. In a separate analysis of UK students aged 13–18, Boneva and Rauh (2021) find that low-SES students expect a lower earnings premium from going to university than high-SES students.

7.2.4 Perceived earnings risk

A smaller set of studies have investigated the spread of individuals' subjective earnings distributions. Dominitz and Manski (1996) analyze the interquartile ranges (IQRs) of students' fitted subjective earnings distributions and show that most students perceive substantial uncertainty, with the IQRs being of the same order of magnitude as the reported subjective medians. The authors additionally show that students tend to be more uncertain about their future earnings with a bachelor's degree than with a lower attainment level. On the other hand, students tend to be equally uncertain about their future earnings at ages 30 and 40, conditional on attainment.

Mazza and Hartog (2011) find similar results in their sample of Dutch high school students, which the authors interpret as an indication that students have a high perceived wage risk. Perceived wage risk does not vary systematically across hypothetical schooling levels, but does vary by gender, with females perceiving higher wage risk than males. Irrespective of gender, students' expectations imply a perceived decreasing wage variance over time, between entry wage and wage after 10 years.

Schweri et al. (2011) also find that students' belief distributions about post-schooling earnings are highly dispersed. However, unlike Mazza and Hartog (2011), they find that the variance tend to be

¹³ A person's perceived return to a college education is defined as the person-specific difference in subjective earnings expectations between the scenario in which the person obtains a college degree and that in which the person does not.

higher in high-age and high-education scenarios (age 40 vs. 30 and tertiary vs. secondary education). As predicted by theory, higher perceived risk (variance) significantly increases expected median wage and higher skewness reduces it. The authors show that the risk elasticities implied by their expectation-based estimates are comparable to those estimated using risk-augmented Mincer earnings equations with realizations data. The authors further show that these effects are not mechanically due to the fact that students' subjective earnings distributions are lognormal, as they are not.

Schweri et al. (2011) show that students expect median earnings to increase with both age and education and that males expect significantly higher median earnings than females, but find no differences by family background or by ability. The authors view these patterns in students' subjective belief distributions as being consistent with observable labor market patterns, but inconsistent with students having/using private information when reporting their earnings expectations. Yet, as noted by Gong et al. (2019), the uncertainty-reducing effect of the greater or better information that high-ability or high-SES students may well be counterbalanced by the uncertainty-enhancing effect of their having greater access to job opportunities. Gong et al. (2019), too, find no difference by American College Testing (ACT) score in the extent of uncertainty held by Berea students at college entrance about their future labor market earnings. They do find differences by race, though. Specifically, black students have significantly larger earnings uncertainty when they enter college, but resolve more uncertainty than the other students during college. So, the race gap in earnings uncertainty is closed by the end of college.

7.2.5 Beliefs about population earnings

Beliefs (or expectations) about population earnings and expectations about own earnings are different concepts. Hence, respondents' reports about them may differ. First, respondents may think that future earnings distributions will differ from current ones. Second, respondents should form expectations about own outcomes conditional on the information available to them; such information may include personal attributes and other factors that distinguish the respondent from the relevant population. At the same time, it is possible that when forming expectations about own future earnings respondents take into account what they know about current earnings in a relevant population, as hypothesized by Manski (1993). This provides a rationale for collecting both sets of data and investigating their relationship.

Betts (1996) finds that undergraduate students at the University of California, San Diego (UCSD) are aware that wage profiles are positively sloped, but their estimates of population earnings vary greatly across personal characteristics and wage subpopulations. For example, students in later study years and students from lower income families provide systematically lower earnings estimates than other students.¹⁴ Moreover, students give higher estimates of the average starting salary of graduates in their own field than in other fields. Betts (1996) shows that this is due to students underestimating population earnings in fields other than their own, while holding more accurate beliefs about starting salaries following graduation in their field. Accuracy of students' beliefs starting salaries in their own field, however, does not carry over to salaries of more experienced workers. Betts (1996) further documents that students in later years of study make smaller mistakes, consistently with learning over time; students from poorer families make larger errors when estimating salaries of college graduates; and higher GPA students make smaller errors when estimating starting salaries.

¹⁴ Betts (1996) hypothesizes that this may be because young people form beliefs about the returns to education by observing workers in their neighborhood.

In a sample of community college students in California, Baker et al. (2018) find that less than 15% of students can rank broad categories of majors accurately in terms of labor market outcomes and that students believe that salaries are, on average, 13% higher than they actually are. In contrast, Conlon (2021) finds that Ohio State University (OSU)'s freshmen underestimate the average salaries of workers from most fields by about \$15K (19% of the average true value) or more, on average. Additionally, the author shows that students are significantly misinformed about the differences in average salary between fields. Across all pairs of fields, the mean error in the difference in average salary is close to \$20K (84% of the average true difference).

Dominitz and Manski (1996) and Wiswall and Zafar (2015a) are, to my knowledge, the only two studies to have elicited both population earnings beliefs and own earnings expectations from the same students.¹⁵ Dominitz and Manski (1996) find that both sets of beliefs follow a similar pattern: limited variation across genders and schooling levels, but substantial variation within those groups. The median male respondent has accurate perceptions of the current median earnings of males, whereas the median female respondent overestimates the median earnings in the female population. The authors speculate that this may be due to a tendency of respondents to report their beliefs about full-time, year-round workers. When examining the IQRs, the authors find that students are aware that the spread of the earnings distribution among college graduates is larger than that among high school graduates, but tend to overestimate the degree of earnings inequality.¹⁶ Finally, the authors find that the subjective medians of the two distributions are highly correlated with each other, suggesting that students take their knowledge of the distributions of current earnings into account when forming expectations about own future earnings.

Wiswall and Zafar (2015a) find that their respondents – despite their being high-ability undergraduates at New York University (NYU), a selective private university – significantly underpredict annual average earnings of male workers with no college degree and overpredict average earnings of male graduates in Economics/Business, on average. While errors in students' beliefs vary widely across respondents, these errors are only weakly correlated with students' observables. Using an experimental design that randomly gives students information about population earnings, the authors show that students' expectations about own earnings are causally linked to students' beliefs about the population earnings. However, the latter do not fully explain the former, indicating that students form their expectations about own earnings also based on other factors.

Outside of the U.S., Botelho and Costa Pinto (2004) find that on average Portuguese university students tend to overestimate the actual returns, but female and senior students have significantly more accurate beliefs than male students and students in earlier years of university.¹⁷ Among Chilean college applicants, Hastings et al. (2015) find that high-achieving students hold nearly correct beliefs on average, while low-income and low-achieving students who apply to low-earning programs overestimate earnings for past graduates by over 100%.

¹⁵ Briel et al. (2022) did that as well, but only the first moment.

¹⁶ Wolter (2000), instead, finds that Swiss students tend to underestimate the extent of the spread in wages.

¹⁷ Botelho and Costa Pinto (2004)'s elicitation uses a scoring rule providing a random subsample of respondents with financial incentives for accurate reporting. The authors find no significant effects of incentives on accuracy.

7.2.6 Are elicited earnings expectations rational?

A number of studies has compared students' earnings expectations with earnings realizations. Early analyses have focused on the means of the expectations and realizations distributions. More recent analyses have also looked at higher moments of the two distributions. Sometimes, elicited expectations have been compared with subsequent realizations in a relevant population; whenever possible, they have been compared within the same sample.

For example, Webbink and Hartog (2004) cannot reject the null hypothesis of equality of means between expected and realized earnings in their sample of Dutch students. They further show that this finding does not vary by respondent's characteristics. More recently, D'Haultfoeuille et al. (2021) and Crossley et al. (2021) have developed a series of new tests of rational expectations that take into account the information on higher moments, contained in survey expectations of continuous variables whenever these expectations are elicited as multiple points on the respondent's subjective belief distribution. Crossley et al. (2021) find that earnings expectations become more accurate as BPS students progress through college, and especially after they leave college. Their analysis almost always rejects the null hypothesis of rational expectations based on the data collected in the in-school period, but the evidence against rationality is much weaker on basis of the data collected in the post-college period (see also Crossley et al. (2022)).

7.2.7 Other labor market outcomes

Some studies have also elicited students' expectations for employment status, unemployment risk, and labor supply, finding that these expectations follow empirical patterns that are similar to or consistent with those documented for earnings expectations, for example, in terms of how expectations vary by students' characteristics (e.g., Carvajal et al. (2000), Fischhoff et al. (2000), Brunello et al. (2004), Zafar (2011b, 2012, 2013), Huntington-Klein (2015, 2016), Wiswall and Zafar (2015b,a, 2020), Giustinelli (2016), Baker et al. (2018), Gong et al. (2019), Gong et al. (2020), Belfield et al. (2020), Delavande et al. (2020), Boneva and Rauh (2021), and Boneva et al. (2022b)).

7.2.8 Monetary costs

Measurement of expectations about the monetary costs of education, financing opportunities, and student debt is highly topical, as they have the potential to shed light on the unsettled debate regarding the importance and role of credit constraints in human capital investment and educational choices (see Lochner and Monge-Naranjo (2012, 2016)'s reviews on credit constraints in education).

Hastings et al. (2015, 2016) find that Chilean college applicants have correctly centered but noisy expectations about the costs of college. Nearly 40% of students report not knowing the costs of their stated first-choice degree program, with this proportion varying by students' socioeconomic status (SES) and performance in the college admission exam (*Prueba Selección Universitaria* or PSU). Low-SES students are almost 11 percentage points more likely than high-SES students to report not knowing program costs, and low-PSU students are 19 percentage points more likely than high-PSU students to report not knowing them. Overall, 50% of students have cost expectations that are approximately within 11% of the cost value observed in the administrative data, but again low-SES and low-PSU students have significantly noisier expectations.

Huntington-Klein (2016) finds that high school students in King County, Washington overestimate costs at their first-choice institution by about 41% at the median, and that low-SES students are more likely to skip the tuition question and exhibit larger IQR of the error distribution.

Using the Survey of Consumer Expectations (SCE), Bleemer and Zafar (2018) find that about 60% of their respondents overestimate average college net costs in the U.S., with no significant differences by education or income.

Using UK data, Belfield et al. (2020) document a mean cost belief of £7.3K per year and a modal cost belief of £9K, consistently with the transition of most universities to the maximum fee of £9K. The authors also find that the response distribution is similar across gender and socioeconomic groups, with responses bunching at £5–6K and £9–10K and a few outliers above £10K. However, high-SES students expect somewhat higher costs than low-SES students. Boneva et al. (2022b) find that female university students report a higher average probability of struggling financially than their male peers, and that high-SES students who attended a state school perceive a significantly larger difference in the probability of struggling financially if they were to pursue postgraduate education relative to not pursuing it than students who attended a private school, despite giving lower subjective estimates of the immediate costs of postgraduate education. Boneva and Rauh (2021) find that, on average, students report a higher probability of struggling financially, a lower probability of having enough money, and a higher probability of receiving financial support from their parents, in the university enrollment scenario than otherwise. Again, beliefs vary significantly across SES groups, with low-SES students reporting significantly higher probabilities of struggling financially and lower probabilities of having enough money and receiving financial support from their parents than high-SES students.

7.3 Survey expectations about nonmonetary outcomes of schooling

7.3.1 Are elicited probabilities meaningful? Rational?

Similarly to studies of earnings expectations, early studies of expectations about nonmonetary outcomes have focused on evaluating the informativeness and quality of survey expectations. Fischhoff et al. (2000) evaluate the probability reports of teen respondents aged 16–17 in the National Longitudinal Study of Youth 1997 (NLSY97) to 18 questions eliciting percent-chance expectations for significant life events, including “Be a student in a regular school one year from now,” “Have received a high school diploma by the time you turn 20,” and “Have a 4-year college degree by the time you turn 30.” Students’ responses to the first question match favorably with the figure that 95% of the sample teens report being currently in school and with teens not in school giving lower probabilities (46% vs. 95%), whereas the responses to the other two questions seem too optimistic. The average subjective probability of achieving a high school diploma by age 20 exceeds the completion rate of 20-year olds (93% vs. 84%). Even more optimistic are the expectations of earning a 4-year college degree by age 30 (73% vs. 30%).¹⁸

¹⁸ The authors’ overall assessment of the expectations module is that the relative accuracy of most aggregate estimates, the lack of stable individual-difference tendency to give high or low probabilities, the sensible correlations between probability responses and responses to related NLSY97 questions, the respondents’ use of the entire response scale, and the between-group differences reflecting social realities provide confidence in the ability of the instrument to capture respondents’ beliefs.

Cowan (2017) finds that NLSY97 teens' expectations are highly predictive of their future college completion and concludes that youths take the expectations question seriously. At the same time, his analysis confirms Fischhoff et al. (2000)'s earlier finding that teens' college expectations are overly optimistic. This is also consistent with earlier evidence based on nonprobabilistic expectations (e.g., Reynolds and Pemberton (2001) and Jacob and Wilder (2010)) and subsequent evidence based on probabilistic expectations in other samples (e.g., Zafar (2011b) and Stinebrickner and Stinebrickner (2012)). Cowan (2017) further shows that the expectation bias is highly negatively correlated with youths' scholastic aptitude (AFQT) and that, once AFQT test scores are accounted for, other variables such as gender, race/ethnicity, parental education, and family income have little or no predictive power. Moreover, the empirical relationship between youths' expectations and family income tracks closely that between actual college completion and family income. The author interprets these results as suggesting that while teenagers seem to properly anticipate the role of family income in college outcomes, they tend to have a poor understanding of the importance of academic preparation for college success. Using a regression test, Cowan (2017) formally rejects the null hypothesis of rational expectations and confirms that youths' college expectations are overly optimistic, although the degree of bias shrinks as the AFQT percentile increases.

Subsequent studies perform additional analyses assessing the quality of students' probability judgments about nonmonetary education outcomes. Zafar (2011a) rejects cognitive dissonance (the concern that respondents may report beliefs that rationalize their choices). Boneva and Rauh (2021) validate their measures by showing that test-retest correlations are high and do not vary by socioeconomic background. Stinebrickner and Stinebrickner (2012) show that, at the end of the first year of college, both past grades (a stock variable) and expectations about future grades (a flow variable) are related to college drop out, implying that subjective expectations data outperform standard assumptions (e.g., rational expectations) in satisfying a basic theoretical implication of their model. Analyses of this type can be highly valuable for assessing the credibility of subjective expectations data vis-à-vis traditional economic assumptions.

7.3.2 Academic performance, study effort, and ability

Studies of college students find a similar optimism about own academic achievement to that previously documented among NLSY97 respondents with regard to their educational attainment. For example, Zafar (2011b) find that NU undergraduates are on average overoptimistic about their likelihood of graduating with a GPA of at least 3.5. Using the same data, Zafar (2012, 2013) further show that, even though students are largely aware of the relative difficulty of different majors, their expectations about academic performance vary widely by respondent characteristics and major. Zafar (2013) finds that about 60% of male students hold a subjective probability of graduating with a GPA of at least 3.5 in Engineering greater than 50%, while only 30% of female students do so; whereas the gender differences for Literature and Fine Arts are much smaller. Zafar (2012) finds that double-major students report a higher probability of graduating with a GPA of at least 3.5 and lower expected hours per week spent on coursework than single-major students for most majors, consistently with a positive selection of double-major students, who indeed have a higher GPA than single-major students.

Stinebrickner and Stinebrickner (2012) show that also Berea students are too optimistic about grade performance, especially at college entrance. Overoptimism is concentrated among students with a high school GPA in the bottom third of the sample (students with a high school GPA in the top-third have

instead accurate beliefs) and among male students (female students are also overoptimistic but less so). Overoptimism about academic performance is driven by overoptimism about ability (about 70%), not effort. Gender differences in overoptimism about ability are similar to those about grade performance. Boneva et al. (2022b) report similar findings for UK university students.

Belfield et al. (2020) examine the subjective probability of obtaining in 11th grade the necessary grades to go to sixth form, and of obtaining in sixth form the necessary grades to go to university, among UK 9th-graders. They document a strong positive association between these subjective probabilities and students' standardized test scores in grade 6 and household's income quartile. They also find evidence that students exert more effort in school to achieve higher grades if they believe that by getting the required grades they can pursue further education from which they derive a high consumption value. Boneva and Rauh (2021) confirm that low-SES students have, on average, a significantly lower subjective probability of obtaining the required grades to go to university (67% vs. 73%), of graduating from university if they enroll (82% vs. 85%), and of obtaining high grades if they graduate (65% vs. 71%) relative to high-SES students.

7.3.3 “Enjoying” education and other nonmonetary outcomes

Belfield et al. (2020) document that female and high-SES students have higher enjoyment probabilities for both sixth form and university than male and low-SES students, respectively. They also find low correlations between the perceived consumption values of education and the perceived monetary returns to education.¹⁹

Boneva and Rauh (2021) find that students from different SES backgrounds share the beliefs that they would be more likely to enjoy the content, find the material interesting, find the material hard, enjoy social life, meet people they easily get along with, lose contact with their family/friends, and feel stressed, and that they would be less likely to feel lonely, if they were to attend university instead of working. However, low-SES students display smaller perceived returns of positive outcomes (e.g., enjoying the content, the material, and social life), and larger perceived returns of negative outcomes (e.g., feeling stressed or lonely) relative to high-SES students. Boneva et al. (2022b) report broadly similar findings among university students with respect to the possibility of continuing to postgraduate education vis-à-vis starting to work.

Gong et al. (2021) estimate an average annual consumption value of college as high as \$15K with considerable heterogeneity across students using the Euler equation, expectations data, and other measures collected in the BPS.

7.3.4 Nonmonetary outcomes in the labor and marriage markets

Zafar (2012) shows that the belief distribution about the prospects of being able to reconcile family and work at the available jobs following graduation for Natural Sciences is first order stochastically dominated by that for Literature and Fine Arts, consistent with the general perception that the typical jobs in the pure science and medical profession entered by NU graduates with a major in Natural

¹⁹ These findings are consistent with those of Baker et al. (2018), who find that salary beliefs are uncorrelated with enjoyment beliefs, but in contrast with those of Wiswall and Zafar (2015b), who find that salary expectations are correlated with taste for majors.

Sciences have hectic work schedules. Zafar (2013) further shows that the belief distributions of male and female students are similar for Economics and Mathematical Methods in the Social Sciences, but dramatically different for Engineering, where the belief distribution of males first order stochastically dominates that of females.

Wiswall and Zafar (2020) find that male and female students share the belief that the marriage return to completing a college degree is positive, but their average perceived returns differ, with female students believing that their likelihood of being married at age 30 would be nearly 13% higher on average if they completed a college degree and men believing that their likelihood would be over 35% higher. Furthermore, unlike males, female students believe that there is a marriage market penalty of about 15 points on the percent chance scale to completing a degree in Science or Business relative to that in the Humanities or Social Sciences. Using earnings expectations, the authors also find that students believe that investing in human capital will not only lead to higher earnings for themselves but also to a match with a higher-earning spouse. With respect to fertility, students expect that by age 30 they would have fewer children following a major in Science or Business than in the Humanities. However, these same expectations are halved when asked for age 45, suggesting that students anticipate that human capital investments will also have an effect on the timing of fertility, not only on its level.

Among UK students, Boneva et al. (2022b) document higher likelihoods of career and life satisfaction conditional on hypothetical attainment of a postgraduate degree and find no statistically significant differences in average perceived returns across SES groups. Boneva and Rauh (2021) further find that students from all SES groups share the belief that they are more likely to meet their life partner if they go to university than if they start working, but the perceived marriage premium from attending university is significantly larger among high-SES students on average.

7.3.5 Attainment and dropout

Comparing NLSY79 with NLSY97, Reynolds and Pemberton (2001) show that in 1979 less than 40% of respondents expected to achieve 16 or more years of education; by 1997, over 70% of respondents reported they had more than a 50% chance of completing college by age 30 and over 50% believed their chances were greater than 75%. The authors further find that in 1979 racial/ethnic minorities have significantly higher college attainment expectations than non-Hispanic Whites, *ceteris paribus*. College attainment expectations are also significantly positively associated to parental education, parental income, the percentage of the county population with a college degree, and the county's unemployment rate, but not to gender. On the other hand, youth in two-parent families where only one parent is related to the youth through birth or adoption have significantly lower college attainment expectations than youth living with both biological parents. Similarly, youth with more siblings have lower college expectations. By 1997, the associations with race/ethnicity, family resources, and county context become weaker and those with family size remain unchanged relative to 1979. The most noticeable differences are the growing gaps between male and female youths and among family arrangements. In 1997, high school girls have significantly higher college attainment expectations than their male peers and, according to enrollment data, are significantly more likely to attend college. Similarly, high school youth living with both biological parents have significantly higher college expectations than youth with any other type of family arrangement. For 1997, the authors further find that grades received in 8th grade, having good teachers who are interested in their students, and having peers who plan to go to college all have a strong positive impact on expectations.

Stinebrickner and Stinebrickner (2012) show that Berea students' overoptimism about GPA and ability translates into overoptimism about completion. Stinebrickner and Stinebrickner (2014a) provide additional evidence that students are substantially overoptimistic about graduation at entrance. BPS respondents assign an average probability of about 13% to the possibility that they will drop out of college and only 5% of them believe that dropping out is their most likely outcome, whereas over 35% of Berea students actually drops out. In a high-ability sample of NYU undergraduates, Wiswall and Zafar (2015b) document similar degrees of optimism.

Boneva et al. (2022b) find that UK students believe they have an 89% chance of completing university. This estimate does not vary significantly by students socioeconomic background and compares favorably with UK statistics. On the other hand, low-SES students report significantly lower probability of graduating from a postgraduate degree than high-SES students.

Kunz and Staub (2020) show that German respondents aged 16–17 tend to be overly optimistic about their medium run graduation prospects; yet, students' subjective probabilities have a comparable information content to that of standard econometric models with perfect foresight. Furthermore, the authors find that the most important predictors of students' completion expectations are their academic ability and personality traits, whereas the most important predictors of actual enrollment and completion are measures of family background (parental education and household income) and local labor market conditions (youth unemployment and education demand and supply).

7.3.6 Education plans

Stinebrickner and Stinebrickner (2014a) document that at college entrance BPS students are highly uncertain about their college major, e.g., students assign a probability of only 31% to choosing the major they actually choose. The authors show that this partly occurs because initially 20% of students indicate Science as their most likely major, but only 7% end up majoring in Science. The reasons are overoptimism about own probability of graduating from college, overoptimism about remaining in Science, and overoptimism about switching to Science.

Wiswall and Zafar (2015b) show that for most university fields the cross-sectional distribution of NYU students' choice probabilities is bimodal, due to a considerable mass of students reporting a zero-to-small probability of majoring in each field and another mass reporting a large-to-one probability of doing so. Using the same data, Patnaik et al. (2020b) find that female students report a significantly higher probability of majoring in Humanities than their male peers (49.9% vs. 31.4%) and a significantly lower probability of majoring in Economics/Business (23.8% vs. 36.7%) or Engineering (5.6% vs. 8.7%).

Belfield et al. (2020) document that UK high school students aged 13–14 have an average probability of continuing to sixth form that compares favorably to UK enrollment statistics. Female students, students who have at least one parent with a university degree, and students in the top income quartile report higher probabilities of going to sixth form and of going to university than other students. Among older UK students, Boneva et al. (2022b) show that university students whose parents never went to university report a lower average probability of enrolling in postgraduate education than other students.

7.3.7 Parental approval and parental beliefs

Zafar (2012) document that the mean subjective probability of gaining parental approval varies across majors (from a low of 59% for Literature and Fine Arts to a high of 87% for Natural Sciences), which

they interpret as suggestive that students believe parents to be more likely to approve of majors associated with higher status and returns in the labor market.

In the context of postgraduate enrollment choice in the UK, Boneva et al. (2022b) find that the mean subjective probability of gaining nonmonetary parental support is similar across schooling scenarios (79% for both stopping with an undergraduate degree and pursuing a postgraduate degree). Parents with a postgraduate degree are perceived as more likely to support pursuing a postgraduate degree relative to stopping with an undergraduate degree, whereas the opposite is true for parents who never went to university.

Only a handful of studies to date has separately elicited percent-chance expectations from students and their parents and have compared the two sets of expectations. Using NLSY97 data, Fischhoff et al. (2000) document that parents share their teens' generally high expectations for educational attainment, with no significant child–parent difference in the mean probabilities of being in school in a year and of having a diploma by age 20. At the family level, the authors document high correlations between the judgments of paired teens and parents, declining slightly as the time period increases. Dominitz et al. (2001) further document that most youths and parents see no chance of an adverse schooling outcome, with the parents being more optimistic than the students on average. They also find that the within-family differences between parent and child is significantly lower for female relative to male youth. Furthermore, in families where the child report unfavorable past experiences such as school suspension, grade repetition, sexual intercourse, and cigarette or marijuana smoking, both child and parents report lower subjective probabilities that the child will receive a diploma by age 20.

Giustinelli (2016) similarly finds that Italian students and parents hold broadly similar beliefs about the chances of a variety of outcomes at the time of high school track choice. The within-family differences in beliefs between child and parent are generally small on average, especially for outcomes such as school enjoyment, but display substantial heterogeneity across families. Based on a Wilcoxon matched-pairs signed-ranks test, the null hypothesis of expectations equality between the child–parent matched pairs is rejected for the majority of choice alternatives and outcomes. Consistently with Dominitz et al. (2001)'s evidence from the NLSY97, also Italian parents appear to be more optimistic about the student's performance than students are. Moreover, parents expect on average smaller differences in the student's study effort and academic performance across high school tracks than students do.

7.4 Analysis of schooling decisions with survey expectations

7.4.1 Monetary returns and risks

Observational studies have typically found modest effects of expected earnings on schooling decisions.²⁰ How about studies of schooling decisions using survey expectations?

Zafar (2013) finds a positive but small and insignificant effect of subjective expectations of income at age 30 on college major choices of NU undergraduates, irrespective of gender and other stratifications. Arcidiacono et al. (2012) find somewhat larger and statistically significant effects among male

²⁰ For example, see Arcidiacono (2004) and Beffy et al. (2012) for evidence on the postsecondary field of study in the U.S. and France, respectively. See also Altonji et al. (2016)'s review.

Duke undergraduates (e.g., a one standard deviation increase in expected earnings in a business career increases the fraction of students majoring in economics from 19.7% to 22.9%). Wiswall and Zafar (2015b), too, find that expectations about future earnings are a significant determinant of major choice among NYU undergraduates, although their estimated average elasticities are modest (between 0.03 and 0.07). They provide evidence that younger students display higher responsiveness to changes in future earnings than older students, presumably because older students have a higher cost of switching major.

Wiswall and Zafar (2015b) show that the estimated elasticities shrink substantially once the correlation between unobserved tastes for majors and expected earnings has been taken into account, and that it is also important to account for students' subjective uncertainty about future earnings. They estimate a large degree of risk and find that unaccounted-for risk aversion tends to inflate the estimated responsiveness of major choice to changes in expected earnings. In follow-up work, Patnaik et al. (2020a) show that ignoring heterogeneity in risk and time preferences also overstates the importance of expected earnings for major choice.

Some studies investigate whether differences in schooling decisions across demographic or socioeconomic groups can be explained by differences in students' subjective expectations or are due to differences in preferences. Zafar (2013) finds that the gender gaps in college majors among NU undergraduates, whereby females are significantly less likely than males to pursue majors such as Engineering or Computer Science and more likely to pursue majors such as Education or Health, cannot be explained by gender differences in either expectations or preferences for future earnings. Patnaik et al. (2020a) similarly find that, while male students are less risk averse and patient than female students, gender differences in expectations about future earnings, risk aversion, and patience cannot explain gender gaps in major choice among NYU undergraduates.

Hastings et al. (2015) evaluate a large-scale randomized disclosure policy, giving information about program-specific earnings and costs to college applicants in Chile and find that the intervention decreases the demand for degree programs in the bottom tercile of the returns distribution, especially among low-income students, while leaving college enrollment unaffected. To understand why disclosure does not completely eliminate the demand for low-return programs, the authors estimate a model of college demand with belief uncertainty and learning about earnings and costs and show that the intervention reduces the uncertainty in earnings beliefs, but the latter's effect on program demand is dampened by students' preferences for nonmonetary attributes.

Among UK students aged 13–14, Belfield et al. (2020) find that the perceived monetary returns to further education are statistically associated with students' plans to continue in full-time education, but can only explain a small share of the latter's variation relative to other perceived benefits of schooling. Boneva et al. (2022b) further document that, on average, low-SES students perceive significantly lower monetary returns to postgraduate education and assign a lower probability to continuing to postgraduate education than high-SES students.²¹ Yet, differences in beliefs about nonmonetary factors have greater explanatory power on the observed socioeconomic gap in postgraduate education plans and enrollment than do differences in earnings expectations.

²¹ The authors find substantial differences also within high-SES students, with students who have at least one parent holding a postgraduate degree reporting an 8 percentage points higher probability of enrolling in a postgraduate degree than students whose parents are college educated but have no postgraduate degree.

7.4.2 Monetary costs

Recent decades have been characterized by increasing monetary returns, labor market risk, and monetary costs of postsecondary education, especially in the U.S. These trends have increased the demand for credit, simultaneously raising the question of whether college students can borrow enough or are credit constrained, and the concern that some students may be actually taking on too much college debt (Lochner and Monge-Naranjo, 2016). Recent evidence on the high degree of complementarity between early and late human capital investments has further generated a concern that postsecondary aid policies may simply come too late to be effective in helping disadvantaged youth (Lochner and Monge-Naranjo, 2012).

Given the ongoing debate, it would seem natural to ask whether students' expectations about tuition and other monetary costs of postsecondary education and their beliefs about borrowing opportunities and terms play a role in college decisions and outcomes such as enrollment, dropout, and major. In practice, the evidence for the U.S. is scarce.²² Based on a randomized experiment providing information about the monetary costs of college or the monetary returns to college in a sample of SCE respondents, Bleemer and Zafar (2018) find that the cost treatment has no significant impact on college attendance expectations, whereas the return treatment has a significant impact on them. Respondents' subjective probability of sending their own child to college increases by about 5 percentage points on average and that of recommending college for a friend's child by 2.3 points. The effects are larger for disadvantaged respondents. In the short run, the return treatment closes the education and income gaps in college attendance expectations by around 30% and in college recommendation expectations by about 15%. These effects were still persistent two months after the treatment.

Hastings et al. (2015) too find that the cost disclosure intervention does not cause Chilean college applicants to choose lower-cost programs. Thus, both Hastings et al. (2015)'s and Bleemer and Zafar (2018)'s findings suggest that information provision about the monetary returns to college can significantly affect college decisions and plans, whereas information provision about monetary costs does not.

Combining the same data with an informal model of college enrollment,²³ Hastings et al. (2016) show that students who overestimate costs are less likely to matriculate in any degree program and more likely to drop out; whereas students who overestimate earnings matriculate at similar rates as other students, but choose degree programs where past students have performed poorly (less likely to graduate, earned less in starting jobs, and more likely to default on student loans). Students with a stated preference for degree characteristics related to the labor market are less likely to overestimate earnings and to choose degree programs whose past graduates have earned more on the labor market, while the opposite is true for students with a stated preference for curriculum enjoyment.²⁴

²² Altonji et al. (2016) review the studies examining the impact of financial aid and tuition fees on college attendance, and note that very little is known about their impact on college major choice.

²³ In the model, college applicants face uncertainty about costs and earnings for different degree programs, decide whether to engage in costly degree-specific search, and can further learn about the chosen degree after enrollment. The model has five main predictions: (1) students facing higher search costs have less accurate beliefs about program attributes such as monetary costs and returns; (2) students who place low value on costs or earnings when making the enrollment decision have less accurate beliefs about those outcomes; (3) students know more about programs in their consideration set; (4) students with less accurate expectations about costs or earnings are more likely to enroll in degrees where past students have performed poorly in those dimensions and more likely to drop out when the uncertainty is resolved.

²⁴ Huntington-Klein (2016) replicates Hastings et al. (2016)'s analysis and selected findings in the U.S.

Belfield et al. (2020) find no significant role of UK students' expectations about tuition costs in sixth-form and college enrollment plans. The authors view this result as being consistent with the failed drop of enrollment in higher education after the recent increase in university tuition fees. Conversely, Boneva et al. (2022b) find that financial considerations do play a role in students' postgraduate plans. The authors estimate that students would be willing to trade off £0.38 in immediate costs for a £1 increase in earnings at age 35. However, nonmonetary factors are found to play a larger role. Boneva and Rauh (2021) find similar results with regard to younger students' college enrollment plans. Financial considerations related to the possibility of struggling financially during college and receiving financial support from parents play a greater role than earnings expectations, but a smaller role than other nonmonetary factors.

7.4.3 Nonmonetary factors: ability, taste, and beyond

Due to the failure of expected monetary returns and costs to explain schooling decisions and related differences across demographic and socioeconomic groups, the literature has turned to investigating the explanatory power of expectations for nonmonetary factors, leading to the robust finding that these are indeed predominant drivers of schooling decisions and plans, although their importance vary across settings and groups.

Two factors whose importance has been long emphasized in the human capital literature are students' abilities and tastes, as they capture key dimensions of the quality of the match between a student and each of the educational alternatives available to him or her (Arcidiacono, 2004). Indeed, Arcidiacono et al. (2012) find that major-specific abilities are important determinants of major choice among Duke undergraduates, above and beyond expected earnings, and that students prefer majors at which they are good. The authors show that equalizing student abilities across majors would drop the fraction of humanities majors from 9.3% to 5.9%, while increasing the fraction of economics majors to 23.8%. Similarly, Baker et al. (2018) find that students' beliefs about course enjoyment and grades are the main determinants of major choice among community college students in California.

Wiswall and Zafar (2015b) identify the residual unobserved taste-for-major component as the dominant factor driving major choice among NYU undergraduates, especially among older students, consistent with a large and increasing cost of switching majors as students progress through college.²⁵

Zafar (2013) finds that enjoying the coursework, enjoying the work at potential jobs, and gaining parental approval are the most important factors driving major choice of NU undergraduates, and that nonmonetary factors explain over 50% of the variation in college major choices among male students and over 80% among female students. Zafar (2013) shows that this is due to gender differences in preferences for workplace attributes, with females valuing nonmonetary aspects such as reconciling work and family substantially more than males. Using his model, Zafar (2013) shows that replacing females' expectations about enjoying the major-specific coursework with those of males would reduce the choice gap in Engineering by 50%, whereas replacing females' expectations about ability and future earnings with those of males would reduce the gap by only 15%, implying that policies aiming at sensitizing females' preferences for STEM fields may be more promising than policies providing information about the monetary returns to STEM fields.

²⁵ Wiswall and Zafar (2015b) discuss the implications of these results for modeling of tastes in choice models with subjective expectations. See also Giustinelli (2022) and Chapter 21 in this Handbook.

Wiswall and Zafar (2020) complement this evidence by showing that students sort into college majors partly based on their perceived returns in terms of potential spouse's earnings and fertility, and that family expectations are particularly important for the major choices of NYU female students.

In the context of high school track choice, Giustinelli (2016) finds that enjoying track-specific subjects is by far the most valued attribute by both students and parents, irrespective of the family decision-making process (solo choice by the student, student choice with parental input, child-parent joint decision). The importance of other short-term outcomes (e.g., academic performance and study effort) relative to longer-term ones (e.g., facing flexible college and work choices after graduation) is instead highly heterogeneous across family members and decision processes. Using her model to perform a number of policy counterfactuals, the author finds that a "math sensitization" campaign increasing students' perceived likelihood of enjoying math in the general track by 10 points on the 0–100 percent chance scale, a relatively small movement in expectations, can have a large impact on the distribution of choices due to the large utility weight that students and parents attach to coursework enjoyment. Subjecting university access to graduation from one of the general curricula – a policy tightening curricular specialization – would also have a significant impact on choices. Instead, providing information about population graduation rates or college enrollment rates by track would have little-to-no impact on choices, due to the modest associated utility weights and to respondents' expectations being already on target for these outcomes.

The findings of Belfield et al. (2020), Boneva et al. (2022b), and Boneva and Rauh (2021) for the UK also point to a predominant importance of nonmonetary factors in driving students' education plans and in accounting for observed demographic and socioeconomic differences in them. Belfield et al. (2020) find that students' perceived consumption value alone explains up to 43% (51%) of the variation in students' subjective probability of going to sixth form (university). Boneva et al. (2022b) find that 91% of the SES gap estimated by their model of postgraduate enrollment can be explained by SES differences in expectations and only 9% by SES differences in preferences, with expectations about the returns to postgraduate education accounting for approximately 70% of the gap. Among younger students, Boneva and Rauh (2021) find that differences in perceived returns across SES groups explain 35% of the SES gap in students' subjective probability of enrolling in university. Students' expectations about receiving parental approval, enjoying studying, and job satisfaction play a major role, whereas monetary factors and parental wealth play a minor role.

7.4.4 Parents and family decision-making

Economic models of school choice have traditionally assumed that parents make schooling decisions for their children while children are minors and that students become solo decision makers when they come of age.²⁶ Accordingly, demand models of postsecondary schooling have typically taken the student as the main decision maker or have implicitly viewed the family as a unitary entity.²⁷ Yet, Zafar (2013)'s and Boneva and Rauh (2021)'s findings on the importance of gaining parental approval in college major choices of NU undergraduates and university enrollment plans of UK high school students,

²⁶ Only limited attention has been devoted to the roles of agency acquisition by children, child–parent interactions, and family decision-making in schooling decisions. Giustinelli and Manski (2018) and Giustinelli (2022) review existing works.

²⁷ Kalenkoski (2008) and Attanasio and Kaufmann (2014) are notable exceptions.

respectively, suggest that parents may play a more active role in postsecondary schooling decisions than previously assumed.²⁸

Giustinelli (2016) addresses the roles of student vis-à-vis parents in the choice of high school track in Italy. The author documents that in nearly 59% of the sample families the actual choice does not coincide with the stated-preferred choice of at least one member, and that in the majority of these cases (about 33% of the whole sample) the actual choice coincides with the stated-preferred choice of the student but not of the parents. This figure is substantially higher among students making a unilateral choice (40%) and lower among families where child and parents make a joint decision (29%).²⁹ Giustinelli (2016) estimates a model that explicitly allows for the documented heterogeneity in family decision processes and in the ways in which student and parent expectations and preferences over track-specific outcomes affect high school track choice. The analysis uncovers significant differences in preferences over track-specific outcomes between students and parents and, within each group, across decision processes. For example, students value outcomes such as experiencing a regular path in high school and being in school with one's friends more than their parents. Among students, those from PR1 families have a higher disutility of study effort and assign a greater utility to pleasing one's parent than students from other families. Among PR2 families, parental expectations have differential influence on the student's choice through different outcomes. For example, parental expectations about the child's academic performance in high school matters more than the child's own expectations, whereas the opposite is true about postgraduation choice flexibility. Among PR3 families, parents have a greater influence on the final choice than their children, with an estimated decision weight of about two-thirds. Counterfactual simulations further confirm the importance of accounting for students' and parents' expectations and decision roles. Mistakenly taking the parent to be the main (or representative) decision maker in all families is found to overestimate the enrollment response to a simulated math sensitization campaign. On the other hand, taking process heterogeneity into account shows that a disclosure policy publishing population statistics on graduation rates would have the largest impact on the choices of solo-choice students. It also shows that if parents alone were made aware of an institutional policy making curricular tracking more rigid, the policy impact would be smaller than if children too were made aware.

7.4.5 Peer effects

Giustinelli (2016)'s estimates suggest that students prefer high school tracks in which they expect their best friends to enroll. In her setting, the mechanism underlying this preference is that students value the possibility of attending the same high school as their best friends and of sharing with them the following five years of their school lives. An alternative but not mutually exclusive possibility is that students value choice alternatives that they expect to be chosen by many of their peers because of the implied "popularity" of these alternatives. Garbin (2021) investigates this possibility by estimating a model of high school track choice, where students' subjective expected utility depends on their expectations about the high school track choices made by the students in their network. The author finds that stu-

²⁸ See also recent evidence by Hotz et al. (2021) on the role of American parents in financing college enrollment and completion of their children.

²⁹ In about 20% of families, the student chooses unilaterally with respect to his/her parents (PR1); in about 30%, the student chooses with parental input (PR2); in the remaining 42%, student and parents make a joint decision (PR3).

dents' expectations about the choices of one's peers matter more for own choice than the expectations over important academic outcomes such as the coursework enjoyment and study effort.

7.4.6 Centralized school choice

In many places around the world, school choices are determined within centralized choice systems matching students to schools on the basis of families' self-reported preferences over schools, schools' capacity, and other constraints. Different matching mechanisms can have different properties in terms of matching stability, allocation efficiency, and strategy proofness (see Hakimov and Kübler (2021)). However, these theoretical properties hold under the strong and often unrealistic assumptions that the canonical version of the mechanism is actually implemented and that applicants are fully informed, hold rational expectations, and make rational choices. In practice, students and families may not be fully familiar with the application-and-admission rules, may not hold accurate beliefs about the student's chances of being admitted to different schools, and may consequently make application mistakes. These problems may disproportionately affect disadvantaged youth and lead to individually suboptimal outcomes and undesirable distributional properties.³⁰

Kapor et al. (2020) study the application behavior of families of rising 9th-graders in New Haven, Connecticut. The authors find that many families engage in strategic reporting behavior, but do so on the basis of an inaccurate understanding on the rules and inaccurate beliefs about the admission chances, leading to application mistakes. Indeed, a lower fraction of respondents correctly describe key features of the assignment mechanism than that implied by random guessing. Moreover, respondents report subjective beliefs about admission probabilities that differ from a rational expectations benchmark constructed by the authors by a large mean (absolute) value of 37 percentage points. As a consequence, families end up underestimating the extent to which ranking a school higher or lower on their application affects the admission chances. Using a model of centralized school choice that incorporates these patterns, the authors show that switching to a strategy-proof deferred acceptance (DA) mechanism, where applicants do not need to understand assignment probabilities to play an optimal strategy, would yield welfare improvements over the status quo, but the opposite conclusion would be reached if families were assumed to have accurate beliefs.

In follow-up work, Larroucau et al. (2021) investigate the role of beliefs about admissions chances in centralized choice settings with strategy-proof mechanisms and show that beliefs still matter, as they influence applicants' search behavior over schools. Combining a model where applicants engage in costly school search with data from a large-scale survey of school applicants in Chile, the analysis provides evidence that learning about schools is costly, beliefs about admissions chances affect searching, and applicants underestimate the risk of not being placed by the system. Using randomized and regression discontinuity designs, the authors evaluate policies that give live feedback about admission chances to applicants within the Chilean and New Haven choice systems. They find that 22% of applicants submitting applications where nonplacement risk is high respond to the feedback by adding schools to their lists and that this reduces nonplacement risk by 58%.

In companion research, Arteaga et al. (2022) analyze the prevalence and relevance of application mistakes in the Chilean strategy-proof centralized college admissions system, with a focus on admissibility mistakes which consist in applying to programs without meeting all requirements. The authors

³⁰ For example, see Sattin-Bajaj (2014), Calsamiglia and Güell (2018), Son (2020), and references therein.

find that 2%–4% of students do not list their true most preferred program, that only a fraction of this behavior can be rationalized by belief biases, and that students tend to underestimate the probability of extreme events and to underpredict the risk of not being placed. The authors additionally show that providing personalized information about admission probabilities significantly reduces the risk of not being placed and the incidence of admissibility mistakes.

7.5 Analysis of expectation formation and learning

7.5.1 Earnings

Manski (1993)’s question about what information students condition on when forming their expectations about future earnings and related perceptions about the monetary returns to schooling underlies many of the analyses of survey-elicited earnings expectations reviewed above. Notably, Wiswall and Zafar (2015a) establish that college students’ expectations about own future earnings are causally linked to their beliefs about the distribution of earnings in relevant populations; thus, the former are formed at least partially based on the latter. Taking advantage of their experimental design, the authors document a positive relationship between students’ revisions in own earnings expectations and population errors. Treated students who discover that they underestimated (overestimated) population earnings revise their earnings expectations upward (downward). The estimated mean response is inelastic, with larger revisions occurring in response to major-specific information. In the full sample, 20% of students do not update their expectations. Among those who do, the most common heuristic is unit updater (28% of the sample), followed by alarmist (19%), contrary and conservative (12% each), and undefined (9%).³¹ Students who have been in college longer are less likely to revise their expectations and to react excessively to information relative to the quasi-Bayesian benchmark (unit updater). Students whose prior population beliefs exceed actual population earnings are more likely to update conservatively. No difference across genders is found. The information treatment also induces revisions in choice probabilities over majors, implying a switch in the modal major for about 12% of the students.

Gong et al. (2019) take advantage of the longitudinal structure of the BPS to investigate the extent and evolution of perceived uncertainty about future earnings among Berea students. The authors document that at college entrance, the cross-sectional average of the standard deviation of students’ subjective belief distributions about future own earnings at age 28 ranges between \$9.6K and \$14.1K a year. While the importance of this initial earnings uncertainty relative to that of heterogeneity is well below 50%, the uncertainty itself is quite persistent, as about 65% of it is still present at the end of college. The authors show that 15%–18% of the variance representing the uncertainty about earnings at age 28 perceived at college entrance can be attributed to uncertainty about grade performance and 11%–17% to uncertainty about college major. The uncertainty about these two factors combined accounts for about 18%–24% of the initial overall uncertainty about future income, suggesting that uncertainty resolution during college reflects students’ learning about their academic ability and college

³¹ A student is classified as (1) a unit updater, if his/her posterior is within a certain band around the benchmark posterior; (2) an alarmist, if his/her response is more exaggerated than implied by the benchmark; (3) a conservative, if the respondent updates in the right direction but less than the benchmark; (4) a contrary, if the updating is in the opposite direction than prescribed by the benchmark model; and (5) a nonupdater, if there is no response to the information.

major. The authors provide further evidence that transitory factors, including search frictions, play an important role in accounting for the remaining uncertainty.

7.5.2 Academic performance

Zafar (2011b) studies expectations about academic performance, defined as the probability of graduating with a GPA of at least 3.5, and uses students' GPA realizations to construct an "information metric" that identifies new information about own academic ability the students receive between survey waves. The author finds that students are initially overconfident about their academic performance in all majors, but they adjust their short-term predictions in response to the new information sensibly: upward upon receiving very positive news, downward upon receiving very negative news, no adjustment for news in the intermediate range. No significant adjustments are observed in long-term GPA expectations. The information metric and the revisions in expectations about weekly hours spent on coursework are negatively related, suggesting that students view ability and effort as substitutes. A comparison of the updating patterns between GPA expectations in the student's own major and GPA expectations in nonpursued majors shows that the two are statistically indistinguishable, suggesting that learning has a general component. That is, by learning about match quality in one's own major, students learn also about their match quality in other majors. Despite the substantial cross-sectional heterogeneity in information-processing rules, a number of empirical patterns suggests that students revise their expectations in ways that are broadly consistent with Bayesian learning.

Stinebrickner and Stinebrickner (2014a) develop a model to understand the reasons behind Berea students' overoptimistic initial expectations about completing a degree in science relative to their final outcomes.³² The model explicitly accounts for the fact that before making a final decision about one's future major, students will have the opportunity to resolve some of their initial uncertainty about major-specific factors.³³ The authors find that students' initial overoptimism about completing a degree in science is largely due to their initial misperception about their likelihood of performing well in science. Science is special relative to other majors, in that students learn about their ability in science primarily by taking science classes (specific learning), whereas substantial learning about one's ability in other majors occurs by taking classes outside those majors (general learning).

Motivated by the inability of financial factors and credit constraints to explain the educational attainment of low-income students and by existing differences in dropout rates within low-income students (e.g., by gender), Stinebrickner and Stinebrickner (2012, 2014b) investigate the role of learning about academic ability through grade performance in college dropout. Stinebrickner and Stinebrickner (2012) find that dropout would be reduced by 41% if no learning occurred about grade performance. Moreover, the substantial gender difference in dropout is predicted almost entirely by academic differences by gender, as measured by both first-year grades and students' expectations about future grades, with males holding significantly more overoptimistic grade beliefs than females. Because students tend to remain overoptimistic about their future performance due to their not understating the importance of permanent

³² Recall that while about 20% of entering students views science as their most likely outcome (a higher proportion than for any other major), and students' average perceived likelihood of completing a science degree is 16% (similar to that of other majors), only 7% of students complete a degree in science.

³³ At college entrance, Berea students are highly uncertain about their final major. On average, they have a subjective probability of graduating from the major from which they eventually graduate of about 30%.

factors in determining grades, the authors conclude that their evidence mitigates the widespread policy concern that students may be leaving college prematurely.

Stinebrickner and Stinebrickner (2014b) develop a dynamic model of college dropout to quantify the overall importance of students' learning about grade performance for dropout and to assess the empirical relevance of three mechanisms why low-performing students may dropout, i.e., (1) they are forced out of college by grade requirements even though they would prefer to stay, (2) they leave because getting low grades lowers their financial returns to staying in college, (3) they leave because getting low grades reduces enjoyability of college. The authors show that, if students held initially correct expectations about future grade performance, about 45% (36%) of dropout in the first two (three) years would disappear, and that the dropouts observed in early years of college are primarily due to students' learning about their academic performance. The analysis further shows that students who perform poorly in the first years leave mainly because staying is not sufficiently valuable (2 and 3), rather than because they are at risk of failing (1), and that students are more likely to drop out relative to females because of academic issues rather than because of inherent taste factors.

Giustinelli and Pavoni (2017) investigate the evolution of students' choice set awareness and belief ambiguity³⁴ about the likelihood of experiencing a regular path in high school, during the process of high school track choice in Italy.³⁵ At the beginning of 8th grade, students display incomplete awareness and ambiguous expectations, especially with regard to low-ranked and newly-introduced alternatives. By the time of preenrollment in high school, students' learning is still incomplete. Moreover, learning itself tends to be concentrated on specific alternatives, this time those most highly ranked by students. The authors identify five main patterns of heterogeneity as a function of students' gender, 8th-grade GPA, mother's education (high SES), father's occupation (low SES), and country of birth. High-SES students display an intensive learning pattern differentiated across high school tracks. Conversely, low-SES students display a more focused learning pattern concentrated on curricula of the technical and vocational tracks. Foreign-born students start 8th grade with lower choice awareness and higher belief ambiguity relative to native students and follow a biased learning pattern, whereby their level of ambiguity for curricula of the general track tends to increase over time. One-fourth of students change their preference ranking over choice alternatives over the survey period, suggesting that the learning process may be crucial for the choice of a sizable fraction of students. The "selective learner" may become stuck with a coarse view of the world that associates a high degree of ambiguity to initially unattractive options, thus reinforcing undesirability of the latter in later periods.

7.6 Conclusion

The economic literature on survey-elicited probabilistic expectations in education was put in motion nearly 30 years ago by a question lacking empirical answer, "*How do youth infer the returns to schooling?*" (Manski, 1993), and by a small set of pioneering studies such as Dominitz–Manski's study and Stinebrickner–Stinebrickner's BPS, which paved the way for subsequent surveys and analyses of

³⁴ See Chapter 24 in this Handbook on uncertainty as ambiguity. See Manski and Molinari (2010) and Giustinelli et al. (2022) for elicitation and analyses of ambiguous probabilities outside education.

³⁵ Giustinelli and Pavoni (2019) carry out a parallel analysis using parents' responses.

subjective expectations, both within and outside education. The amounts and varieties of survey measurements, analytic tools, and empirical evidence accumulated since have been extraordinary. Having taken stock of them, it is natural to ask what they have taught us about Manski (1993)'s initial question. Upon careful review, it appears that they have generated a number of important answers. And yet, in the process of doing so, they have also expanded the scope of the initial question and raised important new ones.

We have learned that students' expectations about own future earnings are causally linked to students' beliefs about population earnings, but only partially determined by them. We have further learned that students form expectations about own future earnings and about the monetary returns, risks, and costs of schooling heterogeneously, but only a part of this heterogeneity can be accounted for by observable factors such as students' characteristics and institutional or market conditions.

In fact, the latter have received much less attention than the former. For example, Arcidiacono et al. (2020) find that a larger share of their study participants ended up in a business occupation than respondents themselves had predicted when they were still Duke undergraduates, while smaller shares ended up in government and law occupations. The authors hypothesize that these differences may be the result of an aggregate shock to the labor market, especially as the Great Recession began in December 2007 and their study surveyed Duke undergraduates in early 2009.³⁶ This suggests an interesting avenue for future research investigating how expectations of the college premium and of college attendance respond to the business cycle. This may be addressed by collecting expectations longitudinally over the business cycle or by eliciting expectations under alternative business cycle scenarios.

Systematic investigation of earnings expectations across alternative schooling scenarios has shown that students do believe that higher levels of education, or specific fields of study, are more remunerative and, in some cases, more risky than others. Yet, these perceived monetary returns and risks of schooling do not seem to be the major determinants of students' schooling plans and decisions, as nonmonetary returns, risks, and costs are often more or equally important.

An underinvestigated issue concerns the perceived sources of individuals' subjective returns to schooling; namely, the main causal models underlying students' and families' perceived monetary returns to schooling.³⁷

We have learned that students form expectations about the nonmonetary consequences of schooling partly on the basis of their personal experiences and socioeconomic circumstances. Students and their families tend to be overly optimistic about the student's educational attainment, with this tendency being more prominent among male students and low-ability students. Among the latter, substantial learning and uncertainty resolution occurs during school, especially about own ability and monetary labor market returns. However, the learning process remains often incomplete, partly due to students'

³⁶ Existing evidence points to a post-Great Recession negative shock, which affected entry into the legal profession and was likely not fully anticipated by prospective graduates.

³⁷ The two main explanations put forward by economic theory are the human capital theory, positing that education increases individuals' labor market productivity and earnings through skill acquisition (e.g., Becker (1962), Schultz (1963), Mincer (1974)), and the signaling theory, positing that education serves as a mere signaling device enabling employers to identify high-ability workers (e.g., Spence (1973), Stiglitz and Weiss (1990)). A third hypothesis emphasizes the screening or selection role of (higher) education, whereby premia arise because university attendance induces students to resolve the uncertainty about their returns (e.g., Chiswick (1973), Lange and Topel (2006)). To my knowledge, the only analysis investigating this issue is Ehrmantraut et al. (2020), which finds evidence consistent with the signaling hypothesis and inconsistent with the screening or selection hypothesis using German data.

unobserved tastes for programs and their preferences for nonmonetary aspects of schooling. Similar learning patterns have started to emerge also in settings where the information is exogenously provided to students rather than endogenously acquired by them.

Last but not least, we have just began to learn about the dangers of ignoring family interactions, peer interactions, and the role of teachers in expectations formation and related schooling decisions and paths.

The experience and evidence accumulated so far suggest that measurement-wise we need more longitudinal surveys capable of tracking the evolution of expectations and realizations for multiple related outcomes over a long period of time, like Stinebrickner–Stinebrickner’s BPS. We need more surveys embedding randomized field-experimental components, like Wiswall–Zafar NYU study and the Chilean studies by Hastings, Neilson, and collaborators. We need more surveys linkable to administrative schooling data, like the BPS and the Chilean studies. We need more multiactor surveys of probabilistic expectations enabling the linking of responses across students and parents within families and across students within networks of peers, like the NLSY97 and Giustinelli’s studies in Northern Italy. We also need probabilistic measures of expectations from teachers that are linkable to students’ and parents’ expectations. We need more studies willing to experiment with elicitation formats that enable respondents to express deep uncertainty, like Giustinelli–Pavoni’s study. Eventually, we need studies that can combine a number of these features on a larger scale.³⁸

We should also not discount the already large and continuously increasing number of surveys that have collected the same or largely overlapping sets of expectations related to education in different populations or using different survey mediums. Systematizing the survey instruments and expectations data already collected and making them more visible and accessible could lead to novel analyses and new findings.

On the modeling and estimation fronts, we need extensions of the current analytical tools that will enable us to employ more systematically survey-elicited expectations to investigate settings with dynamics, interacting decision makers, and deep uncertainty.

On substantive grounds, there are still many fruitful avenues to explore. We have very limited evidence about when, where (from whom), and how individuals involved in making or counseling schooling decisions acquire information; what information they acquire; and how they incorporate the information in their expectations and decision process. We have very limited evidence about who are the relevant actors for different schooling decisions, who are the main decision makers, whether these are the same as those who acquire choice-relevant information or shape students’ choice set, and whether/how these aspects vary across groups.³⁹ We have even less evidence about teachers’ information, expectations, and objectives when counseling schooling decisions. And we have close to no evidence on the precise or ambiguous nature of the expectations held by the relevant actors and on how

³⁸ A potential challenge comes from the tension between the opposing strengths and weaknesses of small researcher-led studies and larger-scale multipurpose studies. The former can afford greater richness of data to study a specific topic in depth, but must pay the price of smaller samples, lower representativeness, and more limited scope and focus, and vice versa. A potential solution may be the pursuit of larger and more representative studies, but with embedded innovation tools such as the experimental modules included in the U.S. Health and Retirement Study (HRS) or the rotating-panel structure of the NYFed’s Survey of Consumer Expectations (SCE).

³⁹ The mismatch between the “normative model” of family decision-making assumed by the NYC Department of Education and school administrators and the quite distinct and heterogeneous decision-making processes followed by actual NYC families documented by Sattin-Bajaj (2014)’s ethnographic work is eye-opening.

all these aspects interact with one another in determining observed schooling decisions and subsequent outcomes.

Similarly to 30 years ago, the path ahead looks both exciting and challenging. But perhaps differently from 30 years ago, the accumulated experience and progress provide some confidence that the enterprise is again feasible and rewarding.

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