

Occupational Choice under Credit and Information Constraints

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Dissertation Abstract

Credit and information constraints can affect both participation levels in different occupations, and the types of individuals found in those occupations. I develop a model of occupational choice which shows how new information alters expectations and thus occupational choice. Using a survey and information experiment in seven vocational high schools in Egypt, I find support for the model's predictions, including that risk averse individuals respond more to changes in expectations of risk at both the intensive and extensive margins. This differential response leads these individuals to shift towards "safer" occupation, and out of using credit to start a small enterprise.

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Executive Summary

The study of occupational choice has a long history dating back at least to the Roy model and continues to be an active area of research in a variety of subfields in economics.¹ Occupational choice has been shown to impact issues including wage inequality, economic growth, and employment, leading to interest in the subject from policy makers as well as researchers.² More recent work has shown the importance of credit constraints on the occupational decisions of individuals, an issue especially important in developing economies, but none have considered the importance of information constraints.³ Yet, information constraints have been shown to have significant impacts on decision making.⁴

I develop a model of occupational choice that accounts for both credit constraints and information constraints. The model allows for an individual's expectations to be informed by their personal information set, which may or may not be accurate.⁵ It also helps explain the important ways in which credit and information constraints can interact— in particular, the *same* information can have opposing effects on occupational choices depending on the presence of credit constraints. I test the model using a unique survey and information experiment in seven vocational high schools in Egypt. The data I collect support the model's predictions, including a key compositional prediction: risk averse individuals respond more strongly to changes in expectations about the variance of income in an occupation and the probability of succeeding in the occupation (i.e. actually finding a

¹See e.g. Roy (1951); Ginzberg et al. (1951); Blau et al. (1955)

²See e.g. Heckman et al. (1998); Banerjee and Newman (1993); WDR: World Bank Staff (2013)

³See e.g. Boskin (1974); Evans and Jovanovic (1989); Banerjee and Newman (1993); Bianchi and Bobba (2013)

⁴See e.g. Duflo and Saez (2003); Jensen (2010); Nguyen (2008); Bettinger et al. (2012)

⁵Although individuals will most certainly have information about themselves that is accurate, and not available to the econometrician, they may also hold beliefs about known values that are incorrect- for instance the population average income in an occupation.

job conditional on looking). This differential response leads highly risk averse individuals to shift towards "safer" occupations on average, and out of using credit to start a small enterprise. Because those who are risk averse report lower returns to credit in general (by favoring lower risk/lower return investments), the average expected income for those utilizing credit rises by 12% relative to the no information case.

More specifically, the model outlines how new information can impact an individual's expectations, and in turn, change their occupational choices. There is no unified use of the term occupation in the literature and so in my model I define three: (1) Wage Work, (2) Entrepreneurship, and (3) Inactivity. The model shows that information which leads to changes in expectations which increase (decrease) expected utility in one occupation relative to another, leads to increases (decreases) in the intent to pursue that occupation relative to the other. Changes in expectations about risk at the intensive (variance of income), and extensive (probability of finding a job) margins, also lead to corresponding changes in occupational intentions. Using a utility function that accounts for risk aversion leads to the prediction that highly risk averse individuals respond more strongly to changes in expected risk than those who are not highly risk averse.

The model also helps make clear the identification issues inherent in the estimation of the determinants of occupational choice. In particular, the model outlines the biases that may arise if unobservable taste parameters are correlated with both the occupational expectations and occupational intentions. I use the information intervention to create a panel of expectations and occupational intentions, similar to Wiswall and Zafar (2013). This panel allows me to difference out any time-invariant taste parameters that may otherwise bias my results, improving upon earlier strategies for estimating the determinants of occupational choice.

To test the model I conduct a survey and information experiment with seniors in seven vocational high schools in Al-Fayoum, Egypt, a city two hours from Cairo. Many of the students are credit constrained (coming from generally poor families) and information constrained (due to a lack of access to official labor market statistics), making this context well suited for testing the model. These students almost never go on to pursue higher education, due to the structure of

the Egyptian education system. Hence, the sample is soon to enter the labor market, making the occupational choice decision a very relevant one.

The survey and experiment is comprised of five main stages. The first stage collects basic demographic information about the students, as well as measures of risk aversion. The second stage elicits the students' expectations of outcomes in the different occupations (wage work, entrepreneurship and inactivity). In particular, it focuses on beliefs about average income in the population in an occupation and then moves to expectations of personal income, variance of income, and the probability of success.⁶ To measure the variance of income, the survey elicits from the student's the probability density function of their expected earnings. It does this using five "bins" of different income levels and asks the students to allocate 100 "points" across the bins to reflect what they believe is the probability they would receive that level of income, conditional on successfully pursuing that occupation. After the elicitation of expected outcomes in the different occupations, students report their occupational intentions- the probability that they will pursue each occupation when they enter the labor market. The survey then introduces a *hypothetical* credit intervention, which mirrors a credit intervention that is being planned by a local NGO, that provides enterprise credit to those who want to start a business.⁷ Students are asked to provide their expectations of outcomes in entrepreneurship while having access to this loan, as well as their occupational intentions given the availability of credit.

The third stage of the survey occurs directly after the elicitation of expectations of outcomes and occupational intentions, with and without credit. The students are provided information about the distribution of incomes in the different occupations. These data come the Egypt Labor Market Panel Survey (ELMPS2012), the first representative survey of the Egyptian population post-revolution. Unlike earlier research on information interventions, which simply provided individuals with averages or estimated returns, I provide the full distribution of income to the students. This

⁶"Probability of success" refers to the probability of finding a job conditional on pursuing wage work/probability of starting a successful business conditional on pursuing entrepreneurship.

⁷The credit intervention is a loan of 10,000LE (approximately \$1450) that must be paid back over the course of a year. The interest rate on the loan is zero to avoid any issues of individuals refusing the loan on religious grounds, due to the Islamic impermissibility of dealing with interest (El-Gamal et al., 2013).

allows for an arguably more accurate representation of labor market outcomes, and a greater emphasis on the natural heterogeneity of income. The students are also provided with the proportion of the working population in each of the occupations and a short explanation of the endogeneity of the income⁸. The data I provide are restricted to those who have the same level of education as the students and are in the same general age range (18-30).

The fourth stage of the survey occurs after the information intervention. Students are asked again to provide their expectations of outcomes in the different occupations and the corresponding updates to their occupational intentions. This allows for the measurement of how the expectations and intentions were impacted by the information intervention. The credit intervention is then re-introduced to measure how the response to credit has changed after the information intervention. This leads to four main cells of occupational expectations and intentions: (1) Baseline, (2) with Credit, (3) with Information, (4) with Credit *and* Information. The fifth stage of data collection is a survey of the students after they graduate, allowing for the measurement of how their actions in the labor market line up with their reports in the first four parts of the survey. Finally, a group of students were surveyed but not provided any information. Following up with these students after they graduate, and comparing their outcomes with those that received the information, allows for an explicit test of the reported effects of the information intervention. The students that did not receive the information serve as an important comparison group and robustness check.⁹

Moving to analysis of the data, I find that the information intervention successfully imparted information about incomes in the occupations to the students, leading to changes in beliefs about the average income in the population and, in turn, changes in expectations of personal income. I use these changes in expectations to test the model's implications. As predicted, when the infor-

⁸The exact explanation of the endogeneity of income can be found in the appendix below. It attempts to make clear that the data are the result of choices by individuals about their most preferred option. The explanation also included the concept that the best self-employed person might not be the best wage worker if they changed occupations and vice versa.

⁹The survey was implemented at the classroom level. The allocation of classes to the information/no-information group was not explicitly random. The classes that received the information were chosen on an availability basis (the classrooms that were free during the time of the survey) and the classes that did not receive the information were returned to later. Although less than ideal, this quasi-random selection leads to groups that are equal on observables. The data from the no-information group are used primarily as an important robustness check for the changes in actions reported by the sample due to the information.

mation leads to increases (decreases) in expected utility in one occupation, relative to the other occupations, individuals increase (decrease) their intent to pursue that occupation. The data also confirm that highly risk averse individuals respond much more strongly to changes in expectations of risk in an occupation at both the intensive (variance of income), and extensive (probability of finding a job) margins.

In the schools, the information intervention leads to an aggregate shift of the sample away from inactivity and towards entrepreneurship. The credit intervention leads to a shift into entrepreneurship larger than the one induced by the information intervention. Information and credit together also lead to a shift into entrepreneurship but a *smaller* shift than just the credit intervention. That is, although information alone leads to a shift into entrepreneurship, the *same* information, when credit is available, leads to a shift *away* from entrepreneurship. I explain these aggregate shifts by combining my estimates of the determinants of occupational choice with the reported changes in expectations by the sample. I find that the information intervention has different effects on expectations in the credit constrained vs. unconstrained case, explaining why it can have opposing aggregate impacts on occupational intentions. A clarifying example is to consider an individual who believes that their average income in entrepreneurship when credit constrained is 500LE and 2500LE when credit is available. If they receive information that shows that all those in entrepreneurship make between 1000 and 2000LE a month, it would lead to an increase in expectations of income in the constrained case and a decrease in the unconstrained case. Follow up data show that the reported changes from the information intervention are mirrored in the actions taken by the sample when they enter the labor market, lending credibility to the changes reported in the survey.

The aggregate effects mask important compositional changes that occur due to the differential reaction of highly risk averse individuals to changes in expectations about risk. While the information intervention leads to an overall shift into entrepreneurship, those who are highly risk averse instead shift into wage work. Similarly, when both credit and information constraints are relaxed, the highly risk averse shift away from entrepreneurship more than the rest of the sample.

Evidence also shows that the highly risk averse plan to use the credit made available to them on lower risk/lower return activities.

From a policy standpoint, the information intervention leads to a more efficient allocation of individuals across occupations, by inducing individuals to change their occupational intentions. This improves individual welfare on average by 6.5%. The relaxation of credit constraints increases expected income and improves sector allocation leading to a 10% increase in welfare. Relaxing both constraints leads to a 12.3% increase in welfare through both increased expected income and improvements in occupational intentions. These changes in welfare are even larger when using a utility function that accounts for risk aversion. The information intervention also leads to changes in the utilization of the hypothetical credit intervention. The proportion of the sample that reports that they would use the credit intervention drops from 30.0% before the information intervention to 24.2% after the information intervention. The proportion of highly risk averse individuals utilizing credit also drops from 30.3% to 23.1%. Because highly risk averse individuals report lower returns to credit (by favoring lower risk/lower return activities), the average income in the credit intervention *increases* by 11.5% relative to the no information case.

These results have significant implications for policy makers as well as researchers. First, information can be sufficient to change occupational choices. These changes can be explained by changes in expectations that are induced by the new information. Second, highly risk averse individuals respond more strongly to changes in expectations of the variance of income and the probability of success in an occupation. This differential reaction leads to a change in the composition of individuals across occupations, further improving individual welfare. Third, information and credit constraints interact in a way that impacts the efficacy of the credit intervention, leading to improved selection into its utilization and increasing the average expected income of those that would use it.

Earlier work on information interventions rarely consider how the information interacts with the constraints facing the individuals (Duflo and Saez, 2003; Jensen, 2010; Nguyen, 2008; Dupas, 2011). This paper shows that these interactions can be non-trivial and have important impacts on

the outcomes of the individuals as well as the outcomes of the policy tool being studied. Other work considers the importance of getting credit to *transformational* entrepreneurs who have the highest return to credit and who start businesses that generate employment (De Mel et al., 2011). In this vein, my results show how a careful bundling of information can allow for low-return individuals to self-select themselves out of utilizing credit and improve the efficacy of a credit intervention.

Governments and international organizations commonly promote entrepreneurship as a solution to unemployment. For instance, Ban Ki-Moon, Secretary General of the United Nations, recently said, “Entrepreneurship can be part of the solution by transforming unemployed young people into major employers” Ki-Moon (2013). Policy makers of this opinion want to encourage individuals to start businesses, but to do so successfully, they must first understand the determinants of occupational choice. My results shed light on the determinants of occupational choice as well as how the relaxation of credit and information constraints can impact both the proportion and composition of individuals in entrepreneurship.

References

- Banerjee, Abhijit V and Andrew F Newman**, “Occupational choice and the process of development,” *Journal of Political Economy*, 1993, pp. 274–298.
- Bettinger, Eric P, Bridget Terry Long, Philip Oreopoulos, and Lisa Sanbonmatsu**, “The Role of Application Assistance and Information in College Decisions: Results from the H&R Block Fafsa Experiment*,” *The Quarterly Journal of Economics*, 2012, 127 (3), 1205–1242.
- Bianchi, Milo and Matteo Bobba**, “Liquidity, Risk, and Occupational Choices,” *The Review of Economic Studies*, 2013, 80 (2), 491–511.
- Blau, Peter M, John W Gustad, Richard Jessor, and Herbert S Parnes**, “Occupational choice: A conceptual framework,” *Indus. & Lab. Rel. Rev.*, 1955, 9, 531.
- Boskin, Michael J**, “A conditional logit model of occupational choice,” *The Journal of Political Economy*, 1974, 82 (2), 389–398.
- Dufo, Esther and Emmanuel Saez**, “The role of information and social interactions in retirement plan decisions: Evidence from a randomized experiment,” *The Quarterly Journal of Economics*, 2003, 118 (3), 815–842.
- Dupas, Pascaline**, “Do teenagers respond to HIV risk information? Evidence from a field experiment in Kenya,” *AEJ: Applied Economics*, 2011, 3 (1), 1–36.
- El-Gamal, Mahmoud, Mohamed El-Komi, Dean Karlan, and Adam Osman**, “Bank-Insured RoSCA for Microfinance: Experimental Evidence in Poor Egyptian Villages,” *Working Paper*, 2013.
- Evans, David S and Boyan Jovanovic**, “An estimated model of entrepreneurial choice under liquidity constraints,” *The Journal of Political Economy*, 1989, pp. 808–827.
- Ginzberg, Eli, SW Ginsburg, S Axelrad, and JL Herma**, “Occupational choice,” *New York*, 1951.

Heckman, James J, Lance Lochner, and Christopher Taber, “Explaining rising wage inequality: Explorations with a dynamic general equilibrium model of labor earnings with heterogeneous agents,” *Review of economic dynamics*, 1998, 1 (1), 1–58.

Jensen, R., “The (perceived) returns to education and the demand for schooling,” *The Quarterly Journal of Economics*, 2010, 125 (2), 515.

Ki-Moon, Ban, “Transforming Unemployed Youth Into Entrepreneurs Part of Solution to Global Crisis,” June 2013. Remarks by Secretary General Ban Ki-Moon at Thematic Debate on Development.

Mel, Suresh De, David McKenzie, and Christopher Woodruff, “Getting credit to high return microentrepreneurs: The results of an information intervention,” *The World Bank Economic Review*, 2011, 25 (3), 456–485.

Nguyen, T., “Information, role models and perceived returns to education: Experimental evidence from Madagascar,” *Working Paper*, 2008.

Roy, Andrew Donald, “Some thoughts on the distribution of earnings,” *Oxford Economic Papers*, 1951, 3 (2), 135–146.

Staff, World Bank, *World Development Report 2013: Jobs*, Oxford University Press, Incorporated, 2013.

Wiswall, M. and B. Zafar, “Determinants of college major choice: identification using an information experiment,” *Working Paper*, 2013.