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ABSTRACT

Testing Classic Theories of Migration in the Lab*

We test different classic migration theories by using incentivized laboratory experiments to investigate how potential migrants decide between working in different destinations. We test theories of income maximization, skill-selection, and multi-destination choice as we vary migration costs, liquidity constraints, risk, social benefits, and incomplete information. The standard income maximization model leads to a much higher migration rate and more negative skill-selection than occurs when migration decisions take place under more realistic assumptions. The independence of irrelevant alternatives assumption mostly holds when decisions just involve wages, costs, and liquidity constraints, but breaks down once we add risk and incomplete information.

JEL Classification: F22, O15, C91

Keywords: migrant selection, destination choice, lab experiment, IIA

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1. Introduction

Income differences across countries around the world are enormous, so that international migration provides the opportunity for those who move to dramatically increase their incomes (McKenzie et al. 2010; Clemens et al., 2019). Yet only 3.3 percent of the world's population live outside their country of origin.[1] Moreover, those who do migrate are positively selected on education from almost every sending country, despite returns to skill being higher in many developing countries than in OECD destinations (Grogger and Hanson, 2011). These patterns of low levels of migration and positive sorting on skills present a challenge to classic theories of migration decisions such as the income maximization approach of Sjaastad (1962) and the Roy-model selection approach of Borjas (1987).

The theoretical literature on migration choice has since evolved from a simple consideration of comparing the income gained from moving to the cost of this move, to also incorporate liquidity constraints, risk and uncertainty, imperfect information, and choices between multiple destinations. Different assumptions about how potential migrants trade-off these different factors can then give rise to different predictions as to how many individuals will move and to where. Empirically testing these theories is however difficult, given that these attributes are not distributed randomly across destinations or individuals.

We use incentivized laboratory experiments to test how potential migrants trade-off different location attributes and use this to distinguish between competing migration theories. We work with samples in Lisbon and Nairobi to examine how sensitive our results are to the study population. We randomly assign observed and unobserved skill levels, and endowments to potential migrants, and then have them make choices between destinations with different returns to skills. We vary the risk of unemployment, whether liquidity constraints bind, whether or not there is full information, and the number of destinations. Using the basic Sjaastad/Borjas model we would predict extremely high migration rates, with negative self-selection. Adding additional real-world features like risk, liquidity constraints, and incomplete information dramatically lowers migration rates and makes selection less negative. We also document a home bias effect, where simply labelling a destination as home without changing the payoffs reduces migration to

[1] http://www.unfpa.org/migration [accessed July 27, 2021].

other destinations. Finally, we can directly investigate the independence of irrelevant alternatives (IIA) assumption often made in modelling multi-destination migration decisions. We find IIA holds for most people when migration decisions just involve wages, costs, and possible liquidity constraints, but starts to break down for some individuals when risk and incomplete information are added. In the sample taken in Nairobi, we also find evidence to suggest some people make migration decisions based on cost minimization rather than income maximization. Taken together, we believe the results demonstrate the need to move beyond classic theories in order to explain the patterns we see in global migration.

This paper contributes to a literature that uses experimental methods to learn about migration (McKenzie and Yang, 2012; McKenzie 2015). Almost all of these experiments have involved policy experiments which vary migrant access to particular services such as financial education, bank accounts, or communication services (e.g. Ashraf et al., 2015; Batista and Narciso, 2018), or which attempt to facilitate migration (Bryan et al., 2014; Beam et al., 2016; Baseler 2021). This paper adds to a much more nascent literature that uses lab experiments. The first example comes from Baláž et al. (2014), who asked Slovak university students to make non-incentivized choices between destinations, to investigate how individuals trade-off economic attributes (wages and living costs) against non-economic factors (climate, crime levels, language difficulty, and personal freedom), varying whether individuals had full or incomplete information. They find that wages and costs are the most important attributes, but that these non-economic factors also matter. Barnett-Howell (2018) used a migration video game in a lab experiment to see how individuals make choices over destination search, finding a role for imperfect information in explaining lack of movement. Lagakos et al. (2018) use discrete choice experiments to examine how Bangladeshis trade-off wages, housing conditions, employment, and frequency of family visits. They find the quality of housing at destination to be an important determinant of the willingness to move internally. This literature complements our findings by highlighting the importance of looking beyond a simple comparison of wages and costs for understanding migration.

This paper also contributes to literature which has critically examined the role of the independence of irrelevant alternatives assumption in modelling migration choices amongst multiple destinations. IIA has been a mainstay of both micro-level modelling of individual-level destination choices (e.g. Dahl, 2002) as well as providing the foundations for cross-country macro-level gravity equation models of migration stocks or flows (e.g. Beine et al. 2016). However, this assumption has been questioned due to the possibility that some destinations are closer substitutes to each other than others, and that unobserved individual characteristics may be correlated across destinations (Beine et al, 2021). This has led the literature to explore modeling choices that relax this assumption, such as two-stage or nested models which assume that IIA only holds within sets of countries (e.g. Ortega and Peri, 2013; Bertoli and Fernández-Huertas Moraga, 2015; Beine et al. 2021). While this literature shows the value of relaxing the IIA assumption for model fit, it only indirectly tests the IIA assumption since it does not observe the same people making multiple migration choices as the destinations vary. We contribute to this literature by being able to directly observe whether individual choices violate the IIA assumption or not, and by varying different features of the migration decision, can highlight the circumstances under which IIA is more or less likely to hold.

The remainder of the paper is structured as follows: Section 2 provides a simple theoretical framework for our games; Section 3 discusses our sample and the game set-up; Section 4 our key results for testing classic theories in the two destination version of the game; and Section 5 results when multiple migration destinations are available. Section 6 shows that game behavior can predict subsequent migration decisions, and Section 7 concludes.

2. Theoretical framework

In order to frame our experimental work, we provide a theoretical model that builds on classical models of migration – namely Sjaastad (1962), Harris and Todaro (1970), Borjas (1987), Stark and Bloom (1985), Rosenzweig and Stark (1989), and Chiquiar and Hanson (2005).

In our model, conditional on the information set Ω_0 available to an individual at the time of the migration decision ($t = 0$), this individual compares the expected discounted utility $U(.)$ derived from staying in the Home country (H) earning wage W_t^H and enjoying local amenities L_t^H between $t = 1$ and $t = T$, to the expected discounted utility derived from moving to the Abroad country (A) earning wage W_t^A and enjoying local amenities L_t^A, also between $t = 1$ and $t = T$.

In this setting an individual will choose to migrate if

$$\sum_{t=1}^{T} \beta\delta^{t} E[U(W_t^A, L_t^A) - U(W_t^H, L_t^H)|\Omega_0] > C \tag{1}$$

and

$$Y_0 \geq C_0 \tag{2}$$

For migration to happen the expected discounted utility from migrating must be larger than the broad cost of migration C (which encompasses utility costs due to monetary and non-monetary reasons), and the initial pecuniary cost of migration C_0 must be feasible given the individual's endowment Y_0 at time $t = 0$, when the migration decision is made. Note that utility $U(.)$ is derived from wages earned and local amenities – where these local amenities include non-pecuniary factor affecting migration decisions, such as language, network connections and weather differences. Expectations $E[.|\Omega_0]$ are formed conditional on Ω_0 , the information set available at $t = 0$, which includes information on wages and unemployment rates that can be achieved in various states of nature and the associated probabilities. β and δ are time discount parameters that allow for the possibility of hyperbolic discounting.[2]

Wages are formed according to the following processes:

$$W_t^A = \overline{W}_t^A + r_s{}^A s_t + r_e{}^A e_t{}^A \tag{3}$$

and

$$W_t^H = \overline{W}_t^H + r_s{}^H s_t + r_e{}^H e_t{}^H \tag{4}$$

where the wage paid in location *l* at time *t* $\left(W_t^l\right)$ is given by the sum of a base wage rate $\left(\overline{W}_t^l\right)$, with the return to both observed (s_t) and unobserved skills $(e_t{}^l)$. Note that we allow an individual's unobserved skills to depend on her location *l*. Finally, $r_s{}^l$ denotes the return on skill *s* in location *l*, which we assume to be time-invariant for simplicity.

We use this theoretical framework as the basis for our experimental work. Namely, as made clear in the following sections, we vary the parameters in this model across different experimental rounds and estimate the effect of these changes on individual migration decisions.

[2] Based on the evidence provided by Gibson et al. (2019), we assume that time preferences (β and δ), and risk preferences (given by the curvature of the utility function U(.) when subject to the risks involved in forming expected utility $E[.|\Omega_0]$) do not change.

3. Sample and Game Set-up

The peak age of international emigration from developing countries is between 22 and 24 years (McKenzie, 2008), with more educated individuals more likely to emigrate (Grogger and Hanson, 2011). We therefore choose for our lab experiments to focus on tertiary educated students in their final year of study. This gives us a sample of individuals who are among those with the highest likely of making international migration decisions in the near future. Within these criteria, we work with samples from two countries: Portugal and Kenya.

3.1 Lisbon Sample

The experimental subjects in the Lisbon sample were recruited in April and May 2017, and were final-year undergraduate students from the Nova School of Business and Economics. Recruitment took place through emails announcing the possibility to participate in a study about career prospects. These emails were sent directly by the school administration to all potential participants. Students are mostly Portuguese, with just over five percent from Lusophone Africa. Nova encourages students to study abroad for a semester in their fourth or fifth semester, and half the sample has spent six months or more outside of Portugal.

Table 1 summarizes some basic characteristics of the 154 students who took part in our lab experiments. The sample is 45 percent female, and ranges in age from 19 to 25, with a mean of 20.7. 58 percent are economics majors. At the time of participating, a few months before graduation, 19 percent had received a job offer for a post-graduation job, with 6 percent having a job offer outside of Portugal. This is a sample with high interest in migration, with 53 percent saying they would prefer to work outside of Portugal after graduation.

We gave participants a short test of 10 questions designed to measure basic mathematical skills (e.g. 37+0.5×64), and 10 questions designed to ensure they were able to calculate expected values (e.g 40% chance of winning 100€, 40% chance of winning 50€, 20% chance of winning 20€). The means were 9.6 and 9.3 out of 10, showing this group is comfortable making calculations that might be required in deciding between different destinations when risk is involved.

3.2 Nairobi Sample

The second sample consists of 265 final year students from Strathmore University and the University of Nairobi who took part in lab sessions conducted by the Busara Center in September and October 2017. These students majored predominantly in economics, management studies, statistics and computer science. Nearly all students were born in Kenya, and only twelve percent has spent six months or more outside of the country. Table 1 summarizes some basic characteristics. As in the Lisbon sample, 45 percent of the Nairobi sample is female. Students tend however to be older, with a mean age of 22.7, ranging from 19 to 32. 32 percent are economics majors. At the time of participating, 19 percent had received a job offer for a post-graduation job (exactly the same proportion as in the Lisbon sample), although only 2 percent had a job offer outside of Kenya. This is also a sample with a relatively high interest in migration, although lower than in the Lisbon sample: 32 percent of subjects in the Nairobi sample say they would prefer to work outside of Kenya after graduation. They perform similarly to the Lisbon sample on the simple mathematical skills test (mean of 9.6 out of 10), but perform considerably worse on the expected values test (mean of 4.0 out of 10).

3.3 Game Set-up

Sessions took place in experimental labs, in twenty sessions of between two and thirteen students per session in Lisbon, and in 14 sessions ranging from five to thirty-five students in Nairobi. All games were programmed in z-tree. The session began with a short questionnaire to collect basic background information about each participant. They then played games on chance and probability to measure risk and ambiguity preferences (see Appendix 1). Then the main part of the session involved migration decisions. Participants were given the following instructions to motivate the choices they would be asked to make in the game:

> *We are interested in learning how people make decisions between different places to work. Imagine that you have just accepted a job offer from a multinational company which has branches around the world. Your employer has told you that you need to accept a company transfer to a different country for a year, but is offering you the choice between destinations. You should assume that everything else about the job and living conditions will be the same across destinations, apart from the information the employer tells you.*

Some of the decisions will be very simple, since the only thing that will vary across the destinations will be the wage you are offered and the cost of moving. Others will be more complicated, since there will be chances of unemployment, you might not be able to afford the moving costs, or you might need to decide whether to pay to get all the information you need about the destination.

You will start the game with a certain endowment. You can use this money to pay the costs of moving, or to acquire information. This is reset for each decision. If we end up playing a game for real, any amount left from your endowment that you do not spend will be added to your game winnings.

You should make each decision as seriously as you can, since at the end of the game we will randomly choose one of your choices to play for real money (using an exchange rate of 1000 lab Euros to 10 real Euros).[3]

Note that this game framing with one-year as the migration time horizon is chosen to avoid the influence of issues like discounting, assimilation and return decision on the migration decisions made in the lab. Our framing also shuts down, or holds constant, the effects of geographic distance, local amenities, and language barriers. We also abstract from the impact of migrant networks for simplicity. All these possibilities, including time dynamics and social networks, would be interesting to add in future lab experiments – and indeed they would be crucial for the purpose of predicting certain types of real world migration behavior.

Each participant was randomly assigned a skill level s uniformly from $\{1, 2, 3\}$. This can be thought of as education or an observed (to the econometrician) skill in standard migration models. Individual participants are not told about this skill level, they are only given wage offers that indirectly reflect the assigned skill level.

Then, as in Borjas (1987), individuals also have unobserved skills e_d that additionally affect how they are paid in different migration destinations d. These are randomly drawn from $\{-200, 0, 200\}$ and are assumed to be perfectly positively correlated for the same individual across destinations for most versions of the games, with the exception of a variant where they are set to

[3] In Kenya we multiplied all the Euro numbers by 100 and then presented them in terms of Kenyan shilling decisions. The average payout to participants in Lisbon was €17.21, and in Nairobi was 1647 KSh (USD 15.90).

zero, and one where they are perfectly negatively correlated. As with observable skills, participants are never told their unobserved skill level and do not need to use it to make any of the calculations – instead an individual's skill assignment is reflected in the wage offers received in the lab games.

Note that the values of wage offers were not arbitrarily chosen, but were chosen to mimic real world features, namely average wages in the country of origin (depending on the educational level of workers) and in neighboring countries – as regional migration is typical in both countries here we run our lab experiments. Note, however, that this exercise is not intended as a calibration exercise to predict the levels of actual migration flows, which would depend on participants actual wealth and education levels and wage offers, rather than those we randomly assign to them in the lab.

Individuals are also given a random endowment of wealth which is drawn as {50, 100}*s. This captures the empirical regularity that more educated people tend to also be wealthier on average – although participants are only told about their wealth endowment, but not about their underlying skill level s.

Games were grouped into three blocks, each of nine games. Block 1 involved making choices between two different destinations, Block 2 choices among three different destinations, and Block 3 among five different destinations. The ordering of the blocks was randomized, as was the ordering and labelling of each destination within each game. Appendix Table 1 confirms that the programming successfully randomized the assignment of skill, endowment, unobserved skill, and module order.

In each game, participants must choose which destination to work in based on the wage w offered at that destination (which depends in turn on their observed and unobserved skill levels), the cost of moving to that destination, the risk of being unemployed, any social insurance paid if they are unemployed (which can be broadly understood as including any type of formal or informal support individuals receive from their network when unemployed), and whether or not their endowment is sufficient to cover the costs of moving. In some of the games there is incomplete information, with participants only being told the distribution of possible unemployment and social insurance rates, but having the option to pay to have full information. In other variants the risk of unemployment is endogenous, depending on how many other people in the same lab session also decide to migrate to a destination. Table 2 describes the key parameters of the nine games in the block with just two destinations. We discuss these more in detail in the next section.

3.4 Testing Home Bias

We designed the games thinking of the costless move destination 1 as "home", and other destinations as migration choices. However, we were concerned that the mere labelling of a destination as "home" might affect choices, regardless of pay-offs, and so in games 1 through 27 we referred to destinations as "destination 1", "destination 2", etc., randomizing at the individual level the ordering of which destination was labelled with each number in each game. In a final game, we explicitly tested for home bias by telling participants "now the multinational corporation allows you to continue working in your home country, while also giving an option to move to a destination abroad". We set the cost of moving to be zero, and the monthly wage to be the same in both destinations. If labelling a destination as "home" had no effect on decisions, we would expect individuals to be invariant between the two destinations, and so choices to be equally split between the two.[4] However, we find that 58.4 percent of the Lisbon sample and 63.8 percent of the Nairobi sample chose the home destination, which t-tests show to be significantly different from 50 percent ($p=0.0357$ and $p<0.0001$ respectively). Moreover, we find choices in this game to be strongly correlated with their professed desire to work abroad after graduating in the baseline questionnaire: 32.1 percent of those who say they want to work abroad chose the home destination, versus 87.7 percent of those who say they want to remain in Portugal ($p<0.0001$). Likewise, 40 percent of those who want to work abroad in the Nairobi sample chose the home destination, versus 75 percent of those who say they want to remain in Kenya ($p<0.0001$). This shows the importance of not using the "home" label in our main game choices, but also suggests that choices in this last game may be predictive of actual future migration decisions – something we test in section 6 using data from a follow-up survey.

4. Testing Classic Theories of Income Maximization and Migrant Self-Selection

We begin by examining how classic migration theories predict migration behavior in the two destination case. For participant i with randomly assigned skill level s_i, unobserved skill at

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[4] Recall that order bias is not a concern here, since participants were randomly assigned to be asked "home or abroad" versus "abroad or home".

destination 1 of e_{1i}, and unobserved skill at destination 2 of e_{2i}, the wages available at the two destinations were specified as:

$$w_{1i} = 500 + 300s_i + 3e_{1i} \quad (5)$$

$$w_{2i} = 1000 + 100s_i + e_{2i} \quad (6)$$

As noted, we consider destination 1 as the home destination. There is thus no cost of moving to this destination and the participant always has full information about this destination and no risk of unemployment. Destination 2 has a higher base wage rate, but a lower return to both observed and unobserved skills. This mirrors the setting in many migrant countries of origin, where the returns to skill are greater at home, but base income levels are higher abroad. The cost of moving to destination 2 is set to be the same for all participants, and does not vary with skill level. We made clear to participants that this was a one period decision, so that although the wage was presented as a monthly wage to make it comparable to their real-life framing, the cost of moving should also be thought of as a monthly equivalent. We then define migration as the decision to choose destination 2 instead of destination 1.

Participants were not told their observable and unobservable characteristics (s and e, respectively), but were instead told their endowment and the costs involved, and then presented with wage offers in both destinations. As a result, they did not have to calculate the wage they would earn given their observed and unobserved skill levels, but just make decisions based on wages and costs. A summary screen also summarized the key parameters for the decision (Appendix 2 provides example screenshots).

4.1 Income Maximization and Migrant Self-Selection

In the simplest classic theory of migration, individuals make a comparison of the benefits and costs of migrating (Sjaastad, 1962). In this view, the driving force behind migration is income maximization. In our first three games, this should be the only factor driving decisions, since there is full information, no liquidity constraints, and no risk of unemployment. In Lisbon, out of the 462 decisions made across the three games, 446 (96.5 percent) choose the income-maximizing option. However, more deviations from income maximization occurred in the Nairobi sample, where only 610 (76.7 percent) of the 795 decisions made across the three games were the income-maximizing choice.

In game 1, there is no unobserved skill, and the cost of moving is 50 euros.[5] Theory would then predict that all of those with skill levels 1 and 2 should migrate, while none of those with skill level 3 should. That is, there should be *negative* self-selection by skill. The top left panel of Figure 1 plots the actual migration rates in the Lisbon sample of 96.5% of those assigned skill level 1, 88.6% of those assigned skill level 2, and 1.9 percent of those assigned skill level 3. In Nairobi, the rates are 68.1% of those assigned skill level 1, 51.1% of those assigned skill level 2, and 10.7% of those assigned skill level 3. Borjas (1987) introduced the importance of also considering self-selection on unobserved (to the econometrician) skills. Note that since this unobserved skill level is reflected in the wage rates individuals see, they can self-select according to both their observed and unobserved skill. The remaining games allow for this possibility, and equations (5) and (6) show that the return to unobserved skills is also higher at home than at destination. In game 2, the unobserved skills are perfectly correlated at home and abroad, while in game 3 they are perfectly negatively correlated.[6] In both cases, the migration predictions are the same: the high return to unobserved skills at home should induce those with observed skill level 1 or 2 who have high unobserved skills not to migrate, while inducing those with low unobserved skills to migrate from skill level 3. This is seen in Figure 2. If we look at the impact on self-selection with regard to observed skills, the top middle and top right panels of Figure 1 show that there is less migration than was the case in game 1, and that it is less negatively selected, with maximum migration rates occurring in the middle of the observed skill distribution.

4.2 Why aren't some people income maximizing?

Income maximization holds for almost all the Portuguese sample. However, one quarter of the decisions made in the first three games for the Nairobi sample do not show income maximization. This is particularly notable in Game 1, where 31 percent do not income maximize. Faced with this pattern, we randomly chose 41 individuals who had not maximized income in one of their choices in our later sessions in Nairobi, and did a qualitative debrief with them to ask

[5] For simplicity of exposition, we discuss payoffs for the Euro framing in the text: in Nairobi these were all multiplied by 100 and presented as Kenyan Shilling amounts.

[6] The difference is in where the individuals end up in the destination wage distribution. Game 3 is an example of Borjas' refugee sorting, in which migrants are negatively selected from the home country wage distribution in terms of unobservable characteristics, but end up positively selected relative to the destination country wage distribution.

why. Almost all these participants said that a desire to avoid costs was their reason for their choice. For example, one noted "as I am a student you make sure you avoid costs, you don't know what can come from them", while another noted "That one had a moving cost and I didn't like that". This idea of *cost-minimization* as the key reason for not maximizing income is supported by the data. Out of the 84 individuals who did not maximize income in Game 1, 75 of those assigned skill levels 1 and 2 did so by choosing to avoid the higher wage destination 2 that involved a moving cost, while only 9 of those assigned skill level 3 did not maximize income by choosing to pay the cost and go to destination 2, even though destination 1 would have maximized income.[7] If we were concerned that failure to income maximize reflects errors made from fatigue, we would expect to see more of less of this behavior for those individuals randomly assigned to be asked Game 1 first, compared to those who get randomly assigned it as part of the middle or last block module. However, we cannot reject that question ordering is not related to this behavior (p=0.977). Taken together, this qualitative and quantitative evidence supports the idea that non-income-maximization was the desired choice, and not simply the result of participants making random choices or hitting the wrong button.

4.3 Introducing Liquidity Constraints and Risk

There are no liquidity constraints in either Sjaastad (1962) or Borjas (1987), with all those who wish to migrate being able to do so. We introduce liquidity constraints in Game 4 by increasing the cost of moving to 100, and otherwise keeping the game the same as in Game 2. Recall that endowments are randomly assigned as {50, 100}**s*. Therefore, all of those with skill level 1 that receive an endowment of 50 are not able to migrate, even though they would like to.

Introducing liquidity constraints in this way halves the migration rate of those in the Lisbon sample with skill level 1 from 72% in Game 2 to 35% in Game 4 (p<0.001); and also halves the rate in the Nairobi sample from 56% in Game 2 to 27% in Game 4 (p<0.001) The higher cost also lowers the return to migration, so that individuals with skill level 2 and unobserved skill 0 are now indifferent between the two destinations. This lowers the migration rate in Lisbon of

[7] We also examined whether non-game characteristics of individuals help predict this behavior by running a probit of not maximizing income as a function of the characteristics in Table 1. We cannot reject that these characteristics are jointly orthogonal to whether or not someone does not maximize income (p=0.501). In particular, we do not find that the math score or expected value score are predictive of not income maximizing, which suggests it is not a case of individuals with lower numeracy misunderstanding.

skill level 2 from 70% in Game 2 to 52% in Game 4 (p=0.019), and in Nairobi from 42% in Game 2 to 30% in Game 4 (p=0.016). In contrast, it should not affect the migration decisions of those with skill level 3, and indeed the migration rate for them is similar in Game 4 (28%) and Game 2 (32%) in Lisbon (p=0.16), although the rate is slightly lower in Game 4 (30%) than in Game 2 (37%) in Nairobi (p=0.057). The overall result is that liquidity constraints have lowered migration rates, and made migration less negatively selected than the standard Borjas model would predict.

The Sjaastad and Borjas models also contain no risk of unemployment. Harris and Todaro (1970) introduced the risk of unemployment, and model individuals as choosing whether to migrate or not on the basis of maximizing expected earnings. In Game 5, we introduce a 30 percent chance of unemployment at destination 2, with those who are unemployed receiving unemployment insurance of 200 (this could be thought of as informal insurance from family and network members in situations where migrants are not eligible for formal benefits). 92.2 percent of participants in Lisbon and 77.0 percent in Nairobi then maximize expected earnings in the resulting game. This chance of unemployment lowers the attractiveness of migration relative to Game 2, and should make it more negatively selected with respect to both observed and unobserved skill. We see this in Figures 1 and 2. In the Lisbon sample, the migration rate has fallen from 72% to 35% for skill level 1, from 70% to 25% for skill level 2, and from 32% to 2% for skill level 3. Almost all the migration comes from low-skilled individuals with low unobserved skills. In Nairobi, the migration rate falls from 56% to 26% for skill level 1, from 42% to 11% for skill level 2, and from 37% to 13% for skill level 3.

An alternative way to allow for the risk of unemployment is to make it endogenous. Let *N* be the number of people in the lab session. In game 6, we fixed the number of jobs *J* available at destination 2,[8] and participants were told that if more than *J* out of the *N* people in the lab chose to move to destination 2, the jobs would be randomly assigned and the remainder would be unemployed. Figure 2 shows this endogenous unemployment setting leads to a similar pattern of negative selection on unobserved skill as in Game 5, except in inducing some individuals with

[8] We varied *J* according to the size of the session: *J* was set as 2 if N≤5; J=3 for N between 6 and 10; J=4 for N between 11 and 15; J=5 for N between 16 and 20; J=6 for N between 21 and 25; J=7 for N between 26 and 30; and K=8 for N>30

skill level 3 and the lowest unobserved skill level to migrate. This makes the overall migrant selection on skills in Figure 1 less negative than in Game 5.

We elicit from participants how many people they think will move to destination 2, and use this to calculate expected earnings. Only 65.6 percent in Lisbon and 64.9 percent in Nairobi maximize expected earnings in this version of the game. In Lisbon, 92 percent of those not maximizing expected earnings are choosing not to migrate, even though they expect positive gains from doing so; while in Nairobi this is the case for 69 percent of those not maximizing expected earnings.

4.4 Risk Preferences and Risky Migration Decisions

The "new economics of labor migration" theory notes that once risk is introduced into migration decision-making, risk-preferences should also matter (Stark and Bloom, 1985; Rosenzweig and Stark, 1989). We take the sub-sample of participants in Games 5 and 6 for whom risk preferences should in theory enter into their migration decisions[9], and in Table 3 estimate probit models to test whether measures of risk preferences help predict which individuals choose to migrate. In Lisbon, all three measures of risk-seeking preferences are positively associated with migrating in Game 5, with two out of the three significant, as is the first principal component of all three measures. In contrast, migration behavior is more difficult to predict in Game 6 (with endogenous unemployment), and although the first principal component of the risk preference measures is positive, it is smaller in size than for Game 5, and not statistically significant. The Dohmen et al. (2011) risk preference measure is significant at the 5 percent level in the Lisbon sample, and is the only risk preference measure correlated with behavior in the Nairobi sample. 75 percent in Lisbon and 84 percent in Nairobi of those who do not migrate in Game 6, even though they have positive expected returns from doing so, are risk averse according to the Dohmen et al. (2011) measure.

4.5 Introducing Incomplete Information

All of these different models about migration discussed so far assume that individuals have full information when calculated expected returns from migration. However, it is difficult and costly

[9] In these games it is strictly dominant for those with unobserved skill level of 200 to never migrate, and this is also the case for those who have skill level 3 and unobserved skill level 0.

to acquire information about destinations abroad, as discussed by Bertoli et al. (2020), and there is evidence that migrants in different contexts can have incorrect information (McKenzie et al, 2013; Shrestha, 2020; Bah and Batista, 2018). Game 7 introduces this element of incomplete information into migrant decision-making by adding uncertainty over the chance of unemployment at destination 2, and over the unemployment insurance that would be received in case of unemployment. Participants can then pay to acquire information about the actual odds. In particular, they are told that the chance of unemployment is either 10%, 30%, or 50%; and that unemployment insurance will either be 100, 200, or 300. They can either make their migration decision without paying for this information, or pay 25 for each piece of information they want and then make their decision. The endowment for this game is set at 100*s for everyone, so that all players can pay both the cost of moving and the costs of acquiring all available information if they so wish.

It is not optimal for individuals with unobserved skills of 200, or with unobserved skill 0 and skill levels 2 or 3, to pay for information, yet we find 6.6 percent of them in Lisbon do and 42.4 percent in Nairobi do. In Lisbon, 82.1 percent of the remaining participants pay for some information: 78 percent for the unemployment risk, and 41 percent to learn the amount of unemployment insurance. In Nairobi, 55.8 percent pay for some information: 47 percent for the unemployment risk and 35 percent to learn the amount of unemployment insurance. We measured ambiguity-aversion (see Appendix 1) and test whether this predicts who pays for information among the subsample for which paying for information can be optimal. In Lisbon, 84.1 percent of the ambiguity-averse pay for information, compared to 79.4 percent of those not ambiguity-averse, but this difference is not statistically significant (p=0.599). Likewise the difference is not statistically significant in Nairobi (57.1 percent for the ambiguity averse compared to 54.7 percent for those not ambiguity-averse (p=0.789)).

The bottom left panel of Figure 1 then shows how the addition of incomplete information changes the scale and skill distribution of migrants. In Lisbon, the overall migration rate is 31.8 percent, compared to only 20.1 percent in Game 5 which had the same expected change of unemployment and same expected insurance rate. In Nairobi the overall migration rate rises from 17.0 percent in Game 5 to 22.7 percent in Game 7. The ability to pay for information allows some individuals to find out if they will be lucky and experience a lower chance of unemployment or higher benefits, thereby inducing more to migrate. This is particularly important for the high-skilled (skill level 3), of whom only 1.9 percent migrated in Game 5 in Lisbon, compared to 20.8 percent in Game 7. In Nairobi, it rises from 13.1 percent in Game 5 to 20.5 percent in Game 7. This makes migration less negatively selected.

4.6 Putting it all together

Games 8 and 9 then combine all the different elements that cause real-life migration decisions to deviate from the basic income maximization model of Sjaastad that was played in Game 1. Game 8 adds the possibility of liquidity constraints to Game 7, by returning the endowment to {50,100}*s, so that those with skill level 1 and endowment of 50 cannot afford to purchase information if they wish to migrate. This lowers the migration rate from 31.8 percent in Game 7 to 27.3 percent in Game 8 in Lisbon, and from 22.7 percent in Game 7 in Nairobi to 17.1 percent in Game 8, and increases the degree of intermediate skill-selection.

Game 9 adds the possibility of liquidity constraints to Game 6 (endogenous unemployment), by raising the cost of moving to 100 instead of 50. This halves the migration rate from 24.0 percent in Game 6 to 12.3 percent in Game 9 in Lisbon, with the largest impacts for skill levels 1 and 2. This makes migration less negatively selected. In Nairobi, the fall is more modest, from 27.9 percent migration in Game 6 to 23.4 percent in Game 9.

As noted in the introduction, a key puzzle for basic migration theories is why so few people migrate, and why migrants are not more strongly negatively selected on skill from many countries. Through adding more and more realistic features to our migration decision games, we see why. In Lisbon, migration rates for the low-skilled were 97 percent in Game 1, and have fallen to 10.5 percent in Game 9, and the resulting skill pattern of migration is much more of an intermediate skill-selection. In Nairobi, the migration rate for the low-skilled fell from 68.1 Percent in Game 1 to 23.1 percent in Game 9.

5. Testing Multi-Destination Choice

In practice migrants make choices among multiple possible destinations in many cases. This raises two key issues in the literature. The first is how they sort across destinations, as in Dahl's (2002) multidimensional Roy model. Grogger and Hanson (2011) find positive sorting on skill within OECD countries, with countries with higher returns to education attracting more educated workers on average. The second issue is how the addition of more destinations affects the choice between the original two destinations. Many studies in the literature (e.g. Grogger and Hanson, 2011) have made the independence of irrelevant alternatives (IIA) assumption. This assumption requires that adding a third (or more) destination does not affect the relative odds of choosing between the first two destinations. Bertoli and Fernández-Huertas Moraga (2013) question this assumption, arguing instead that migration rates between a dyad represented by an origin and a destination country do not depend solely on the attractiveness of both, but also on how this relates to the opportunities to move to other destinations. However, directly testing this assumption based just on observed migration choices is difficult, since in practice researchers typically do not observe all inputs into these decisions, nor choices of the same individuals as destinations get added or removed. Using our lab setting, we can directly test these ideas in our second and third game blocks, by adding additional destinations.

5.1 Three Destinations

The second block of games repeats games 1 through 9, with the addition of a third destination. Wages at destination 3 are determined by:

$$w_{3i} = 200 + 400s_i + 4e_{3i} \quad (7)$$

We set $e_{2i} = e_{3i}$ so that unobserved skills are the same in both migrant destinations. Note then that this third destination has a higher return to observed and unobserved skills than either destination 1 (home) or destination 2, but a lower base wage rate than either. The cost of moving to destination 2 is also higher (100).

Figures 3a and 3b shows the resulting migration choices across the nine games for the Lisbon and Nairobi samples respectively. We consider both whether or not the individual chooses to migrate at all (blue bars), as well as where they choose to migrate (red and green bars). We see a number of similarities with the two destination case: high rates of migration and negative skill-selection in the basic game, with the migration rates then falling and more intermediate selection on observed skills as we add additional real-life features to the migration decision. We see positive sorting amongst destinations in the way predicted by basic theory – higher-skilled individuals are relatively more likely to migrate to destination 3, which has the highest return to skill. Unlike in the case of Game 2 vs Game 3, we do see very different migration patterns in Game 11 vs Game 12 in the Lisbon sample. In Game 11, with perfect positive correlation between unobserved skill at home and abroad, we see that only those with high observed skill level 3 migrate to destination 3. In contrast, in Game 12, the negative correlation between unobserved skill at home and abroad combined with the high return to unobserved skill at destination 3 leads to more migration to destination 3 from all skill categories. In Game 13, adding liquidity constraints to Game 11, migration to the more expensive destination 3 is reduced for those with lower skill levels (and hence lower endowments on average). The Nairobi sample shows qualitatively similar results, although, as with the two destination version, with more deviations from income maximization, which seem to reflect the desire of some individuals to minimize costs.

5.2 Five Destinations

The third block of games adds destinations 4 and 5 with wages determined by:

$$w_{4i} = 900 + 100s_i + e_{4i} \quad (8)$$

$$w_{5i} = 100 + 400s_i + 4e_{5i} \quad (9)$$

Where the cost of moving to destination 4 is 50, and to destination 5 is 100; and $e_{2i} = e_{3i} = e_{4i} = e_{5i}$. Note that destination 4 then costs the same to migrate to as destination 2, and always pays a wage of 100 less; and destination 5 costs the same to migrate to as destination 3, and always pays a wage of 100 less. The only reason to choose either destination will then be in games with a risk of unemployment, if the risk of being unemployed is lower in one of these destinations, or the unemployment insurance higher.

Figures 4a and 4b show the resulting migration choices across the five locations in each of the nine games. We again see both the scale of migration and the skill selectivity pattern vary across games. The decisions in Games 19 to 22 look similar to those in Games 10 to 13, suggesting that the addition of two irrelevant destinations did not change migration choices. We test this formally in the next sub-section. In Game 23 the unemployment rate in destination 4 is set at 20%, which is lower than the 30% in destination 2, so here we do see switching of destinations compared to Game 14. In Game 24, we see some strategic choices, where some participants choose the lower wage destination 4 instead of 2, believing that less people will move there and so the chance of unemployment will be lower. This increases the overall migration rate in the Lisbon sample in Game 24 to 38.3 percent, compared to 28.6 percent in Game 15. In Nairobi the increase is smaller, from 30.2 percent in Game 15 to 33.2 percent in Game 24.

In Game 25 there are potentially 8 pieces of information individuals can pay to acquire (the unemployment rate and unemployment insurance amount for each of the four destinations). The endowment was set to 100*s+200 for this game, so that all participants could afford to purchase full information if they wish, and still have enough money left to move to their destination choice. However, only 55 percent in Lisbon and 58 percent in Nairobi purchase any information. Not a single individual in Lisbon purchases full information: the maximum is 5 pieces of information, and the median, conditional on purchasing, is 2 pieces. In contrast, 7.9 percent in Nairobi purchase all 8 pieces of information, and the median conditional on purchasing is 3 pieces of information. The most common piece of information purchased was the unemployment rate in destination 2 (46 percent in Lisbon and 35 percent in Nairobi purchased this), followed by the unemployment rate in destination 4 (35 percent in Lisbon and 31 percent in Nairobi purchased this), with fewer than 2 percent in the Lisbon sample purchasing any information about destination 5 (although 23 percent in Nairobi purchased some information about destination 5). This shows not all individuals are able to filter out irrelevant choices when deciding where to acquire information about migration destinations.

5.3 Which Features Matter Most for Changing the Level and Skill Selectivity of Migration?

We stack the migration decisions of individuals across the 27 games and then run a probit to investigate which features of the games are most associated with lowering the level of migration from the high rates seen in Game 1, and for changing the skill selectivity. Table 4 reports the results. We see qualitatively similar results across the two samples, although some of the magnitudes are larger in the Lisbon sample given that the Nairobi sample was migrating less to begin with in Game 1.

The feature that reduces migration levels most is adding either an exogenous or endogenous risk of unemployment in the migration destination. This lowers the migration rate by more than 40 percentage points for the Lisbon sample, and by 19 (endogenous risk) to 26 (exogeneous risk) percentage points in the Nairobi sample. Liquidity constraints lower migration rates by 6 to 10 percentage points, and migration rates decrease with observed and unobserved skill levels in our game, reflecting the higher returns to skill at home than abroad. Notably both the risk of unemployment and liquidity constraints lower migration more for the low-skilled than for high-skilled individuals, making migration less negatively skill-selected.

In contrast, we see migration rates are higher when there are more destinations to choose amongst. Incomplete information acts to increase the migration rate in the Lisbon sample, because individuals have the opportunity to pay the costs of overcoming this lack of information and discovering that the odds of unemployment are lower than the 30 percent average rate specified in our complete information setting.

5.4 Testing IIA

Independence of irrelevant alternatives requires that if destination 2 is preferred over destination 1 in the two-destination game, then introducing additional destination choice 3 (or choices 3, 4 and 5) should not make destination 1 preferable to destination 2. We examine whether IIA holds in Figure 5, plotting the proportion of individuals choosing to migrate to destination 2 in each game out of all those choosing either destination 1 or destination 2; and in Table 5, which summarizes the proportion of individuals who change their relative ranking of destination 1 versus destination 2 when more destinations are added.

We see from the top row of Figure 5 and from the first three columns of Table 5 that IIA holds for almost everyone in the basic Sjaastad and Borjas games in the Lisbon sample: 95 to 99 percent of participants do not change their migration decision between destinations 1 and 2 when a third, or a third, fourth, and fifth, destination is added. Adding liquidity constraints and an exogenous risk of unemployment still results in IIA holding for 90 to 95 percent of participants in variants of Games 4 and 5 in Lisbon. In contrast, we see 12 to 22 percent of participants violating IIA in these simple settings in the Nairobi sample. These violations of IIA are linked to individuals being inconsistent in choosing cost minimization over income maximization. That is, adding an additional destination which also contains a migration cost may change how people think about the role of costs when deciding between a destination with no moving cost (home) and another that involves a cost.

IIA starts to break down for some people in Lisbon under two of our settings. The first is when the risk of unemployment is endogenous. Here, adding a third or more destinations raises the possibility that others who would have migrated to destination 2 now migrate to destination 3, 4, or 5, thereby reducing the risk of unemployment at destination 2. This results in 12-14 percent of participants changing their ranking of destination 1 versus destination 2 in Games 15 and 24 versus Game 6, and in Game 24 versus Game 15. 17-18 percent of participants in Nairobi also change their ranking here, but this is no higher than it was in the simpler games. The second factor is the addition of incomplete information. We see approximately 20 percent of participants in Lisbon changing their choice of destination 1 versus destination 2 when more destinations are added to Games 7 and 8. One reason for this is that the addition of more destinations with incomplete information causes individuals to change whether or not they decide to pay to acquire information about destination 2: 19 percent of individuals made a different choice as to whether to pay to know what the unemployment rate was in destination 2 when they faced a choice of five destinations versus two destinations. In Nairobi, 16-22 percent of participants change their rankings in these games with incomplete information.

We investigate what predicts violation of IIA by estimating probits where the outcome is coded as one if the destination choice between destinations 1 and 2 switches in either the 3- or 5-destination version of the game compared to the 2-destination version, and zero if it stays the same. We stack the data to form a panel of choices for each individual, and then cluster standard errors at the individual level. Column 1 of Table 6 then shows that the probability of IIA being violated in Lisbon does not significantly increase when we add liquidity constraints to the basic game, but does when we add risk (either endogenous or exogenous), and incomplete information. Column 2 then controls for the assigned skill and unobserved skill levels of the participant. Since the return to skill is higher at destination 1 than destination 2, those with higher skill levels are less likely to want to migrate at all, so less likely to violate IIA by choosing migration in at least one game. Column 3 adds non-game attributes of the individual: we see that violation of IIA is not correlated with gender, desire to migrate, ambiguity aversion or risk preferences. Finally, column 4 restricts to skill levels 1 and 2, who have the most incentives to migrate, with results similar for this sample, except for weakly significant evidence that ambiguity-averse individuals are more likely to violate IIA.

Columns 5 to 8 repeat the same analysis for the Nairobi sample. Here we see that introducing liquidity constraints in the game does reduce violations of IIA. This occurs because it physically prevents some individuals from choosing the migration option, so there is no possibility for them to change this decision when an additional (irrelevant) destination is added. This differs from the Lisbon case because there were so few violations of IIA in the basic game in Lisbon for liquidity to effect. In contrast to Lisbon, adding exogenous risk reduces violations of IIA in Nairobi. The reason here seems less about the complexity of the decision being made, but rather than adding exogenous risk made migration less appealing, so that people would be more strongly attached to destination 1. We do again see that adding incomplete information leads to more violations of IIA. We do not find any correlation between violations of IIA and non-game attributes of the individual. In particular, we noted that one difference between the two samples was much worse performance on expected value questions in Nairobi. However, it is not the case that those who are better at such calculations are less likely to violate IIA.

6. Does game behavior predict real-life migration actions?

We examine whether migration decisions made in the lab can help predict real-life migration actions by collecting follow-up data on actual migration decisions made by the experimental subjects who played the lab games.

We collected data on 140 out of the 154 lab participants in the Lisbon sample six months after their graduation, which closely coincided with the time of participation in the lab experiments. We found that 50% had decided to pursue graduate education, while 26% were working, and only 5.7% currently live abroad.

In the Nairobi sample, we found that most study participants took longer to graduate. For that reason, there was a longer gap between participation in the lab experiments and graduation, but students were also, on average, interviewed at about 6 months after graduation. We were able to reinterview 242 out of the 265 initial experimental subjects. Most study participants were either working (39.3%) or looking for a job (42.2%). Differently from the Lisbon sample, only 3.7% pursued graduate studies. The fraction who had migrated abroad was low at 1.7%.

In order to evaluate the predictive behavior of migration decisions made in the lab, we focused on the decisions made in the "home bias" round because this is the only round of lab decisions that did not depend on any lab assigned characteristics (namely observable and unobservable skills).

As is shown in Table 7, we find that lab decisions in this round strongly predict whether study participants had looked for jobs abroad and received job offers from abroad. Participants displaying "home bias" in the lab were less likely to look for jobs abroad by 29p.p. and 17p.p. in the Lisbon and Nairobi samples, respectively. These differences were strongly statistically significant - at the 1% and 2% levels. The same pattern holds for receiving job offers from abroad: participants who exhibited “home bias” in the lab were 2.8p.p. less likely to receive job offers from abroad in the Lisbon sample (not significant) and 4p.p. in the Nairobi sample (significant at the 5% level).

When we look at the probability of living abroad, we find that participants exhibiting “home bias” in the lab were 8 p.p. less likely to be living abroad in the Lisbon sample (significant at the 5% level), whereas this difference was not significant in the Nairobi sample, likely due to the low prevalence of migration in this sample.

Overall, despite the relatively low levels of actual international migration six months after graduation of the study participants, we do find supportive evidence that lab decisions are predictive of real-world migration behavior. This finding is particularly encouraging since participants from both samples in our study do not have many job offers or alternatives abroad. Conducting these lab experiments in other settings, such as with applicants for temporary contract worker positions in different Gulf countries, would offer a setting in which the likelihood of migration is much higher and would likely provide additional support to the promise of lab experiments in studies of economic migration.

7. Conclusions

The results of our work are encouraging of the promise of laboratory experiments to help us better understand migration-decision making behavior.

Our results show that adding real world features which take account of liquidity constraints, risk and uncertainty, and incomplete information to the classical Sjaastad/Borjas migration model makes a huge difference in terms of predicting the rate of migration and the selection pattern. The largest impact comes from adding risk (of unemployment) to the migration outcome.

We also find that the independence of irrelevant alternatives (IIA) assumption, which underlies many models of multi-destination migration choices, holds well for simple migration decisions that just involve comparisons of costs and wages in a developed country setting, but even in these simple cases, violations occur for 14-21 percent of our sample in Nairobi. Moreover, when the risk of unemployment and incomplete information are added, IIA no longer holds for 20 percent of people in our game in Lisbon. Since most real world migration decisions involve considerable risk and incomplete information, real world violations of IIA are likely to be non-trivial.

Our results also show that even in the simplest settings, people do not always make the destination choice which maximizes net income. Instead, cost minimization seems to be a key decision factor in the migration decision – particularly for individuals in the Nairobi sample.

In addition to improving our understanding of the factors affecting migration decisions, these results also shed light on why observed migration is lower than could be expected. The implications are important for the design of migration policies: they highlight that it cannot be simplistically assumed that physical or legal barriers to migration are the only impediments to migration, and more comprehensive approaches are required to influence migration behavior.

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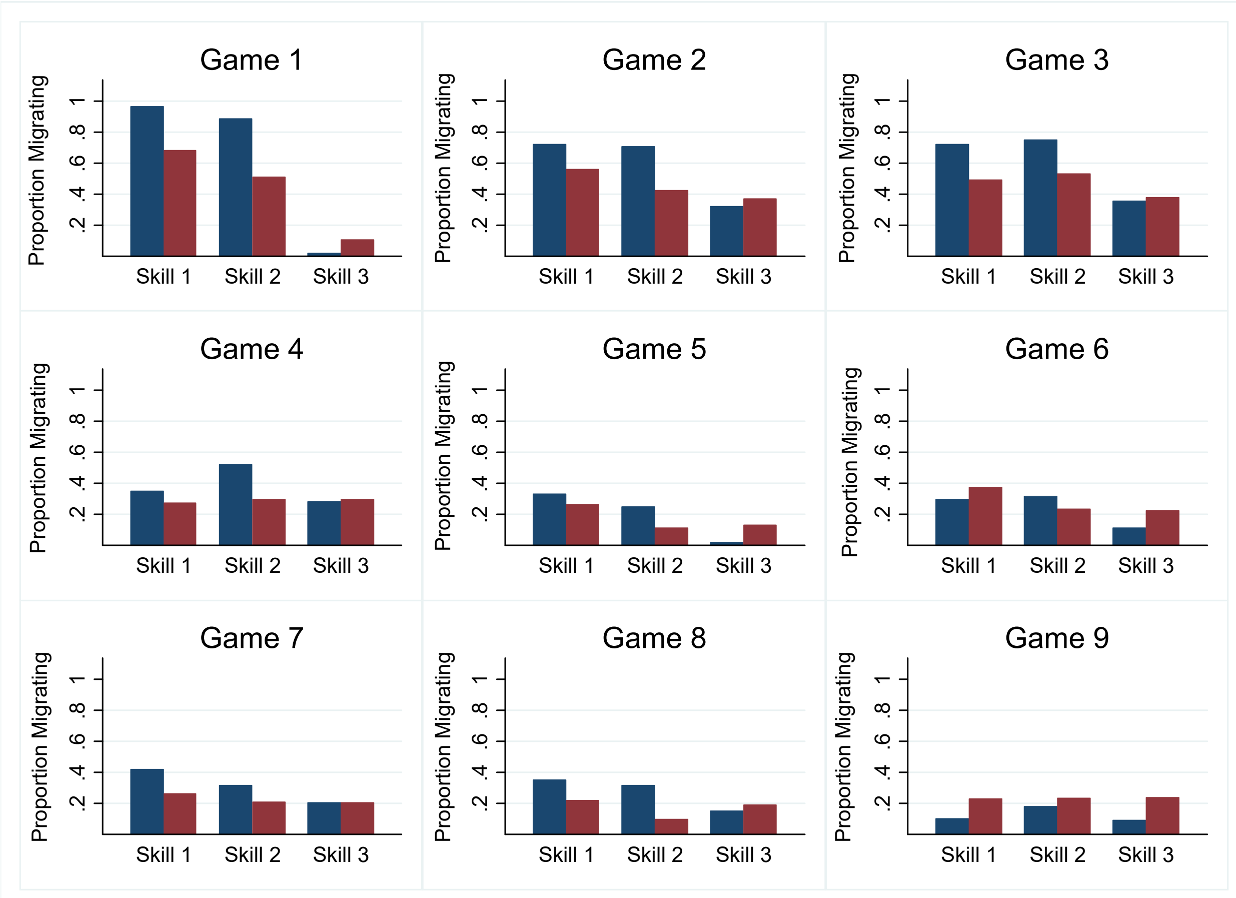
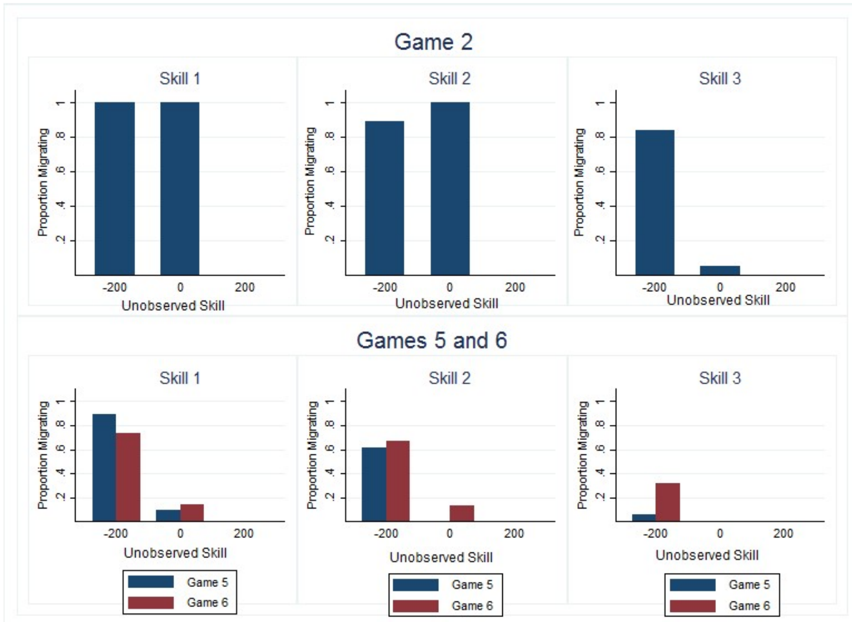
Figure 1: Rate of Migration and Migration Skill-Selection in Two Destination Games in Lisbon Sample (Blue) and Nairobi Sample (Red)



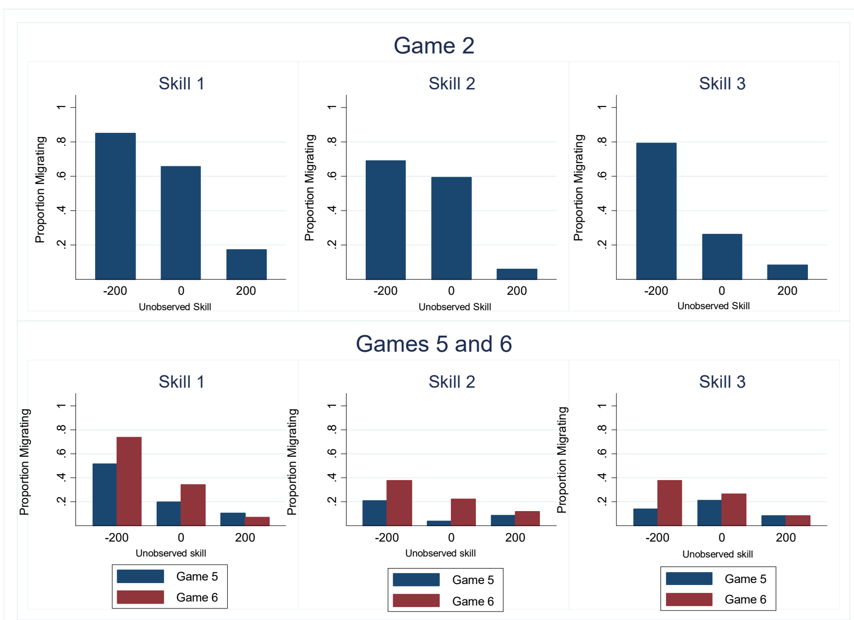
Notes: the return to observed and unobserved skills are held constant across the nine games. Game 1 is the basic Sjaastad (1962) migration decision; positively correlated (Game 2) and negatively correlated (Game 3) unobserved skills at home and abroad are introduced in Games 2 and 3 as in Borjas (1987); Game 4 incorporates the possibility of liquidity constraints; Game 5 introduces the chance of unemployment at the migration destination; Game 6 includes endogenous unemployment which depends on how many others move; Game 7 has the risk of unemployment with incomplete information about this risk , but the possibility of paying to know what the risk is; Game 8 adds the possibility of liquidity constraints to Game 7; and Game 9 adds the possibility of liquidity constraints to Game 6.

Figure 2: Borjas Selection on Unobserved Skills with and without Unemployment Risk

Panel A: Lisbon Sample

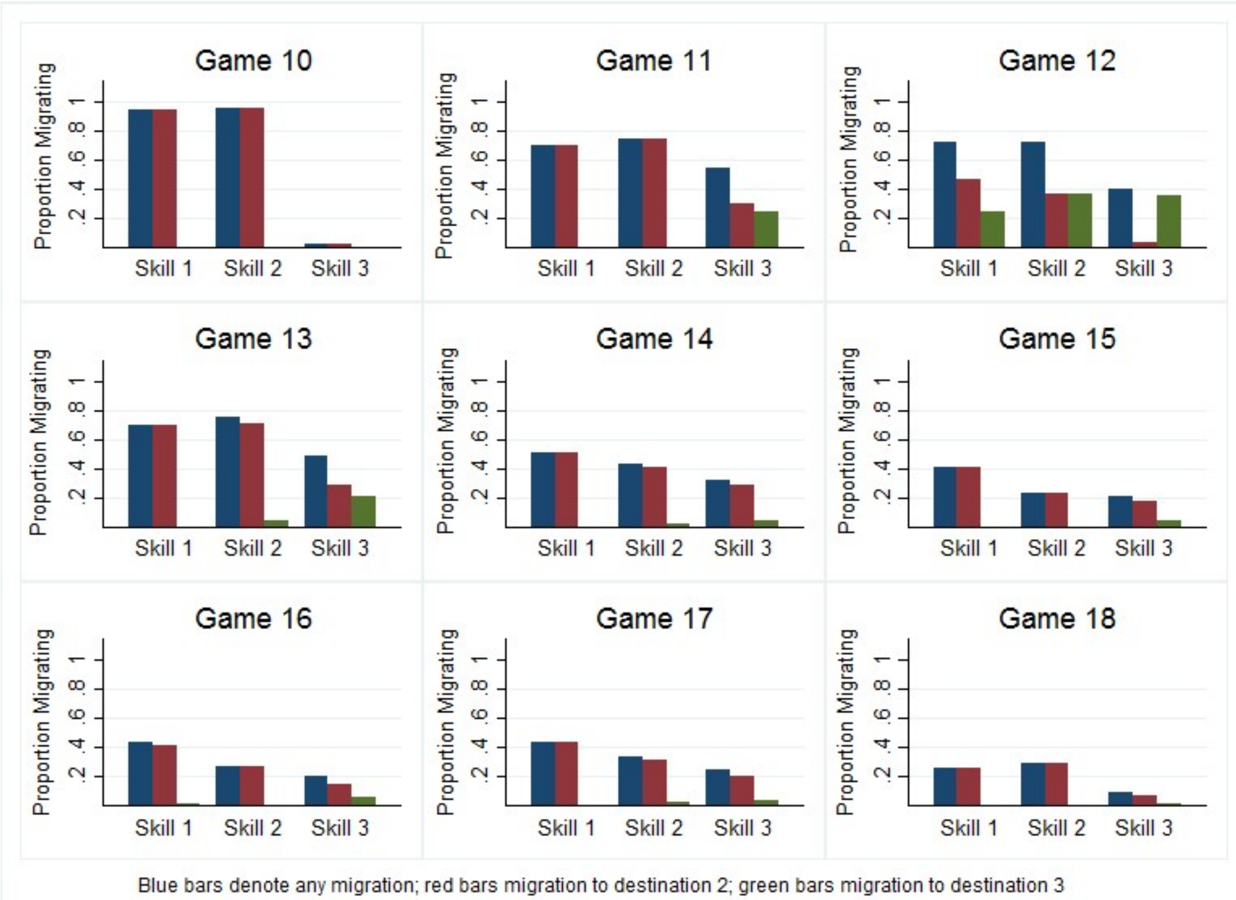


Panel B: Nairobi Sample



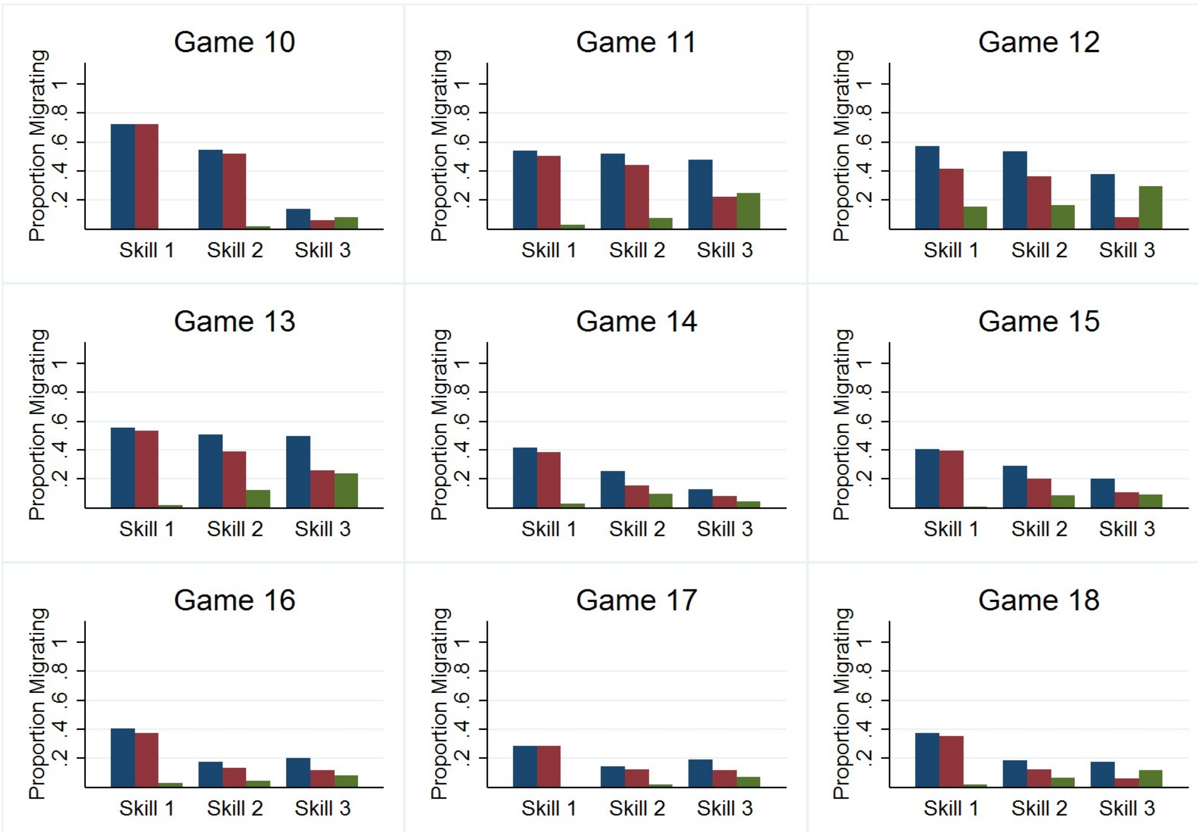
Notes: Unobserved skill at home and abroad is perfectly positively correlated, and is randomly assigned at the individual level as one of -200, 0, or 200. Game 2 is a basic migration decision between two destinations with positively correlated unobserved skills at home and abroad as in Borjas (1987). The return to both observed and unobserved skills is higher at home than abroad. Game 5 introduces a 30% chance of unemployment at the migrant destination, with social benefit 200, compared to Game 2 where there is no unemployment. Game 6 makes the unemployment rate endogenous, depending on how many other individuals in the lab session also choose to migrate.

Figure 3a: Rate of Migration and Migration Skill-Selection in Three Destination Games in Lisbon Sample



Notes: Games are similar to those in Games 1 to 9, with the addition of a third destination (destination 3), that has a lower base wage, but higher return to observed and unobserved skills than migrant destination 2. The return to observed and unobserved skills are held constant across the nine games. Game 10 is the basic Sjaastad (1962) migration decision; positively correlated (Game 11) and negatively correlated (Game 12) unobserved skills at home and abroad are introduced in Games 11 and 12 as in Borjas (1987); Game 13 incorporates the possibility of liquidity constraints; Game 14 introduces a known chance of unemployment at the migration destination, which is randomly drawn from {10%, 30%, 50%} for each player for each destination; Game 15 includes endogenous unemployment which depends on how many others move to each destination; Game 16 has the risk of unemployment with incomplete information about this risk, but the possibility of paying to know what the risk is; Game 17 adds the possibility of liquidity constraints to Game 16; and Game 18 adds the possibility of liquidity constraints to Game 15 and incomplete information about unemployment insurance which participants can choose to purchase.

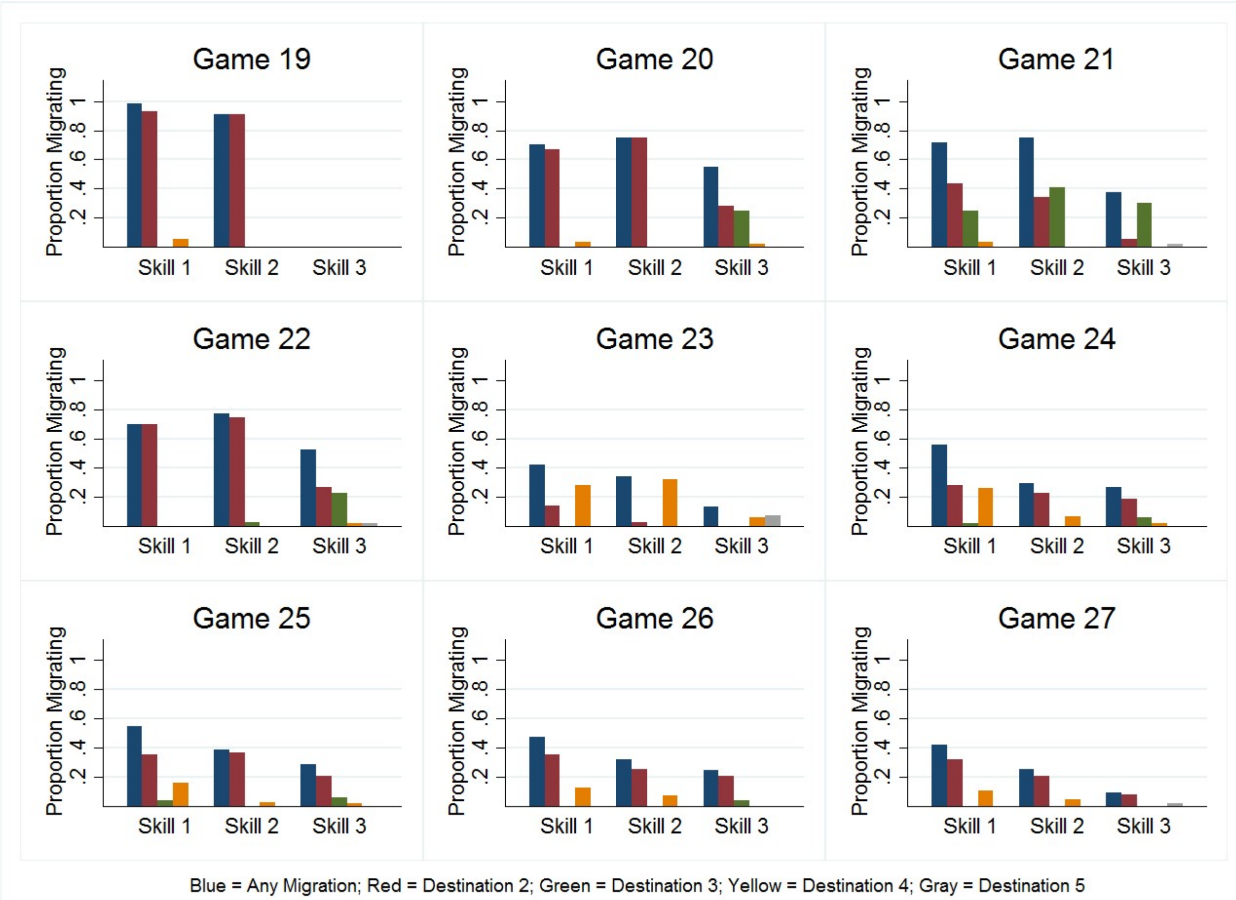
Figure 3b: Rate of Migration and Migration Skill-Selection in Three Destination Games in Nairobi Sample



Blue bars denote any migration; red bars migration to destination 2; green bars migration to destination 3.

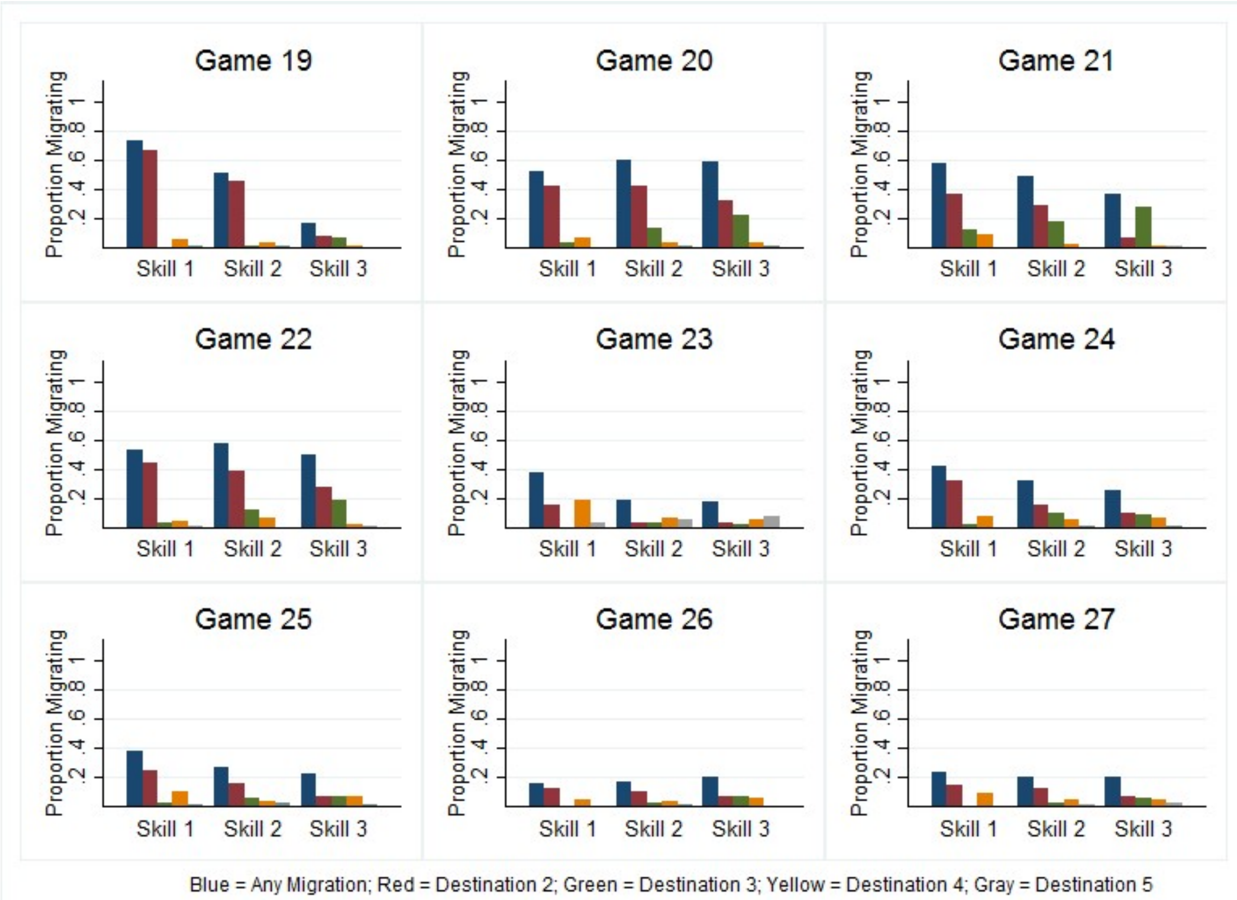
Notes: Games are similar to those in Games 1 to 9, with the addition of a third destination (destination 3), that has a lower base wage, but higher return to observed and unobserved skills than migrant destination 2. The return to observed and unobserved skills are held constant across the nine games. Game 10 is the basic Sjaastad (1962) migration decision; positively correlated (Game 11) and negatively correlated (Game 12) unobserved skills at home and abroad are introduced in Games 11 and 12 as in Borjas (1987); Game 13 incorporates the possibility of liquidity constraints; Game 14 introduces a known chance of unemployment at the migration destination, which is randomly drawn from {10%, 30%, 50%} for each player for each destination; Game 15 includes endogenous unemployment which depends on how many others move to each destination; Game 16 has the risk of unemployment with incomplete information about this risk, but the possibility of paying to know what the risk is; Game 17 adds the possibility of liquidity constraints to Game 16; and Game 18 adds the possibility of liquidity constraints to Game 15 and incomplete information about unemployment insurance which participants can choose to purchase.

Figure 4a: Rate of Migration and Migration Skill-Selection in Five Destination Games in Lisbon Sample



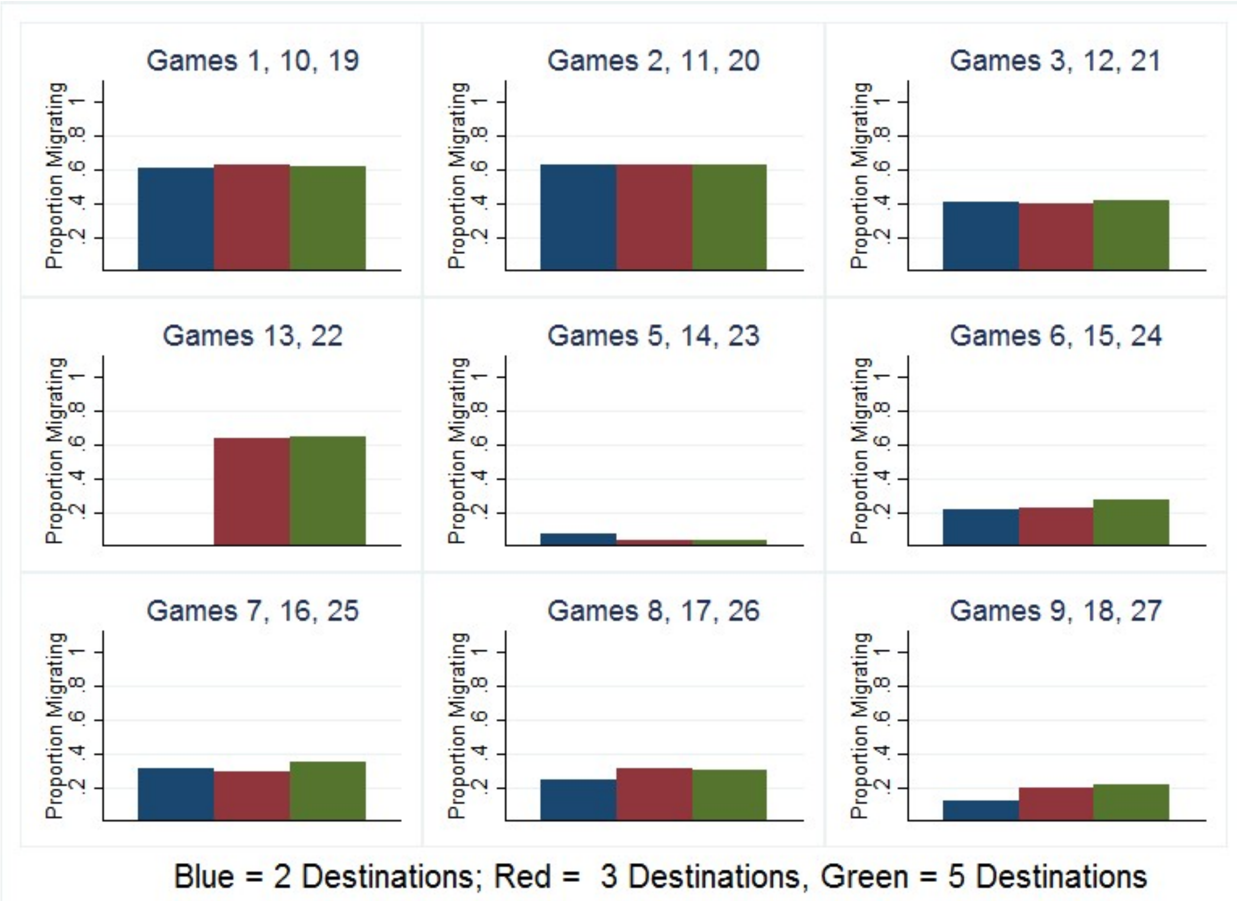
Notes: Games are similar to those in Games 10 to 18, with the addition of destination 4 (that pays less than destination 2), and destination 5 (which pays less than destination 3). The return to observed and unobserved skills are held constant across the nine games. Game 19 is the basic Sjaastad (1962) migration decision; positively correlated (Game 20) and negatively correlated (Game 21) unobserved skills at home and abroad are introduced in Games 20 and 21 as in Borjas (1987); Game 22 incorporates the possibility of liquidity constraints; Game 23 introduces a known chance of unemployment at the migration destination, which is 30% at destination 2, 20% at destinations 3 and 4, and 10% at destination 5; Game 24 includes endogenous unemployment which depends on how many others move to each destination; Game 25 has the risk of unemployment (randomly drawn from {10%, 30%, 50%} for each player at each destination) with incomplete information about this risk, but the possibility of paying to know what the risk is; Game 26 adds the possibility of liquidity constraints to Game 25; and Game 27 adds the possibility of liquidity constraints to Game 24 and incomplete information about unemployment insurance which participants can choose to purchase.

Figure 4b: Rate of Migration and Migration Skill-Selection in Five Destination Games in Nairobi Sample



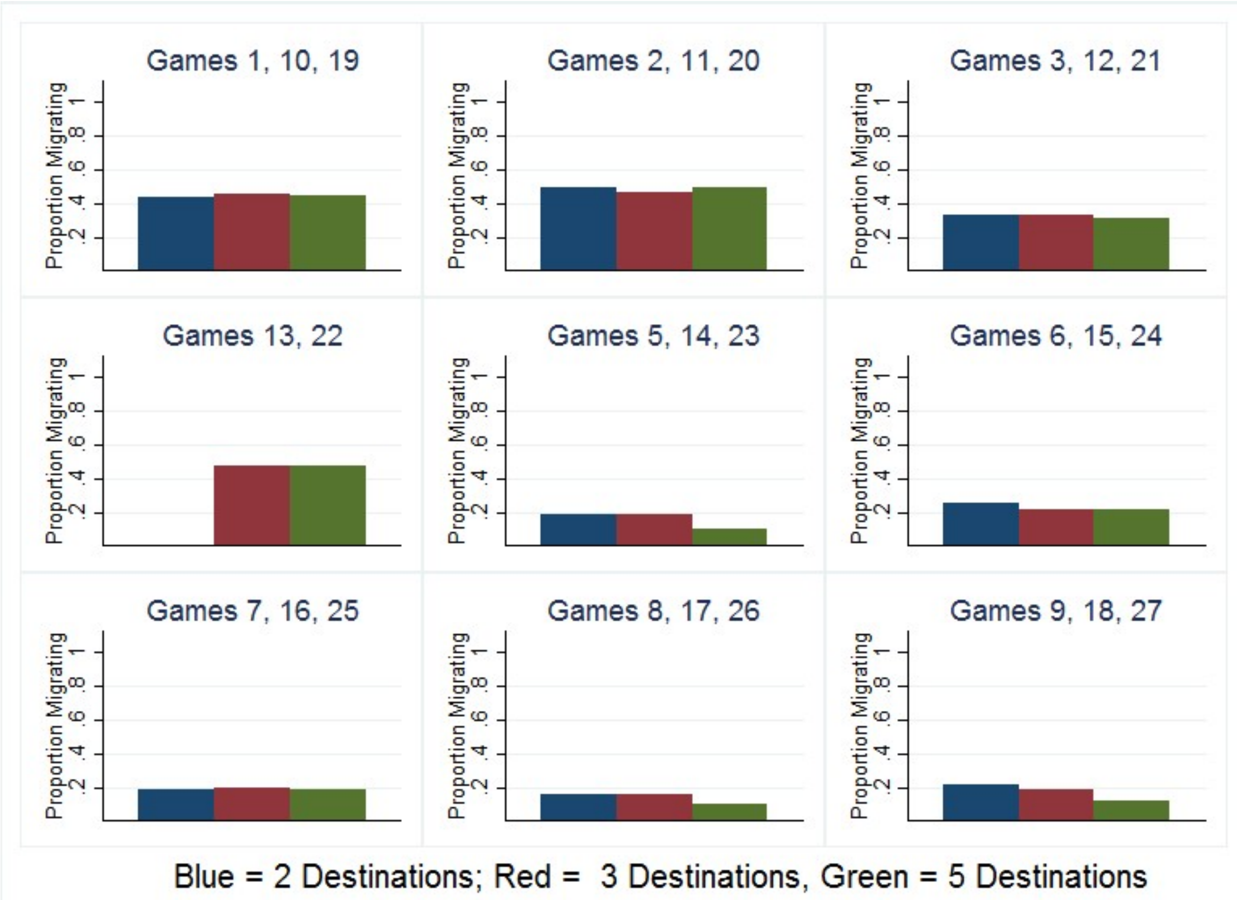
Notes: Games are similar to those in Games 10 to 18, with the addition of destination 4 (that pays less than destination 2), and destination 5 (which pays less than destination 3). The return to observed and unobserved skills are held constant across the nine games. Game 19 is the basic Sjaastad (1962) migration decision; positively correlated (Game 20) and negatively correlated (Game 21) unobserved skills at home and abroad are introduced in Games 20 and 21 as in Borjas (1987); Game 22 incorporates the possibility of liquidity constraints; Game 23 introduces a known chance of unemployment at the migration destination, which is 30% at destination 2, 20% at destinations 3 and 4, and 10% at destination 5; Game 24 includes endogenous unemployment which depends on how many others move to each destination; Game 25 has the risk of unemployment (randomly drawn from {10%, 30%, 50%} for each player at each destination) with incomplete information about this risk, but the possibility of paying to know what the risk is; Game 26 adds the possibility of liquidity constraints to Game 25; and Game 27 adds the possibility of liquidity constraints to Game 24 and incomplete information about unemployment insurance which participants can choose to purchase.

Figure 5a: Testing IIA in the Lisbon Sample: Proportion of those Choosing Either Destination 1 or 2 Who Choose to Migrate to Destination 2 by Game



Notes: Sample restricted to those answering destination 1 or 2 for each of the three destination choices in a game variant. Under IIA proportion migrating to 1 versus 2 should be the same regardless of how many destinations are in the Game. Games 1, 10, and 19 are the basic Sjaastad (1962) income maximization decision; Games 2, 11, and 20 are the Borjas (1987) selection game with positively correlated unobserved skills; Games 3, 12, and 21 are the Borjas selection game with unobserved skills in destination 1 negatively correlated with those in other destinations; Games 13, and 22 add the possibility of liquidity constraints (Game 4 is omitted because the moving cost was set higher in this game); Games 5, 14, and 23 add an exogenous risk of unemployment at destination 2; Games 6, 15, and 24 add an endogenous risk of unemployment at destination 3; Games 7, 16, and 25 have an uncertain risk of unemployment at destination 2 that individuals can pay to find out; Games 8, 17, and 26 add the possibility of liquidity constraints along with uncertainty; and Games 9, 18, and 27 add the possibility of liquidity constraints to Games 6, 15, and 24.

Figure 5b: Testing IIA in the Nairobi Sample: Proportion of those Choosing Either Destination 1 or 2 Who Choose to Migrate to Destination 2 by Game



Notes: Sample restricted to those answering destination 1 or 2 for each of the three destination choices in a game variant. Under IIA proportion migrating to 1 versus 2 should be the same regardless of how many destinations are in the Game. Games 1, 10, and 19 are the basic Sjaastad (1962) income maximization decision; Games 2, 11, and 20 are the Borjas (1987) selection game with positively correlated unobserved skills; Games 3, 12, and 21 are the Borjas selection game with unobserved skills in destination 1 negatively correlated with those in other destinations; Games 13, and 22 add the possibility of liquidity constraints (Game 4 is omitted because the moving cost was set higher in this game); Games 5, 14, and 23 add an exogenous risk of unemployment at destination 2; Games 6, 15, and 24 add an endogenous risk of unemployment at destination 3; Games 7, 16, and 25 have an uncertain risk of unemployment at destination 2 that individuals can pay to find out; Games 8, 17, and 26 add the possibility of liquidity constraints along with uncertainty; and Games 9, 18, and 27 add the possibility of liquidity constraints to Games 6, 15, and 24.

Table 1: Sample Characteristics for Lisbon and Nairobi Samples

	Lisbon Sample					Nairobi Sample				
	Mean	**S.D.**	**Min.**	**Median**	**Max.**	**Mean**	**S.D.**	**Min.**	**Median**	**Max.**
Female	0.45	0.50	0	0	1	0.45	0.50	0	0	1
Age	20.7	1.0	19	20	25	22.7	1.7	20	22	32
Economics Major	0.58	0.49	0	1	1	0.32	0.47	0	0	1
Grade Point Average	15.0	1.4	11	15	18	67.9	9.3	49	67	100
Born abroad	0.06	0.25	0	0	1	0.01	0.09	0	0	1
Spent 6 months or more outside of country	0.52	0.50	0	1	1	0.12	0.32	0	0	1
Would prefer to work outside of country after graduating	0.53	0.50	0	1	1	0.32	0.47	0	0	1
Has a job offer	0.19	0.40	0	0	1	0.19	0.39	0	0	1
Has a job offer outside of country	0.06	0.24	0	0	1	0.02	0.15	0	0	1
Money available as moving costs (Euros/Ksh)	2467	3002	0	1500	20000	182497	253662	0	100000	2000000
Math score (out of 10)	9.55	0.64	7	10	10	9.62	0.73	6	10	10
Expected value question score (out of 10)	9.31	1.51	1	10	10	4.00	4.23	0	2	10
Ambiguity Averse	0.49	0.50	0	0	1	0.49	0.50	0	0	1
Share of a Windfall that would put in a fair gamble	0.30	0.29	0	0.2	1	0.32	0.29	0	0.2	1
Risk-seeking Choice in Eckel and Grossman (2002) risk game	4.10	1.94	1	4	7	3.00	1.82	1	3	7
Point at which switch in Dohmen et al. (2011) risk game	10.19	6.06	1	11	20	7.25	7.35	1	2	21
Sample Size	**154**					**265**				

Table 2: Migration Decision Factors in Each Game

Game	Wage at Destination	Moving Cost	Endowment	Correlation in Unobserved skill	Liquidity Constraints	Chance of Unemployment	Unemployment Insurance	Full Information	Cost of Information
Game 1			{50,100}*Skill	none	no	no	none	yes	n.a.
Destination 1	500 +300*Skill	0							
Destination 2	1000+100*Skill	50							
Game 2			{50,100}*Skill	perfect positive	no	no	none	yes	n.a.
Destination 1	500 +300*Skill+3*e1	0							
Destination 2	1000+100*Skill+e2	50							
Game 3			{50,100}*Skill	perfect negative	no	no	none	yes	n.a.
Destination 1	500 +300*Skill+3*e1	0							
Destination 2	1000+100*Skill+e2	50							
Game 4			{50,100}*Skill	perfect positive	yes	no	none	yes	n.a.
Destination 1	500 +300*Skill+3*e1	0							
Destination 2	1000+100*Skill+e2	100							
Game 5			{50,100}*Skill	perfect positive	no	yes	yes	yes	n.a.
Destination 1	500 +300*Skill+3*e1	0				0	0		
Destination 2	1000+100*Skill+e2	50				30%	200		
Game 6			{50,100}*Skill	perfect positive	no	yes	yes	no	n.a.
Destination 1	500 +300*Skill+3*e1	0				0	0		
Destination 2	1000+100*Skill+e2	50				Endogeneous	200		
Game 7			100*Skill	perfect positive	no	yes	yes	no	25
Destination 1	500 +300*Skill+3*e1	0				0	0		
Destination 2	1000+100*Skill+e2	50				{10%, 30%, 50%}	{100, 200, 300}		
Game 8			{50,100}*Skill	perfect positive	yes	yes	yes	no	25
Destination 1	500 +300*Skill+3*e1	0				0	0		
Destination 2	1000+100*Skill+e2	50				{10%, 30%, 50%}	{100, 200, 300}		
Game 9			{50,100}*Skill	perfect positive	yes	yes	yes	no	n.a.
Destination 1	500 +300*Skill+3*e1	0				0	0		
Destination 2	1000+100*Skill+e2	100				Endogeneous	200		

Notes: {} denotes parameter is randomly drawn from parameters in set. Skill level is randomly assigned to be 1, 2, or 3. Unobserved skill e1 and e2 are randomly assigned to be either -200, 0, or 200, with perfect positive correlation in games 2, 4-9, and perfect negative correlation in game 3. Endogenous unemployment arises when odds of unemployment depend on decisions of others in the session as to whether or not to move to destination 2. Liquidity-constrained games are ones in which some participants cannot afford the cost of moving to destination 2 and/or of acquiring information about chance of unemployment and unemployment insurance offered. In games 7 and 8, participants can elect to pay 25 to learn which of the three possible values of unemployment applies, and similarly for the unemployment insurance. Numbers shown are for Lisbon sample. Kenyan sample multiplies all by 100 and then presents as Shillings.

Table 3: Risk Preferences Predict Migration Choices in Games 5 and 6

	Migrate in Game 5				Migrate in Game 6			
Panel A: Lisbon Sample								
Expected income gain from migrating	0.002***	0.002***	0.002***	0.002***	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eckel and Grossman (2002) risk score	0.047**				-0.008			
	(0.021)				(0.028)			
Modified Gneezy and Potters (1997) risk score		0.138				-0.048		
		(0.145)				(0.175)		
Dohmen et al. (2011) risk score			0.022**				0.019**	
			(0.009)				(0.009)	
Principal component of risk-seeking behavior				0.096***				0.028
				(0.032)				(0.044)
Sample Size	93	93	93	93	93	93	93	93
Panel B: Nairobi Sample								
Expected income gain from migrating	0.001***	0.001***	0.001***	0.001***	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Eckel and Grossman (2002) risk score	-0.000				0.002			
	(0.018)				(0.021)			
Modified Gneezy and Potters (1997) risk score		-0.076				-0.158		
		(0.120)				(0.148)		
Dohmen et al. (2011) risk score			0.008*				0.010*	
			(0.004)				(0.005)	
Principal component of risk-seeking behavior				0.046				0.063
				(0.031)				(0.040)
Sample Size	147	147	147	147	147	147	147	147

Notes: margin effects from probit estimation shown, with robust standard errors in parentheses. *, **, and *** denote significance at the 10, 5, and 1 percent levels respectively.

All three risk measures are coded so that higher scores indicate more risk-seeking behavior. Principal component also has higher scores denote more risk-seeking behavior.

Games 5 and 6 involve 2-destination migration choice, where there is a risk of unemployment if migration occurs.

Sample in each case are individuals for whom theory predicts risk preferences should enter into migration decisions.

Table 4: What predicts the level and skill selectivity of migration?

Dependent variable: Choosing a destination other than Destination 1

	Lisbon Sample					**Nairobi Sample**				
	Full Sample	Full Sample	Low Skilled	Medium Skilled	High Skilled	Full Sample	Full Sample	Low Skilled	Medium Skilled	High Skilled
Game Characteristics										
Liquidity Constraints	-0.096***	-0.096***	-0.277***	-0.111***	0.031	-0.064***	-0.065***	-0.160***	-0.077***	0.033*
	(0.020)	(0.020)	(0.042)	(0.038)	(0.022)	(0.012)	(0.012)	(0.019)	(0.018)	(0.019)
Exogenous Risk	-0.410***	-0.411***	-0.579***	-0.664***	-0.156***	-0.261***	-0.262***	-0.274***	-0.316***	-0.196***
	(0.032)	(0.032)	(0.064)	(0.068)	(0.034)	(0.020)	(0.020)	(0.039)	(0.037)	(0.031)
Endogenous Risk	-0.413***	-0.413***	-0.566***	-0.652***	-0.169***	-0.187***	-0.187***	-0.211***	-0.216***	-0.132***
	(0.025)	(0.025)	(0.053)	(0.048)	(0.031)	(0.017)	(0.017)	(0.033)	(0.030)	(0.026)
Incomplete Information	0.088***	0.088***	0.168***	0.024	0.063	0.022	0.022	-0.004	0.022	0.054*
	(0.032)	(0.032)	(0.051)	(0.043)	(0.047)	(0.018)	(0.018)	(0.030)	(0.034)	(0.032)
Observed Skill Level	-0.231***	-0.226***				-0.084***	-0.087***			
	(0.024)	(0.025)				(0.020)	(0.020)			
Unobserved Skill Level	-0.211***	-0.211***	-0.288***	-0.306***	-0.096***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.014)	(0.014)	(0.025)	(0.035)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Asset Endowed	-0.000	-0.001	-0.001	0.002	-0.001	0.000	0.000	0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Three Destinations	0.155***	0.155***	0.170***	0.119***	0.144***	0.075***	0.075***	0.125***	0.066***	0.034
	(0.020)	(0.020)	(0.037)	(0.045)	(0.030)	(0.014)	(0.014)	(0.027)	(0.021)	(0.025)
Five Destinations	0.180***	0.180***	0.256***	0.117***	0.139***	0.078***	0.078***	0.081***	0.085***	0.067**
	(0.020)	(0.020)	(0.032)	(0.044)	(0.033)	(0.015)	(0.015)	(0.030)	(0.020)	(0.027)
Non-game atttributes										
Female		-0.037					0.011			
		(0.039)					(0.032)			
Wants to work abroad		-0.027					0.009			
		(0.037)					(0.034)			
Expected value score		-0.004					0.001			
		(0.009)					(0.004)			
Averse to Ambiguity		0.024					-0.028			
		(0.038)					(0.031)			
Dohmen Risk Measure		0.000					0.007			
		(0.010)					(0.009)			
Sample Size	4158	4158	1539	1188	1431	7151	7151	2454	2430	2267

Marginal effects from probit estimation shown. Robust standard errors in parentheses, clustered at the individual level.

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

Table 5: Proportion Not Obeying IIA by Game

Panel A: Lisbon Sample

Panel I:	Compared to Migration Choice in Two Destination Game								
	Game 1	Game 2	Game 3	Game 4	Game 5	Game 6	Game 7	Game 8	Game 9
Three Destination Version									
Proportion Changing Migration Decision	0.052	0.035	0.010		0.091	0.138	0.220	0.212	0.163
Sample Size	154	141	105		33	152	150	151	153
Five Destination Version									
Proportion Changing Migration Decision	0.060	0.043	0.019		0.051	0.122	0.167	0.225	0.152
Sample Size	151	138	103		117	131	138	142	145
Panel II:	Compared to Migration Choice in Three Destination Game								
	Game 10	Game 11	Game 12	Game 13	Game 14	Game 15	Game 16	Game 17	Game 18
Five Destination Version									
Proportion Changing Migration Decision	0.040	0.053	0.066	0.099	0.000	0.119	0.203	0.236	0.138
Sample Size	151	151	151	152	28	135	143	144	145

Panel B: Nairobi Sample

Panel I:	Compared to Migration Choice in Two Destination Game								
	Game 1	Game 2	Game 3	Game 4	Game 5	Game 6	Game 7	Game 8	Game 9
Three Destination Version									
Proportion Changing Migration Decision	0.160	0.188	0.142		0.157	0.173	0.223	0.160	0.219
Sample Size	256	234	211		83	248	251	257	247
Five Destination Version									
Proportion Changing Migration Decision	0.198	0.157	0.158		0.119	0.175	0.183	0.160	0.180
Sample Size	247	217	202		219	228	230	244	239
Panel II:	Compared to Migration Choice in Three Destination Game								
	Game 10	Game 11	Game 12	Game 13	Game 14	Game 15	Game 16	Game 17	Game 18
Five Destination Version									
Proportion Changing Migration Decision	0.213	0.211	0.206	0.271	0.137	0.179	0.210	0.163	0.187
Sample Size	254	251	252	251	73	246	243	252	246

Notes:

Sample Size shows number who choose either destination 1 or destination 2 in the three or five destination version of the game.

Game 4 is omitted since the moving cost varied in this Game. Sample for Game 5 versus three destination version Game 14 is restricted to those for whom chance of unemployment in Game 14 was drawn to be 30%, the same as Game 5.

Under independence of irrelevant alternatives (IIA), choice of destination 1 vs destination 2 should not be affected by addition of more destinations, and so proportion changing decision should be zero (conditional on choosing either destination 1 or destination 2).

Panel B considers whether choice between destinations 1, 2, and 3 in three destination game is affected by adding destinations 4 and 5.

Table 6: What predicts violation of IIA?
Outcome: Violates IIA

	Lisbon Sample				Nairobi Sample			
Game Attributes	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Liquidity constraints possible	-0.002	0.000	0.001	0.008	-0.043*	-0.043*	-0.044*	-0.047*
	(0.020)	(0.017)	(0.017)	(0.022)	(0.022)	(0.023)	(0.023)	(0.028)
Exogenous risk	0.103***	0.090***	0.090***	0.118***	-0.038*	-0.043*	-0.043*	-0.070**
	(0.033)	(0.030)	(0.030)	(0.041)	(0.023)	(0.023)	(0.022)	(0.028)
Endogenous risk	0.102***	0.082***	0.082***	0.117***	0.004	-0.001	-0.001	-0.008
	(0.035)	(0.031)	(0.031)	(0.042)	(0.023)	(0.022)	(0.022)	(0.026)
Incomplete Information	0.067***	0.047**	0.046**	0.050**	0.075***	0.074***	0.075***	0.085**
	(0.024)	(0.022)	(0.021)	(0.025)	(0.027)	(0.027)	(0.027)	(0.034)
Observed Skill Level		-0.027***	-0.027***	-0.028		-0.014	-0.015	-0.029
		(0.009)	(0.010)	(0.020)		(0.013)	(0.014)	(0.024)
Unobserved Skill Level (in 100s)		-0.047***	-0.046***	-0.045***		-0.029***	-0.028***	-0.030***
		(0.005)	(0.005)	(0.006)		(0.006)	(0.006)	(0.007)
Non-game Attributes								
Female			-0.000	-0.001			-0.011	-0.024
			(0.016)	(0.021)			(0.022)	(0.025)
Wants to work abroad after graduating			-0.001	0.008			0.020	0.040
			(0.017)	(0.021)			(0.023)	(0.027)
Number of expected value questions correct out of 10			-0.003	-0.006			-0.000	-0.002
			(0.004)	(0.006)			(0.002)	(0.002)
Averse to Ambiguity			0.023	0.032*			-0.010	-0.030
			(0.016)	(0.019)			(0.021)	(0.023)
Risk-seeking first principal component			-0.006	0.001			0.001	-0.002
			(0.005)	(0.005)			(0.006)	(0.007)
Sample restriction	none	none	none	skill 1 and 2	none	none	none	skill 1 and 2
Sample Size	2104	2104	2104	1388	3613	3613	3613	2527

Notes:
Marginal effects from probit estimation shown. Robust standard errors in parentheses, clustered at the individual level.
Outcome is whether choice in 3 or 5 destination game violates independence of irrelevant alternatives compared to choice over 2 destinations.
Sample restricted to those choosing either destination 1 or 2 in the 3 and 5 destination games.
*, **, and *** denote significance at the 10, 5, and 1 percent levels respectively.

Table 7: Does Game Behavior Predict Migration Actions?

Panel A: Lisbon sample

	Has looked for work abroad	Offered work abroad	Currently living abroad
Chose "home" in labeled game	61.3%	2.5%	2.5%
Did not choose "home" in labeled game	90.6%	5.3%	10.3%
p-value	0.0057	0.399	0.0498
N	63	137	139

Notes: Sample is 140 individuals who were reinterviewed, sample for has looked for work abroad is conditional on having looked for work at all.

Panel B: Nairobi sample

	Has looked for work abroad	Offered work abroad	Currently living abroad
Chose "home" in labeled game	25.0%	0.6%	0.6%
Did not choose "home" in labeled game	41.6%	4.6%	1.1%
p-value	0.0119	0.0382	0.6791
N	213	242	242

Notes: Sample is 242 individuals who were reinterviewed, sample for has looked for work abroad is conditional on having looked for work at all.

Online Appendices

Appendix 1: Measurement of Preferences

Modified Gneezy and Potters (1997) task (not incentivized)

Participants are asked to imagine they won €100,000 in a lottery, and then told there is an opportunity for an investment in which there is a 50% chance the money will double immediately, and a 50% chance that all the money invested will be lost. They then have to decide what amount to invest. Note that in the original Gneezy and Potters task, the gamble has positive expected value and so both a risk neutral and risk-seeker should invest the entire amount. We modify the task so that the gamble is a fair one, enabling for more gradation in risk attitudes. We then calculate the share of the windfall they are willing to gamble, with higher shares representing more risk-seeking behavior.

Eckel and Grossman (2002) task (incentivized)

Participants are presented with seven gambles, each with 50/50 odds of either outcome, starting from a safe alternative (100 game euros for a head or tail), to higher expected return but risky gambles (up to 0 for heads, 400 game euros for tails). This is coded from one to seven, with higher scores representing more risk-seeking behavior.

Dohmen et al. (2011) task (incentivized)

Participants are presented with a series of choices between a lottery that has a 50 percent chance of paying 300 game euros and a 50 percent chance of zero versus a safe payment. The safe payment varies from 0 to 190 game euros over 20 choices. We look at the point at which they switch from the risky lottery to the safe payment, with a higher number indicating more risk-seeking behavior.

Ambiguity Aversion

Participants are told they will play a game where they draw a ball out of a bag without looking, and if it is the right color they win. Bag 1 contains 4 red balls and 6 yellow balls, and if they choose this bag, they must draw a red ball to win. Bag 2 contains 10 balls, some yellow and some red. They get to decide which color ball wins, and then must choose this color. Individuals are ambiguity averse if they select Bag 1 instead of Bag 2.

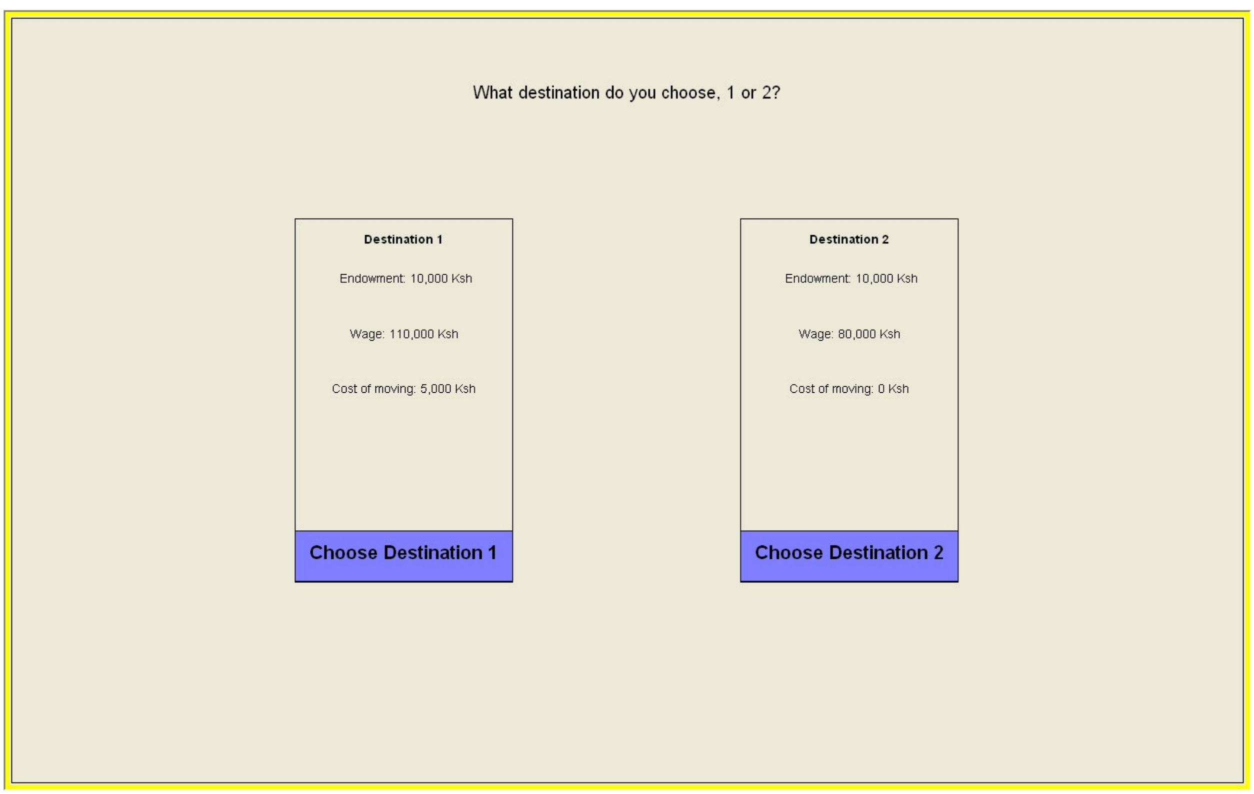
Appendix Table 1: Tests of Random Assignment in Lisbon and Nairobi Samples

	Lisbon Sample				Nairobi Sample			
	Skill	Endowment	Unobserved Skill	Block Order	Skill	Endowment	Unobserved Skill	Block Order
Female	0.811	0.141	0.275	0.022	0.042	0.974	0.512	0.380
Age	0.124	0.349	0.983	0.755	0.000	0.981	0.603	0.307
Economics Major	0.739	0.959	0.407	0.114	0.573	0.636	0.452	0.786
Grade Point Average	0.024	0.495	0.718	0.364	0.029	0.690	0.379	0.952
Born outside of Portugal	0.685	0.676	0.218	0.645	0.369	0.979	0.369	0.369
Spent 6 months or more outside of country	0.420	0.219	0.165	0.388	0.656	0.763	0.925	0.255
Would prefer to work outside of country after graduating	0.045	0.223	0.419	0.230	0.051	0.098	0.860	0.876
Has a job offer	0.981	0.983	0.460	0.070	0.526	0.761	0.392	0.565
Has a job offer outside of country	0.455	0.027	0.926	0.624	0.548	0.435	0.635	0.502
Money available as moving costs (Euros/KSh.)	0.981	0.985	0.173	0.606	0.413	0.423	0.274	0.299
Math score (out of 10)	0.119	0.890	0.806	0.781	0.427	0.311	0.190	0.668
Expected value question score (out of 10)	0.606	0.534	0.128	0.991	0.779	0.862	0.436	0.232
Ambiguity Averse	0.285	0.763	0.575	0.975	0.378	0.586	0.572	0.930
Share of a Windfall that would put in a fair gamble	0.380	0.957	0.907	0.502	0.647	0.653	0.565	0.286
Risk-seeking Choice in Eckel and Grossman (2002) risk game	0.559	0.123	0.955	0.334	0.197	0.418	0.256	0.879
Point at which switch in Dohmen et al. (2011) risk game	0.819	0.865	0.681	0.796	0.791	0.073	0.435	0.162

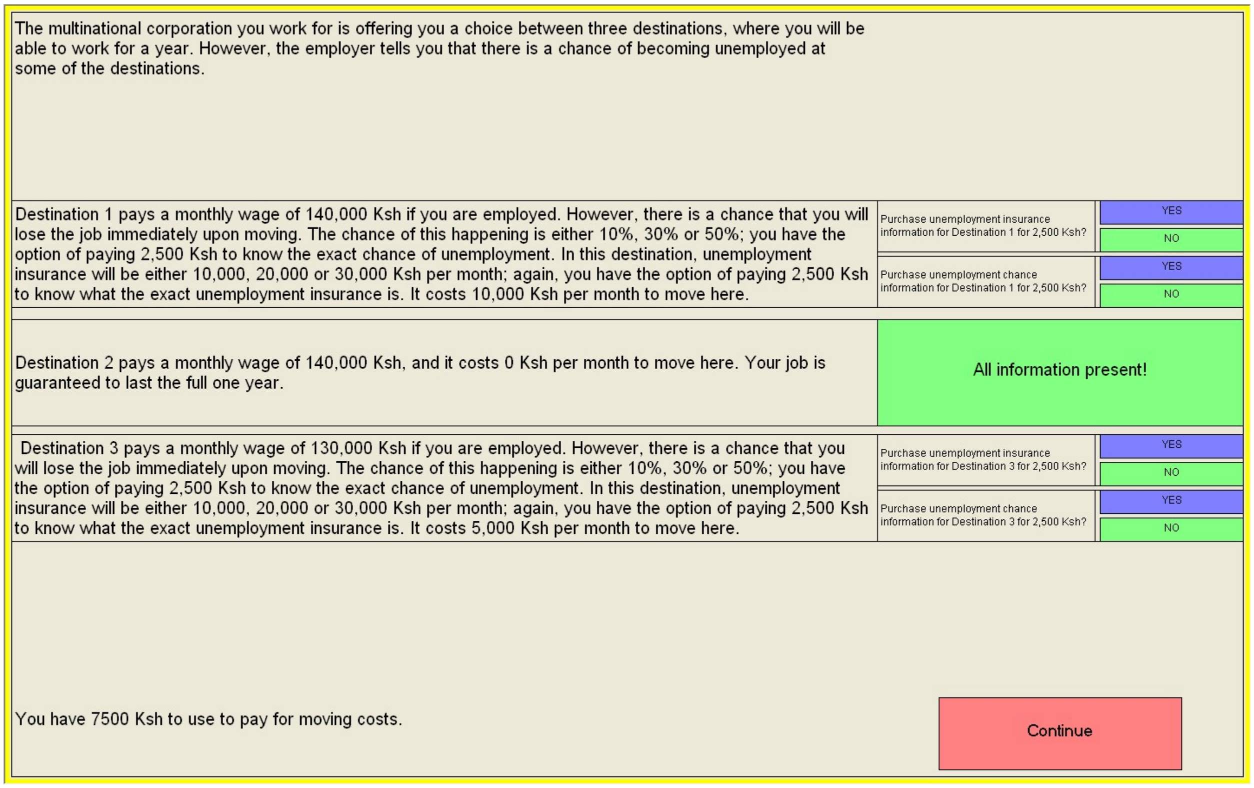
Note: each cell shows the p-value for testing that the variable listed in the first row (e.g. female) is orthogonal to the randomly assigned levels of the column.

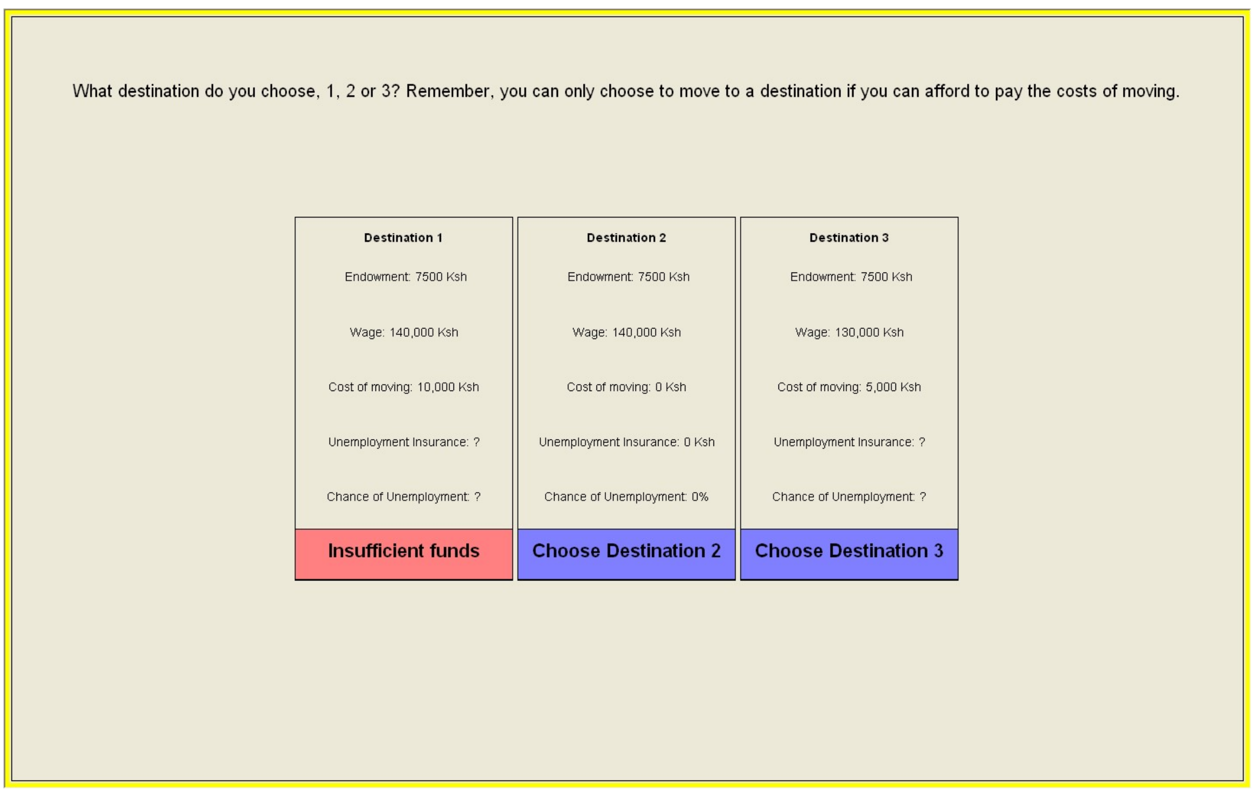
Appendix 2: Example Screenshots Showing Decision to be Made

Game 1



Game 17


The multinational corporation you work for is offering you a choice between three destinations, where you will be able to work for a year. However, the employer tells you that there is a chance of becoming unemployed at some of the destinations.
Destination 1 pays a monthly wage of 140,000 Ksh if you are employed. However, there is a chance that you will lose the job immediately upon moving. The chance of this happening is either 10%, 30% or 50%; you have the option of paying 2,500 Ksh to know the exact chance of unemployment. In this destination, unemployment insurance will be either 10,000, 20,000 or 30,000 Ksh per month; again, you have the option of paying 2,500 Ksh to know what the exact unemployment insurance is. It costs 10,000 Ksh per month to move here.
Purchase unemployment insurance information for Destination 1 for 2,500 Ksh?
YES
NO
Purchase unemployment chance information for Destination 1 for 2,500 Ksh?
YES
NO
Destination 2 pays a monthly wage of 140,000 Ksh, and it costs 0 Ksh per month to move here. Your job is guaranteed to last the full one year.
All information present!
Destination 3 pays a monthly wage of 130,000 Ksh if you are employed. However, there is a chance that you will lose the job immediately upon moving. The chance of this happening is either 10%, 30% or 50%; you have the option of paying 2,500 Ksh to know the exact chance of unemployment. In this destination, unemployment insurance will be either 10,000, 20,000 or 30,000 Ksh per month; again, you have the option of paying 2,500 Ksh to know what the exact unemployment insurance is. It costs 5,000 Ksh per month to move here.
Purchase unemployment insurance information for Destination 3 for 2,500 Ksh?
YES
NO
Purchase unemployment chance information for Destination 3 for 2,500 Ksh?
YES
NO
You have 7500 Ksh to use to pay for moving costs.
Continue


What destination do you choose, 1, 2 or 3? Remember, you can only choose to move to a destination if you can afford to pay the costs of moving.
Destination 1
Endowment: 7500 Ksh
Wage: 140,000 Ksh
Cost of moving: 10,000 Ksh
Unemployment Insurance: ?
Chance of Unemployment: ?
Insufficient funds
Destination 2
Endowment: 7500 Ksh
Wage: 140,000 Ksh
Cost of moving: 0 Ksh
Unemployment Insurance: 0 Ksh
Chance of Unemployment: 0%
Choose Destination 2
Destination 3
Endowment: 7500 Ksh
Wage: 130,000 Ksh
Cost of moving: 5,000 Ksh
Unemployment Insurance: ?
Chance of Unemployment: ?
Choose Destination 3