

The search goes on: Parameter effects on the return migration decision

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Abstract

In this paper we present an experiment designed to test some of the predictions of the Harris-Todaro model of migration. In particular, we examine determinants of an individual's return migration decisions. Data issues in the developing world and with migration data in general limit empirical testing of the model. In such a data environment, laboratory experiments can add insight to the theory. We introduce an external opportunity to a traditional labour market search experiment to examine whether it extends search and unemployment in a primary market. Our results generally support the predictions of the model. The experiments predict that the possibility of return, the cost of return, and the existence of trophy wage opportunities in the urban market all reduce the likelihood of return migration.

Keywords: Migration, Harris-Todaro model, unemployment, experimental economics, job search.

Introduction

Harris and Todaro's migration research (1970) presented a paradox. One part of that paradox was the seemingly irrational behaviour of migrants in less developed countries (Ingene, 2001). Migrants moved from rural regions with a high probability of employment to urban regions with significant unemployment. This part of the paradox disappeared by hypothesizing that migrants made their decisions based on expected wages, balancing the much higher urban wages against the higher probability of unemployment.

Empirical tests of the Harris and Todaro (HT) expected earnings hypothesis have been inconsistent. The developing country data problems that often accompany empirical migration research may partly explain the inconsistency of these empirical findings (Greenwood, 1975; Lucas, 1997). Greenwood, et al. (1991) pointed to the potential of laboratory experiments in migration research. Experiments produce a means of testing the HT hypothesis without the typical data issues since data are collected in a controlled environment. However, while field and natural experiments have been used to overcome

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the selection bias in migration data (McKenzie, 2012), there has been limited use of lab experiments in the study of migration.

Edwards and Huskey (2008) used a laboratory experiment to test one aspect of the expected earnings hypothesis of the HT model of migration: the effect of the potential for return migration on the length of search unemployment an individual undertakes. The results of that research generally support the predictions of the HT model. The paper at hand examines how robust the 2008 findings are by introducing different wage distributions and a cost of moving into the experiment.

Search unemployment and the HT paradox

There are many explanations of the HT paradox. Bright lights, education opportunities, and family risk sharing have all been suggested as reasons for the relatively high unemployment migrants find in urban areas. Sato (2004) and others have suggested that search or frictional unemployment explains the HT paradox. Migrants experience unemployment because of the limited information they have about the job market in urban areas.

The HT model explains the flow of migrants from villages to urban areas but this flow is actually net migration. Newbold and Cicchino (2007) have shown that both short and long term return migration is significant. Regional wage differentials are likely to affect migration and emigration decisions differently. Dustmann (2003) and Stark (2003) suggest that return migration may occur even when the destination economy offers higher wages than the home economy. Return migration is affected by the difference in both wages and purchasing power in home and destination regions. Liang (2007), in his survey of migration literature, identified a better understanding of return migration as a fruitful area for research. In this paper we examine the effect of parameter changes on participants' return migration decisions.

In 2008 we assumed, like Sato, that migrants face limited information about the availability of jobs and the wage distribution across jobs in the urban region. Urban unemployment is search unemployment. In 2008 we used an experimental structure that was similar to past job search experiments to examine the effect of the possibility of migration on search behaviour. Our experiment introduced an external opportunity, a home job market, to see how this affected the length of time people searched. We were interested in how the possibility of return migration would affect search behaviour in the urban destination.

In the context of the HT model, the 2008 experiment offered participants the choice between continued search in the urban job market or movement to the rural market. Participants started in the urban market and searched in an environment which, compared to the rural market, had a lower probability of finding a job. The urban market also offered a trophy wage, a twenty percent chance that a wage offer would be twice the rural wage.

The 2008 experiment compared the search behaviour of participants in the urban market with and without the external (rural) market opportunity. We found a result which was consistent with the HT model: participants searched longer when they had the possibility of moving to the rural market. The existence of the alternative “home” market, which offered the possibility of return, resulted in participants searching longer and experiencing longer unemployment in the urban market. These results suggested the “home” market served as insurance for migrants to the city, allowing them to take greater risks to find a high wage urban job. This finding lends support to the theories that include rural-urban migration as a part of risk reducing strategy for rural households (Stark and Levhari, 1982; Katz and Stark, 1986).

In this paper we examine the effects of changing two parameters on these results. First, we examine the effects of introducing a cost of moving from the urban market to the rural market. Lucas (2001) identified the complex role of distance in migration decisions in the developing world. High moving costs may keep migrants from moving back to the rural area after an unsuccessful search (Ghatak and Levine, 1994), which reduces the value of the rural market as insurance. We expect that introducing migration costs would reduce job search duration in the urban market.

We also introduce an alternative wage distribution in the urban job market. The alternative distribution reduces the highest wage offer but increases the probability of an urban job offer having a wage higher than the jobs in the rural region. The complexity of urban-rural wage differences has been suggested as a reason for the inconsistent empirical support of the HT model (Agesa, 2000). We examine the effects of changes in the distribution of wages on our results.

Varying urban wage distributions and migration costs also allow us to test the effect of these parameters on unemployment and the decision to return to their home market. In any given round when a job offer exists the participant has three choices: accept the job offered, search again in the urban market, or migrate to the rural market. The decision we are interested in is ultimately dichotomous — Does the subject remain in the primary market and search again or not? We expect that people are more likely to migrate to the rural market the lower the cost of moving and the less likely they are to find high wage jobs.

The Experiment

The theory underlying economic laboratory experiments was pioneered by Vernon L. Smith. Smith’s Induced Value Theory establishes that the proper use of a reward medium allows an experimenter to induce pre-specified characteristics in the subjects (in a laboratory setting) so that their innate characteristics become irrelevant (Smith, 1994). Therefore, it does not matter who the subjects are in the experiment as long as the experimental design follows the necessary conditions. There are five fundamental requirements for In-

duced Value Theory to hold (Smith, 1982). 1. Non-satiation (monotonicity). Subjects must prefer a higher reward to a lower reward – in a suitable reward medium, more is always better. 2. Salience. For each agent, the reward corresponds to a clear outcome function (like profit or utility), and subjects understand the connection. 3. Dominance. Reward increments are more important than other components of the subjects' utility that are affected by the experiment. 4. Privacy. Full information is not necessary to achieve efficient outcomes. 5. Parallelism. Regularities in the laboratory experiment are consistent with "real world" observations. The experiments we have conducted follow these five principles.

Laboratory experiments have been used by many researchers to address job search questions. While our basic question differs from other work that has been done in the laboratory, our experiments are similar in many ways to past experiments by others (Cox and Oaxaca, 1992, and Harrison and Morgan, 1990). The structure of job search experiments has been very similar, regardless of the underlying question being examined. Davis and Holt (1993) describe the standard job search experiment where wage offers are generated from a given distribution of possibilities. Each experimental round is complete when the subject accepts an offer (or makes another terminal decision). Typically, in order to pass from one round to the next, the subject incurs some sort of cost, either explicit or implied. With this basic framework, a wide variety of complications can be introduced to address specific research questions.

The usual research design is exploited to investigate questions about search duration where the evaluation of a generated outcome depends upon a comparison to an optimal outcome where a theoretical subject is an expected utility maximizer. The results of these experiments often show subjects searching at or near theoretically optimal durations. For example, even though there are minor differences in experimental design, Cox and Oaxaca (1989) and Hey (1982, 1987) found more than half of their subjects searching optimally. Among the subjects failing to search optimally, the most common outcome was short searches ending in sub-optimal wages rather than searching too long (Davis and Holt, 1993).

In our experiments, we ask how job search behaviour changes when participants are offered the external opportunity of a second market to search in. If unemployed people search longer for jobs rather than accepting a low offered wage, they will remain unemployed longer. Results consistent with the HT model will show that the introduction of an external opportunity increases search time compared to the situation with no external market, thereby implying higher unemployment. Decisions to search longer reduce the likelihood of an individual migrating back to their home region (switching markets).

Our experiments were arranged in the standard way where an individual subject responds to job market information displayed on a computer screen.

We compare job search behaviour in two different settings with varying parameters. In the Base Case there is only one possible market for subjects to search in. The external opportunity, or home market, is introduced in the Treatment Case. Subjects are aware of the probability of receiving a job offer, the wage distribution, and the probability of receiving any particular wage.

In the Base Case, subjects begin the experiment unemployed. Subjects start by searching for a job and are told whether or not one is available. If there is no job offer, a player must search again. If a job is available the program randomly selects a wage offer from a uniform distribution and asks whether the subject accepts it. If the subject declines, he or she remains unemployed and must go to the next round to search again. Each scenario contains a maximum of twelve rounds and ends when the subject either accepts a wage offer or passes through the maximum number of rounds. The subject's payoff for a game equals the wage they accepted times the number of remaining rounds. Most standard models of job search include some form of costs for continued search (Martensen and Pissarides, 1999). In this experiment the cost of searching is the foregone income from passing up a job offer and/or the lost income from not having a job.

In the Treatment Case subjects can choose to switch (move) out of the primary market and search in an alternate job market. Figure 1 shows the extensive form of one round of the Treatment Case. At node 1, the subject decides whether to search in the primary market or switch to the secondary market. If the subject switches markets they move into the secondary market in the next round. If they choose to search in the primary market, they move to node 2. At node 2, the program offers a job seventy percent of the time. If there is no job offer, the subject can switch markets and search in the secondary market in the next round or stay in the primary market and search there in the next round. If the subjects does get a job offer, he or she moves to node 3 where there are three choices: accept the offer (generated randomly), decline the offer and search again in the primary market in the next round, or decline the offer and search in the secondary market in the next round. The research question is whether subjects search more in the presence of an external market than in its absence, so the examined choice at node 3 is the dichotomous result of searching again or not searching again.

We conducted four sets of experiments varying the availability of the external market, the wage distribution, and costs for switching markets. Table 1 summarizes the four states of nature, the number of subjects facing each state, and the number of observations generated by the subjects' behaviour. The results of experiments conducted with Subject Set I was reported in Edwards and Huskey (2008). In the paper at hand, we are interested in whether moving costs affect subjects' decision making and whether subjects are sensitive to the different wage distributions.

Table 1. Subjects, Observations, and Parameters

	Possible Wages: 5, 6, 7, 8, 20	Possible Wages: 5, 7, 9, 11, 14
Zero Moving Cost	<i>Subject Set I</i> 35 subjects 972 observations	<i>Subject Set II</i> 31 subjects 614 observations
Positive Moving Cost	<i>Subject Set III</i> 62 subjects 1604 observations	<i>Subject Set IV</i> 35 subjects 1401 observations

Jobs are available seventy percent of the time in the Base Case scenario. Wage offers are uniformly distributed across two possible arrays in separate experiments: {\$5, \$6, \$7, \$8, \$20} or {\$5, \$7, \$9, \$11, \$14}. The expected wage for any round in the Base Case is \$6.44 for both sets of wages. In terms of expected value, a player's best strategy is to accept any wage offer over the expected value, so in most cases accepting the wage offer is the best choice. In the Treatment Case subjects begin unemployed in the primary market which has the same probability of a job offer and the same wage distribution as the market in the Base Case. They can choose to switch markets in any round of a game until they accept a job. Once they switch to the second market they are not able to return to the primary market. In the second market, jobs are offered eighty percent of the time and the only possible wage is \$10. The secondary market has the same characteristics regardless of the wage distribution in the primary market.

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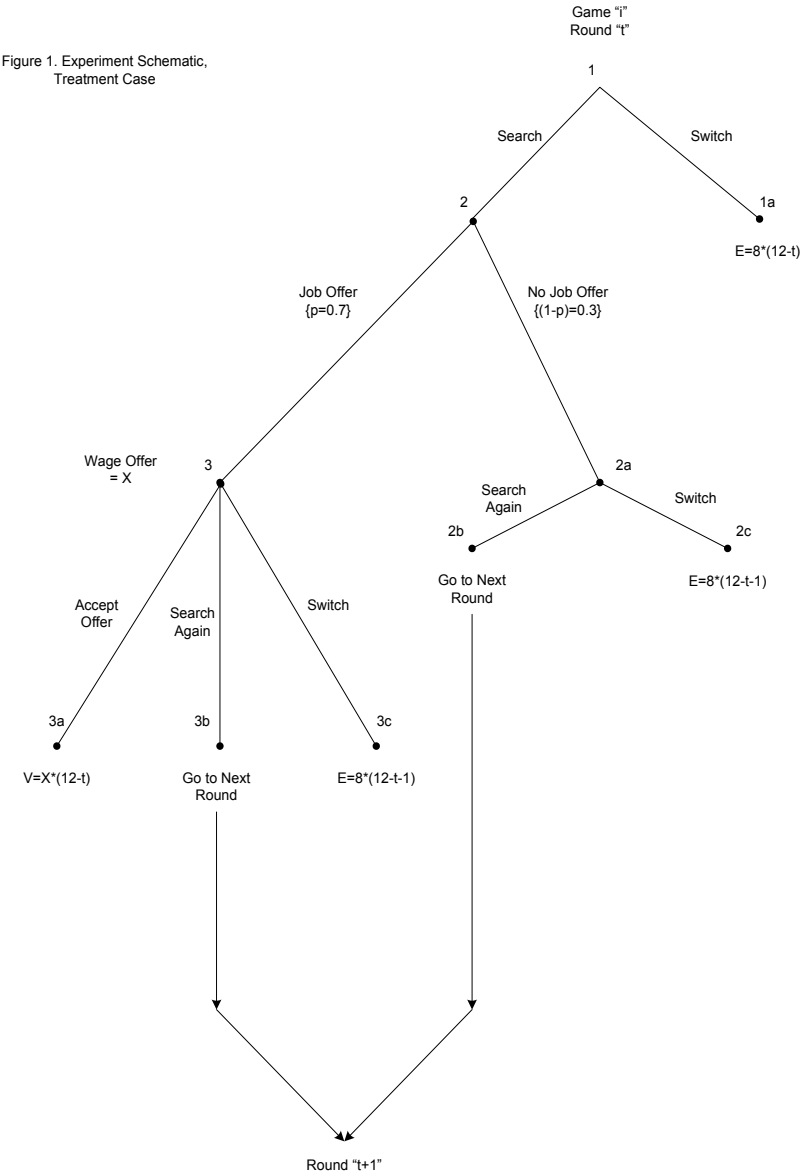
If subjects make decisions based solely on expected value, the best strategy in the Treatment Case is to switch to the secondary market immediately and never search in the primary market. Subjects who violate the expected value rule are pursuing a risky strategy, hoping to get a better wage offer in the future by staying in the primary market, even if the odds are against it. This behaviour is consistent with persistent unemployment in the HT model where migrants remain in urban areas in the face of high unemployment.

In previous work, we discovered that when an external market exists subjects who remain in the primary market search longer there. We now consider two specific hypotheses: (1) the wage distribution affects search duration, and (2) switch (moving) costs lead to less job search.

Results

All of the experiments were conducted at the University of Alaska Anchorage and the subjects were university undergraduates. Subjects were paid a five dollar show-up fee and two cents for every experimental dollar earned. The average pay-out was approximately twenty five dollars and most subjects were finished with the experiment in fifteen minutes. Each subject engaged in a series of eight experimental games. We ordered the games as two Base Case games followed by two Treatment Case games, then repeated. As shown in Table 1, we also varied the wage distribution and moving costs in discrete experiments. No individual subject faced different wage distributions or different moving costs during their set of eight experiments.

Figure 1. Structure of the Search Experiment



The results of a probit analysis using three different model pairs are presented in Table 2. Each separate model has a different dependent variable and each pair compares a probit estimation using the original data set from the first experiment with a probit using the data from all four subject sets and adding variables to test parameters for market switching cost and the different wage distributions. The dependent variable for Model I is the probability that

the subject will search again in the primary market at a given decision node. If the marginal effect on a parameter is positive, then the probability of searching again increases. We interpret this result as an increase in search duration. For Model II, the dependent variable is the probability that a subject will switch from the primary market to search in the secondary market. A positive parameter in this model indicates a reduction in search duration because switching from the primary market to the secondary market increase the likelihood of finding a job. Model III's dependent variable is the probability that a subject will accept an offered wage. A positive parameter in this model indicates a reduction in a search duration because when a wage is accepted, the job search is over.

Table 2: Probit Marginal Effects Summary Results

	Model (I)	Model (Ia)	Model (II)	Model (IIa)	Model (III)	Model (IIIa)
Dependent Variable (→)	Prob (Search Again in Primary Market)	Prob (Search Again in Primary Market)	Prob (Switch Markets)	Prob (Switch Markets)	Prob (Accept Job Offer)	Prob (Accept Job Offer)
Independent Variables (↓)						
Wage Offer	-0.065* (0.006)	-0.094* (0.003)	-0.028* (0.004)	-0.018* (0.001)	0.031* (0.003)	0.055* (0.002)
Round	-0.023* (0.007)	-0.026* (0.003)	-0.004 (0.010)	-0.158* (0.003)	0.015* (0.004)	0.019* (0.003)
External Opportunity†	0.123* (0.037)	0.049* (0.016)			-0.111* (0.0178)	-0.115* (0.012)
Switch Markets†	-0.903* (0.014)	-0.881* (0.008)				
Switch cost†		-0.003* (0.001)		-0.005* (0.001)		0.002* (0.001)
No \$20 wage†		-0.098* (0.020)		-0.005 (0.016)		0.101* (0.017)
Subject Set	I	I, II, III, IV	I	I, II, III, IV	I	I, II, III, IV
Scenario	Base Line case (BL), Treatment case (TR)	BL, TR	TR	TR	BL, TR	BL, TR
Pseudo R ²	0.611	0.603	0.121	0.178	0.5802	0.4980
Number of subjects	35	163	35	163	35	163
Number of Observations	972	4591	368	1987	972	4591
Log likelihood function	-224.869	-1146.256	-169.428	-642.862	-200.242	-1231.579
Prob ($\chi^2 >$ value)	0.00	0.00	0.00	0.00	0.00	0.00

*significant at the 99 percent level; standard errors are in parentheses.

†Dichotomous variable which equals unity in the given state.

All three model pairs generate statistically significant results overall and the parameters have the anticipated signs. Looking first at Model I, as the wage offer increases and rounds of the experiment progress, the probability that a subject will search again declines. The presence of the external opportunity, the availability of a secondary job market, increases the probability that a subject will search again in the primary market — this is the main finding of our earlier research. The parameters for switching costs and the more homogeneous wage distribution are both statistically significant. Switching costs reduce the probability of searching again, indicating that the positive effect of the fall-back secondary job market is reduced if there is a cost associated with accessing it.

The negative parameter on the “No \$20 wage” variable indicates that when subjects face the wage distribution {\$5, \$7, \$9, \$11, \$14} they are less likely to search again in the primary market than when they face the wage distribution {\$5, \$6, \$7, \$8, \$20}. This finding is consistent with the idea that a very high wage of twenty dollars causes trophy wage-seeking and supports the interpretation that nominal wages above the wage in the secondary market attract job seekers. Finally, note that the common parameters in both versions of Model I have the same signs and significance levels, but when the “Switch Cost” and “No \$20 wage” variables are included, the marginal effects increase for “Wage” and “Round” but decline for “External Opportunity” (in absolute value).

In Model II, the findings are not as robust as in the other models, with a relatively lower Pseudo- R^2 value, and not all parameters are statistically significant. Even so, the general results indicate that the presence of explicit market switching costs reduces the probability that a subject will move to the secondary market at any given decision node. There is no support in Model II to indicate that the different wage distributions affect the market switching decision significantly.

Model III is designed to investigate whether the introduced scenarios affect the probability of accepting a given wage offer. In general, the presence of an external opportunity to search in the secondary market does reduce the probability of accepting any given wage offer, as expected. Additionally, explicit moving costs reduce search duration (increase probability an offer is accepted) and the {\$5, \$7, \$9, \$11, \$14} wage distribution decreases search duration, as expected.

Conclusions

These experiments are suggestive of factors that will influence an urban migrant’s decision to return to their home region. Our earlier work on job search models in laboratory settings established that the presence of an external job opportunity increases the likelihood of continuing to search in a given job market, thereby increasing search duration and, ultimately, unemployment in

any given period. These results are consistent with the basic propositions of Harris-Todaro model of migration.

This study found that the distribution of available nominal wages affects the job search decision in the laboratory even when the expected wage is held constant. In this experiment the existence of a high wage job opportunity increased the willingness of participants to search. This suggests that even with no difference in expected wages, the urban migrant will be less likely to return to their home village if the urban wage distribution contains jobs with high wage earning opportunities.

Our latest findings also indicate that the introduction of explicit cost barriers to migration change individuals' search behaviour. As standard theory predicts, positive migration costs reduce the probability that individuals will return from the urban to the home market. Positive migration costs also reduce the insurance value of the home market and make individuals less likely to search for a better job in the urban market.

This paper treats the return migration decision as an individual decision. There are many explanations of HT migration behaviour which reflect family decisions (Stark, 2003; Lall, Selod, and Shalizi, 2006). Families may be involved in the migration decision by providing support during the migrants search. Migration by a family member may also reflect a coinsurance scheme balancing the uncertainties of urban and rural income. Our results could be interpreted as the decision of a family maximizing the earnings of a migrant.

Laboratory experiments can overcome a lack of data or problems with data that often accompany research on migration. Experiments can be extended to expand our understanding of migration in less developed and remote regions. Extensions could include tests of Ravenstein's stepping stone hypothesis by examining the migration path individuals take through increasingly larger job markets. The effect of non-wage benefits in rural markets on migration could be examined by adding a constant reward for being in the secondary market. One important extension would be to include group decision making with people in both urban and rural markets choosing the optimal location. Experiments like the one we have used here provide social scientists with an additional avenue to understand migration behaviour.

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