

The Welfare Effects of Encouraging Rural-Urban Migration

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This Paper: Measure the Welfare Impact of Encouraging Migration

A lot of evidence suggestive of misallocation between rural and urban areas. . .

- Large urban-rural living-standards gaps in cross section

Gollin, Lagakos, and Waugh (2014), Young (2013), Herrendorf and Schoellman (1998)

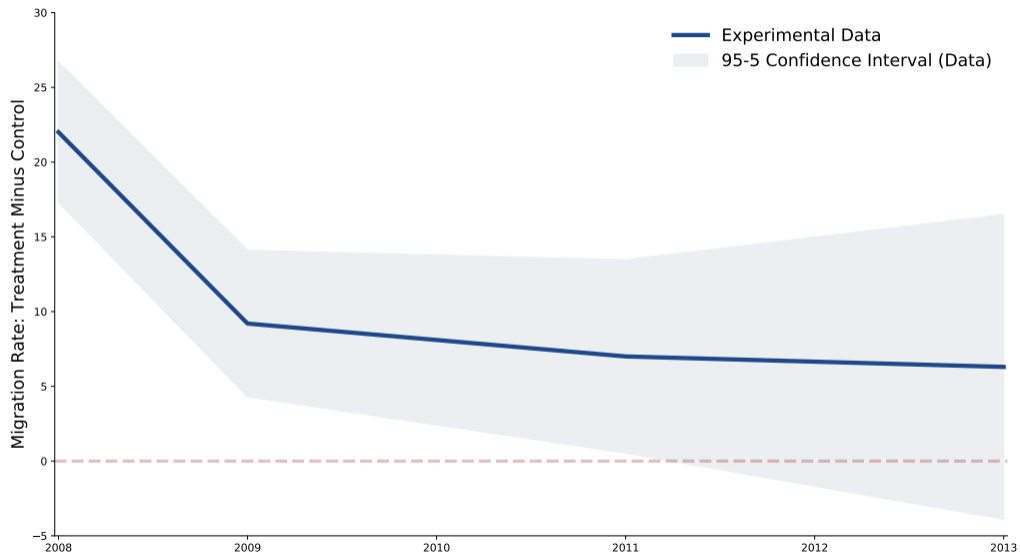
- Rural-urban migrants increase their consumption

Hicks, Kleemans, Li, and Miguel (2017), Lagakos, Marshall, Mobarak, Vernot, and Waugh (2020)

Migration experiment of Bryan, Chowdhury, and Mobarak (2014)

- Random villages in Rangpur region of Bangladesh; performed during “lean season.”
- Treatment group offered 600 Taka (\$8.50) conditional on migration + 200 Taka check-in bonus.
- Migration rate 58%, compared to 36% in control group
- Among those induced, consumption 30% higher; Subsequently replicated on larger scale in 2014

Migration Response: Experiment of BCM (2014))



What We Do

1. Build two-region model with migration. Multiple mechanisms:
 - Selection as in [Roy \(1951\)](#),
 - Migration disutility from that depends on migration experience.
 - Incomplete financial markets as in Bewley tradition \Rightarrow two sources of inefficiency:
 - Migration is subject credit constraints,
 - Imperfect ability smooth consumption.
2. Discipline using the experimental evidence.
 - Perform experiment within model and match experimental moments using SMM.
3. Use model to interpret experimental results and evaluate welfare effects in PE and GE.

Preview of Results

1. To match the data, model requires:

- Few rural households with strong comparative advantage in city \Rightarrow self-financing of migration can easily overcome credit constraint.
- Substantial non-monetary disutility of migration.
- Seasonal migration by those with **lowest** income and assets \Rightarrow the experiment “works” by transferring resources to high MUC households willing to migrate to smooth consumption.

2. Welfare gains mostly from targeting funds to poor, vulnerable households

- One time, PE: 0.4% gain in CE units on average; 1% for the poorest.
- Permanent, GE: 3.2% gain; much more equal gain across income groups.

3. New survey data. We ask “why don't you migrate?” Poor housing a key component of disutility.

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Model

Model: Households and Preferences

Unit mass of households; preferences:

$$\sum_{t=0}^{\infty} \beta^t u(c_t) \bar{u}^{x_t}$$

- \bar{u} is disutility of migration
- $x_t \in \{0, 1\}$, takes on value 1 iff household is “inexperienced at migration” and in the urban area.
- $u(c_t) = \frac{c_t^{1-\alpha}}{1-\alpha}$

Also face additive taste shocks, which are iid across time and moving options and drawn from a Type-1 EV distribution with scale parameter σ_v

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Model: Experience

A household is either “experienced” or “inexperienced” at migration.

Experience is acquired by being in the urban area, is lost by being away. . .

After each period in the urban area,

- Inexperienced households remain so with probability λ , and become experienced with probability $1 - \lambda$,
- Experienced households stay experienced.

After each period in the rural area,

- Experienced households stay experienced with probability π and lose experience with probability $1 - \pi$,
- Inexperienced households stay inexperienced.

Model: Production Technologies and Seasons

One homogenous good produced in both locations and competitive markets. Production technology in rural area:

$$Y_r = A_{ri} N_r^\phi$$

where $0 < \phi < 1$; A_{ri} is rural productivity indexed by season i , with $A_{rg} > A_{rl}$

- Deterministic transition: If rural productivity is A_{rg} , then the economy transits to A_{rl} next period.
- Idea: mimic seasonal agricultural crop cycles

Production technology in urban area

$$Y_u = A_u N_u$$

Model: Household Location-Specific Productivity

Each household has permanent productivity types as in Roy (1951)

- z permanent productivity in urban area. $z \sim \text{Pareto}(\theta)$.
- no permanent productivity differences in the rural area.

Each household experiences transitory shocks s that follows an AR(1) process

$$\log s_{t+1} = \rho \log s_t + \epsilon_{t+1} \quad \text{with} \quad \epsilon_{t+1} \sim \mathcal{N}(0, \sigma_s).$$

Household-specific efficiency units of labor in each location:

- s in the rural area.
- zs^γ in the urban area.
- If $\gamma > 1$, implies the shocks are more volatile in the urban area.

Model: Options

Households in the rural area can. . .

1. Work in the rural area.
2. Pay fixed cost m_T , work in the urban area the next period, return to rural.
This is seasonal migration.
3. Pay fixed cost $m_p > m_T$, move to urban area next period, stay indefinitely.
This is permanent migration.

Households in the urban area can. . .

1. Work in the urban area.
2. Pay fixed cost m_p , work in rural area for the indefinite future.

Model: Asset Choices

Households can accumulate a non-state contingent asset, a , with gross rate of return, R . Assets move with the household.

- Asset holdings can not be negative (no borrowing).
- R is exogenous (small open economy).

Who moves? When do they move?

All else equal, seasonal migration more likely:

- In the lean season,
- Among agents with higher z ,
- When experienced.

The open question is how migration depends upon:

- The transitory shock, s
- Asset holdings, a .

Model flexible; experimental data disciplines whether e.g. agents migrate when transitory shock and assets are sufficiently high or sufficiently low.

Calibration

Calibration Overview

Parameterize productivity distribution & shocks, pre-assign some values

Remaining parameters picked to minimize distance between model & data

1. Experimental moments: Perform the [Bryan et al. \(2014\)](#) experiment in model.
2. Cross-sectional moments: urban-rural wage gap, rural share, variances of consumption and earnings.

Pre-Assigned Parameters

Pre-Assigned Parameters

Parameter	Value	Source
Time period	Half year	—
Risk aversion, α	2.0	—
Discount factor, β	0.95	—
Gross real interest rate, R	0.95	1/ gross inflation rate
Rural seasonal productivity, A_{rl}/A_{rg}	50% drop in rural inc.	—
Returns to Scale in Rural P.F.	ϕ	AKM (2018) experiment
Seasonal moving costs, m_T	10% of rural consumption	Bryan et al. (2014)
Permanent moving costs, m_p	$2 \times m_T$	—

Parameters to Calibrate

- Productivity urban area: A_u
- Shape parameter, urban permanent productivity: θ
- Standard deviation of transitory shocks: σ_s
- Urban relative risk parameter: γ
- Persistence of transitory shocks: ρ
- Disutility of migration: \bar{u}
- Probability of gaining experience: $1 - \lambda$
- Probability of losing experience: $1 - \pi$
- Additive Type-1 EV taste shocks: σ_ν

plus two sources of measurement error... to match 11 moments.

Calibration: The BCM (2014) Field Experiment

The BCM (2014) field experiment ...

- 100 randomly selected villages in the Rangpur region of Bangladesh. Selected 19 households in each village.
- Villages randomly put into four groups: cash, credit, information, control.

Households in the cash group given 600 Taka (\$8.50) conditional on migration. Given 200 Taka if they reported in at the destination.

- 600 Taka a bit more than a round trip bus ticket to main destinations.

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The BCM (2014) field experiment ...

- 100 randomly selected villages in the Rangpur region of Bangladesh. Selected 19 households in each village.
- Villages randomly put into four groups: cash, credit, information, control.

Key results / our calibration targets:

- 22% increase in migration in treatment relative to control (58% vs 36%).
- 9% increase in migration in the subsequent year.
- Migrants increased consumption by 10%, OLS.
- *Induced* migrants increased their consumption by 30% relative to the average household. Also known as the “LATE”.

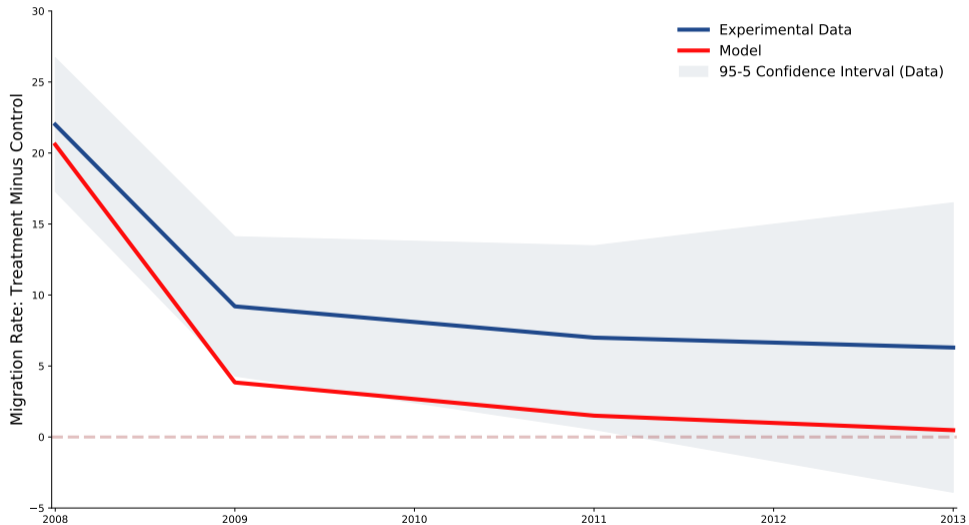
Calibration: Performing the BCM (2014) Experiment in the Model

1. Solve for optimal policies of households when offered m_T , if they move.
 - Offer is one-time, unanticipated, no general equilibrium effects.
2. Randomly sample rural households in the stationary distribution consistent with BCM (2014) sample selection. . .
 - Offer households m_T , and follow.
 - Compare with the actions of the same households absent the offer.
3. Compute statistics in the model as done with the data.

Calibration Results — Model Fit

Moments	Data	Model
Control: Variance of rural log consumption growth	0.19 (0.03)	0.19
Control: Percent of rural households with no liquid assets	47 (1.13)	48
Control: Seasonal migration rate	36 (2.64)	36
Control: Consumption increase of migrants (OLS)	10 (4.47)	10
Control: Repeat migration rate	68 (0.46)	70
Treatment: Seasonal migration relative to control	22 (2.39)	21
Treatment: Seasonal migration relative to control in year 2	9 (2.44)	4
Treatment: Consumption increase of induced migrants (LATE)	30 (9.67)	29
Urban-Rural wage gap	1.89 (0.18)	1.89
Percent in rural area	62 (1.36)	60
Variance of log urban wages	0.56 (0.06)	0.56

Migration Rates: Data and Model



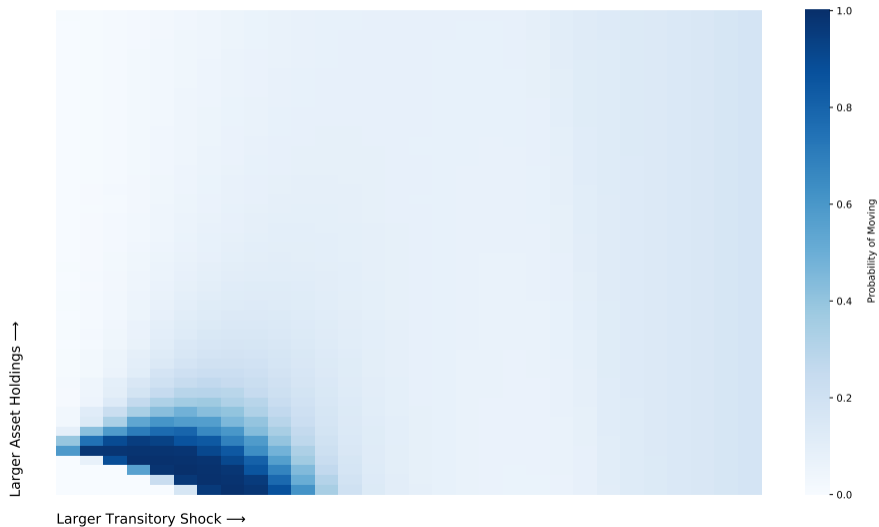
Calibration Results — Parameters

Calibration Results: Parameters

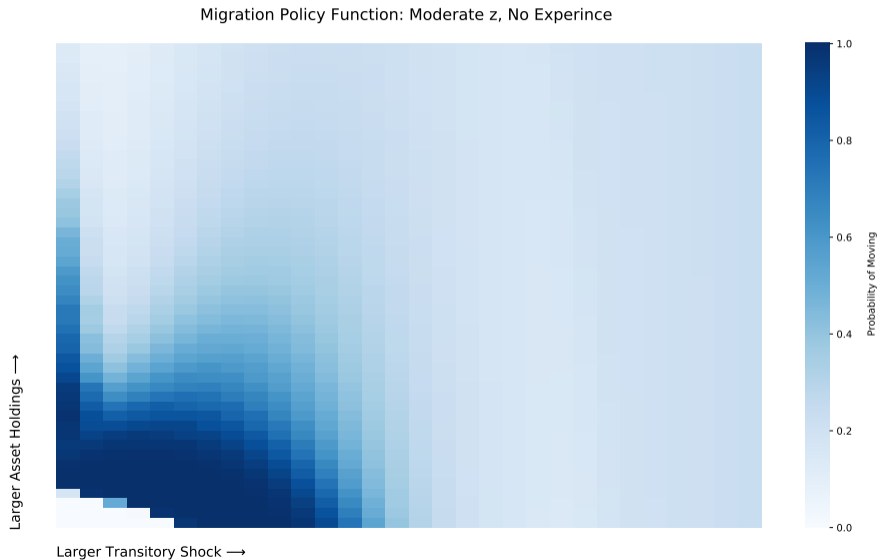
Parameter	Value
Migration disutility, \bar{u}	1.51 (0.004)
Probability gaining experience, λ	0.67 (0.054)
Probability losing experience, π	0.63 (0.028)
Shape parameter, urban talent, $1/\theta$	0.54 (0.002)
Urban relative shock, γ	0.57 (0.002)
Productivity urban area A_u	1.55 (0.022)
Standard deviation of transitory shocks	1.28 (0.866)
Persistence of transitory shocks	0.74 (0.217)
Type-1 EV scale parameter	0.11 (0.010)

Migration Policy: Low z , Lean Season, No Experience

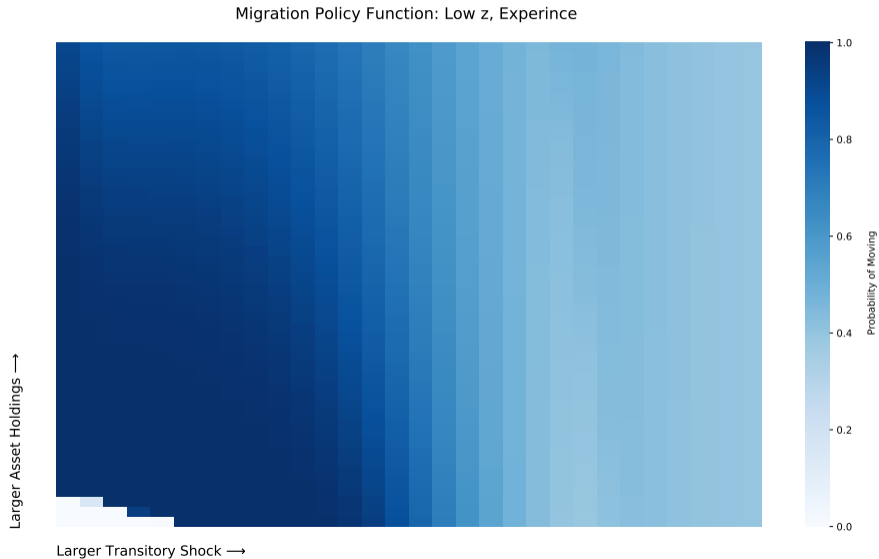
Migration Policy Function: Low z , No Experienced



Migration Policy: Moderate z , Lean Season, No Experience



Migration Policy: Low z , Lean Season, Experience



OLS vs. LATE and Negative Selection in the Migration Policy Functions

The OLS specification is

$$c = \alpha + \beta M + U$$

where the issue is that the unobserved component U correlated with M the migration choice.

$$\hat{\beta}^{ols} = \beta^* + \frac{\text{cov}(U, M)}{\text{var}(M)}$$

where our LATE estimate is an estimate of β^* .

Our model **makes explicit** what the unobserved component depends on—the h.h. state variables a, s, z, x .

Thus, to match $\hat{\beta}^{ols} < \hat{\beta}^*$ we need $\text{cov}(U(a, s, z, x), M) < 0$. This implies that migration must negatively co-vary with a and s —which is what the policy functions illustrate.

Interpretation: A Credit Constraint Story?

A potential source of misallocation: People want to move, but can't.

1. The policy functions in previous slides suggested otherwise.
 - Low income, low asset households are more likely to migrate.
 - Consistent with negative selection in OLS vs. LATE estimates.

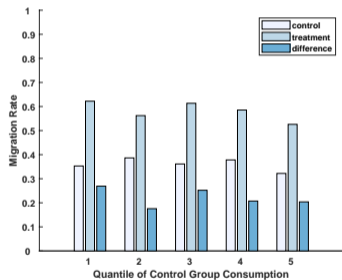
Effect of Migration on Consumption

	OLS	IV (LATE)
Data	10	30
Model	10	29
Model of Bryan et al (2014)	57	52

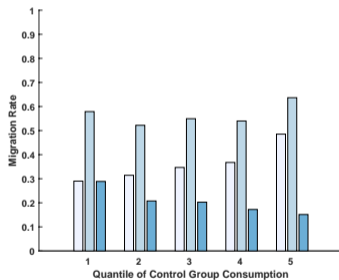
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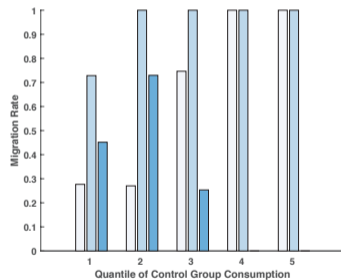
2. Migration rates (non-targeted) by level of consumption suggest otherwise.



(a) Data



(b) Baseline Model



(c) Model of Bryan et al (2014)

Interpretation: A Credit Constraint Story?

A potential source of misallocation: People want to move, but can't.

3. The migration response to an **unconditional** transfer (non-targeted) suggests otherwise.

Effects of an Unconditional Transfer on Migration

	Control	Treatment
Data	34	44
Model	36	37
Model of Bryan et al (2014)	66	88

Note: In the Data, there is no statistical difference between control and treatment.

Welfare

Welfare Gains

Welfare Effects of Conditional Migration Subsidies

		One-Time		Permanent		Permanent	
		Partial Equilibrium		Partial Equilibrium		General Equilibrium	
		Welfare	Migr. Rate	Welfare	Migr. Rate	Welfare	Migr. Rate
Income Quintile	1	1.05	85	4.79	92	4.41	91
	2	0.40	62	3.80	79	3.44	76
	3	0.26	53	3.47	70	3.09	67
	4	0.16	43	3.15	60	2.81	57
	5	0.11	39	2.69	51	2.38	48
Average		0.39	57	3.58	71	3.22	68
Fraction Rural			60		66		65
Fraction w. Experience			23		42		41

Welfare Gains Under Alternative Parameterizations

Welfare Effects of Under Alternative Parameterizations

	Average Welfare Gains	LATE (Cons.)	OLS (Cons.)	Treatment Effect (Migration)	Seasonal Migration Control
Data	-	30	10	22	36
Benchmark calibration	0.39	29	10	21	36
+ Higher urban risk	0.12	27	51	10	16
+ No migration disutility	0.51	9	29	28	55
+ Higher urban TFP	1.29	33	51	15	84
+ Higher migration cost	1.98	16	34	62	36

Evidence on the Source of Migration Disutility

Discrete Choice Migration Experiment

New surveys of same villages as BCM (2014);

- Conducted summer 2015
- Present two hypothetical migration options for 2015 lean season (fall 2015) to each respondent; pick Choice #1, Choice #2, or “No Migration.”
- Options vary with respect to risk, amenities, and wages at destination.

Goal: Gauge importance of “migration disutility” relative to other migration determinants.

Discrete Choice Migration Experiment

S.1.C.2			
Given the attributes below, which option do you choose? Please evaluate each new pair of migration options independent of the ones you saw earlier.			
	Choice #1: Migration	Choice #2: Migration	Choice #3: No Migration
Chance of Employment	33%	33%	N/A
Daily Wage (Taka)	270	340	Wage at Home in November
Latrine Facility during Migration	Pucca Latrine in Residence	Walk to Open Defecate or Public Pay Toilet	N/A
Family Contact	See Family Every Month	See Family Every 2 Month	N/A
<i>s16bq2_1</i> Your Choice (Tick Single Box)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Housing Matters

Estimate multinomial logit model of migration choice as a function of offered attributes from survey responses.

Holding destination #1 characteristics fixed, we find. . .

- Marginal effect of frequency of family visit is zero.
- Marginal effect of a latrine in destination residence is 18pp.
Equivalent to 22 percent increase in expected base pay in destination.

Implications. . .

- Helps validate the migration disutility in the model.
- Suggests policy interventions—improve urban slum housing.

Conclusions

General-equilibrium model of migration. Unique contribution: Disciplined using experimental variation. Value added of our analysis. . .

Interpretation of experimental response.

- Not about missallocation of people b.c. of say credit constraints.
- About extreme poor, facing bad shocks, and moving to stabilize consumption, with large, non-monetary disutility to migration.
- Key pieces of evidence: negative selection in consumption response; survey evidence validates non-monetary attributes of migration.

Normative implications.

- Conditional migration transfers are effective at targeting the most vulnerable relative to rural workfare or cash transfers.
- Issues in urban areas prevent the realization of large gains from migration.

Appendix

References I

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Calibration — Non-Experimental Targets

Targets from Bangladesh Household Income and Expenditures Survey, 2010.

- Urban-rural wage gap: 1.80
- Percent residing in rural: 63
- Variance of log wages in urban: 0.68

Targets from BCM (2014) control group

- Percent of households with no liquid assets: 47
- Variance of consumption growth: 0.12
- Consumption increase of migrants (OLS): 0.10

The Role of Information

BCM did an information experiment too

- Treatment group instruction on types of jobs in urban areas
- Also information on average wages, and where/how to find these jobs
- Result: precise zero effect on migration

We did follow-up surveys on same villagers on wage expectations, 2014

- Ratio of perceived Dhaka wages to rural Rangpur wages = 2.4
- Averages from Household Income and Expenditure Survey = 2.2
- Consistent with model's assumption of rational expectations