STEG TA Session: Migration and Risk

Nate Barker

Yale University

April 13, 2021

Modeling Migration and Risk

Today's Agenda:

- Go through key pieces of model in Bryan, Chowdhury, Mobarak (2014)
- Discuss Empirical Basis for Model
- Discuss quantitative assessment of Model

Part 1: Modeling Migration and Risk

One way that I like to think about classifying models (in reality, most fall somewhere between these extremes):

- Models to introduce a key insight (e.g. Banerjee and Newman 1993: inherited wealth affects occupation)
- Structural Models: we know several things matter, let's highlight them and quantify their interplay, conduct counterfactual analysis (Meghir et al 2020, Lagakos, Mobarak, Waugh 2020)
- Models to develop a basic intuition for empirical results ("here is a basic sketch that might explain what we're seeing")

Model in Bryan et al (2014)

- Goal: build a model to explain how risk aversion, credit constraints, might preclude people from migrating, even if profitable on net
- Core intuition: positive expected *value* lotteries might not be expected *utility* positive for individuals living near subsistence
- Two forces driving this in the model
  - (1) If I pay to migrate and don't find work, I have low income (and therefore consumption) today
  - (2) If I pay to migrate, I have less income against self-insurance tomorrow
- Core building blocks of model: two value functions, one higher than the other, I have to pay to learn if I get to switch to the better value function

Migration and Risk Model: Basic Set-up

- Agents get utility from: consuming c in every period $u(c), u'(c) < 0$
- Agents vary in: (a) how good they are at migrating, (b) their current cash on hand, x
- Agents decide: (a) whether or not to migrate (and learn if they're good at migrating), (b) how much of their cash to consume
- Agent face uncertainty over: whether they are good at migrating (with probability π_G), what state of the world s they will face (which determines their home income, y_s)

Structure of each period

- Start with cash on hand, x (and possibly the knowledge of whether they're good at migrating)
- Decide whether or not to migrate
  - If good at migrating, earn net income $m > 0$
  - If bad at migrating, earn net income $F < 0$
- Decide how much to consume, c, subject to cash on hand ($c \leq x$ if not migrating)
- Whatever not consumed converted to next period's cash on hand, x', at rate R
- Earn income y_s, which depends on state s, common for everyone

Dynamic Program: Bad Migrants

Someone who is bad at migrating (and knows they're bad at it) solves:

$$B(x) = \max_{c \leq x} u(c) + \delta \int_s B(x')d\mu_s$$

$$\text{s.t } x' = R(x - c) + y_s$$

- Since they're bad at migrating, it's never worth it for them to do so
- Classic Deaton (1991): "Buffer Stock" model
- Only decision: given current cash, x, and uncertainty over income, what's the right amount to save?

Dynamic Program: Good Migrants

Someone who is good at migrating (and knows they're good at it) solves:

$$G(x) = \max_{c \leq x+m} u(c) + \delta \int_s G(x')d\mu_s$$

$$\text{s.t } x' = R(x + m - c) + y_s$$

- Again here, no need to make decision about migration: always a good option
- Once again, decision is simply how much to save, against risk of low-income realization

Dynamic Program: Someone who has never migrated

- Someone who has never migrated needs to decide both (a) should I migrate, (b) given my choice, what's my optimal consumption?
- First, if they choose not to migrate this period, their value function is:

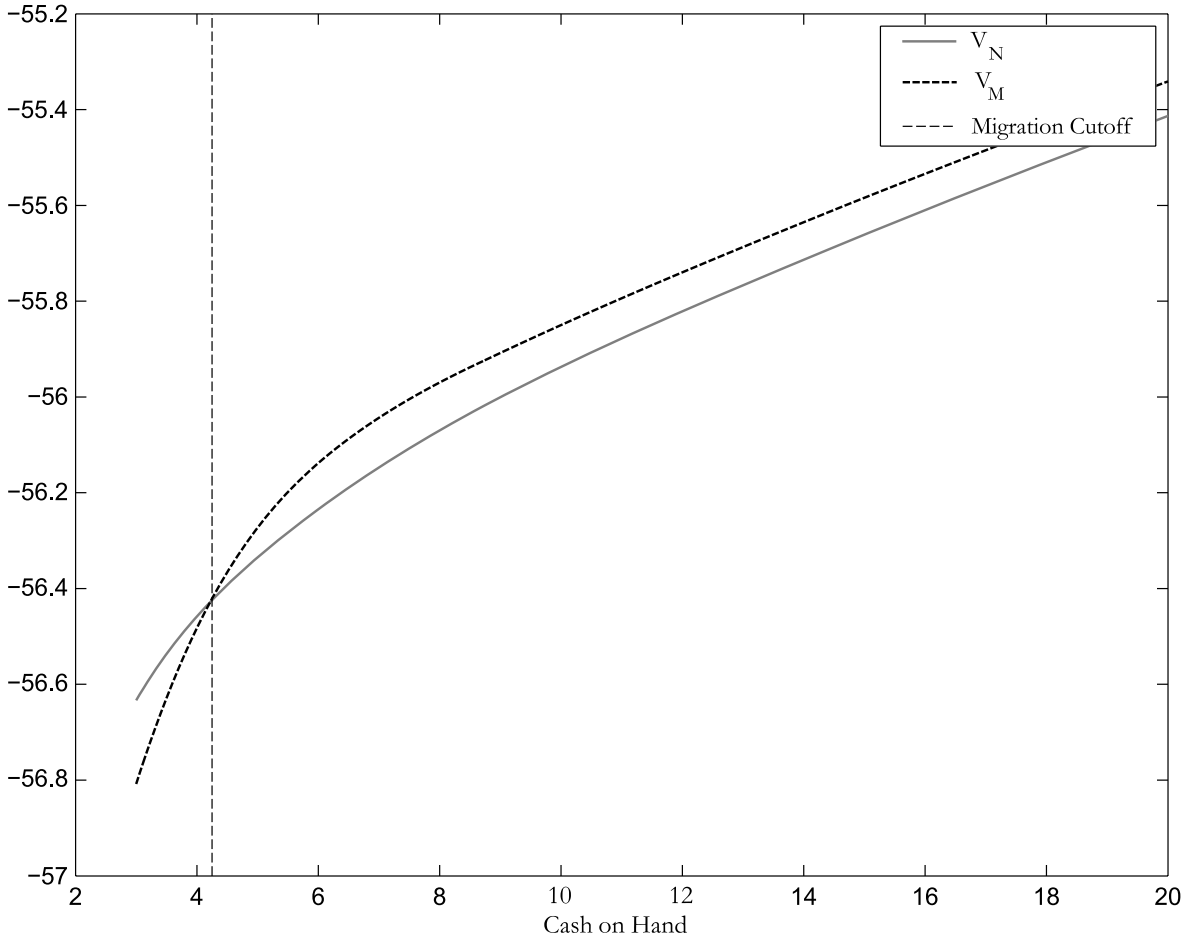
$$V(x) = \max_{c \leq x} u(c) + \delta \int_s V(y_s + R(x-c)) d\mu_s$$

- Given this, their full optimization problem is:

$$V(x) =$$

$$max\left\{ \max_{c \leq x} \left[u(c) + \delta \int_s V(y_s + R(x-c)) d\mu_s \right], \pi_G G(x) + (1-\pi_G) B(x-F) \right\}$$

Basic Shape of Value Function



Part 2: Do Empirical Facts Support Model?

Key ideas present in model:

- Households face income risk (and thus need buffer stock)
- Households are near subsistence (and thus close to point where migrating isn't optimal)
- Migration is risky; learning/experience is idiosyncratic (I can't simply learn from others whether migration will go well for me)

Risky income: autocorrelation of consumption is low

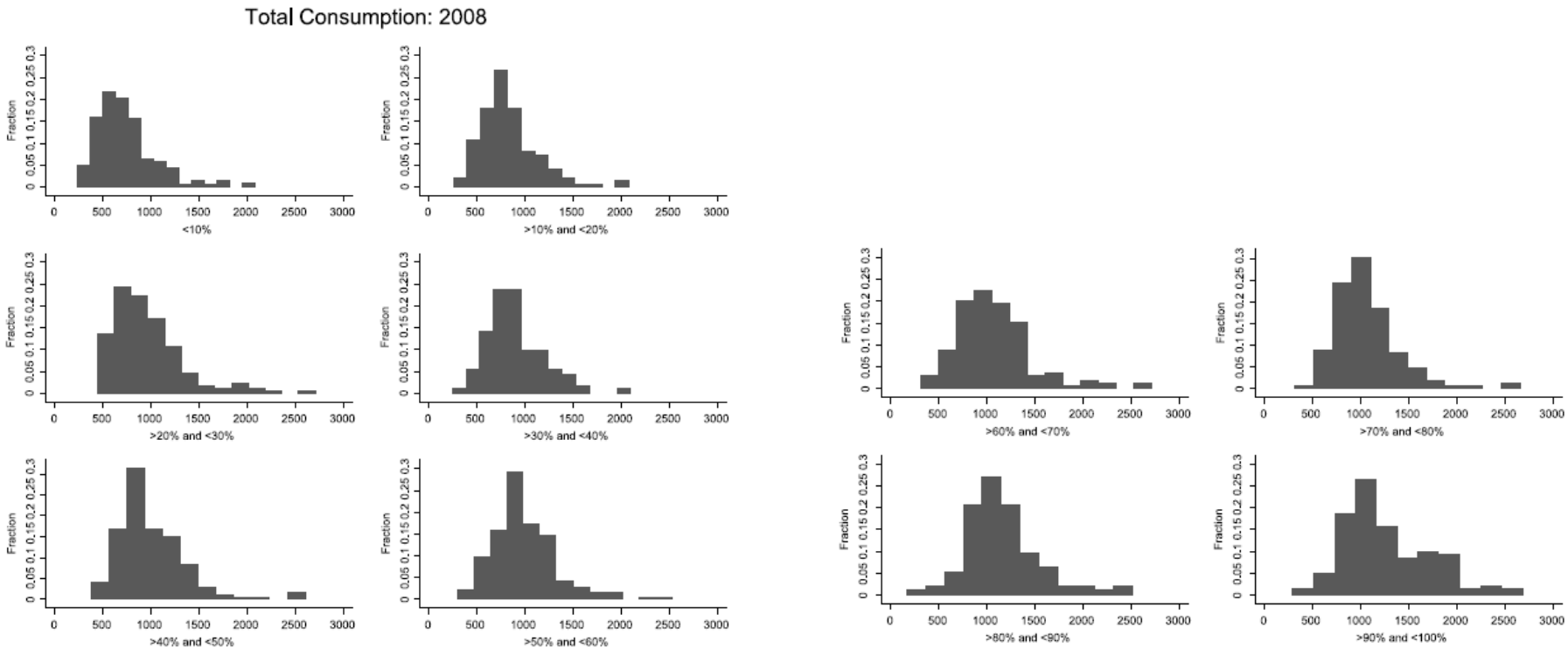
TABLE A.VII

COVARIANCE OF INCOME PER CAPITA ACROSS ROUNDS[a]

	Consumption in R2	Consumption in R3	Consumption in R3
Consumption per capita in R1	0.102***		0.067***
	(0.014)		(0.012)
Consumption per capita in R2		0.445***	
		(0.027)	
Constant	881.546***	765.099***	1094.635***
	(18.215)	(25.513)	(15.676)
Sub-district FE?	No	No	No
Observations	1855	1782	1798
R-squared	0.027	0.131	0.017

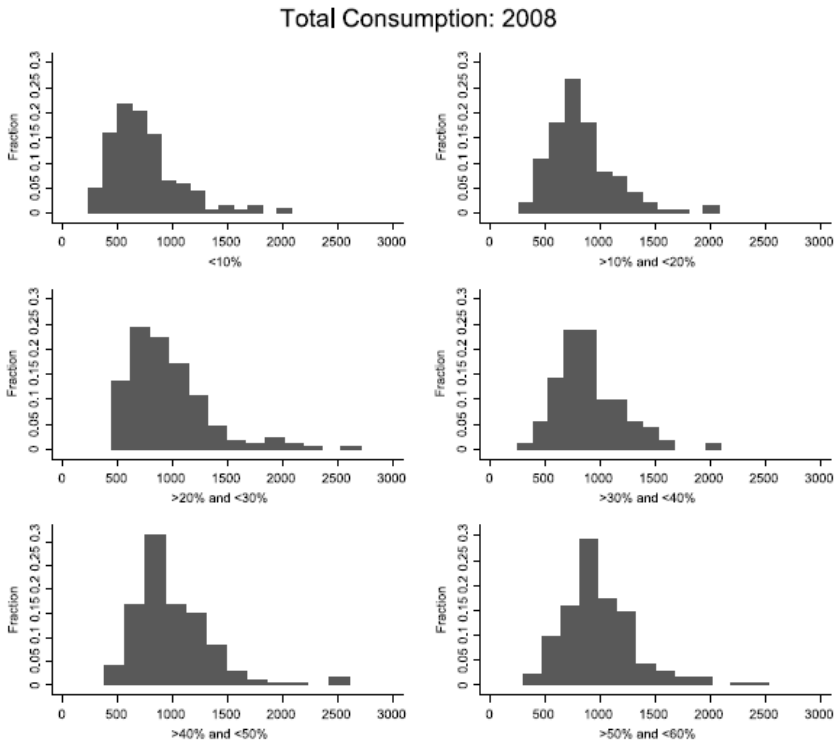
[a]Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

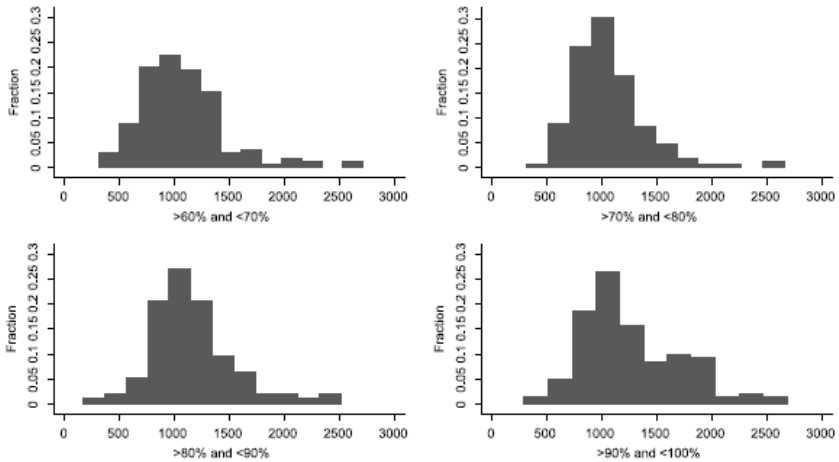
Risky income: autocorrelation of consumption is low



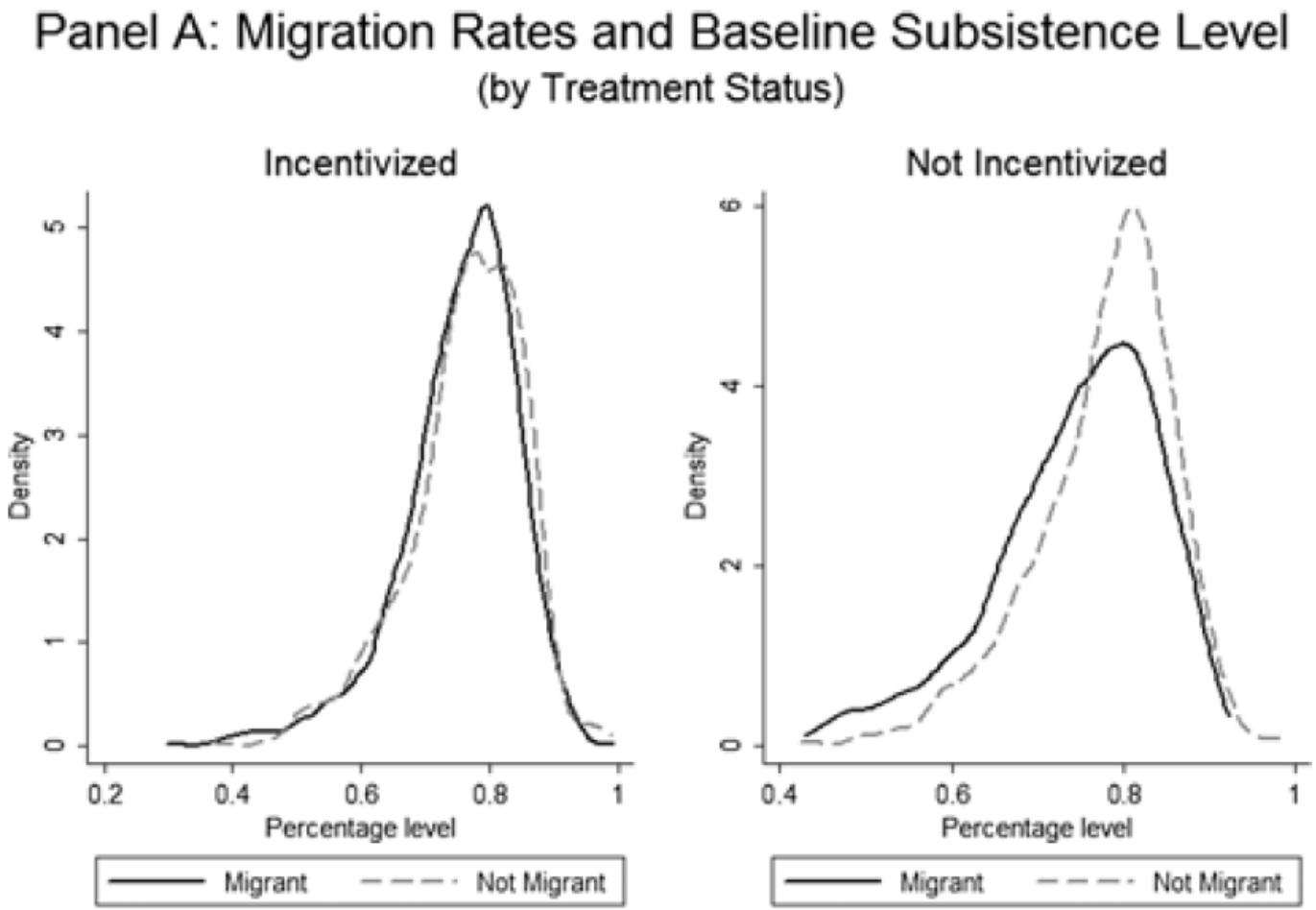
Subsistence matters

Needed expenditure to meet ultra-poor (subsistence) threshold: 660 taka





Subsistence and Migration



Subsistence is defined as percentage of food expenditures on total expenditures

Is Learning Idiosyncratic?

TABLE VI

LEARNING FROM OWN EXPERIENCE AND OTHERS' EXPERIENCES IN 2009 RE-MIGRATION DECISION[a]

Dep. Var.: Migration in 2009	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Did any member of the household migrate in 2008?	0.392*** (0.02)	0.410*** (0.145)	0.392*** (0.02)	0.486*** (0.136)	0.393*** (0.021)	0.436*** (0.132)	0.392*** (0.02)	0.476*** (0.13)
Number of friends and relatives who migrated			0.007 (0.01)	−0.001 (0.025)				
Number of friends who migrated					−0.012 (0.025)	−0.048 (0.049)		
Number of relatives who migrated							0.01 (0.011)	0.007 (0.027)
Constant	0.097*** (0.037)	0.088 (0.083)	0.095** (0.038)	0.050 (0.080)	0.098*** (0.037)	0.078 (0.076)	0.095** (0.038)	0.052 (0.077)
Observations	1818	1818	1818	1818	1797	1797	1797	1797
R-squared	0.207	0.206	0.207	0.198	0.208	0.206	0.209	0.202

[a] *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses.

Who chooses to migrate?

TABLE VII

DIFFERENCES IN CHARACTERISTICS BETWEEN MIGRANTS IN TREATMENT AND IN CONTROL GROUP[a]

	Incentive	Non-Incentive	Diff.
Panel A: Percentage of Migrants That Know Someone at Destination			
First episode	47%	64%	17***
	(1.84)	(3.30)	(3.8)
Any episode	57%	66%	8.3**
	(1.83)	(3.63)	(3.82)
Panel B: Percentage of Migrants That Had a Job Lead at Destination			
First episode	27%	44%	17***
	(1.64)	(3.41)	(3.55)
Any episode	32%	46%	14.5***
	(1.72)	(3.43)	(3.69)
Panel C: Percentage of Migrants Traveling Alone			
First episode	30%	32%	1.6
	(1.70)	(3.20)	(3.6)
Any episode	38%	39%	0.65
	(1.79)	(3.35)	(3.79)

[a] *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors are in parentheses.

Quantitatively Assessing Model

- One possible approach: build big structural model, estimate parameters
- Not done here, primary contribution is empirics
  - Big question in economics: does encouraging more migration increase income (Harris and Todaro 1970)
- Instead: how quantitatively plausible is model?
  - Impose parameters, simulate, compare to data

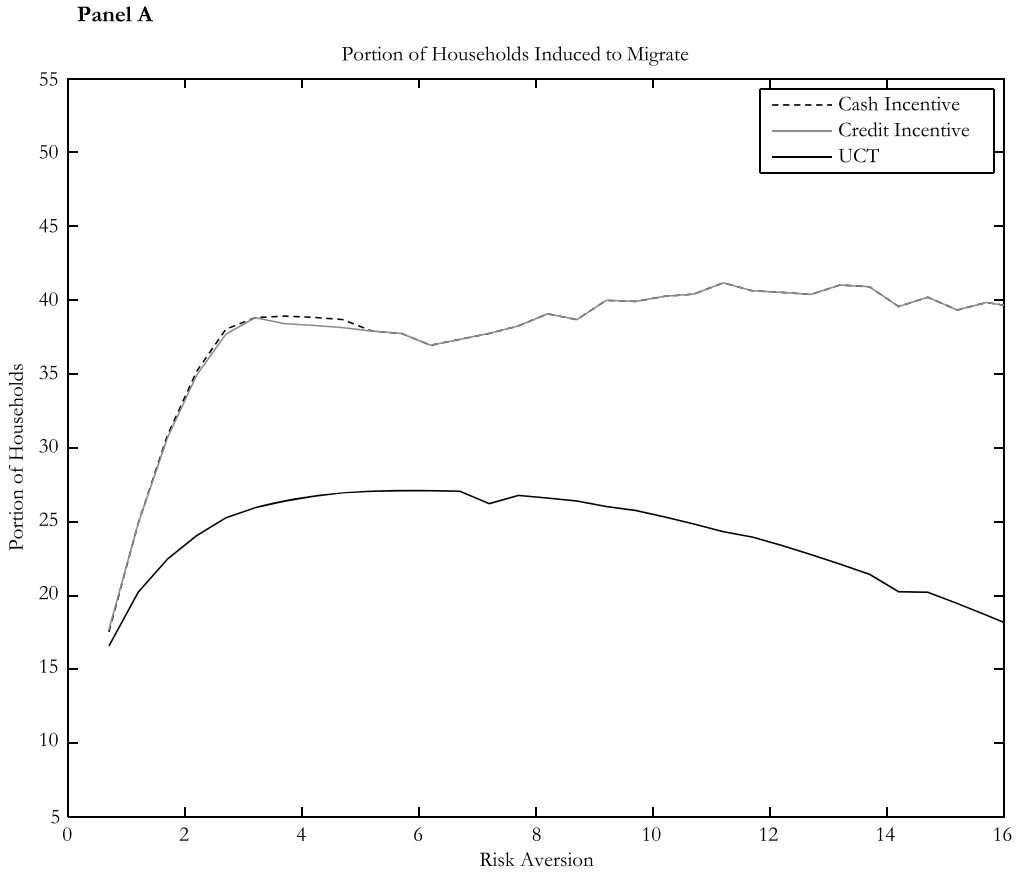
Imposed Parameters

TABLE VIII

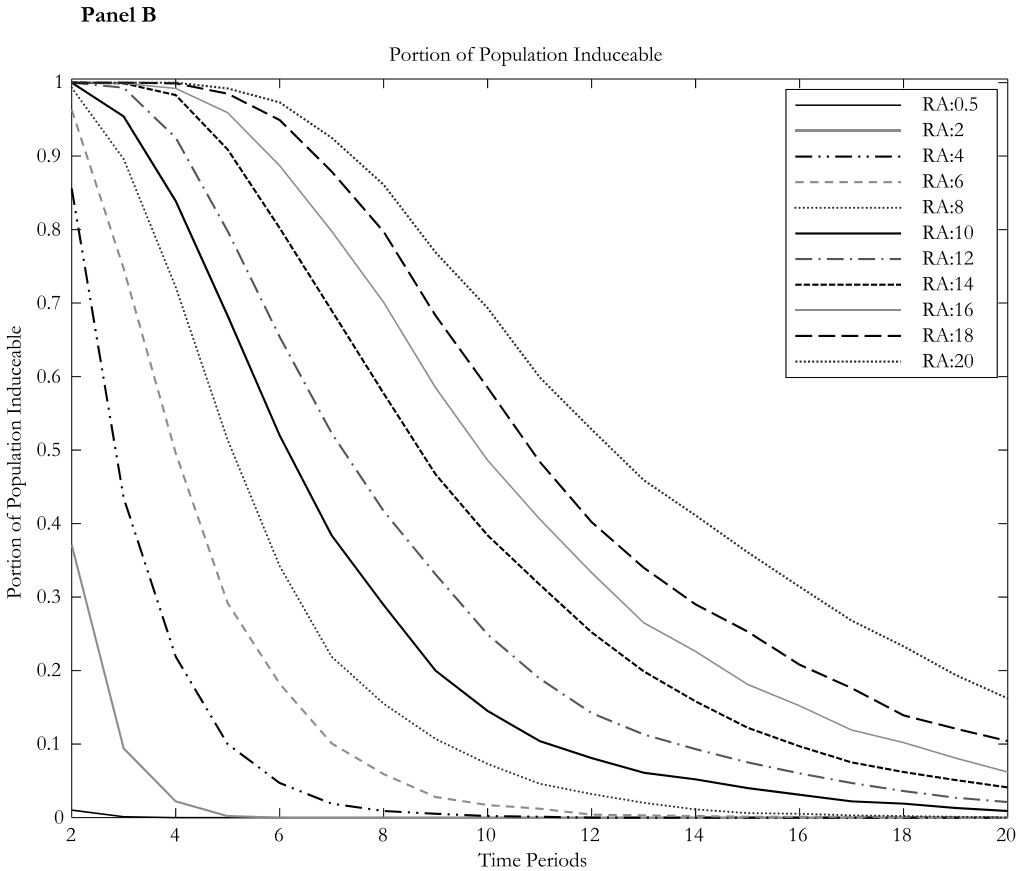
PARAMETERS USED FOR CALIBRATION

Parameter	Calibration	Notes
$u(c)$	$\frac{(c-s)^{1-\sigma}}{1-\sigma}$	HARA utility function
s	*250* Taka per hh member per month	Enough for about 600 calories per hh member per month
π_G	*0.5*	The portion of induced migrants that re-migrate
F	*250* Taka per hh member per month	600 Taka for bus fare, plus 6 days of foregone labor at 60 Taka per day. Spread over 4 hh members
m	*550* per household member per month	Solution to: $\pi_G(m+I)=350$ where 350 is our LATE estimate and I is the size of our incentive
$\mu(y)$	$N(700, 70)$ per household member per month	Designed to look like the distribution of the bottom half of the population
Time period	6 months	We assume the choice to migrate can be made after planting for either of the agricultural seasons
δ	0.99	
I (incentive size)	200 Taka per household member	Assumes a households size of 4

Able to Match Characteristics of 1-period Model...



...but not when saving is allowed



Why might this be?

- Saving constraints preclude saving up?
- Non-monetary dis-utility of migration
  - Seems to also require mis-perception of dis-utility
- Depreciation of migration ability
- Behavioral Bias?
- Motivates fuller treatment in Lagakos, Mobarak, Waugh (2020)