

**Economics 270c**  
Graduate Development Economics

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Graduate Development Economics

Lecture 11 – April 7, 2009

## Macroeconomic growth empirics

Lecture 1: Global patterns of economic growth and development (1/20)

Lecture 2: Inequality and growth (1/27)

## The political economy of development

Lecture 3: History and institutions (2/3)

Lecture 4: Corruption (2/10)

Lecture 5: Patronage politics (2/17)

Lecture 6: Democracy and development (2/24)

Lecture 7: War and Economic Development (3/3)

Lecture 8: Economic Theories of Conflict (3/10) – Guest lecture by Gerard Padro

## Human resources

Lecture 9: Human capital and income growth (3/17)

Lecture 10: Increasing human capital (3/31)

Lecture 11: Labor markets and migration (4/7)

Lecture 12: Health and nutrition (4/14)

Lecture 13: The demand for health (4/21)

## Other topics

Lecture 14: Environment and development (4/28)

Lecture 15: Resource allocation and firm productivity (5/5)

## Additional topics for the development economics field exam

-- Ethnic and social divisions

-- The Economics of HIV/AIDS

- Prerequisites: Graduate microeconomics, econometrics
- Grading:  
Four referee reports – 40%

Two problem sets – 20%

→ Problem set 1 due Thursday April 9 (email to Jonas)

Problem set 2 handed out next Tuesday, due Tuesday April 21

Research proposal – 30%

Class participation – 10%

- All readings are available online (see syllabus)
- Additional references on syllabus



# Lecture 11 outline

- (1) Labor markets and migration in economic development:
  - United National Development Program Human Development Report 2009
  - Yang (2008)
- (2) Rosenzweig (1988) on labor markets and migration
- (3) Hanson (2006) and Hamory and Miguel (2007) on “selective” migration
- (4) Munshi and Rosenzweig (2006)

# (1) Labor markets and migration

- The nature of people's work changes dramatically during the process of economic development
- The shift from rural agricultural work to urban wage labor is central to the “structural transformation” (Lewis 1954)

# (1) Labor markets and migration

- The nature of people's work changes dramatically during the process of economic development
- The shift from rural agricultural work to urban wage labor is central to the “structural transformation” (Lewis 1954)
- How does this process occur? How do workers get from here (rural, agricultural, poor) to there (urban, industrial / services, wealthy)?
  - Migration is a central issue in the labor markets of many less developed countries



# (1) Labor markets and migration

- Today focus on migration (both international and internal) and urban labor markets
- Stylized facts:
  - Urban areas are growing rapidly
  - Urban wages are higher than rural wages (why?)
  - Urban unemployment / underemployment is high

Urban population					
	millions		% of total population		average annual % growth
	1990	2003	1990	2003	1990–2003
World	2,263.3 s	3,015.7 s	44 w	49 w	2.2 w
Low income	447.5	686.5	26	30	3.3
Middle income	1,148.1	1,570.8	44	53	2.4
Lower middle income	946.4	1,319.8	41	50	2.6
Upper middle income	201.8	251.1	71	75	1.7
Low & middle income	1,595.7	2,257.4	37	43	2.7
East Asia & Pacific	454.1	725.5	28	39	3.6
Europe & Central Asia	294.4	301.1	63	64	0.2
Latin America & Carib.	309.1	407.8	71	77	2.1
Middle East & N. Africa	126.6	181.8	54	59	2.8
South Asia	280.1	403.5	25	28	2.8
Sub-Saharan Africa	131.5	237.6	28	36	4.6
High income	667.6	758.3	77	80	1.0
Europe EMU	220.9	239.0	75	78	0.6

## 3.10b

... and urbanization is growing fastest in Sub-Saharan Africa and Asia

Average annual growth rate, 1990–2003 (%)



Source: Table 3.10.

# (1) Labor markets and migration

- Today focus on migration (both international and internal) and urban labor markets
- Stylized facts:
  - Urban areas are growing rapidly
  - Urban wages are higher than rural wages (why?)
  - Urban unemployment / underemployment is high
- What models can explain these patterns? What do we know empirically about the process of migration and about the functioning of urban labor markets?

# (1) Labor markets and migration

- Summary statistics and patterns from the forthcoming 2009 UNDP *Human Development Report*
- Approximately 5 million persons cross into developed countries every year
  - Larger numbers move to developing countries
  - The aspiration: improvements in well-being
- This is not surprising: around the world, well-being is strongly associated with location
  - Norway/Sierra Leone: 1.9 times longer life expectancy, 6 times higher average years of schooling, 82 times as many goods and services

# (1) Labor markets and migration

- Today's population movements are nothing new.
  - At the close of the 19<sup>th</sup> century, the share of migrants in world population was between 5 and 6 percent, roughly twice what it is today.
  - 19th century migrants had high rates of remittances (14-19% in US), return migration (58% Italy, 12% UK)
- These movements played a key role in structural transformation of economies and were often equalizing
  - A difference with the past is that destination country immigration policies are much more restrictive today than in the 19<sup>th</sup> century

# (1) Labor markets and migration

- How have international population movements changed since 1960?
  - The total share of migrants in the world population has barely changed. Excluding countries with serious comparability issues (e.g., USSR and Czechoslovakia), the share has been stable at 2.7%.
- However, there has been a significant increase in the share of migrants going to developed countries
  - This is due to an increase in South-North migration, and relative decline in migrants to developing regions

# (1) Labor markets and migration

- Internal migration is a major issue in most less developed countries
  - The rates of internal migration, often from rural to urban areas, are high in most countries
  - E.g., the movement of tens (hundreds?) of millions of Chinese to coastal cities since 1978
- For both international and internal migration, one of the most robust stylized facts is the age at migration: young adults in their 20s have the highest rates



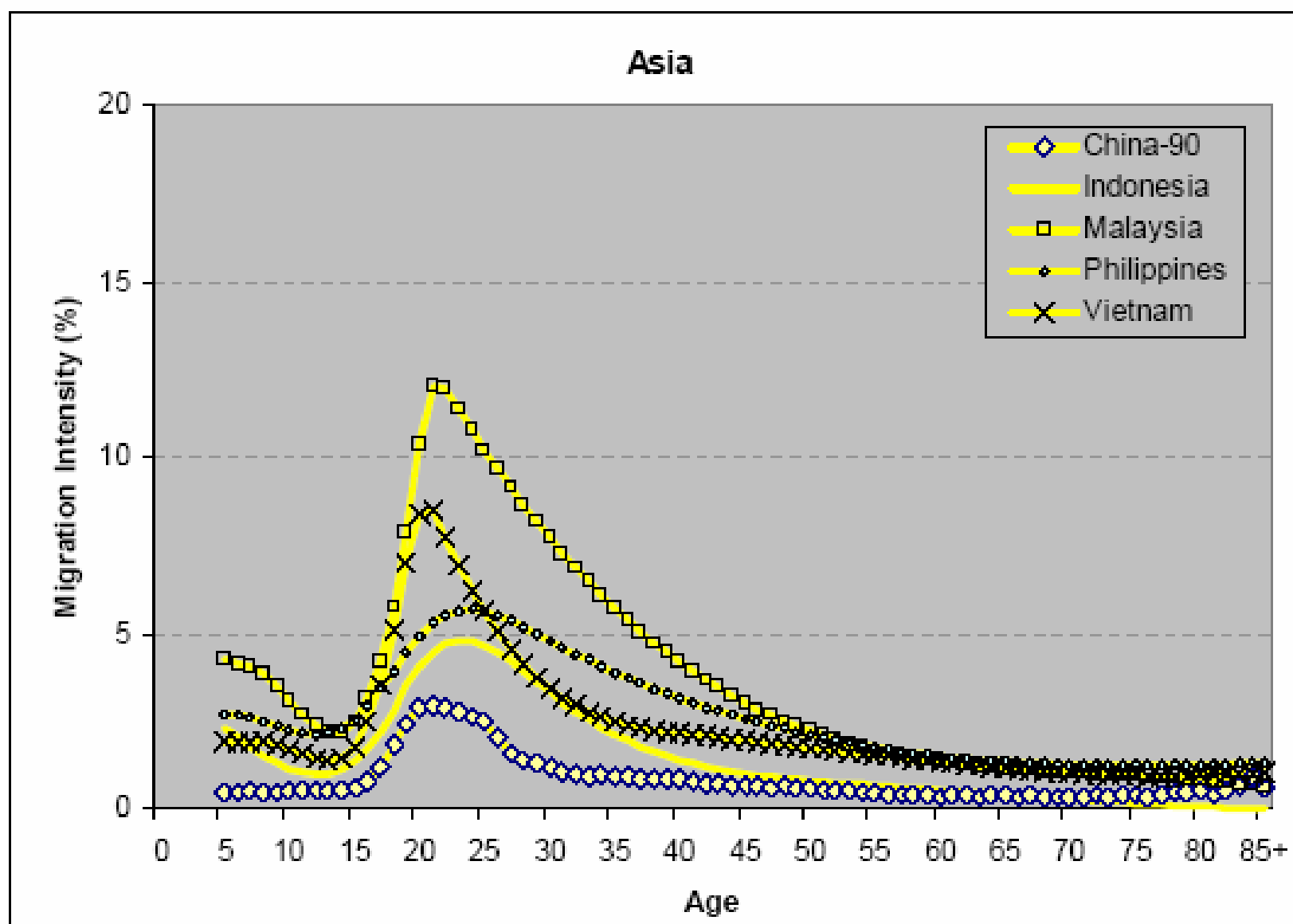
**Intensity of lifetime migration rates for largest zonal systems in country**

	<b>Country</b>	<b>Zonal</b>	<b>Intensity (%)</b>
<i><b>Africa</b></i>			
	Ghana	Region	17.8
	Kenya	Province	12.6
	Rwanda	Province	10.4
	South Africa	Province	15.4
	Uganda	Region	5.2
<i><b>Asia</b></i>			
	Belarus	Region	10.8
	Cambodia	Province	11.7
	China	Province	6.2
	India	State	4.1
	Indonesia	Region	4.1
	Malaysia	State	20.7
	Philippines-1990	Region	11.7
<i><b>Latin America and Caribbean</b></i>			
	Argentina	Province	19.9
	Brazil	Region	10.1
	Chile	Region	21.3
	Colombia	Department	20.3
	Costa Rica	Province	20.0
	Ecuador	Province	20.2
	Mexico-2000	State	18.5
	Panama	Province	20.6
	Venezuela	State	23.8
<i><b>Developed Countries</b></i>			
	Portugal	Region	12.8
	Spain	Province	22.4
	USA	Region	17.8

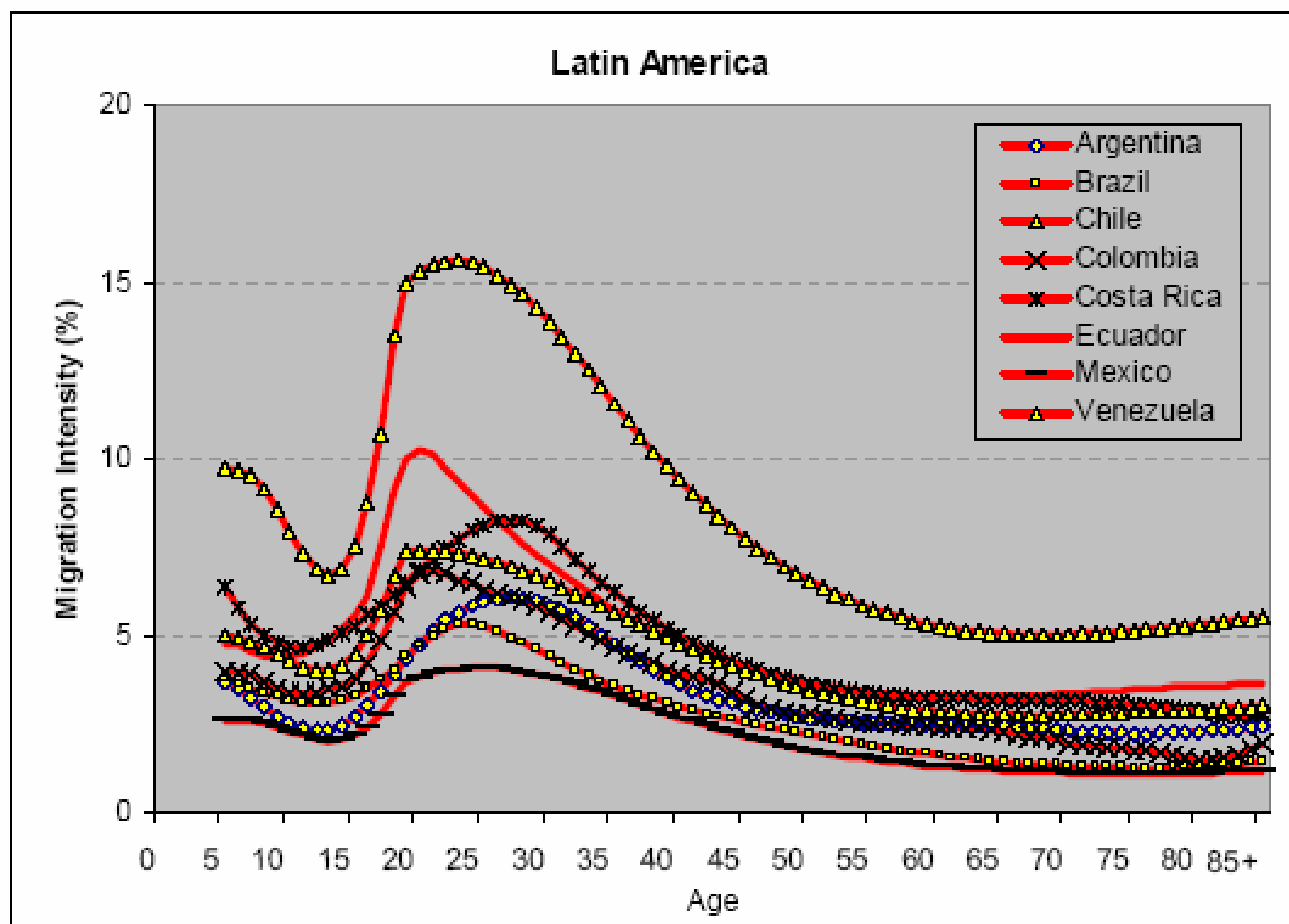
Soucre: Bell, 2009

Country	Age at peak	Major regions
		Intensity at peak (%)
<i>Africa</i>		
Ghana	23	6.05
South Africa	24	8.84
<i>Asia</i>		
China – 1990	21	2.91
Indonesia	22	4.80
Malaysia	21	12.02
Philippines	24	5.67
Vietnam	21	8.49
<i>Latin America &amp; Caribbean</i>		
Argentina	27	6.08
Brazil	24	5.31
Chile	23	15.63
Colombia	21	6.84
Costa Rica	26	8.24
Ecuador	20	10.27
Mexico	25	4.08
Venezuela	20	7.42
<i>Developed Countries</i>		
Canada	26	8.21
Portugal	28	6.91
USA	25	18.28

**Figure 4a: Age Profiles of Five Year Migration Intensity for 'Major Regions', Selected Countries in Asia**



**Figure 4b: Age Profiles of Five Year Migration Intensity for 'Major Regions', Selected Countries in Latin America**



# (1) Labor markets and migration

- Is migration a net positive (remittances) or negative (brain drain) for sending countries? Receiving countries?  
-- Yang (2008) exploits the 1997 Asian financial crisis: Filipino migrants were in countries affected differentially by the crisis, but look similar in underlying characteristics
- Higher remittances lead to higher consumption in the sending household, greater educational expenditures and less child labor, and increased entrepreneurship  
-- In another paper, Yang and Choi (2007) show that remittances also serve as partial insurance (against rainfall shocks) for sending Filipino households

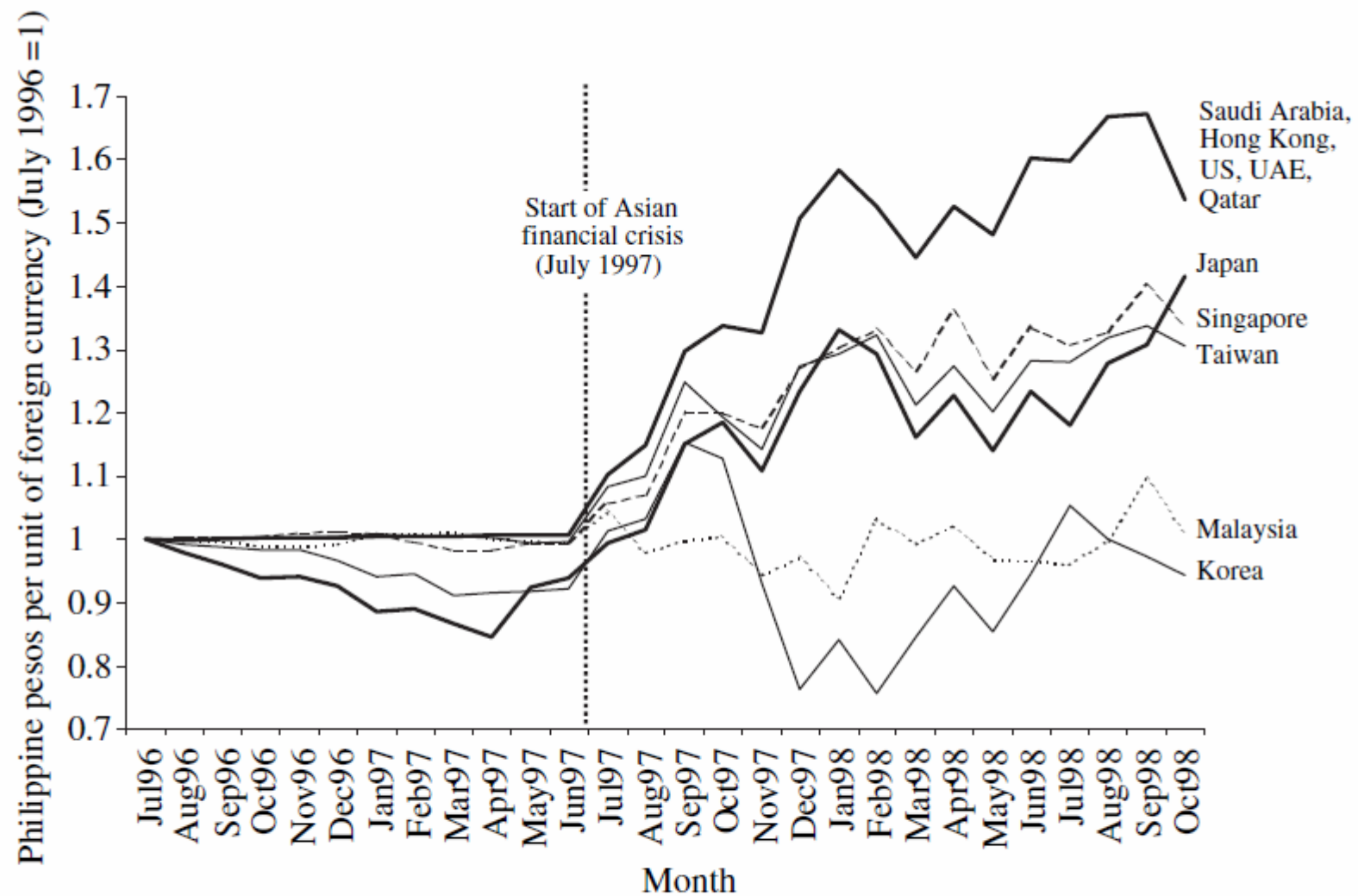


Fig. 2. *Exchange Rates in Selected Locations of Overseas Filipinos, July 1996 to October 1998*  
 (Philippine pesos per unit of foreign currency, normalised to 1 in July 1996)  
*Notes:* Exchange rates are as of last day of each month. Data source is Bloomberg L.P.

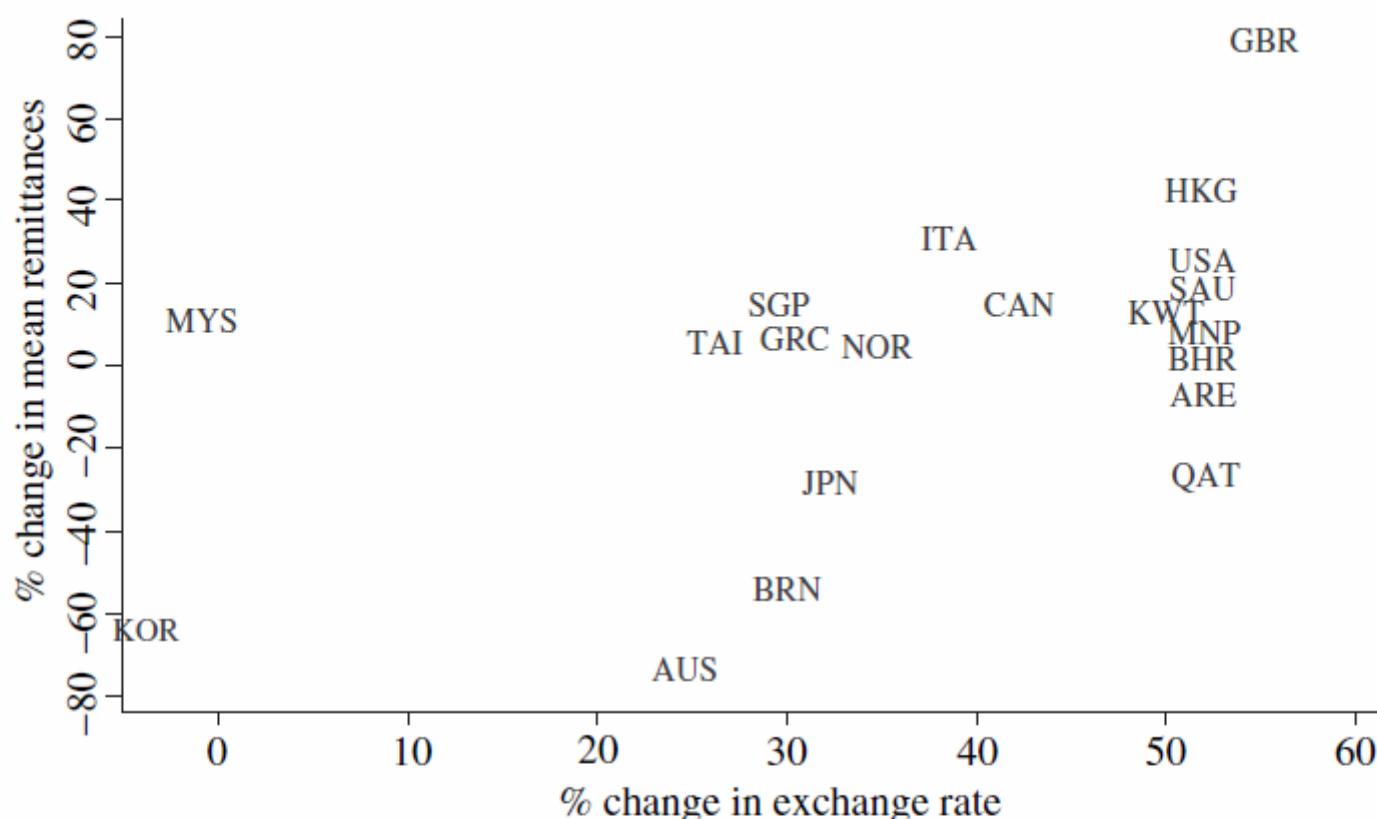


Fig. 1. *Impact of Migrant Exchange Rate Shocks on Philippine Household Remittance Receipts (1997–1998)*

*Notes:* Exchange rates are in Philippine pesos per unit of foreign currency. Percentage change in exchange rate is mean exchange rate from October 1997 to September 1998 minus mean exchange rate from July 1996 to June 1997, divided by the latter. Mean remittances are calculated among all households with a single migrant in given overseas location. Percentage change in mean remittances is between January–June 1997 and April–September 1998 reporting periods. Datapoints are the top 20 locations of Philippine overseas workers (as listed in Table 1).

Table 4

*Impact of Migrant Exchange Rate Shocks, 1997–8*

OLS regressions of change in outcome variable on exchange rate shock. Columns 1 and 2 report coefficients (standard errors) on exchange rate shock.

	<i>Initial mean of outcome</i>	<i>Mean (std.dev.) of change in outcome</i>	<i>Regressions</i>		<i>Implied elasticity (coefficient in col. 2 divided by initial mean)</i>
			(1)	(2)	
<i>(a) Remittances, migrant returns</i>					
Remittance receipts	0.395	0.151 (0.022)	0.175 (0.119)	0.238 (0.086)***	0.60
Migrant return rate (over 15 months)	<i>n.a.</i>	0.136 (0.008)	−0.155 (0.048)***	−0.125 (0.064)*	
<i>(b) Income and consumption</i>					
Household income	1.000	0.251 (0.030)	0.258 (0.162)	0.26 (0.126)**	0.26
Wage and salary income	0.234	0.063 (0.010)	0.027 (0.044)	−0.008 (0.049)	−0.03
Entrepreneurial income	0.166	0.023 (0.007)	0.041 (0.034)	0.029 (0.041)	0.17
Other sources of income (includes remittances)	0.6	0.165 (0.023)	0.189 (0.137)	0.239 (0.100)**	0.40
Household consumption	1.000	0.093 (0.012)	−0.063 (0.068)	−0.083 (0.074)	−0.08
<i>(c) Non-consumption disbursements</i>					
Disbursements, potentially investment-related	0.178	0.066 (0.012)	0.235 (0.124)*	0.244 (0.130)*	1.37
Educational expenditures	0.066	0.018 (0.002)	0.023 (0.013)*	0.036 (0.016)**	0.55
Purchases of real property	0.019	0.01 (0.006)	0.13 (0.101)	0.13 (0.100)	6.84
Repayments of loans	0.024	0.001 (0.004)	0.027 (0.025)	0.009 (0.020)	0.38
Bank deposits	0.069	0.036 (0.008)	0.055 (0.040)	0.069 (0.044)	1.00
Other non-consumption disbursements	0.071	0.042 (0.013)	−0.003 (0.071)	−0.003 (0.059)	−0.04
<i>(d) Durable good ownership</i>					
Radio	0.836	0.105 (0.010)	0.04 (0.069)	0.088 (0.069)	
Television	0.828	0.03 (0.006)	0.062 (0.035)*	0.095 (0.035)***	



## (2) Rosenzweig (1988, Handbook chapter)

- Influential review article on rural, urban labor markets
- Written at a time when migration was central to development economics: “a large proportion of the development economics literature is concerned with these questions of the mobility of labor” (p. 744)

#### 4.1. *The basic human capital model of migration*

The beginning point in modeling the migration decision of agents is the human capital model. In this framework, migration is viewed as an income-augmenting investment in which costs are incurred initially and returns accrue over time. An individual compares the direct costs of migrating with the discounted present value of income gains, if any, from each potential destination; he or she thus finds the maximum of a set of potential migration gains across all possible destinations, where the gain  $G_j$  for any destination  $j$  is:

$$G_j = \int_0^T e^{(g-r)t} (Y_{Dj} - Y_o) dt - c_j, \quad (25)$$

$c_j$  is the cost of migration (transportation costs) to destination  $j$ ,  $Y_{Dj}$  is the per-period income the individual would receive by migrating to  $j$ ,  $Y_o$  is per-period origin income, and  $r$  is the discount rate.  $Y_o$ ,  $Y_D$  and  $c$  may also have time subscripts, may vary with age, although direct migration costs are incurred all at once. If  $\max\{G_j\}$  is positive, then the potential migrant will choose to move to that destination with the highest gain.

## (2) Rosenzweig (1988, Handbook chapter)

- This human capital migration model has the following predictions:
  - Younger people have longer time horizons and thus will be more likely to move than older people
  - Greater costs (distances)  $c_j$  between areas will reduce migration flows among them
  - Greater wage differences between areas / sectors  $Y_{Dj} - Y_0$  induce larger flows between them

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  - Greater costs (distances)  $c_j$  between areas will reduce migration flows among them
  - Greater wage differences between areas / sectors  $Y_{Dj} - Y_0$  induce larger flows between them
- How can we account for the fact that flows between two cities, say, are often in both directions? → Heterogeneity across individuals (in wages, returns to skill, network connections, costs, idiosyncratic tastes, job “shocks”)

## (2) Rosenzweig (1988, Handbook chapter)

- It has long been observed that individuals from a particular “sending” region tend to cluster in the same “receiving” region

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- It has long been observed that individuals from a particular “sending” region tend to cluster in the same “receiving” region
    - Plausible explanations to be disentangled:
      - (1) individuals from the same region share some unobserved characteristic that yields high returns  $Y_{Dj}$  there (e.g., a particular industrial skill, location)
      - (2) The presence of others from one’s home location reduces the migration cost / job search costs  $c_j$   
(Carrington 1996 models this in the context of the U.S. Great Migration of African-Americans from the South; Munshi 2003 on Mexicans immigrants in the U.S.)
- persistent migration patterns / path dependence

## (2) Rosenzweig (1988, Handbook chapter)

- How to understand high urban unemployment? The classic explanation is by Harris-Todaro (1970 *AER*)
- Let urban labor markets be partially regulated such that the urban wage  $W_U^*$  is greater than its free market level
  - Could be due to union strength, rents provided to government elites with state posts, government fear of urban political discontent
  - As relative urban wages increase, the incentives to migrate from rural areas also increase. Thus high urban wages and high urban unemployment naturally co-exist

is modified so that the per-period income flow in the urban sector is weighted by the probability of obtaining a job in that sector;  $G_j$  becomes  $G'_j$ .

$$G'_j = \int_0^T e^{(g-r)t} (p(t) Y_{Dj} - Y_o) dt - c_j, \quad (26)$$

where  $p(t)$  is the destination (urban) employment probability.  $G'_j$  is now the expected net return from migration, and is clearly lower than  $G_j$  as long as  $p(t) < 1$ .

Harris and Todaro (1970), based on the model of Todaro (1969), embed the notion of employment risk into a two-sector general equilibrium model of migration, employment and wage determination. In this model, wages are determined competitively (by supply and demand) in the rural sector, but the wage rate in the urban sector is an institutionally set ("politically determined") rigid minimum wage set above the initial rural wage. Employment is a Bernoulli process in which the probability of employment in the urban sector is equal to the number of urban jobs ( $E_U$ ) divided by the size of the urban labor force or number of job-seekers ( $N_U$ ). Since all agents are assumed to maximize  $G'$  (are risk neutral), and are perfectly mobile, and the rural wage (= marginal product in agriculture) is origin income, the unemployment equilibrium condition is:

$$W_R = W_U (E_U/N_U), \quad (27)$$



## (2) Rosenzweig (1988, Handbook chapter)

- Who migrates to urban areas? Selection possible
- Individuals move to exploit wage differences across sectors/regions (Roy 1951):  
Rural income ( $Y_R$ ) and urban income ( $Y_U$ ) may depend on heterogeneous individual ability ( $h_i$ ), and individual migration costs  $c_i > 0$   
→ Migrate if  $Y_U(h_i) - Y_R(h_i) - c_i \geq 0$

## (2) Rosenzweig (1988, Handbook chapter)

- Let the rural-urban wage gap at ability level  $h$  be denoted

$$g(h_i) \equiv Y_U(h_i) - Y_R(h_i)$$

- Migration costs are a function of observed ( $X_i$ ) and unobserved ( $e_i$ ) household and individual characteristics

$$c_i = -X_i'b - e_i$$

$$\rightarrow \text{Migrate}_i = 1\{g(h_i) + X_i'b + e_i \geq 0\}$$

## (2) Rosenzweig (1988, Handbook chapter)

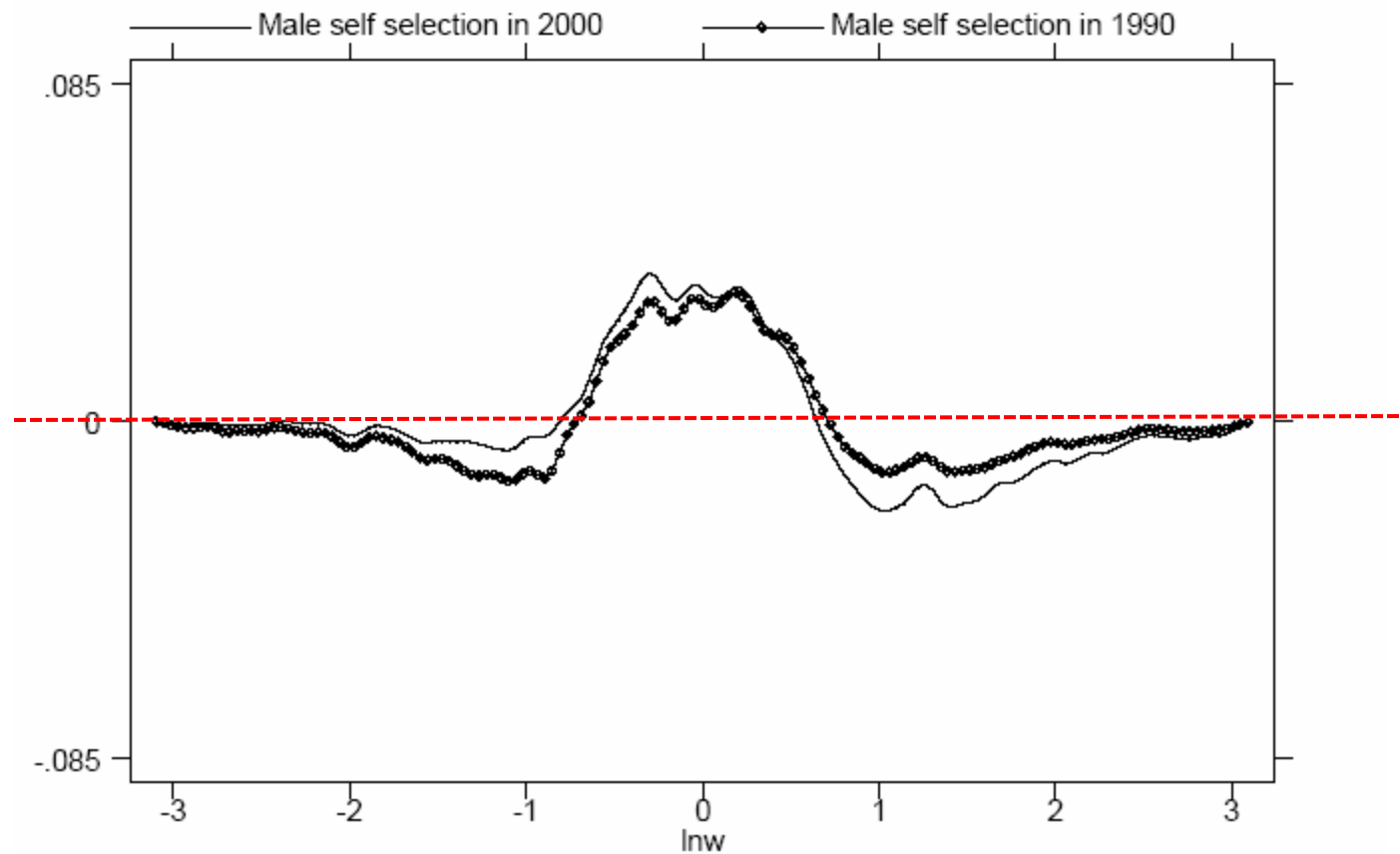
- Higher ability people are more likely to migrate if there are greater returns to ability in the urban sector

$$Y_U'(h_i) > Y_R'(h_i)$$

- There is U.S. evidence that not just wage levels, but also wage growth, is higher for observationally equivalent workers in cities compared to non-cities
  - This is consistent with faster human capital accumulation in cities. (Why?) If individuals have time inconsistent preferences or simply are not fully aware of this, subsidizing urban migration might be desirable

### (3) Hamory and Miguel (2007)

- How selected are migrants?
- Most papers focus on years of schooling
- The largest literature is on Mexico-U.S. migration
  - Hanson (2006, *JEP*) finds evidence that most immigrants are drawn from the middle of the Mexican educational distribution, less in both left and right tails



**Figure 10: Immigrant (counterfactual) – Resident (actual) Wage Densities, 1990 and 2000**  
 (counterfactual density for Mexican immigrants minus actual density for Mexican residents)

### (3) Hamory and Miguel (2007)

- The largest literature is on Mexico-U.S. migration
  - Hanson (2006, *JEP*) finds evidence that most immigrants are drawn from the middle of the Mexican educational distribution, less in both left and right tails
  - This empirical “inverted-U” shape is the opposite of the theory predictions of Banerjee and Newman (1998). They predict high skilled individuals (with high urban returns) and the poorest individuals (with the weakest networks and opportunities in rural areas) migrate
- Inequality in the returns to skill in both Mexico and the U.S. matters (Borjas 1987), as does potentially unequal access to credit to cover the fixed costs of moving

Appendix Table 1: Existing literature on selective migration, and comparison to current study

Study	Country(ies)	Empirical ability measure	Relationship with migration
Chiquiar and Hanson (2005)	Mexico to U.S.	Schooling attainment	Positive
Grogger and Hanson (2007)	Cross country analysis	Schooling attainment	Positive
Hoddinott (1994)	Kenya (urban)	Schooling attainment	Positive
Hunt (2004)	Germany (urban)	Schooling attainment	Positive
Ibarraran and Lubotsky (2007)	Mexico to U.S.	Schooling attainment	Negative
Lanzona (1998)	Philippines (urban)	Schooling attainment	Positive
McKenzie et al (2006)	Tonga to New Zealand	Schooling attainment	Positive
Zhao (1999)	China (urban)	Schooling attainment	None
<i>Current study:</i>			
Hamory and Miguel (2009)	Kenya (urban)	Schooling attainment	Positive; but none conditional on a cognitive test score
		Cognitive tests	Positive
		Health status	None / weakly positive
	Kenya to Uganda	Schooling attainment	None
		Cognitive tests	None
		Health status	None

### (3) Hamory and Miguel (2007)

- We study out-migration among young adults living in a rural district of Western Kenya in 1998
- The most commonly studied measure of “ability” is schooling attainment
- We focus on an alternative (and arguably preferable) measure, a pre-migration academic test score, when the individual was in grade 3-7
  - Consider another aspect of ability, pre-migration health, which was exogenously improved by deworming



### (3) Hamory and Miguel (2007)

- Representative sample of adolescents from the Kenya deworming project (Miguel and Kremer 2004)
- Survey data on 5200 young adults collected in 2003-08.
  - Includes panel information on all residences (for a period of > four months) between 1998 and 2008
  - We focus on the 3100 individuals with 1998 baseline survey data and academic test scores. Roughly half have had data collected in 2007-2008 (others soon)

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- Survey data on 5200 young adults collected in 2003-08.
  - Includes panel information on all residences (for a period of > four months) between 1998 and 2008
  - We focus on the 3100 individuals with 1998 baseline survey data and academic test scores. Roughly half have had data collected in 2007-2008 (others soon)
- Direct contact with 85.5% of target restricted sample respondents: 82.0% surveyed, 1.4% dead, 1.8% refused
  - Residence data on 89% (from respondent or relatives)

Table 1: Summary statistics on sample attrition and residential location

Means	All	Treatment Group			Gender	
		1	2	3	Female	Male
<u>Panel A: Sample attrition, KLPS-2 I-Module</u>						
Found (effective tracking rate) <sup>a</sup>	0.855	0.853	0.837	0.876	0.844	0.865
Surveyed (effective response rate)	0.820	0.810	0.814	0.838	0.810	0.829
Not surveyed, dead	0.014	0.021	0.010	0.010	0.010	0.017
Not surveyed, refused	0.018	0.019	0.009	0.026	0.023	0.014
<u>Panel B: Residential location information<sup>b</sup></u>						
Residence in Busia District	0.718	0.725	0.725	0.704	0.709	0.726
Residence in districts neighboring Busia District <sup>c</sup>	0.074	0.082	0.074	0.063	0.094	0.056
Residence outside of Busia and neighboring districts <sup>d</sup>	0.208	0.193	0.201	0.234	0.197	0.218
In Nairobi	0.101	0.090	0.069	0.146	0.099	0.104
In Mombasa	0.037	0.042	0.046	0.021	0.033	0.040
In Nakuru	0.008	0.008	0.010	0.005	0.011	0.005
In Kisumu	0.017	0.020	0.012	0.017	0.014	0.019
Residence outside of Kenya	0.053	0.054	0.053	0.051	0.057	0.049
Number of Observations	1665	588	526	551	826	839

Table 5: Summary statistics, urban migrants versus non-migrants

	Individuals Who Have Lived in a City	Individuals Who Have Not Lived in a City	Difference
Female	0.523	0.442	0.081** [0.035]
Age (1998)	13.01	12.37	0.64*** [0.15]
Years of assigned deworming treatment during 1998-2003	2.65	3.13	-0.48*** [0.13]
Test score (1998) <sup>a</sup>	0.077	-0.040	0.117* [0.067]
Average school participation (1998)	0.932	0.920	0.012 [0.010]
Highest grade attained at time of survey	9.03	8.75	0.28* [0.16]
Falls sick often, self-report (1998) <sup>b</sup>	1.94	1.92	0.03 [0.04]
Weight (kg, 1998)	37.03	34.06	2.97*** [0.58]
Years of mother's education	6.50	5.75	0.76** [0.39]
Years of father's education	9.99	9.49	0.50 [0.54]
Household owns cattle (1998)	0.498	0.535	-0.037 [0.035]
Household has a latrine (1998)	0.826	0.778	0.048 [0.032]
Number of living siblings <sup>c</sup>	4.53	4.37	0.16 [0.17]
Number of older living siblings <sup>c</sup>	2.28	1.95	0.33** [0.14]
Number of observations	525	993	1518

Table 7: Summary statistics on migration history

Means	Gender			1998 Age	
	All	Female	Male	At/Below Median	Above Median
<u>Panel A: Urban Migration</u>					
Individuals who lived in a city during 1998-2008	0.343	0.381	0.308	0.292	0.410
Among those with information on date of move <sup>a</sup> :					
Number of total moves	2.38	2.67	2.06	2.28	2.47
Number of urban moves	1.30	1.38	1.23	1.21	1.40
Length of stay in urban area (yr) <sup>b</sup>	2.25	2.10	2.41	1.85	2.62
<u>Panel B: International Migration</u>					
Individuals who lived outside Kenya during 1998-2008	0.142	0.128	0.155	0.121	0.172
Among those with information on date of move <sup>c</sup> :					
Number of total moves	2.46	2.42	2.49	2.40	2.51
Number of international moves	1.20	1.15	1.24	1.18	1.22
Length of stay in foreign location (yr) <sup>b</sup>	2.50	3.25	1.92	2.28	2.70
Number of Observations	1518	770	748	864	654

Table 8: Reasons for migration

Means <sup>a</sup>	Gender			1998 Age	
	All	Male	Female	At/Below Median	Above Median
Panel A: Among Urban Migrants					
Schooling/training	0.328	0.435	0.222	0.323	0.332
To look for work	0.279	0.388	0.171	0.195	0.348
To start a new job	0.115	0.100	0.130	0.078	0.145
Marriage	0.062	0.009	0.115	0.048	0.074
Parent/guardian moved	0.018	0.018	0.017	0.014	0.020
Return to permanent home	0.005	0.000	0.011	0.000	0.010
Just visiting	0.355	0.231	0.478	0.408	0.312
Other	0.093	0.093	0.092	0.039	0.137
Number of observations <sup>b</sup>	434	218	216	192	242
Panel B: Among International Migrants					
Schooling/training	0.372	0.353	0.396	0.421	0.335
To look for work	0.249	0.419	0.029	0.103	0.359
To start a new job	0.086	0.153	0.000	0.091	0.083
Marriage	0.177	0.000	0.405	0.199	0.160
Parent/guardian moved	0.008	0.000	0.019	0.012	0.006
Return to permanent home	0.026	0.024	0.029	0.041	0.015
Just visiting	0.132	0.104	0.167	0.214	0.069
Other	0.066	0.015	0.131	0.069	0.063
Number of observations <sup>c</sup>	140	68	72	67	73

### (3) Hamory and Miguel (2007)

- Higher ability young adults are more likely to migrate
  - The use of cognitive test scores, as well as the randomized health intervention, to measure ability sets this analysis apart from previous work

Table 13: Impact of test score and educational attainment on urban migration

	Dependent Variable: Ever Moved to a City			
	(1)	(2)	(3)	(4)
Pupil test score (1998)			0.027 [0.012]**	0.027 [0.012]**
Highest grade attended	0.018 [0.006]***	0.010 [0.006]	0.006 [0.007]	0.006 [0.007]
Years of mother's education		0.011 [0.005]**	0.011 [0.005]**	0.011 [0.005]**
Years of father's education		0.000 [0.004]	0.000 [0.004]	0.000 [0.004]
Age at tracking, demeaned	0.022 [0.010]**	0.010 [0.010]	0.010 [0.010]	0.010 [0.010]
Falls sick often, self-report (1998)	0.028 [0.032]	0.035 [0.033]	0.036 [0.032]	0.036 [0.032]
Household owns cattle (1998)	-0.039 [0.037]	-0.026 [0.038]	-0.022 [0.038]	-0.022 [0.038]
Household has a latrine (1998)	0.06 [0.042]	0.063 [0.040]	0.066 [0.040]*	0.066 [0.040]*
Weight, kg (1998)	0.001 [0.002]	0.002 [0.002]	0.002 [0.002]	0.002 [0.002]
Average school participation, 1998				-0.003 [0.093]
Controls for gender and 1998 grade	Yes	Yes	Yes	Yes
Controls for years assigned deworming	No	Yes	Yes	Yes
Number of observations	1485	1485	1485	1485
Mean [std dev] of dependent variable	0.346 [0.476]	0.346 [0.476]	0.346 [0.476]	0.346 [0.476]



Figure 4: Cubic plot of urban migration on test score

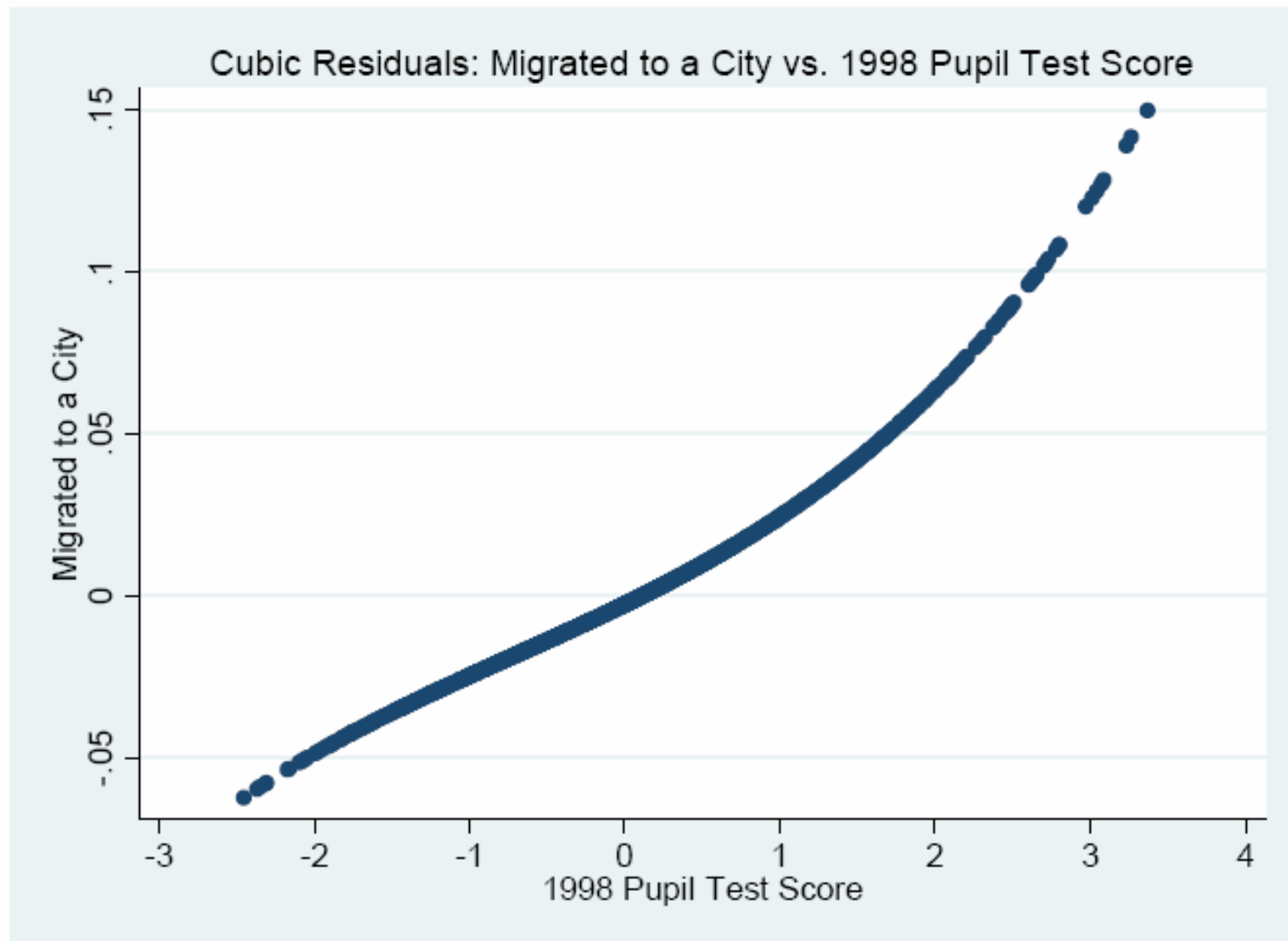


Table 12: Impact of deworming treatment and test score on urban migration

	Dependent Variable: Indicator for Ever Moved to a City						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Pupil test score (1998)		0.028 [0.011]**	0.029 [0.011]**	0.029 [0.011]**	0.057 [0.035]	0.029 [0.014]**	0.056 [0.037]
Years assigned deworming	0.015 [0.014]	0.017 [0.014]	0.018 [0.015]	0.019 [0.015]	0.007 [0.020]	0.046 [0.083]	0.08 [0.084]
Pupil test score * Female					0.003 [0.034]		0.011 [0.033]
Pupil test score * Age at tracking					-0.001 [0.007]		-0.003 [0.007]
Pupil test score * Deworming					-0.011 [0.009]		-0.011 [0.009]
Controls for gender and 1998 grade	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1518	1518	1518	1518	1518	1518	1518
R-squared	0.099	0.103				0.174	0.179
Mean [std dev] of dependent variable	0.343 [0.475]	0.343 [0.475]	0.343 [0.475]	0.343 [0.475]	0.343 [0.475]	0.343 [0.475]	0.343 [0.475]

*Cols 3-5: Probit*

### (3) Hamory and Miguel (2007)

- Higher ability young adults are more likely to migrate
  - The use of cognitive test scores, as well as the randomized health intervention, to measure ability sets this analysis apart from previous work
- Unconditionally, urban wages are twice rural wages in our sample. How much can selective migration explain?

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- Higher ability young adults are more likely to migrate
  - The use of cognitive test scores, as well as the randomized health intervention, to measure ability sets this analysis apart from previous work
- Unconditionally, urban wages are twice rural wages in our sample. How much can selective migration explain?
  - Very little. At mean schooling levels (8.85 years) and mean test score (zero), the urban premium is about 90% as large, even conditioning on these measures
  - What explains higher urban wages? Agglomeration spillovers, complementary inputs (e.g., infrastructure, electricity). Or other unobserved individual factors?

Figure 5: Linear residuals fit of wages on test score, by location of residence

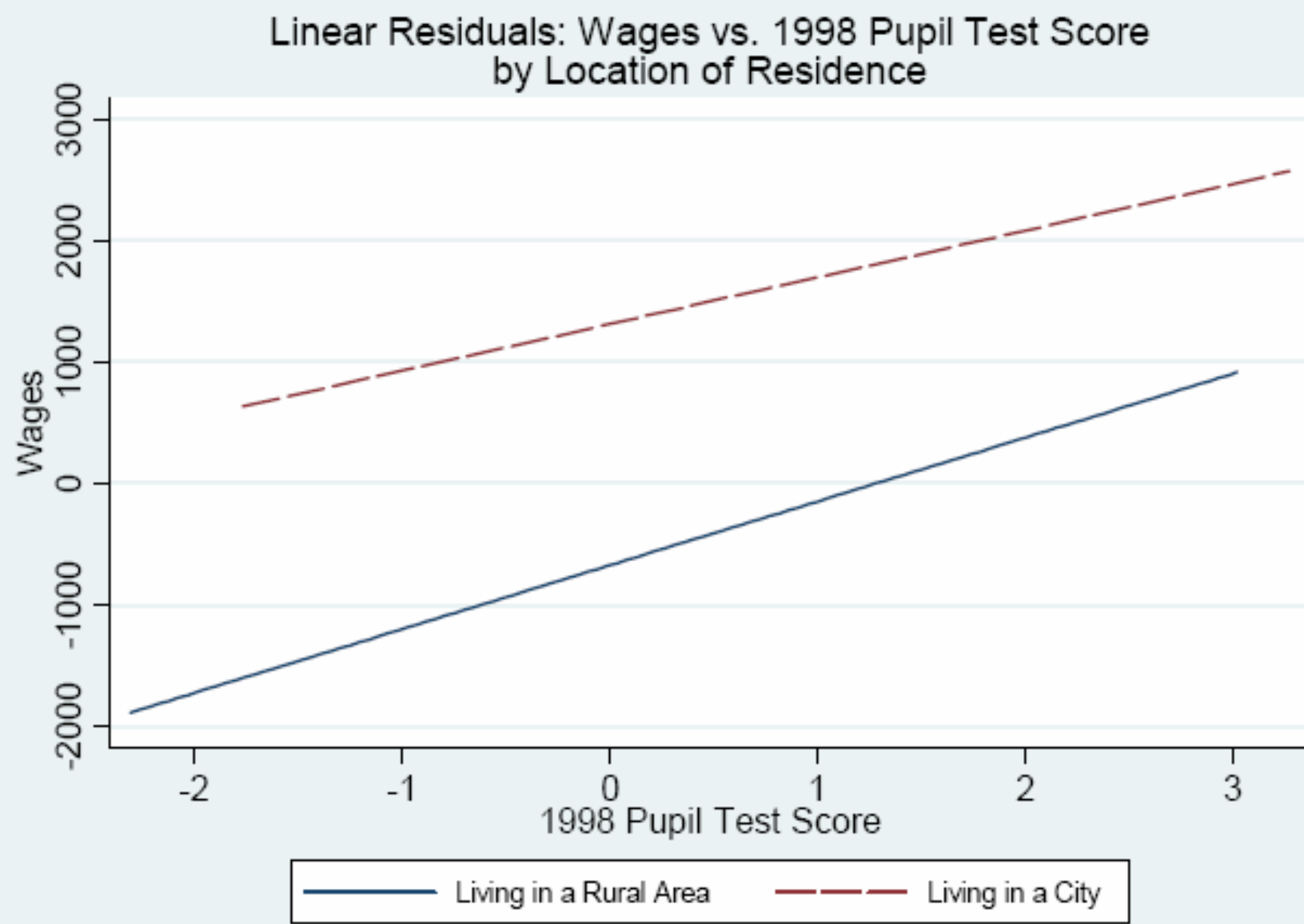
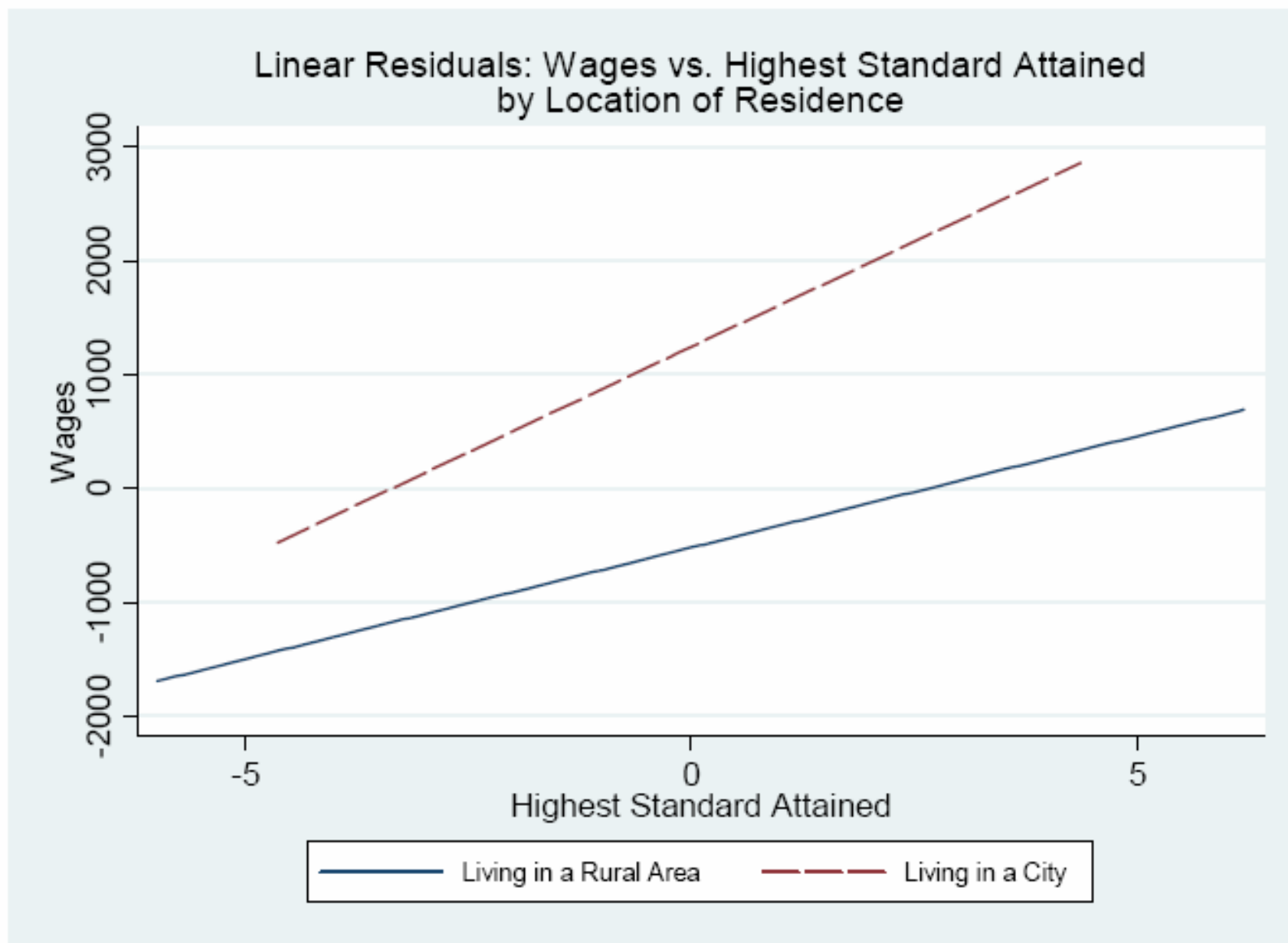


Figure 6: Linear residuals fit of wages on schooling attainment, by location of residence



### (3) Hamory and Miguel (2007)

- U.S. urban workers earn 33% more than nonurban workers (Glaeser and Mare 2001). Urban residence could speed the accumulation of human capital
  - What is special about cities? High density and diversity, small distances, anonymity?
- Evidence for agglomeration economies: observationally equivalent U.S. workers earn higher wages when their industrial sector / occupation is numerically larger (in their metropolitan area, Wheaton)
  - Moretti (2004, *AER*) finds that increased worker human capital increases manufacturing firm productivity in U.S. cities

### (3) Hamory and Miguel (2007)

- Do these findings generalize beyond East Africa? If migration depends on the relative returns to skill across sectors, then the extent of technological sophistication in agriculture and the types of urban sector jobs will be critical in determining relative returns



## (4) Munshi and Rosenzweig (2006)

- Movement across economic sectors (e.g., from traditional trades into modern industry) can be studied using many of the same tools as those used by geographic migration
- The costs to mobility can be interpreted broadly to include social and psychological costs to change

## (4) Munshi and Rosenzweig (2006)

- Movement across economic sectors (e.g., from traditional trades into modern industry) can be studied using many of the same tools as those used by geographic migration
- The costs to mobility can be interpreted broadly to include social and psychological costs to change
- This paper embeds the model within the Indian caste system. If these mobility costs  $c_j$  vary with subcaste (occupation) and by gender, then we could expect to see different evolutions of sectoral mobility

## (4) Munshi and Rosenzweig (2006)

- Indian males have much higher formal labor market participation than females, and much greater reliance on personal / network referrals for jobs
  - These referral effects are particularly strong for working caste males, who get blue collar jobs this way

## (4) Munshi and Rosenzweig (2006)

- Indian males have much higher formal labor market participation than females, and much greater reliance on personal / network referrals for jobs
  - These referral effects are particularly strong for working caste males, who get blue collar jobs this way
- In the 1990s the returns to English language skills increased following major economic reforms and “opening” to international trade and investment
- Study how patterns of English language schooling (versus Marathi schools) evolve in Bombay, across caste and gender

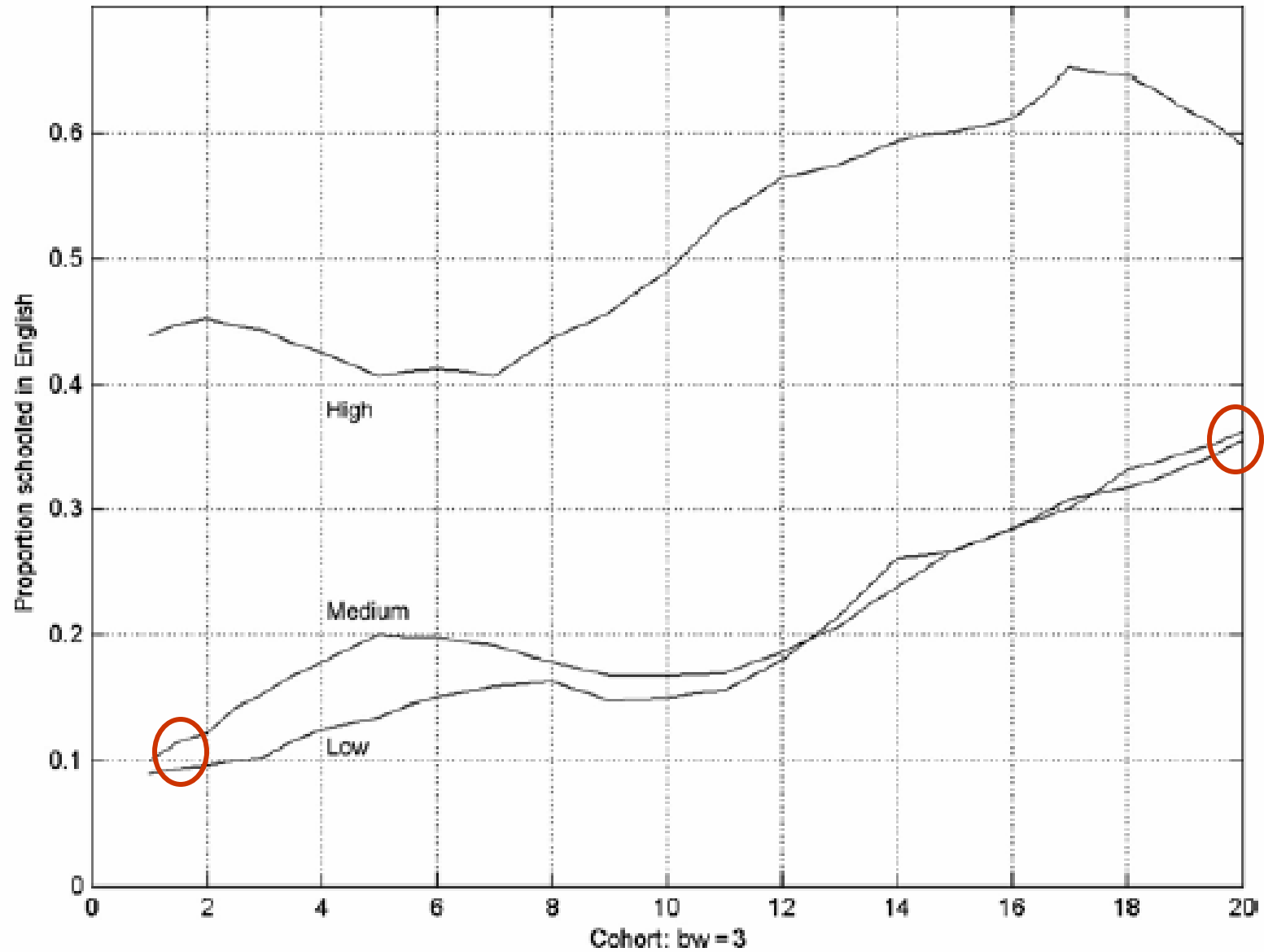


FIGURE 3. ENGLISH SCHOOLING: NET PARENTAL EDUCATION EFFECT—BOYS

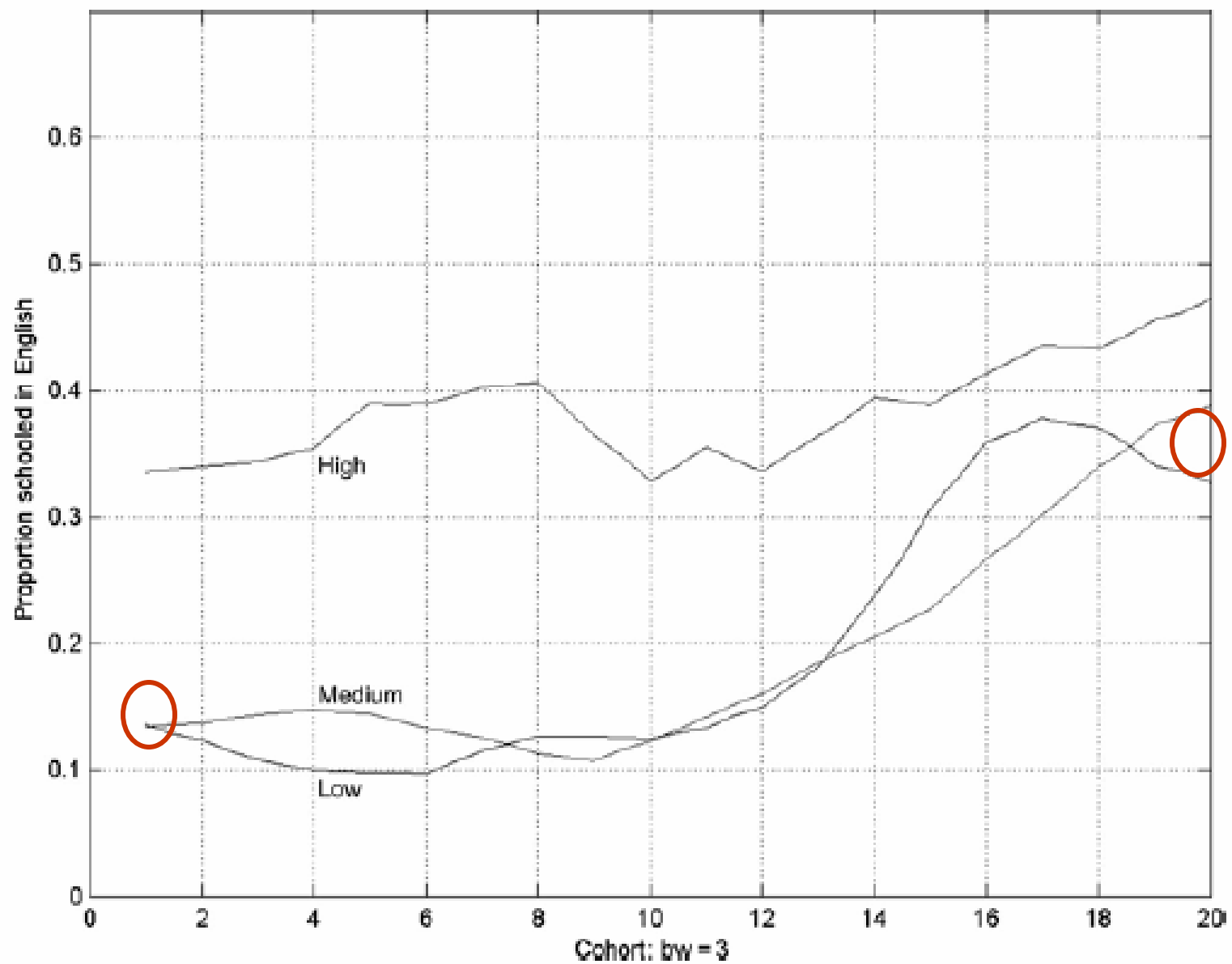


FIGURE 4. ENGLISH SCHOOLING: NET PARENTAL EDUCATION EFFECT—GIRLS

## (4) Munshi and Rosenzweig (2006)

- Alternative explanation: the one group that is not showing increased enrollment in English medium schools are the high caste girls. Perhaps there are stronger social norms against their participation in the formal sector – is this the cause?

## (4) Munshi and Rosenzweig (2006)

- Alternative explanation: the one group that is not showing increased enrollment in English medium schools are the high caste girls. Perhaps there are stronger social norms against their participation in the formal sector – is this the cause?
- The dataset consists of students who graduated from 28 local schools (grade 10) over the past ten years, plus current students in grades 1-10
  - Issues of selective graduation; selective migration / school attendance elsewhere; selective attrition (only 40%, 8,092 of 20,596, students' families are in the area!)



## (4) Munshi and Rosenzweig (2006)

- What is the take-away message of this paper?
- How much do the results generalize to other contexts? (without a caste system)

# Whiteboard #1

# Whiteboard #2

# Whiteboard #3

# Whiteboard #4

# Whiteboard #5

