A B S T R A C T

Previous studies show migrants are generally healthier than the populations in receiving societies, a result generally attributed to the positive selection of migrants on health. This hypothesis, however, has not been adequately evaluated due to lack of adequate data. In this article, using high-quality longitudinal data from Indonesia, the health selectivity hypothesis, also referred to as the healthy migrant hypothesis, is examined with respect to internal migration. Specifically, this study explores whether pre-migration health status affects the likelihood of migration by comparing those from the sending population who do and do not move. Results show that migrants in Indonesia tend to be selected with respect to health and that this selection is robust to household unobserved heterogeneity. However, the strength and direction of the health–migration association vary by types of migration and dimensions of health.

Test of the 'healthy migrant hypothesis': A longitudinal analysis of health selectivity of internal migration in Indonesia.
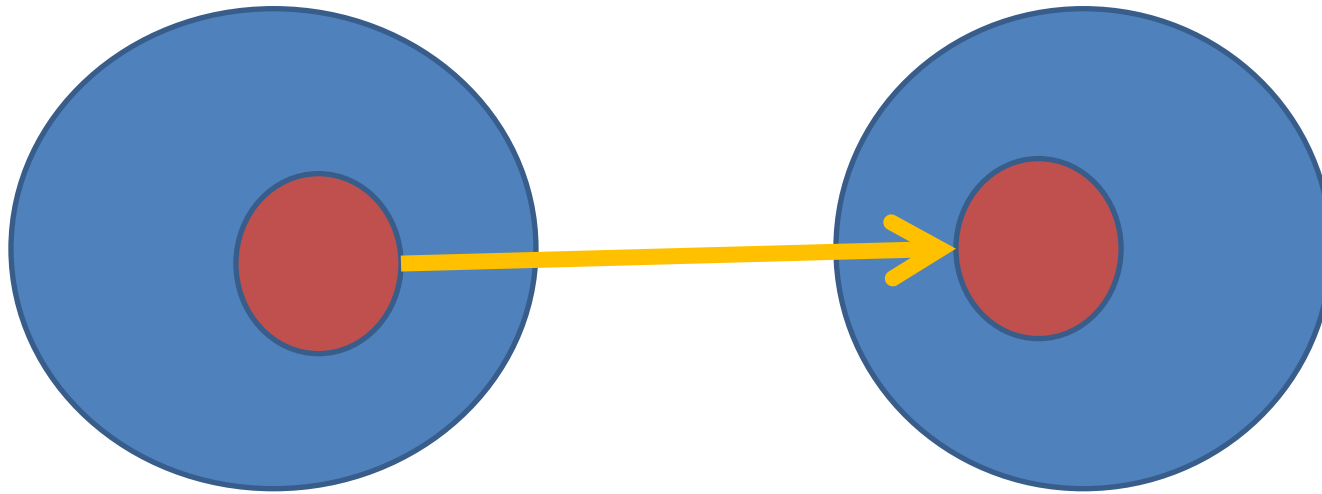
Yao Lu (2008) Social Science and Medicine, 67(2008) 1331-1339.

Departmental meeting, M. Umezaki, 15 December 2009
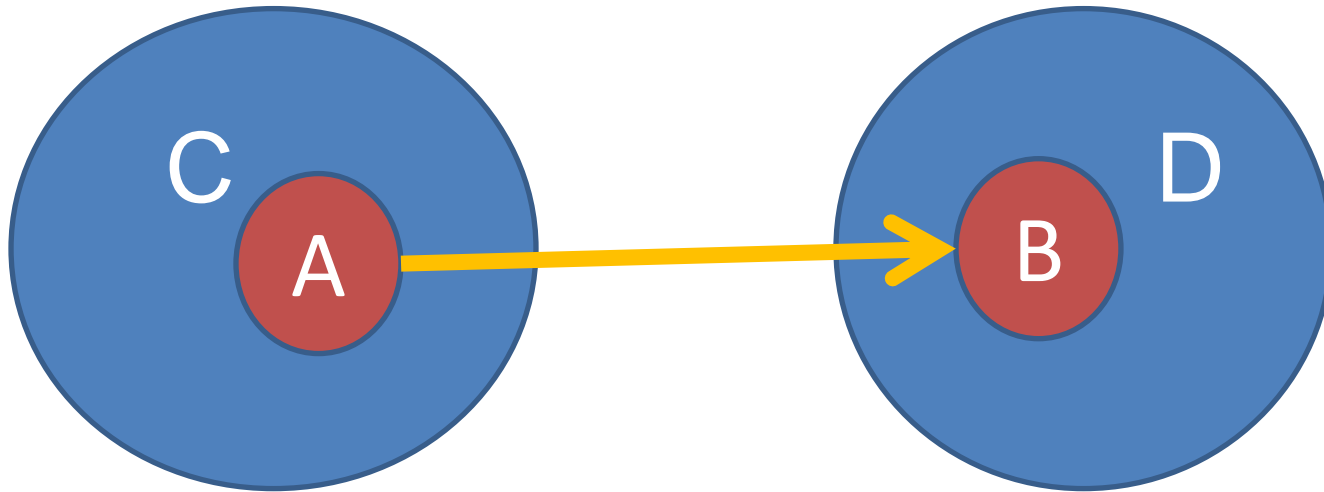
Migration

Place of origin

Place of destination

Internal
International

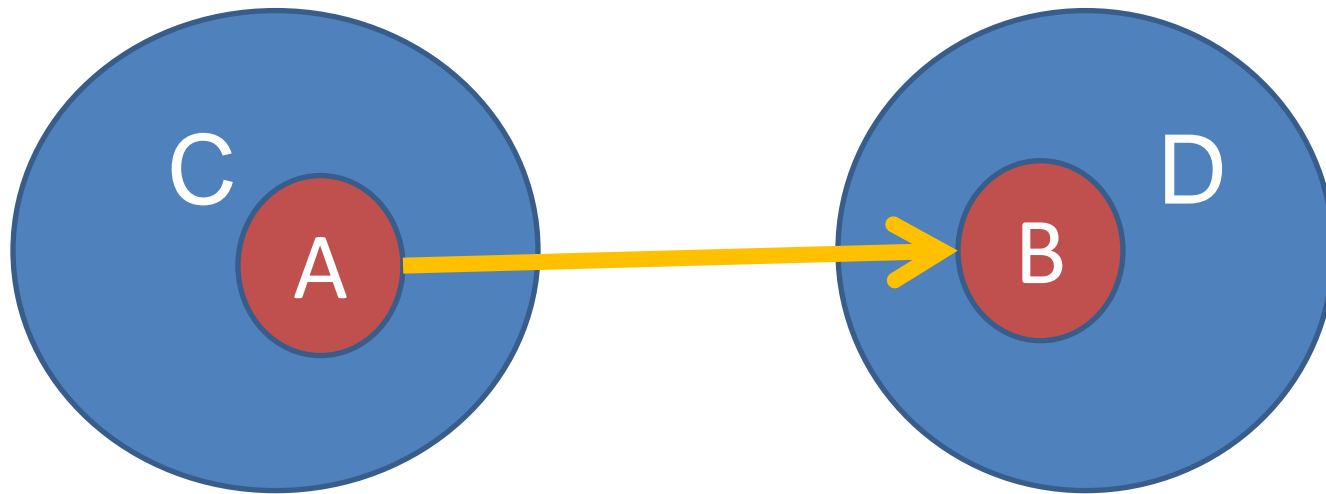Family-related
Work-related
Other

Epidemiological paradox

Health status
(i.e., mortality rates, chronic conditions, mental health)

B > D

(Anson, 2004; Feranil, 2005; Marmot, Adelstein, & Bulusu, 1984; Palloni & Morenoff, 2001)

Healthy migrant hypothesis

$B>D$, because $A>C$ and $C= A$

Speculative and inadequately tested due to lack of the data

Implication of "healthy migrants"

Mortality by
heart diseases

Mortality by
Cerebrovascular Disorder

65〜74歳の心臓死

男性

女性

65〜74歳の脳血管死

男性

女性

US White

Japanese
(Japan)

Japanese
(San Francisco)

Japanese
(Hawai)
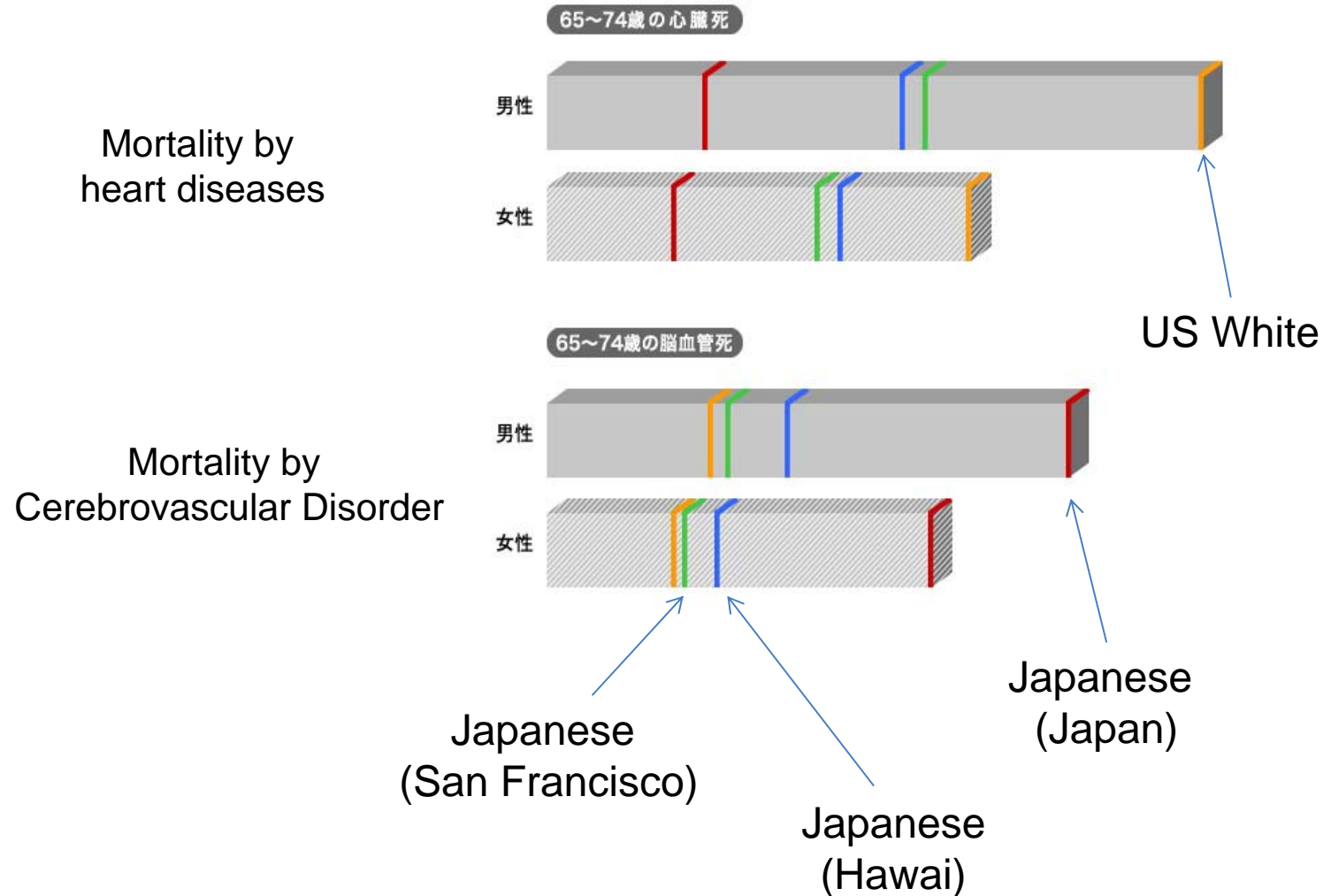
Points to be considered

- Age of migrants: 18-45 y and 46-75 y
- Type of migration: work-related, family-related, and others
- Type of health indicators: chronic and severe, acute and mild

Hypotheses

H1. For the young, migrants are positively selected with respect to health.

H2. For the elderly, migrants are negatively selected with respect to health.

H3. Work-related migrants are particularly favorably selected with respect to health.

H4. Selectivity is especially salient with respect to chronic and severe conditions.

H1 & H2: Table 2
H3:   Table 4
H2:   Table 3

Methods

IFLS (Indonesia Family Life Survey)

13 out of 27 provinces, multistage-probability sampling

In 1993 (IFLS1), 7224 households, 22,347 individuals

In 1997 (IFLS2), 94% (HHs) and 91 % (individuals) of IFLS1
   (including 1500 migrants)

In 2000 (IFLS3), >94% (HHs) of IFLS1, and >90% of IFLS(1+2)

Demographic, socioeconomic, and health information

Hb and BP were measured in IFLS 2 and IFLS 3

Analytical framework

Migrated during the period between 1997 and 2000?
(each trio > 6 months)

(Yes, No)

Logistic regression model

Health indicators
1.Chronic and severe: ADL (any difficuty reported or not)
2.2. Acute and mild: BMI (<18.5 or not), BP (140/90< or not),
          Anemia (Hb< 12 g/dl (f), 13 g/dl (m), or not),
          Self-reported conditions (yes for the last 4 w, or not)

Covariates: age, sex, years of schooling, income (1997), marital status (1997), ever moved before 1997, rural residence (1997), economic shocks (1992-97)

Table 1

Means and percentages of variables used in the analysis by age group, Indonesian adults' age 18–75 (standard deviations in parentheses)

Variables[a]	Age 18–45	Age 46–75
Migration status		
Migration between waves* (%)	11.1	3.1
Migration by purpose	$(N = 1074)$	$(N = 137)$
(for migrants only)*		
Labor migrant (%)	21.5	16.7
Family migrant (%)	42.4	34.3
Other migrants (%)	36.1	49.0
Ever moved before* (%)	49.4	55.3
Health measures		
Problems with ADL* (%)	19.2	44.4
Morbidity in last month* (%)	78.1	83.1
Low BMI* (%)	13.2	22.8
Hypertension* (%)	18.7%	46.7%
Anemia* (%)	28.5%	38.0%
Control variables		
Age*	31.3 (8.0)	57.2 (7.7)
Male* (%)	42.2	47.0
Years of completed schooling*	7.3 (4.4)	4.1 (4.2)
Per capita annual income	693.3 (939.0)	579.3 (906.6)
(in thousands of 1997 Rupiah)*		
Marital status*		
Never married (%)	22.5	0.7
Married, living with spouse (%)	70.9	77.2
Married not living with spouse (%)	3.0	1.2
Other (%)	3.7	21.0
Rural residence* (%)	51.9	57.1
Economic shock in past five years (%)	41.4	41.3
N	9666	4455

*p value < 0.05. p values were obtained from chi-square tests or t-test, depending on whether the variable is continuous or categorical.

[a] All variables were measured in 1997, with the exception of migration between waves and by purpose, which were gathered in 2000.

N=9666 (18-45y)
N=4455 (46-75y)

11.1% (18-45y) and 3.1% (46-75) migrated

Table 2

Logistic regression of migration between 1997 and 2000 on problems with ADL and other predictors measured in 1997, IFLS 1997–2000 (robust standard errors in parentheses)[a]

Logits	Age 18–45	Age 46–75
Problems with ADL	−0.243** (0.093)	0.373* (0.187)
Age	(ref. 18–25)	(ref. 46–55)
Second decile (26–35 or 56–65)	−0.601*** (0.089)	−0.175 (0.193)
Third decile (36–45 or 66–75)	−1.318*** (0.121)	−0.514† (0.284)
Male	−0.001 (0.060)	0.344* (0.164)
Years of schooling	0.071*** (0.010)	0.021 (0.023)
Log per capita annual income	−0.016† (0.008)	−0.011 (0.018)
Marital status (ref. never married)		
Married with spouse	−0.717*** (0.106)	−1.153† (0.659)
Married not with spouse	−0.075 (0.187)	−0.431 (0.822)
Other	−0.126 (0.201)	−0.815 (0.682)
Ever moved before 1997	0.741*** (0.072)	1.105*** (0.204)
Rural residence	−0.206* (0.087)	−0.555** (0.211)
Economic shocks	−0.095 (0.080)	0.357† (0.196)
Constant	−1.507*** (0.220)	−3.195*** (0.752)
Log-likelihood	−3371.5	−653.7
N	10,520	4787

***p value < 0.001; **p value < 0.01; *p value < 0.05; †p value < 0.1.

[a] Estimates for province of residence are not shown.

Chronic and severe

ADL problems
→less migration (young)
→more migration (old)

H1 and H2

Covariates

Migrants: younger, educated, ever moved, not married, not rural residence…

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Table 3

Logistic regression of migration between 1997 and 2000 on health status and other predictors measured in 1997, IFLS 1997–2000 (robust standard errors in parentheses)[a]

Logits	Morbidity last month	Low BMI	Hypertension	Anemia
Age 18–45				
Health measures	−0.014 (0.082)	−0.081 (0.099)	0.059 (0.093)	−0.134 (0.082)
Log-likelihood	−3375.1	−3001.9	−3002.1	−3000.9
N	10,520	9672	9672	9672
Age 46–75				
Health measures	0.130 (0.228)	0.021 (0.232)	−0.025 (0.184)	0.066 (0.185)
Log-likelihood	−655.6	−578.2	−578.2	−578.1
N	4787	4459	4459	4459

***p value < 0.001; **p value < 0.01; *p value < 0.05; †p value < 0.1.

[a] Estimates for other predictors (same as in Table 2) are not shown.

(Covariates were included in each model but not shown on the table)

Acute, mild or not apparent health problems: no effects on migration

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By type of migration

Table 4

Multinomial logistic regression of migration by purpose between 1997 and 2000 on health status and other predictors in 1997, adults age 18–45, IFLS 1997–2000 (robust standard errors in parentheses)[a]

Logits	Labor migrants	Family migrants	Other migrants	Log-likelihood	N
ADL	−0.847*** (0.238)	−0.145 (0.132)	−0.120 (0.138)	−4552.1	10,520
Morbidity last month	0.003 (0.029)	0.028 (0.021)	−0.006 (0.023)	−4558.9	10,520
Low BMI	−0.164 (0.189)	−0.035 (0.139)	−0.063 (0.158)	−4039.2	9672
Hypertension	−0.109 (0.192)	0.029 (0.140)	0.168 (0.141)	−4038.8	9672
Anemia	−0.262 (0.178)	−0.184 (0.123)	−0.017 (0.121)	−4037.5	9672

***p value < 0.001; **p value < 0.01; *p value < 0.05; †p value < 0.1.

[a] The base category is non-migrants. Estimates for other predictors (same as in Table 2) are not shown.

Table 5
Household fixed-effect logit models of migration between 1997 and 2000 on health status and other predictors in 1997, adults age 18–45, IFLS 1997–2000 (standard errors in parentheses)[a]

Logits	ADL	Morbidity last month	Low BMI	Hypertension	Anemia
Health	−0.508*	−0.184	0.339	−0.198	−0.022
measures	(0.236)	(0.185)	(0.256)	(0.228)	(0.202)
Log-likelihood	−325.5	−327.4	−274.3	−274.9	−275.3
N	1256	1256	1083	1083	1083

***p value < 0.001; **p value < 0.01; *p value < 0.05; †p value < 0.1.
[a] Estimates for other predictors (same as in Table 2) are not shown.

H1. For the young, migrants are positively selected with respect to health.

H2. For the elderly, migrants are negatively selected with respect to health.

H3. Work-related migrants are particularly favorably selected with respect to health.

H4. Selectivity is especially salient with respect to chronic and severe conditions.

Findings

H1: Yes, individuals without ADL problems tended to migrate (Table 2)

H2: Yes, individuals with ADL problems tended to migrate (Table 2)

H3: Yes, individuals without ADL problems tended to migrate for work-related purposes (Table 4)

H4: Yes, health indicators of chronic and severe conditions (ADL) were associated with likelihood of migration, those of acute and mild problems (BMI, BP, Hb) were not associated with likelihood of migration.

Points of Discussion

1. Characteristics of migrants

   Demographic, socioeconomic….. Plus health consideration

2. Healthy young people for job
   Not healthy old people for health care or family support

3. Health indicators of "severe" problems only

4. New insights for "migrant's health study"