A Longitudinal Study of Migration and Health

Empirical Evidence from Thailand and its Implications

Chalermpol Chamchan, Wing-kit Chan and Sureeporn Punpuing

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Introduction to Working Papers on Migration and Health in China

This paper is part of a series of outputs from the research project on <u>Migration and Health in China</u>.

China is confronted by major challenges posed by the massive population movement over the past three decades. In 2009, approximately 230 million rural inhabitants moved temporarily or permanently to cities in search of employment and better livelihoods. Such large-scale mobility has huge implications for the pattern and transmission of diseases; for China's health care system and related policies; and for health of the Chinese population in both receiving and sending areas. The health and social issues associated with population movement on such an unprecedented scale have been inadequately addressed by public policy and largely neglected by researchers. Based on interdisciplinary research across the health, social science and policy fields, this project constitutes a major effort to fill research and policy gaps. Collectively, the papers and commentaries in this series aim to provide a comprehensive assessment of the health and public policy implications of rural to urban migration in China, to inform policy and to identify future research directions.

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Acronyms

ASEAN	Association of Southeast Asian Nations
CHARLS	Chinese Health and Retirement Longitudinal Study
CLHLS	Chinese Longitudinal Healthy Longevity Survey
IPSR	Institute for Population and Social Research
KDSS	Kanchanaburi Demographic Surveillance System
MCS	Mental Components Summary Scale
NIH	National Institutes of Health
PCS	Physical Components Summary Scale
URBMI	Urban Resident Basic Medical Insurance

Acknowledgements

Abstract

Using longitudinal data and analysis from 2005 to 2009, this study aims to examine the complex relationship between rural-urban migration and health in Thailand. Measured by Physical and Mental Component Summary Scales from the Short Form (SF-36) Health Survey, the physical and mental health of respondents was assessed and tracked over this five-year period with regard to migration status and relevant socio-demographic characteristics. A total of 2,397 individuals of prime migration age (between the ages of 15 and 29) in 2005 are included in this analysis. The study finds that rural-urban migration in Thailand depended on the individual's health. The likelihood of migrating from a rural origin to an urban destination was higher for those who had better physical health but poorer mental health. Compared to residents in urban destinations, migrants were, on average, physically and mentally healthier upon arrival, or up to two years after migrating. Their health, nevertheless, deteriorated within two to four years after migration. By using multilevel modelling, migration was found to affect an individual's physical health positively in the short-run, but negatively in the long run. Migration impacts on mental health were similar, but weak, and insignificant when controlled by other factors. Based on empirical findings from Thailand, the applicability of a longitudinal design for migration and health studies in different contexts of developing countries is discussed. China in particular—as the fastest growing economy in the developing world and a country that is currently facing a huge flow of domestic rural-urban migration—is considered in the discussion.

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Keywords: migration, health, longitudinal study, Thailand, China

1. Introduction: Migration and Health

In the context of a population "on the move" both domestically and internationally, issues of migration and health (both physical and mental) are starting to gain the interest of academics and policy makers. Migration—a process of population relocation from one setting to another—creates a series of human events and experiences over a prolonged period of time which affects the quality of life and well-being of individuals in various areas, including their health. Many studies have investigated migration and health linkages with a focus either on health as a determinant of migration or the impacts of migration on health outcomes. Most of these studies follow the framework of migration process (figure 1) and consider the causal relationship between migration and health at different phases, including pre-departure (at origin), travel (from origin to destination), destination, and return (from destination to origin).[1]

The nexus throughout the migration process

Studies often test the migration selectivity hypotheses that migrant characteristics during the pre-departure stage, including health status, are different from those of the population at large. This is controlled by the various reasons for migration (for example, work, study and health care) and other confounding factors of migration (such as sex, age, education and other socioeconomic characteristics).[2]

During the destination phase, many studies have focused on testing the healthy migrant hypothesis by comparing the health of migrants to that of local or longer term residents at the destination. This hypothesis consists of two parts. First, upon arrival, migrants' health is generally better than that of local residents, and, second, after a period of time, their health worsens to an average—or even lower—state of health at the destination. The first part of the hypothesis can be explained by a selective migration process in which healthier people in the origin population are physically and financially better able to migrate (Kristiansen et al. 2007; Lu 2008).

An "acculturation process" related to migrants' health determinants is a partial explanation for the deterioration of migrant health at the destination in the second part of the hypothesis.[3] These determinants are generally classified into personal determinants (unhealthy lifestyles and health behaviours, sex, age, and education); socioeconomic determinants (legal status, employment status, living standards and income, and social network and connectivity); environmental determinants (living arrangements, distance between origin and destination, and work environments); and health system factors (entitlement to health insurance and access to, and use of, health services).[4]

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[1] McKay et al. 2003; Gushulak and MacPherson 2006; Lu 2010; Zimmerman et al. 2011.
[2] VanLandingham 2003; Norman et al. 2005; Lu 2008; Nauman et al. 2011; Findley 1988.
[3] Sander 2007; Lassetter and Callister 2009; Evans 1987.
[4] VanLandingham 2003; Bhugra 2004; Arifin et al. 2005; IOM 2005; Saifi 2006; Kristiansen et al. 2007; Sander 2007; Holdaway 2008; Punpuing et al. 2009; Evans 1987.

Even though empirical literature is still limited, during the return phase, consideration of the nexus between health and migration is based on the hypothesis of successful and unsuccessful return migrants. Those who, having fulfilled the original objectives of their migration, return to their place of origin without a significant decline in health or long-term health problems are considered to have achieved successful migration (Sander 2007; Davies et al. 2011).

Figure 1. Framework of migration process for migration and health studies
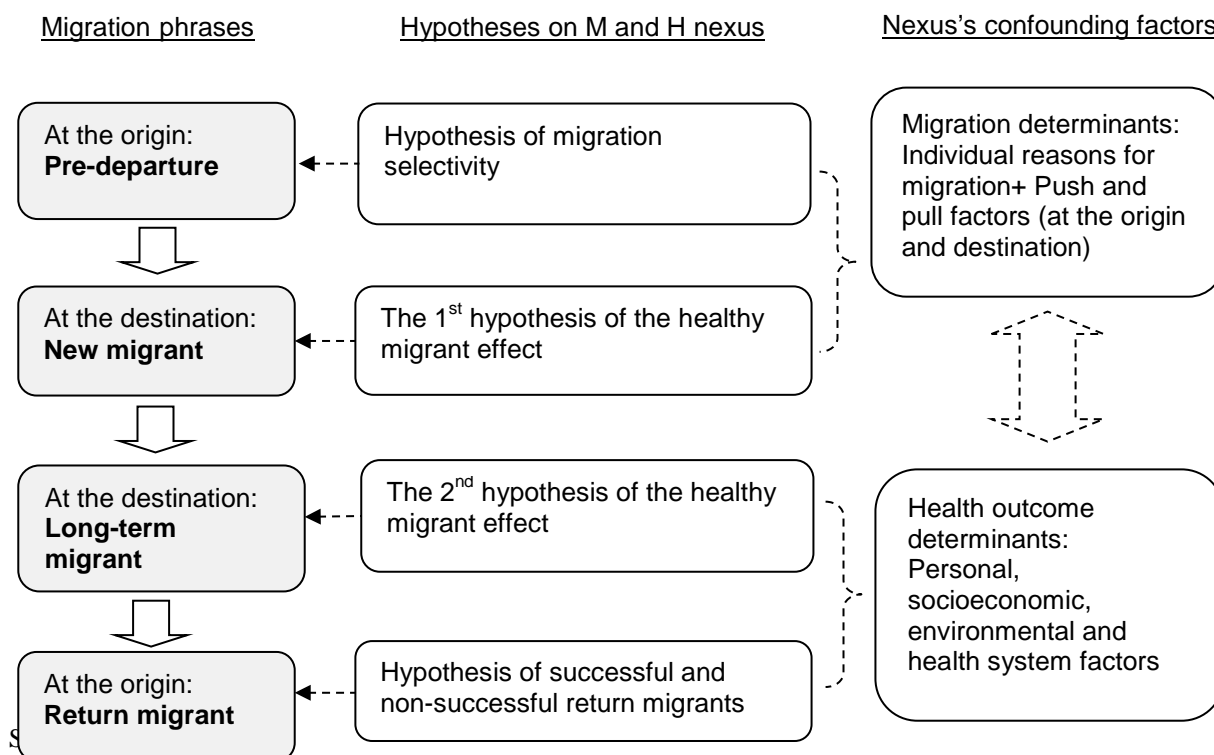
Methodological limitations of previous studies on migration and health

In assessing the nexus between migration and health throughout the migration process, the key constraint on most existing empirical studies has been a lack of systematic and comprehensive data tracking changes in individuals' health status over a prolonged period (IOM 2008). Using cross-sectional datasets, the studies could only investigate and test a hypothesis at a certain point in time, during a certain part of the migration process, and in a certain location (for example, comparing the health status of migrants to that of the local population at destination or comparing the health status of return migrants to that of non-migrants at origin) (Lu 2010:413). Ensuring that the selection of migrants (either at origin or destination) is appropriate for comparison is a limitation of a study when trying to gain a complete understanding of the health determinants and consequences of migration (Davies et al. 2011; Gushulak and Macpherson 2011). Analysing longitudinal data should overcome this limitation (Kristiansen et al. 2007).

Some studies have already analysed longitudinal data to explore migration and health.[5] However, there are still limitations with the data used in that they only cover two periods, which prevents one from gaining a complete understanding of the relationship and consequences. Also, most of the existing longitudinal surveys have not been designed to capture all dimensions of individual health. Most of the time, the studies only ask a single question to measure the health status of individuals (for example, self-reported general health, prevalence of chronic disease, acute morbidity or emotional health). Incomprehensive data on health measures is another limitation on previous studies.

This study attempts to illustrate the use of a longitudinal research design and its implications in tracking associations between health and migration throughout the migration process. The scope of this study is domestic migration from rural to urban areas[6] in Thailand from 2005 to 2009. The data is taken from a longitudinal dataset of the Kanchanaburi Demographic Surveillance System (KDSS) collected by the Institute for Population and Social Research (IPSR), Mahidol University, Thailand. Specific study objectives include: (i) investigating and comparatively assessing health consequences at different migration phases of rural-urban migrants; and (ii) highlighting methodological implications of a longitudinal research design for migration and health studies in developing countries in different contexts. Across the five-year period covered in this study, samples are classified by migration status (for example, non-migrants, new migrants, long-term migrants and return migrants). Health status at each period is measured in eight dimensions and divided into two summary scales: the Physical Components Summary Scale (PCS) and Mental Components Summary Scale (MCS).

II. Longitudinal Migration Study in Thailand: Data and Methods

KDSS Migration and Health Project

By way of background, the KDSS was set up and used during 2000–2004, with support from the Wellcome Trust. During this first phase, the primary aim of the KDSS was to monitor demographic changes from various dimensions within field sites in Kanchanaburi province, the third largest province in Thailand. Researchers conducted an annual census with longitudinal design in 86 villages and 14 urban blocks throughout the province during the five-year period. The survey included the application of a village/block questionnaire, a household questionnaire for all households in the village/block, and an individual questionnaire for all members aged 15 years and over in the household. Key components of these questionnaires included demographic profiles (that is, data on fertility, mortality and migration) and questions on social, economic, general health and environmental issues. Although some studies have collected and

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[5] Arifin et al. 2005; Norman et al. 2005; Saifi 2006; Lu 2008; Punpuing et al. 2009; Lu 2010; Nauman et al. 2011.

[6] Due to increased urbanization and the consequences of development, domestic migration (from rural to urban areas specifically) is on the rise in many developing countries, including the Southeast Asian region. A study of intra-country movement will provide a crucial understanding of health consequences and its association with migration, which is important in terms of policy implications.

analysed data on migration and the health of migrants (Arifin et al. 2005; Saifi 2006), they do not delve deeply into the complex relationship between migration and health status and outcomes.

The second phase of the KDSS was the Migration and Health Project (conducted with support from the National Institutes of Health of the United States), which lasted from 2005 to 2009. The fieldwork in the second phase still covered 100 villages and blocks and all households within the areas surveyed. In the first survey of the Migration and Health Project (conducted in 2005), only individuals between the ages of 15 and 29 were included so as to examine the linkages between health and migration during young adulthood. The second and third surveys of the Migration and Health Project, conducted in 2007 and 2009, respectively, followed up on all the individuals surveyed in 2005. Migrants who stayed at the origin in Kanchanaburi were re-interviewed there. Those who had moved to an urban area—including Bangkok, Nakhonprathom province and Kanchanaburi city—from rural Kanchanaburi during the two-year period and stayed there were interviewed in their destination cities.[7]

The samples

Since this study uses the data collected by the KDSS Migration and Health Project (2005–2009), this study includes only individuals aged 15 to 29 who were interviewed in rural areas of the Kanchanaburi survey site in 2005 and interviewed again, either at the origin or destination, in 2007 and 2009.

Figure 2. Longitudinal samples in 2005, 2007 and 2009 by migration status
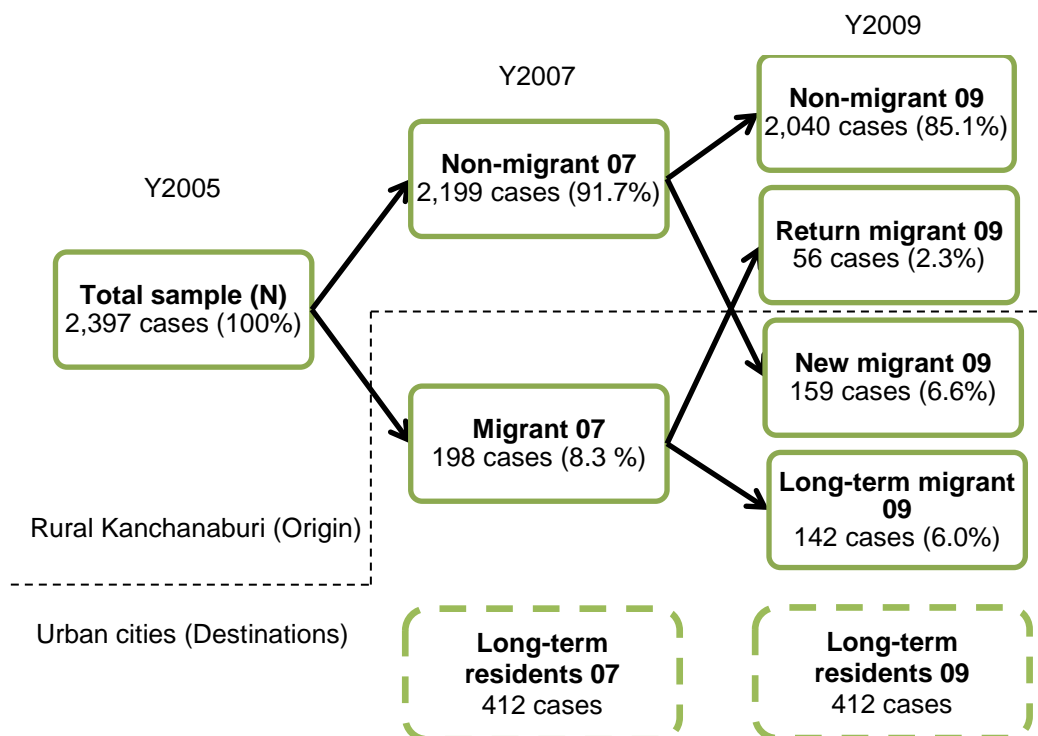
Source: Authors, computed from the KDSS Migration and Health Project data.

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[7] In the second (2007) and third (2009) surveys, a number of long-term residents in urban communities where migrants from Kanchanaburi had settled were also interviewed using the same individual questionnaire (412 cases for each survey). The objective was to gather sample data to compare to that of rural-urban migrants from KDSS sites.

By this criterion, a total of 2,397 individuals, all of whom were at the prime age for migration (15- to 29-year-olds) in 2005, were selected for the analysis. Figure 2 depicts the distribution of the longitudinal samples in 2005, 2007 and 2009 by their migration status in 2007 and 2009. Those who were re-interviewed in the second wave of surveys in 2007 can be separated into (i) the non-migrant 07, or those who remained at the origin in 2007 (2,199 cases); and (ii) migrant 07, or those who moved to and stayed in the urban destination in 2007 (198 cases). Those who were re-interviewed in the third wave of surveys in 2009 can be categorized into four groups: (i) non-migrant 09, or those who remained at the origin in 2007 and 2009 (2,040 cases); (ii) new migrant 09, or those who remained at the origin in 2007 but moved to and stayed in the urban destination in 2009 (159 cases); (iii) long-term migrant 09, or those who moved to and stayed in the urban destination in 2007 and 2009 (142 cases); and (iv) return migrant 09, or those who moved to and stayed in the urban destination in 2007 but returned to and remained at the origin in 2009 (56 cases).

Measurement of health

The KDSS Migration and Health Project used the Short-Form 36 Health Survey (SF-36) developed by the RAND cooperation and J.E. Ware (RAND Health n.d. (a) and (b)) to assess and detect variations of individual health status over time in 2005, 2007 and 2009. The SF-36 consists of one question measuring change in health status over the past year and 35 questions with scaled response options measuring eight specific dimensions of health status: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health. After having a scale for each health dimension, two summary scales—the PCS and MCS—can then be derived to evaluate an individual's health status. In this study, the PCS and the MCS (0–100 score) are used as measurements of the physical and mental health status of the individual during each survey year. These two summary scales are estimated using standard scoring algorithms—the United States–derived principle component coefficients (Ritvo et al. 1997). The resulting component scores have a mean of 50 and a standard deviation of 10 in the general population in the United States.[8]

III. Longitudinal Migration Study in Thailand: Findings

In this section, results from statistical analysis are presented in three parts. The first part illustrates basic characteristics of the interviewees based on migration status in 2009. The second part presents findings on the relationship between migration and health across the study period. These findings include changes in the interviewees' health status over time by migration status, empirical reflections on the hypotheses of migration selectivity and the healthy migrant effect, and the experience of successful return migrants. Using multi-level analysis, the third part presents evidence from KDSS longitudinal data on the differences between potential health outcomes of migrants.

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[8] Ware et al. (1998) found very high correlations between the SF-36 summary health scores estimated using standard (United States–derived) and country-specific algorithms in nine European countries. Accordingly, use of the standard scoring was suggested as being possible in estimating summary health scores in countries for which normative data are not yet available. With a different factor structure from the United States and nine countries in that study, the use of standard scoring in this paper is applied cautiously.

Basic characteristics of the samples in 2009

By classifying the samples (N=2,397) by their migration status in 2009, variations in basic characteristics of the samples in each group are illustrated in table 1. Compared to non-migrants at the origin, migrants who stayed at their urban destination in 2009 (referred to as "long-term migrant" and "new migrant") tended to be younger, unmarried, with higher levels of education, as they were often studying at the destination. Their socioeconomic status, measured by the household asset score, tended to be lower. Characteristics of return migrants—those who lived at the urban destination in 2007 but returned to and stayed at the origin in 2009 were clearly different from the migrants who lived at the destination in 2009 in terms of marital, household, working and socioeconomic status. These return migrants were more likely to be married, the head of a household, with higher socioeconomic status, and working or looking for a job.

As mentioned earlier, Kanchanaburi province is located in the west of the country that shares a long border with Myanmar. Approximately 9 per cent of the individuals surveyed were not of Thai nationality. Most were long-term migrants who had been living in the survey sites for several years and had socially integrated into local society.[9]

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[9] A survey in 2010 found that 23.6 per cent of Myanmar migrants in the KDSS sites had been living in Thailand for 16–20 years; 22.4 per cent and 16.4 per cent had been living in Thailand for 21–25 years and 11–15 years, respectively (Punpuing et al. 2011).

Table 1. Basic characteristics of the sample by migration status in 2009 (per cent)

Characteristics		Non-migrant 09 (n=2,040)	New migrant 09 (n=142)	Long-term migrant 09 (n=159)	Return migrant 09 (n=56)	Total (N=2,397)
		Migration Status 2009				
Sex	Male	35.7	32.1	37.3	53.6	36.0
	Female	64.3	67.9	62.7	46.4	64.0
Nationality	Thai	90.2	97.5	97.2	98.2	91.3
	Non-Thai	9.8	2.5	2.8	1.8	8.7
Age Group	19-25 years	37.5	88.1	86.6	73.2	44.6
	26-33 years	62.5	11.9	13.4	26.8	55.4
Marital status	Single	24.8	82.7	75.0	44.6	32.0
	Married	70.8	14.1	25.0	46.4	63.9
	Widowed/Divorced/ Separated	4.4	3.2		8.9	4.1
Household head relationship	Non-household head	18.6	76.1	70.4	12.5	25.3
	Household head	81.4	23.9	29.6	87.5	74.7
Education	No education	7.3	1.3	1.4	0	6.4
	Primary	35.2	8.9	10.6	19.7	31.6
	Secondary	47.5	52.5	34.5	60.7	47.4
	> Secondary	10.0	37.3	53.5	19.6	14.6
Work status	Employed/Seeking Employment	78.7	30.2	38.0	76.8	73.0
	Studying	4.5	57.9	47.2	3.6	10.6
	Studying and Working	1.6	7.5	9.9	5.4	2.6
	Others	15.1	4.4	4.9	14.3	13.8
HH tri-tiles economic class (by asset score)	Lower class	32.0	74.2	72.5	21.4	36.9
	Middle class	35.9	18.9	17.6	39.3	33.8
	Upper class	32.1	6.9	9.9	39.3	29.3

Source: Authors, computed from the KDSS Migration and Health Project data.

Evidence of the relationship between migration and health

Overall health transitions of the interviewees

Figure 3 shows the average PCS and MCS (derived from the health scores of the SF-36 Survey) of the interviewees between 2005 and 2009. Overall, physical health of the samples was found to be deteriorating from a score of 52.3 to 50.8 over the course of the study, while mental health scores fluctuated. On average, MCS was 47.5 in 2005, increased to 48.6 in 2007, but decreased to 46.2 in 2009. The deterioration of physical health is likely explained by the ageing of the interviewees, whereas the fluctuation of mental health scores (specifically the decline of MCS during the 2007–2009 period) could be explained by the global economic crisis that affected the Thai economy in late 2008 and 2009. Explanations of these findings should be further explored. In this study, these PCS and MCS scores provide some insight into migrant health trends over the course of the study.

Figure 3. Physical and Mental Component Summary scales of the samples in 2005, 2007 and 2009
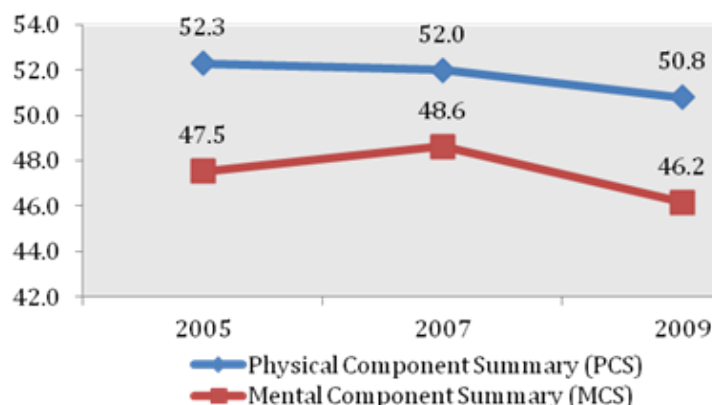
Source: Authors, computed from the KDSS Migration and Health Project data.

Testing migration selectivity

By using a longitudinal dataset, factors related to rural-urban migration can be analysed using logistic regression. In the regression, the dependent variable is the individual's migration status at time t (either year 2007 or 2009). Independent variables include physical and mental health status and relevant socio-demographic factors at time t-1[10] (year 2005 and 2007, respectively). There are 4,596 samples in total (according to figure 2) including: migrant 07 and non-migrant 07 (for t = year 2007), and new migrant 09 and non-migrant 09 (for t = year 2009).

Table 2. Determinant factors of rural-urban migration during time t-1 to t

Variables	Model 1 Exp(B)	Model 2 Exp(B)	Model 3 Exp(B)
Constant	0.023***	0.006***	1.317
PCS (t-1)	1.049***	1.049***	1.021**
MCS (t-1)	0.981***	0.984**	0.986*
Sex: Male (reference = Female)		1.014	0.698***
Nationality: Thai (reference = non-Thai)		3.512***	2.461***
Age (t-1)			0.856***
Marital Status (t-1): Ever married (reference = Single)			0.212***
Household Head (t-1) (reference = HH head)			3.844***
HH Asset tri-tiles (t-1)			1.311
Nagelkerke R^2	0.017	0.031	0.247
Model Chi-square (sig.)	0.000	0.000	0.000

Notes: (1) Binary dependent variable is "Migration status": [1= Migration, 0 = No-migration]. "Migration" refers to living at the origin in Kanchanaburi at time t-1 and at the urban destination at time t. "No migration" refers to living at the origin both at time t-1 and t. (2) *, **, and *** is significant at 10, 5 and 1 per cent levels.
Source: Authors, computed from the KDSS Migration and Health Project data.

According to table 2, PCS and MCS at time t-1 significantly determined the rural-urban migration of the individual. Those with better physical health but worse mental health are more likely to move to the city. Odd ratios of PCS and MCS from the regression (Model 3) are 1.021 and 0.986, respectively. This implies that, at the time before migration (t-1), migrants were physically healthier, but mentally unhealthy. The

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[10] As rural-urban migration occurred during the two-year period between time t-1 and t, it is hypothesized that health and other socio-demographic factors at time t-1 determined that migration decision.

samples of younger, single Thai females who were not the head of household at time *t-1* are more likely to move to and stay in one of the urban destinations at time *t*.

Testing the healthy migrant effect and successful return migrants

Figure 4. PCS and MCS scales in 2007 and 2009 of the long-term and return migrants in 2009, compared to long-term residents at the urban destination
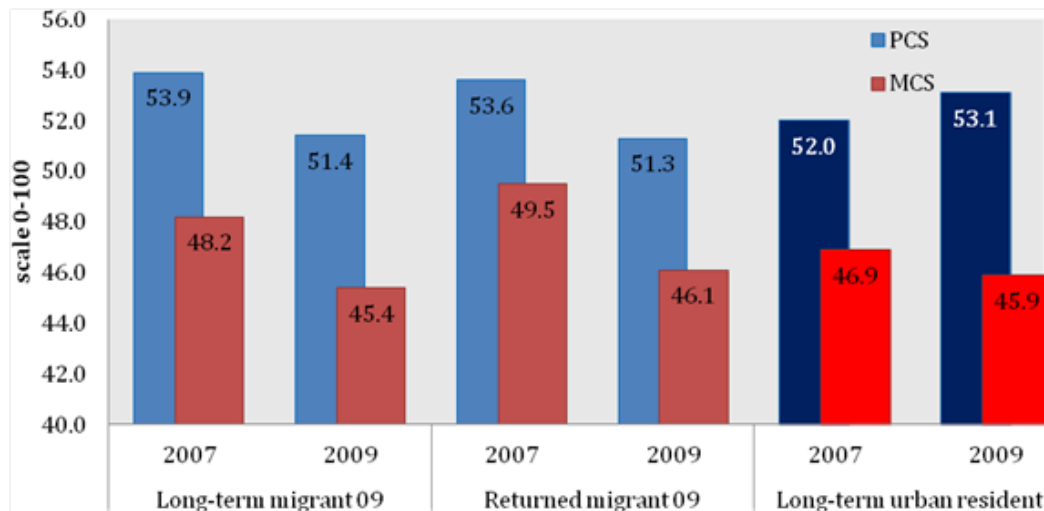
Source: Authors, computed from the KDSS Migration and Health Project data.

To test the hypothesis of the healthy migrant effect, the health status of migrants who moved to an urban destination during 2005–2007 were compared to the health status of long-term residents at the destination in 2007 and 2009. This group included the long-term migrant 09 (who moved during 2005–2007 and remained at the destination in 2009) and the return migrant 09 (who moved during 2005–2007 but returned to and stayed at the origin in 2009).

Based on figure 4, by comparing the health status in 2007 of the long-term migrant 09 and return migrant 09 to that of long-term urban residents, the first part of the hypothesis of the healthy migrant effect (that is, the hypothesis that, upon arrival, the health of the migrant tends to be better than the health of the native or local residents at the destination) seems to hold true. PCS and MCS of the migrants in the year after they moved to an urban destination (53.6–53.9 and 48.2–49.5, respectively) were higher than those of long-term urban residents (52.0 and 46.9, respectively).

By comparing the health status in 2009 of the long-term migrant 09 and urban resident, the second part of the hypothesis of the healthy migrant effect (that is, the hypothesis that, after a period of time, the migrants' state of health will decline to the average state of health at the destination, or even worse) also seems to be true. The PCS and MCS of the long-term migrant 09 (51.4 and 45.4, respectively) were lower than those of urban

residents (53.1 and 45.9, respectively) in 2009, or about two to four years after migration.[11]

Next, the health of long-term migrant 09 and return migrant 09, both of whom moved from rural Kanchanaburi during 2005–2007 to a city area, are compared. In 2007 and 2009, the physical health of these two groups was similar (PCS scores were about 53.6-53.9 in 2007 and 51.3–51.4 in 2009). Somehow, the mental health of migrants who returned to the origin by 2009 (49.5 in 2007 and 46.1 in 2009) appeared to be slightly better than that of migrants who still lived at the destination (48.2 in 2007 and 45.4 in 2009). This is insufficient evidence to test the hypothesis regarding the successful and unsuccessful return migrant. However, by gathering additional information from the longitudinal data used in this survey, it is possible to explore and test this hypothesis.

Migration and its potential impact on health

To examine the impact of migration on health from the KDSS longitudinal data, the linear random coefficient model was used to do multi-level modelling of health determinants[12] (Rabe-Hesketh and Skrondal 2005:68–84). PCS and MCS were analysed separately. Independent variables or health determinants included in the model were categorized into three groups, consisting of migration factors (migration status and years of migration); pre-disposing factors (age, sex and marital status); and socioeconomic factors (nationality, working status, status in household, education and household socioeconomic status). The time variable was also included to reflect the time effect on health.

Table 3. Operational definition of variables

Variables	Definition/Categories
Dependent variables	
PCS	Physical Component Summary (score 0-100)
MCS	Mental Component Summary (score 0-100)
Independent variables	
TIME	Time variable (Year 2005 = 0, Year 2007 = 1, Year 2009 = 2)
MIG	Migration status (0 = non-migrant living at the rural origin, 1 = migrant living at the urban destination)
MIG_Y	Number of years living at the urban destination since 2005 (0-4 years)
AGE	Age
SEX	Sex (0 = female, 1 = male)
MARIT	Marital status (0 = never married, 1 = married)
NATION	Nationality (0 = non-Thai nationality, 1 = Thai nationality)
WORK	Working status (0 = not working/ studying, 1 = working/job hunting)
HHH	Status in household (0 = not household head, 1 = household head)
EDU_1	Education level 1 (0 = others, 1 = primary and secondary level)
EDU_2	Education level 2 (0 = others, 1 = higher than secondary level)
H_ASST	Household asset score (0-1), measuring household socioeconomic status

Source: Authors.

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[11] This finding should be considered a tentative conclusion. First, the worsening of long-term migrant health in 2009 might not only be the result of "long-term migration", but also of a decline in population health as a whole at origin in that year. Second, in this survey, samples at destinations of long-term urban residents in 2009 were not exactly from the same group as in 2007. Possible variations in comparing health statuses may be caused by sampling error.

[12] In the estimation of random coefficients, migration variables (including MIG and MIG_Y) are specified in the random part. The general equation is $Y_{ij} = (\beta_1 + \varsigma_{1j}) + (\beta_2 + \varsigma_{2j})X_{ij} + \beta_3 Z_{ij} + \epsilon_{ij}$, where Y_{ij} is the health score for the ith individual in year j, X_{ij} are migration variables, Z_{ij} are other variables included in the model, β_1 is the mean intercept, ς_{1j} is the year-specific intercept, β_2 and β_3 are the mean slopes, and ς_{2j} is the year-specific slope of migration variables.

Table 4 presents the results of the multilevel modelling on PCS and MCS between 2005 and 2009. On physical health (model 2), individuals' PCS declined over time and was significantly affected by age (-); sex (male, +); nationality (Thai, -); marital status (never married, -); working status (working, -) and household socioeconomic status (+). Migration status (living at the destination) affected PCS positively (coef.=1.84), while the number of years migrated affected it negatively (coef.= -0.50). This can be seen as evidence that migration improved the physical health of migrants during the early years but caused it to deteriorate in the longer term. Considering the coefficients of MIG and MIG_Y, impacts of migration on health could potentially become negative after four years.

Table 4. Determinants of PCS and MCS by multilevel modelling with linear mixed model methods

	Physical Component Summary (PCS)		Mental Component Summary (MCS)	
	Model 1	Model 2	Model 1	Model 2
Constant	52.48***	54.34***	48.00***	48.80***
TIME	-0.41***	-0.33***	-0.32***	-0.37***
MIG	2.20***	1.84***	0.69	0.61
MIG_Y	-0.39*	-0.50**	-0.43*	-0.40
AGE		-0.05**		0.04*
SEX		1.17***		0.62***
MARIT		-0.95***		-0.10
NATION		-0.72*		-1.66***
WORK		-0.44**		-0.08
HHH		0.09		0.14
EDU_1		-0.04		-0.36
EDU_2		0.71		-0.08
H_ASST		0.86**		-0.14
Log likelihood	-23,144.2	-23,024.7	-23,855.7	-23,797.4
Wald Chi2 (sig.)	0.000	0.000	0.000	0.000

Note: (1) Maximum Likelihood Estimates (MLE) with year-specific random effects. (2) ***, **, and * significant at 1, 5 and 10 per cent level, respectively.
Source: Authors, computed from the KDSS Migration and Health Project data.

As for mental health, results from the modelling are somewhat different. MCS (model 2) was negatively affected by time but positively affected by age. Apart from this, it was significantly correlated only with sex (male, +) and nationality (Thai, -). Migration factors affected mental and physical health in the same direction, but the effect was weak (only for MIG_Y) and statistically insignificant when controlling for other pre-disposing and socioeconomic factors.

IV. Discussion: Implications of a Longitudinal Research Design for Migration and Health Studies in China

Public health issues concerning internal migrant workers have recently been extensively studied. Because of the limited availability of data about the migration process from pre-departure to possible return, it is still difficult to fully understand the causal relationship between migration and health. By using KDSS data and longitudinal analysis, the study in Thailand has significant implications for conducting similar migration and health studies in other parts of the developing world using identical comparative methodologies.

In this era of globalization, there is massive rural-urban migration in many developing countries. The case of rural-urban migration in China, a rising economic power, has been drawing much attention from scholars around the world since the 1980s and 1990s (Rozelle et al. 1999). Some argue that the experiences of Chinese migrants are similar to migrants in other countries (Gaetano and Jacka 2004). In addition, many empirical studies have thoroughly debated whether staying in urban areas or returning to the countryside is better for migrants in China. These studies, however, have approached the issue mainly from an economic and psychological perspective.[13]

The experience of migration in China should not be ignored by comparable studies done in other countries, especially countries in Asia that share cultural similarities with China. Because of similarities in the manufacturing industry between China and Association of Southeast Asian Nations (ASEAN) member states (namely, foreign capital and intense use of labour), a comparison of migration experiences is valuable. In recent years, many multinational corporations have left China for ASEAN countries due to rising labour costs. More rural workers in these other countries will migrate to cities to take up jobs previously done by Chinese migrant workers. This makes the case for comparative studies even more compelling: policy measures developed in China and the ASEAN regarding migration issues may be applicable in other parts of the developing world.

Moreover, while there is a rich body of literature focusing on rural-urban migration in China, the health status of migrant workers is a topic that has not been thoroughly discussed. This paper may therefore bring in a new approach for further studies on the topic.

Compared to the key findings of this study in Thailand, there are a number of similarities between the two countries, but there are also some significant differences due primarily to differences in social structure (for example, the household registration system).

General trends in the health status of rural-urban migrant workers in China can be seen as being comparable to, or even worse than, those in Thailand. Young migrant workers arrive in cities in a relatively healthy state and return to their villages in a less healthy state (Chen 2011). Hu et al. (2008) characterize this phenomenon as "youth mining," in which rural youth are being exploited for financial gain, as rural China sends out healthy workers and gets the sick and injured back.

This study finds that migrants are more likely to be individuals who are physically healthy but mentally less healthy and that migrants who return to the origin are in slightly better mental health than those who live in the destination. Empirical studies in China show that migrant workers face numerous serious mental health problems after migrating to cities and return home in a worsened state after spending a few years in the

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[13] Chan and Zhang 1999; Zhao 1999; Meng and Zhang 2001; Zhang and Song 2003; Wong et al. 2007.

cities.[14] The main reason for this is thought to be the stigma attached to migrant workers linked to the *hukou* system[15] (see, for example, Meng and Zhang 2001; Wong et al. 2007). The situation in Thailand makes a strong argument for the dismantling, or at least loosening, of the hukou system, given these detrimental impacts on the mental health of migrant workers.

In terms of gender, this study finds that a significant proportion of long-term migrants in Thailand are female (62.7 per cent) and not the head of their household (70.4 per cent), although there are no concrete explanations from a social or cultural perspective. In China, however, women are more likely to stay in cities for longer periods of time (or even permanently), but for a different reason: upward social mobility via marriage (see, for example, Zhou et al. 2011). As a result, rural villages have been depleted of young women, potentially bringing long-term changes to the demographic pattern of rural China.

In terms of methodological implications, the longitudinal analysis adopted in this paper is rarely seen in similar research in China. Longitudinal analysis has long been employed in research of health issues concerning older adults in China. Some large surveys have been conducted in the past decade, including the Chinese Health and Retirement Longitudinal Study (CHARLS) and the Chinese Longitudinal Healthy Longevity Survey (CLHLS). Recent publications using longitudinal methods to study health issues in China continue to focus mainly on the elderly who have local hukou and are not part of the "floating" population.[16] Longitudinal studies on the health status of migrants are rare because of the difficulties involved in tracing individuals who are in the migrant population and lack local hukou. There is a rich body of research on migrants with hukou status at the destination, which illustrates that this a dilemma. For example, there are numerous studies of households that were resettled from the Three Gorges Dam to the coastal areas (for example, Gray et al. 2012), but very few studies of migrants who left the hinterland for coastal areas without hukou or other official arrangements. There is need for longitudinal analysis to study the health of rural migrants without local hukou, but reliable access to this population is first required.

Collecting this kind of data is not easy because access to information about individuals within this population depends heavily on assistance from informal or formal NGOs like independent labour unions and hometown fellow associations. Previous attempts to trace migrants from the Three Gorges Dam were possible thanks to assistance from local officials who maintained profiles of the resettled population (Gray et al. 2012). Data collected from other attempts to trace those without local hukou at the destination via unofficial channels are made problematic by issues of accuracy and representativeness. Alternatively, some recent ongoing studies are trying to assess the issue by analysing data on the Urban Resident Basic Medical Insurance (URBMI), which is designed to cover the urban unemployed and migrant workers who are not

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[14] Wong et al. 2008; Lin et al. 2011; Chen 2011; Chen et al. 2011.
[15] Hukou refers to the system of household registration required by law in China. The system records information such as the registered residency status of individuals as well as parents, spouse, and date of birth.
[16] Li et al. 2011; Luo et al. 2012; Wang et al. 2012.

covered by a parallel scheme for contract employees. However, since many migrant workers are not covered by any health insurance, it would be difficult for such an approach to claim that it accurately represents the migrant population as a whole. In short, the application of longitudinal analysis in China still has a long way to go.

All in all, the findings of this study, when compared to migrant issues in China, provide some insight into the situation in both countries, which, if nothing else, demonstrates the need for more in-depth studies in this field. Important questions remain. Does internal migration in developing countries, unrestricted by a household registration system, work better for the mental and physical health of migrants? To look at the issue from an economic perspective, do remittances to migrant-sending rural communities justify the "youth mining" phenomenon? When young rural women are more likely to stay in the cities, what are the implications for the future demography in these communities? And what needs, including with respect to health, emerge for families consisting of both rural and urban members?

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