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CONTENTS

	<i>Page</i>
Abstracts	1
Articles	
Addressing Unmet Need: Potential for Increasing Contraceptive Prevalence in the Philippines <i>By Paulyn Jean B. Acacio-Claro and Maridel P. Borja</i>	5
Below to above Replacement: Dramatic Increase in Fertility and its Determinants in Sri Lanka <i>By W. Indralal De Silva, B. Nishanthi Perera and K. Chamara Anuranga</i>	27
The Effect of Remittances on Return Migration and its Relation to Household Wealth: The Case of Rural Thailand <i>By Yuying Tong and Martin Piotrowski</i>	53
Determinants of Living Arrangements of Elderly in Orissa, India: An Analysis <i>By A.K. Panigrahi</i>	97

Addressing Unmet Need: Potential for Increasing Contraceptive Prevalence in the Philippines

5

Lack of knowledge and cultural or personal objections prevent women from using contraceptives even if they want to space or limit their pregnancies, thus leading to an unmet need for contraception. Utilizing secondary data from 4,129 ever-married women included in the 2000 Reproductive Health (RH) Baseline Surveys, this article examines the relationship between selected psychosocial factors and unmet need. After controlling for the effects of attitude, a low level of knowledge was significantly associated with either unmet need for spacing ($p < 0.001$) or limiting ($p < 0.001$). By contrast, after controlling for the effects of age, the number of living children, knowledge and access to family planning services, the association of negative attitude with unmet need was modified by educational level. In comparing women with a negative attitude to those with a positive one, the adjusted odds ratio of having unmet need for spacing (OR=3.8, 90 per cent CI=2.0-7.3) and unmet need for limiting (OR=2.2, 90 per cent CI=1.2-4.0) was found to be highest among those with low levels education. Meanwhile, no association existed between attitude and unmet need among women with tertiary education.

These findings can be used to help family planning programme managers design and implement an effective unmet need strategy in the Philippines that targets subgroups of women with the highest priority. Accordingly, strategies should increase knowledge about modern contraceptives and facilitate attitudinal change towards family planning, particularly among women who do not attain a higher education.

Below Replacement to above Replacement: Increased Fertility and its Determinants in Sri Lanka

27

During the period from 1995 to 2000 Sri Lanka achieved a fertility level below replacement, identified by a total fertility rate (TFR) of 1.9. Yet the most recent survey data from the Sri Lanka Demographic and Health Survey (SLDHS, 2006/2007) indicates a TFR of 2.3, an increase in fertility well above the replacement level. Within

the developing world, no single country has shown this kind of fluctuation in TFR once it has reached a level below that of replacement.

In Sri Lanka, deferment of the age at marriage curtailing the reproductive age span in marriage, particularly in females, high use of contraception, and the practice of induced abortion have all been noted as key contributory factors to the declining trend in fertility below the replacement level. When fertility increased well above this level, the same key contributory factors had also changed to favour increasing fertility and culminated in a significantly reversed trend.

The period of reduced fertility also resulted in a slowing down of the family planning activities of the State, private and civil sectors. Coupled with the dissemination of pro-natalistic discourses, Sri Lanka experienced a decline in the demand for contraceptives and service delivery, and unplanned conceptions were more likely to result in childbirth.

The Effect of Remittances on Return Migration and its Relation to Household Wealth: The Case of Rural Thailand

53

This paper examines the effect of remittances on return migration, as it relates to household wealth. Using longitudinal data from Nang Rong, an agrarian district located in Thailand's north-eastern region, the authors find that migrants' sending of remittances is positively related to return migration, but only when the amounts remitted are small. The authors argue for a signaling motive whereby the migrant sends money to the household to keep open the return option by maintaining membership rights in the origin household. They also find that the relationship between remittances and return migration only exists for migrants from households in the middle of the wealth continuum. Remittances from migrants of poorer and wealthier households are not related to return.

Differences between households at various levels of wealth may reflect the need for remittances, intentions to return, a need for co-insurance, or the absence of a household strategy altogether. Findings from this paper suggest that, while a household economics approach may be more practical in describing strategies pursued by rural-to-urban migrants in developing countries, theorists and policymakers may need to pay more attention to the different types of motivations followed by migrants and households at various

points on the wealth continuum. Future work needs to be done to determine what types of migration motivations are undertaken by poorer households.

Also, policymakers should notice that only a small number of migrants return. Therefore, policy efforts should focus on helping migrants at their destination, especially if they are living in slum housing or working in hazardous occupations, which may require better access to medical care.

Determinants of Living Arrangements of Elderly in Orissa, India: An Analysis

97

Very few studies have been conducted on older persons in India, although they are the fastest growing elderly population in the world. Joint family systems are on the decline in India and more families are becoming nuclear in size and orientation. Given this background, it is important to explore the current nature of older persons' living arrangements and their determinants. The present paper analyses the socio-economic and demographic correlates of the living arrangement choice of older persons in the state of Orissa.

Data for the present work are drawn from the 60th round of the National Sample Survey on the elderly for Orissa. The total sample size for Orissa is 1,238 older persons: 660 males and 578 females. Both bivariate and multivariate techniques with Pearson's chi-square test statistics were used for the analysis. The majority of older persons (51.5 per cent) were living with their spouse and children; roughly one third were living without spouses but with children and another small proportion (2.5 per cent) were living with other relatives and non-relatives. The major demographic factors that determined the living arrangements of older persons considered in this study were age, sex, marital status and surviving children, while socio-economic factors were place of residence, education, caste, income and economic dependency. These variables play an important role in determining the living arrangements of older persons in Orissa.

In considering the country's changing socio-economic and demographic scenarios, increasing levels of education and income along with a decline in fertility, it seems very likely that an increasing proportion of older persons in India will be living alone in the future. Related policies and programmes will have to take this reality into account in order to effectively address the specific needs of those older persons living alone.

Addressing Unmet Need: Potential for Increasing Contraceptive Prevalence in the Philippines

One of the overriding goals of a family planning programme should be to increase women's knowledge regarding family planning and their reproductive health. Highest priority should be given to women with low levels of knowledge, such as those who did not reach secondary school.

By Paulyn Jean B. Acacio-Claro and Maridel P. Borja*

Sample surveys carried out during the last four decades have proven the existence of “unmet need”, a term coined to describe a significant gap between a woman’s sexual and contraceptive behaviour and her stated fertility preference. According to the Demographic and Health Surveys (DHS) definition, a woman has an unmet need for contraception if she is fecund, sexually active and not using any contraceptive method, and yet does not want a child for at least two years. If a woman is pregnant or amenorrhoeic after giving birth, she is also considered to have had an unmet need if she had not wanted the pregnancy or birth either when it occurred or ever (Ross and Winfrey, 2002).

Although the definition of unmet need has been adjusted to take into account only modern method use, including various health dimensions and unmet need among unmarried women and men, its

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measurement is still based on the same underlying concept, which is the identification of the pool of non-users of contraceptives who are capable of conceiving, who are exposed to the risk of pregnancy and who wish to avoid or postpone pregnancy (DeGraff and de Silva, 1996).

An estimated 105.2 million married women in the developing world have such an unmet need (Ross and Winfrey, 2002). Asia accounts for the highest proportion of women with unmet need. In the Philippines, almost one fifth of currently married women of reproductive age have unmet need, with 9.4 per cent of them having unmet need for limiting births and 7.9 per cent having unmet need for spacing births (National Statistics Office, 2003).

The magnitude of unmet need, either for spacing or limiting births, varies substantially according to the demographic and social characteristics of women. The most prominent of these are age, number of living children, residence, education and socio-economic status (Chaudhury, 2001). Researchers found that women cited a range of obstacles that prevented them from using contraceptives. Prominently cited obstacles include lack of knowledge about contraception, health concerns, high costs, limited supplies and cultural or personal objections. Some women also give conflicting answers to different survey questions about their fertility preferences, which may reflect ambivalence or uncertainty about childbearing and reproductive intentions (Robey, Ross and Bhushan, 1996).

Various articles in the literature have underscored the demographic significance of meeting unmet need in addition to enhancing individual health and rights. However, evidence shows that the level of unmet need remains high in the developing world. Thus, with less than a decade remaining to accomplish the International Conference on Population and Development (ICPD) benchmark of zero unmet need in 2015, it is imperative for programmes to develop specific responses that address the barriers to contraceptive use.

Most research on unmet need to date has concentrated on issues of definition and measurement. While many studies have explored the causes of unmet need using data from large-scale surveys, there is a scarcity of local in-depth qualitative and quantitative research on the factors that could help provide planners with important information in order to strengthen family planning programmes.

Some local studies have been conducted to estimate the level of unmet need for contraception in the Philippines but those have used the standard definition. This article varies, specifically in that it focuses on unmet need for modern contraception and provides a

comprehensive, quantitative study, which is aimed at identifying factors associated with either unmet need for spacing or unmet need for limiting. In particular, the present study measures the relationship between unmet need and women's knowledge regarding birth control and its source, and attitudes towards birth control. It is also aimed at determining the factors that confound or modify the effect of knowledge and attitude regarding unmet need.

Results of this study can be used to identify subgroups of women with unmet need and provide family programme planners with valuable inputs for the formulation and implementation of targeted strategies for meeting the demand for contraception of women with varying needs.

Methods

Study site and design

This study involved further analysis of secondary data derived from the 2000 Reproductive Health-Family Planning Baseline Surveys conducted nationwide in 16 provinces by the College of Public Health of the University of the Philippines-Manila for the Department of Health and the United Nations Population Fund (UNFPA). The provinces were selected based on the following criteria: geographic representation for the three major islands in the country - Luzon, Visayas and Mindanao; their physical contiguity with each other; size of the beneficiary population and magnitude of reproductive health needs; performance in the last UNFPA Country Programme; and political support from local authorities. The said baseline surveys assessed various target populations using pre-tested and validated interview schedules and guided self-administered questionnaires.

The sampling design used was a stratified two-stage systematic cluster sampling. The *barangays*¹ which served as the primary sampling units (PSU) were first stratified according to urban-rural location and according to presence or absence of community-based interventions. However, the sampling frame for PSUs excluded the barangays that were very inaccessible or had peace and order problems. The number of *barangays* drawn from each stratum was proportional to the distribution in the province. Overall, 171 *barangays* were included in the three reproductive health surveys.

In each *barangay* included, sample households, the secondary sampling units, were selected using a systematic random sampling design. A sample of 12,229 households representing the provinces

included was drawn. Target respondents were interviewed from those sampled households.

Study population

The present study included ever-married women aged 15 to 49 years who were currently married or living with a man at the time of interview. Those who were either menopausal or not fecund² or had undergone hysterectomy or had indicated a desire to have children were excluded because they were not at risk of having unmet need. After satisfying the said inclusion and exclusion criteria, and after assessing for completeness of information and consistency of responses, there were 4,129 eligible participants for the study.

Variables

The outcome (dependent) variable in this study was unmet need for modern contraception (based on standard definition) categorized as either unmet need for spacing or unmet need for limiting. Two main exposure (independent) variables were considered, namely, attitude towards birth control and knowledge regarding birth control methods and their sources.

A scoring system was used to compute a knowledge index based on knowledge of the various types of contraceptive methods and awareness of sources of contraceptives. Awareness of modern methods was given higher points, i.e., a score of three points was given for every modern method identified spontaneously by the respondents while two points were given for every modern method identified only after probing. By contrast, a score of two points and one point was given for every traditional method identified spontaneously and after probing, respectively. Another one point was given if the respondent knew the source of the contraceptive method that she recognized either spontaneously or after probing. Scores greater than or equal to the median score were considered to reflect a high level of knowledge while those below the median score were considered low level. The highest possible score using this system was 34.

A scoring system was also used to compute for an attitude index. One point was given for every positive answer by the respondent when asked whether or not the Government should provide contraceptives as one of its services and whether or not provision of family planning messages on mass media were acceptable. Another one point was given if the respondent answered "both" or "either"

to the question, “Who do you think ought to use a method; is it you or your spouse/partner?” A score of two to three points indicated a positive attitude towards birth control, while a score of less than two points indicated a negative attitude towards birth control.

Other variables collected because of their potential to confound or modify the effect of knowledge and attitude were the respondent’s sociodemographic characteristics, such as age as of the last birthday, highest level of education completed, place of residence based on whether the area was classified as urban or rural by the National Statistics Office, number of living children, religion and socio-economic status. The respondent’s access to family planning services, which referred to her perception on how long it takes to travel from one’s home to the source of contraceptive method (if current user), or duration of travel from one’s home to the nearest family planning source (if non-user), was also measured.

The socio-economic status of the respondent was determined by an asset index based on the one used by the Demographic and Health Surveys/World Bank to measure socio-economic status in the absence of income and expenditure data (Filmer and Pritchett, 1998). The said index has been found to be an accurate proxy for household “wealth” (Demographic and Health Surveys Project, 2002). The asset variables used in this study were composed of household ownership of certain consumer durables, such as electricity, radio, television, video equipment, gas or electric range, refrigerator, bicycle, motorcycle, jeepney,³ private car and telephone. Variables were also included which indicated the source of drinking water and type of toilet facility of the household.

Data processing and analysis

The present study utilized recorded data from face-to-face interviews of ever-married women regarding their household assets, personal characteristics, pregnancy history, fertility and fertility preferences, as well as knowledge, attitudes and practices on contraception. Relevant variables were first extracted from the various data collection tools used in the Baseline Surveys and then merged into a single database using the Epi Info 6 software package. Range checks and frequency distributions were done to ensure the completeness and accuracy of the data.

In this study, principal components analysis (PCA) was employed to determine the household asset index, which was used to measure socio-economic status. PCA is a statistical procedure that simplifies

the description of a set of interrelated variables (Afifi and Clark, 1990). The value of the household asset index was calculated by summing the score on each variable across all the variables included in the PCA (Filmer and Pritchett, 1998). The subject population was then divided into quintiles – five categories, from the poorest 20 per cent to the richest 20 per cent – on the basis of wealth as calculated by the said asset index (Rani and Lule, 2004).

The selection process for model building began with a crude analysis of each variable to check the nature and strength of association of knowledge and attitude with unmet need and to screen for probable confounders. A probable confounder is a variable that showed statistical significance at the 25 per cent level on crude analysis. This cut-off value was chosen in order to avoid the exclusion of variables, which may be weakly associated due to the confounding of other variables.

Next, stratified analysis was conducted to identify initially the potential effect measure modifiers (EMMs), namely, variables across which the effect measure differs. Probable effect measure modification or statistical interaction was examined using Woolf's test of homogeneity. The level of significance that indicated probable effect measure modification was set at 10 per cent. Stratum-specific odds ratios on opposite sides of the null were likewise considered as an indication of probable statistical interaction even if there was no statistical significance at 10 per cent level.

Since the literature presented limited data on EMMs for the association between unmet need and the exposure variables of interest, only factors that could logically interact with these exposure variables were screened. In this study, the interaction terms that were explored were accessibility of the family planning service with knowledge of birth control methods, and source and respondent's educational attainment with attitude towards birth control.

Since studies had shown that the correlates of unmet need for spacing varied from the correlates of unmet need for limiting, unmet need had to have three categories, with women having no unmet need serving as the reference category. Thus, polytomous (having more than two categories) logistic regression was employed to model the relationship between a polytomous outcome variable and a set of covariates accounting for confounding and effect measure modification of extraneous variables.

Two models were developed for this study, the first one with knowledge as the exposure variable; the second one with attitude as the exposure variable.

The model that includes the exposure variable of interest, the probable EMM identified in the stratified analysis and their interaction, was used to assess effect measure modification. An interaction term statistically significant at 10 per cent was considered an EMM and was retained in the model.

Subsequently, confounders were assessed using a backward stepwise selection starting with the “full model”. The full model included the independent variable plus all probable confounders, significant EMM and the interaction term identified previously. The probable confounder with the largest p-value on Wald’s test was the first to be removed from the model. Confounding by a particular variable was determined by comparing the odds ratio (OR) derived from the reduced model (i.e., the crude OR) to the odds ratio of the full model (i.e., the adjusted OR). If the relative change in the odds ratio was 10 per cent or more (change-in-estimate criterion), then the variable was considered a confounder and was retained in the model. Otherwise, it was deleted (Rothman and Greenland, 1998). In the presence of a significant EMM, stratum-specific odds ratios were evaluated for confounding. The process of deleting insignificant confounders continued until none could be deleted from the model.

The final model consisted of the dependent and independent variables plus the significant confounders and EMM. The odds ratios, obtained through exponentiation of the estimated coefficients from each logit function, and 90 per cent confidence interval (CI) estimates were presented to describe effect measures. The 90 per cent confidence level was used instead of the usual 95 per cent level because the former estimates approximate results of exact methods more closely (Rothman and Greenland, 1998). Stratum-specific odds ratios were calculated when an EMM was included in the final model.

Results

Sociodemographic profile and other relevant characteristics of respondents

A total of 4,129 women in the reproductive age group, who were either married or in consensual live-in relationships, were included in this study. Table 1 shows the distribution of these women according to sociodemographic characteristics. With a mean age of 33 years, almost half (42 per cent) of these women were in their early to late thirties. By contrast, very few (2 per cent) were aged less than 20 years. These women had three living children on

Table 1. Distribution of respondents according to sociodemographic characteristics

Sociodemographic characteristics	Number	Percentage
<i>Age in years (N=4 129)*</i>		
Less than 20	81	2
20-29	1 456	35.3
30-39	1 748	42.3
40 years and older	844	20.4
<i>Number of living children (N=4 127)*</i>		
0-1	627	15.2
2-4	2 515	60.9
5 and more	985	23.9
<i>Education (N=4 124)*</i>		
None/primary or lower	1 205	29.2
Secondary	1 856	45
Tertiary or better	1 063	25.8
<i>Place of residence (N=4 129)*</i>		
Urban	1 347	32.6
Rural	2 782	67.4
<i>Religion (N=4 112)*</i>		
Catholic	2 957	71.9
Non-Catholic	1 155	28.1
<i>Travel time to access family planning services (N=3 785)*</i>		
Less than 15 minutes	2 911	70.5
16-45 minutes	654	15.8
45 minutes and over	564	13.7

* Total may differ due to missing values.

average with three fifths of them having two to four children. The highest number of living children recorded was 14. Over 70 per cent of these women had a secondary or higher education. More than two thirds of the respondents (67 per cent) lived in rural areas. The sample was also predominantly Catholic. More than 70 per cent of the respondents had access to family planning services within 15 minutes or less. However, more than a tenth (14 per cent) had to travel for more than 45 minutes to access family planning services. In general, their mean travel time was about 18 minutes.

The majority of respondents (68 per cent) had electricity in their households. The most common household asset owned was a radio (73 per cent) while the least common was a telephone (3 per cent) (see figure 1). At least one quarter had access to piped water as

their main source of drinking water while three quarters of the respondents had flush-type toilet facilities in their households. A small proportion of respondents reported ownership of motorized vehicles (figure 2).

Figure 1. Percentage of respondents according to ownership of household assets

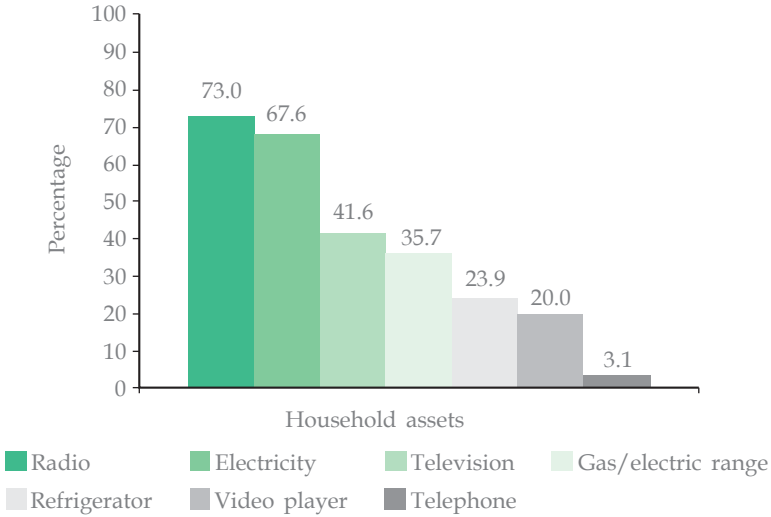
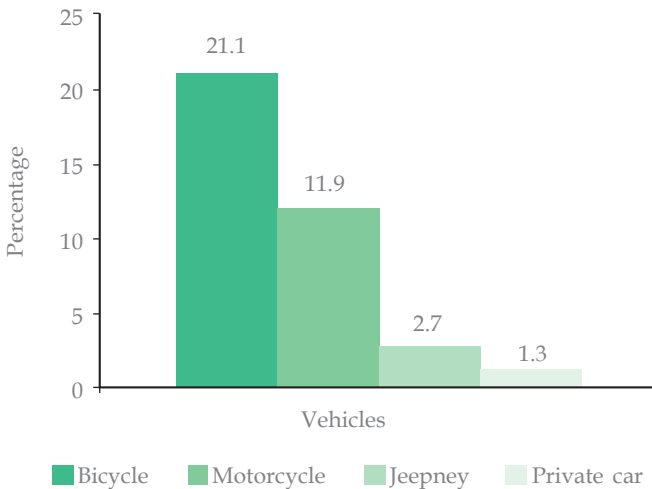


Figure 2. Percentage of respondents according to ownership of vehicles



The principal components analysis conducted to calculate a household asset index as a measure of socio-economic status yielded negative standardized weights for possession of radio, television and gas/electric range and also for having access to electricity, piped water and flush toilet. This was apparently due to the fact that large proportions of women had access to these amenities. By contrast, owning a jeepney, car or telephone had greater positive weights. The sign of the standardized weight would indicate the contribution of the particular household asset in the calculation of the index and consequently in the measurement of wealth. Based on the values of the household asset indices, a quintile distribution of respondents was obtained. Using the classification of Filmer and Pritchett (1998), women belonging to the first and second quintile, the third and fourth quintile, and the fifth quintile were considered to be poor, middle-class and rich, respectively. Table 2 presents the distribution of respondents according to their socio-economic status classification.

Table 2. Distribution of respondents according to socio-economic status classification

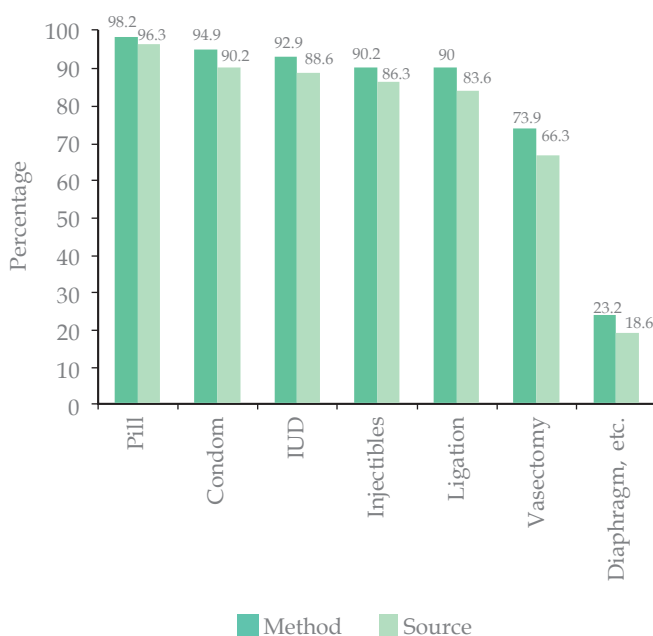
Socio-economic status classification*	Number	Percentage
Poor	1 576	38.17
Middle	1 745	42.26
Rich	808	19.57
	4 129	100.00

* Based on classification by Filmer & Pritchett (1998).

The most popularly known modern contraceptive methods were the pill, condom and IUD (intrauterine device). The least known were vaginal methods, such as the diaphragm, foam, jelly or cream. A similar trend can be observed regarding women's awareness of the sources to procure the above-cited birth control methods (see figure 3). Awareness of natural methods, such as calendar rhythm/periodic abstinence (83 per cent) and withdrawal (90 per cent), appeared to be high except for fertility-based methods such as basal body temperature, which was recognized by only 38 per cent of the women.

Women believed that the onus of contraception had to rest on them, either alone (41 per cent) or in collaboration with their partners (42 per cent). Nearly all (98 per cent) of the women were of the opinion that a government health centre should provide family planning/contraceptives as one of its services. The overwhelming

Figure 3. Percentage of respondents aware of specified contraceptive methods and their sources



majority (96 per cent) also found it acceptable for family planning information to be provided on the radio or television. Based on the scoring system devised, almost all of the respondents (96 per cent) had a positive attitude towards contraception.

Among fecund women who should have used contraception, since they either believed that they had completed their desired family size or wished to delay their next pregnancy for at least another two years, 46 per cent had unmet need for modern contraception. Among those, 36 per cent had unmet need for limiting births while 10 per cent had unmet need for spacing births. Table 3 shows that women with low levels of knowledge and those with negative attitudes had higher levels of unmet need for modern contraception as compared with women having high levels of knowledge and a more positive attitude. The discrepancy in unmet need was much greater for spacing than for limiting.

Analysis of association between exposure and outcome variables

Among all variables considered as probable confounders, only attitude actually distorts the observed association between level of

Table 3.1. Percentage of unmet need according to the level of knowledge of respondents

Knowledge	Number	Percentage	Percentage of unmet need for spacing	Percentage of unmet need for limiting	Percentage without unmet need	Total
Low level	1 682	40.7	14.3	38.3	47.4	100
High level	2 447	59.3	8	34.3	57.7	100
Total	4 129	100				

Table 3.2. Percentage of unmet need according to the attitude of respondents

Attitude	Number	Percentage	Percentage of unmet need for spacing	Percentage of unmet need for limiting	Percentage without unmet need	Total
Negative	151	3.7	15.2	52.3	32.5	100
Positive	3 978	96.3	9.8	35.3	54.9	100
Total	4 129	100				

knowledge and unmet need for spacing and limiting. Results show that after controlling for the effect of attitude, a low level of knowledge about birth control and source is significantly associated with both unmet need for spacing ($p < 0.001$) and unmet need for limiting ($p < 0.001$). The risk of having unmet need for spacing births among women with a low level of knowledge was 1.8 times higher than among women with high level of knowledge. Meanwhile, the odds ratio for unmet need for limiting is 1.3 (90 per cent CI=1.2-1.4).

Based on the algorithm described previously, the variables included in the second final polytomous logistic regression model include age, number of living children, knowledge and access to family planning services as confounders for the association between negative attitude and unmet need for spacing and limiting. Education proved to be a significant EMM since the association of attitude with unmet need varied with level of educational attainment.

While attitude was not associated with unmet need for spacing and limiting among women who attained a college level of education, an association existed among less educated women (table 4). Among

Table 4. Stratum specific odds ratio estimates for association of negative attitude with unmet need for spacing or limiting births by level of education

Effect modifier	Unmet need for spacing			Unmet need for limiting		
	OR	90 per cent CI	p-value	OR	90 percent CI	p-value
Education						
None/primary	3.81	1.98-7.33	0.001	2.07	1.29-3.32	0.024
Secondary	2.2	0.86-5.63	0.166	2.22	1.24-3.98	0.012
Tertiary	0.99	0.26-3.74	0.991	0.94	0.44-2.01	0.888

Abbreviations: OR = odds ratios; CI = confidence interval.

women who had only a primary level of education or no education at all, the odds of having unmet need for spacing were significantly higher for women with a negative attitude towards birth control compared with those with a positive attitude ($p=0.001$). The said odds were shown to be two to seven times higher ($OR=3.8$, 90 per cent $CI=2.0-7.3$) in this group compared with their counterpart with a positive attitude. Although the odds ratio was not statistically significant among women who attained a secondary level of education, it was greater than two and could be as high as six ($OR=2.2$, 90 per cent $CI=0.9-5.6$).

The odds of having unmet need for limiting were also significantly higher for women with a negative attitude towards birth control as compared with those with a positive attitude ($p=0.024$). Specifically, the odds ratio is 2.1 (90 per cent $CI=1.3-3.3$) among women with only a primary education or no education at all. The odds were also statistically significant at 2.2 (90 per cent $CI=1.2-4.0$) among women who reached the secondary level of education.

Discussion

Magnitude of unmet need

The estimated proportion of women with unmet need for both spacing and limiting from this study was markedly higher (36 and 10 per cent, respectively) than that obtained by the country's National Statistics Office (NSO) (8 and 9 per cent, respectively). This may be partly attributed to the differences in inclusion criteria for the definition of unmet need that were used by NSO and the

present study. While NSO (using the DHS definition of unmet need) included those “who are not using any method of family planning”, this study was stricter in identifying women with unmet need and included all non-users of contraception plus women using natural methods, because natural methods had been shown to have high contraceptive failure and discontinuation rates (Robey, Ross and Bhushan, 1996). Moreover, a local study has also shown that these may be responsible for many unwanted pregnancies (Laguna and others, 2000). Thus, the figures reported by NSO may actually be an underestimate of the true situation in the country.

Correlates of unmet need for contraception

This study found that both knowledge and attitude are associated with unmet need. It is important to note, however, that these variables could be subject to temporal ambiguity -- an inherent limitation of cross-sectional studies where there is no assurance that the exposure variables actually preceded the outcome. It could be assumed though that there has been no change in knowledge and attitude prior to the conduct of the survey and measurement of unmet need.

Attitude was found to statistically confound the association between a low level of knowledge and unmet need for spacing. Studies have shown that women with unmet need are less likely than contraceptive users to approve of contraception (Bhushan, 1997; Casterline, Perez and Biddlecom, 1997; Govindasamy and Boadi, 2000). They were also consistently more likely to disapprove of the provision of family planning information through broadcast media than women who use contraceptive methods (Pasha, Fikree and Vermund, 2001). Hence, not adjusting for the effect of attitude in this study would increase the odds of having unmet need for spacing among women with a low level of knowledge.

In the association between negative attitude and unmet need, the respondent's age was found to be a confounder. It has a negative relationship with unmet need for spacing and a positive relationship with unmet need for limiting (Brophy, 1990; Klijzing, 2000; Robey, Ross and Bhushan, 1996). This is expected because younger women want to have more children, while older women have achieved their desired number of children (Chaudhury, 2001).

The variable, number of living children, also confounded the association of negative attitude and unmet need for spacing births. Women with fewer living children are more interested in contraception for spacing than women with high parity as the latter are more concerned with limiting births.

Knowledge was another variable found to confound the relationship of attitude and unmet need. A study using DHS data from Egypt showed that women who knew of more contraceptive methods were less likely to have unmet need. In the Republic of Korea in 1974, 85 per cent of the women who did not know where to obtain contraceptives had unmet need (Robey, Ross, Bhushan, 1996). Indeed, a low level of knowledge on birth control and sources of contraceptives would predispose a woman to have unmet need.

Likewise, accessibility of family planning services confounded the association between attitude and unmet need. Bongaarts and Bruce (1995) showed that contraceptive prevalence declines as distance to family planning facilities lengthens. Chaudhury (2001) also reported that among women with unmet need in several South Asian countries, lack of access to contraceptive methods is one of the major barriers to contraceptive use.

If this study had not controlled the confounding effect of all these variables, an over- or underestimation of the odds ratio for either unmet need for spacing for limiting may have resulted. Yet, even though confounding variables were controlled, residual confounding could still have occurred owing to a misclassification. This control by age, number of living children and access to family planning services depends on accurate information and, since some misclassification of the relevant information resulted when these continuous variables were grouped into discrete categories, some residual confounding remains.

Uncontrolled confounding may also have occurred because there were other factors that studies have shown to be associated with unmet need but were not analysed in this study due to inherent limitations of the secondary data used. It is hoped that the negative and positive biases discussed above will balance each other out so that the result obtained is close to the true value of the odds ratio.

Several demographic surveys have documented that the most frequent reason given by women for not using contraceptives, regardless of whether they have a need to space or limit births, is a lack of knowledge about contraception. Bankole and Westoff (1995) found this factor to be prominently cited as reason for non-use of contraception in almost all sub-Saharan countries and in many others outside that region. They concluded that lack of knowledge is a critical cause of unmet need in countries with low contraceptive prevalence and even in some countries with high levels of contraceptive prevalence, such as Bolivia and Peru.

Although accessibility of family planning service was not found to be a significant EMM in this study, it could modify the relationship between knowledge and unmet need. Studies have pointed out that women with a high level of knowledge tend to have less unmet need probably because they know when and how to use contraception. However, in the absence of family planning services in their areas or because of inaccessible family planning facilities, the proportion of women with unmet need between those with high and low levels of knowledge may not differ significantly. Therefore, the hypothesized association between knowledge and unmet need may be modified at different levels of accessibility of family planning services.

As shown in this study, the effect of attitude on either unmet need for spacing or limiting was not the same for all levels of the respondent's educational attainment. This indicated the presence of statistical interaction between attitude and education. Assuming that this can be considered an actual biological interaction, results of this study suggest that a low level of education (secondary education or lower) combined with a negative attitude has a magnified effect on unmet need. Indeed, the most substantial effect of negative attitude on unmet need was seen among women with little or no education at all.

Govindasamy and Boadi (2000) found that women who were less likely to approve of contraception were those with unmet need who do not intend to use contraception in the future because they oppose its use. Hence, in the present study, it could be supposed that women with a negative attitude do not only disapprove of the provision of family planning information and services but also oppose modern contraceptive use. If a woman with a negative attitude has a high educational attainment, it could be surmised that she is knowledgeable about method mix and sources of contraceptives. According to Rutenberg and others (1991), there is a strong positive correlation between contraceptive knowledge and level of education. Thus, it follows that an educated woman with a negative attitude towards birth control, concedes her own opposition to contraceptive usage since she knows when and how to use contraception in order to space or limit births. On the contrary, women with a negative attitude and low level of education are more inclined to avoid contraceptive use regardless of need for contraception.

The significant association between negative attitude and unmet need among women with secondary education indicates that contraceptive information could not have been provided or that contraceptive knowledge is limited in this group. This may be due to the

fact that in the country, family planning has yet to be comprehensively integrated in the educational system, especially at the secondary school level. It appears that the greatest barrier to addressing unmet need is negative attitude and a low educational level, implying that attitudinal change and education of women should be given priority by family planning programmes in order to effect behavioural change.

Indeed, one of the overriding goals of a family planning programme should be to increase women's knowledge regarding family planning and their reproductive health. Highest priority should be given to women with low levels of knowledge, such as those who did not reach secondary school. Target areas of information, education and communication (IEC) strategies should provide information about the different modern contraceptive methods and their sources. Moreover, a component on attitudinal change should be included in programmes to replace negative social and cultural attitudes and outdated norms about family planning and reproductive health. Mass media can be used to highlight the economic advantages and health benefits of contraceptive use for spacing and limiting births, thus, promoting a positive image of family planning and contraception and creating and reinforcing positive social norms.

Educational intervention on reproductive health and family planning should also be introduced in secondary schools. This recommendation could serve as a strong justification for local governments to give priority to the Adolescent Reproductive Health (ARH) programme of the Department of Health. Currently, ARH is one of the service deliverables of the Department's Second Women's Health and Safe Motherhood Project where ARH-related activities are being subcontracted to non-governmental organizations since there is no clear approach yet on how to package ARH. Institutionalizing ARH may yet be the best way, as suggested by the findings brought forward by this study.

Acknowledgement

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Endnotes

- ¹ The National Statistical Coordination Board (2010) of the Philippines defines a “barangay” as the smallest political unit into which cities and municipalities in the Philippines are divided. It is the basic unit of the Philippine political system. It consists of an area with fewer than 1,000 inhabitants residing within the territorial limit of a city or municipality and administered by a set of elective officials, headed by a *barangay* chairman (*punong barangay*).
- ² A fecund respondent is a woman who has not been ligated, has regular sexual activity with her partner and has been pregnant. If she has regular sexual activity but has never been pregnant, she should have been married/living together with her husband/partner for a period of fewer than five years (based on operational definition used by Govindasamy and Boadi, 2000).
- ³ A “jeepney” is a popular form of public transportation in the Philippines. It is well known for its flamboyant decoration and has also become a symbol of Philippine culture. Jeepneys were originally made from military vehicles left in the country by the United States of America, following the end of the Second World War.

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Below to above Replacement: Increased Fertility and its Determinants in Sri Lanka

With this recent development in fertility, the child dependency ratio is likely to increase in the near future, as will the ageing of the population. A future demographic scenario for Sri Lanka indicates a difficult outlook at both ends of the population pyramid.

**By W. Indralal De Silva, B. Nishanthi Perera and
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During the early phase of the demographic transition in Sri Lanka (in the 1920s), the birth rate persisted at about 40 per 1,000 population, with the death rate fluctuating at around 20 per 1,000. A slight decline in the death rate was observed from the late 1920s onward. After the 1940s, the crude death rate dropped at an unprecedented level: about 1.5 deaths per 1,000 population per year on average, before reaching the level of 12 deaths per 1,000 population by the middle of the twentieth century (Caldwell, 1986).

Fertility started to decline in Sri Lanka in the 1960s and by 1994 the country had undergone several transitions with regard to major demographic factors, having reached the crucial stage of replacement-fertility¹ and moved even below that level. Demographers researching determinants of population growth predicted that Sri Lanka would reach a total fertility rate (TFR) of 2.1 children per woman by the year 2000. Yet the country reached it about six years

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earlier, becoming the only one in South Asia to do so before the dawn of the new century (De Silva, 1994). A total of 18 countries and areas in the Asian and Pacific region reached the below-replacement level of fertility in the same period (Gubhaju, 2008).

Although during the period 1995 to 2000 Sri Lanka experienced fertility rates even below the replacement level – identified by a TFR of 1.9 – the most recent survey data from the Sri Lanka Demographic and Health Survey (SLDHS, 2006-2007) indicate a TFR of 2.3, which demonstrates an increase in fertility, well above the replacement level. Within developing regions no single country has demonstrated this kind of fluctuation in TFR, once it has reached levels below replacement.

Against this backdrop, the present article examines Asia's fertility transition, focusing briefly upon fertility-related policies, programmes and targets in Sri Lanka. It also examines the demographic changes which enabled the country to achieve replacement-level fertility and to even pass beyond that level. Major factors underlying the recent fertility fluctuations in Sri Lanka, uncommon to any other developing country in the region, are also examined.

Data

The main sources of data for this analysis are the Sri Lanka Demographic and Health Surveys (SLDHS) for the years 1987, 1993, 2000 and 2006-2007. Samples for those surveys had been designed for multistage data collection and were based on a stratified probability sampling procedure, which ensures representativeness of the sample for the whole country. The SLDHS 2006-2007 survey covered all the provinces in Sri Lanka except the Northern one, which is home to only about 5 per cent of the Sri Lankan population. The SLDHS 2000 had excluded both the Northern and Eastern provinces of the country, where civil disorder prevailed at the time. Despite differences between these two surveys, which called for some adjustments on the part of the authors, comparison of the findings can be assumed to be reasonably accurate.

A total of 6,601 eligible respondents, ever-married women aged 15-49 years, had been identified in the Sri Lanka Demographic and Health Survey 2000 and 6,385 of those respondents were interviewed, indicating a response rate of 96.6 per cent. A wider sample of 15,068 respondents, ever-married women aged 15-49 years, had been identified in the Sri Lanka Demographic and Health Survey 2006-2007, with 14,692 interviews completed, indicating a further enhanced response rate of 97.5 per cent. These constitute the data sources used for the present study.

The expert views of several professionals in the population and health sector had been gathered on the current fertility phenomena, including with regard to the causation of recent fluctuations in TFR and the consequences of such fertility behaviour. Their views have been taken into consideration when conceptualizing the present paper.

The SLDHS surveys 2000 and 2006-2007 used two basic questionnaires - one on households which recorded information on all household members and the other on individuals, which recorded detailed information on eligible women, who had been identified based on the earlier household questionnaires. The questionnaire on individuals helped to collect information related to the respondents' background characteristics, reproductive history and child mortality, knowledge and practice of family planning, breast-feeding practices, marriage, fertility preferences, and health and anthropometric information on children. The details of the surveys are available online from: www.statistics.gov.lk/dhs.

Population change

The total population enumerated in Sri Lanka in the first census ever conducted in 1871 was only 2.4 million, while the 2001 population census enumerated 18.7 million, denoting an almost eightfold increase. The overall trend in the population growth rate during the period 1871 to 1946 - just over seven and a half decades - had been fairly low, ranging from 0.9 to 1.7 per cent per annum. During the post-Second World War period, between 1946 and 1953, a rapid escalation of the population growth rate to 2.8 per cent per annum was observed. Thereafter, the population growth rate of Sri Lanka declined steadily. By 1992 the country had one of the lowest annual population growth rates (1.0 per cent) in Asia. The two main factors responsible for this trend were fertility decline and increased emigration, especially towards the Middle East and developed countries.

The rapid increase in the annual rate of population growth in the post-war years in Sri Lanka was the result of a sharp decline in the death rate, while the birth rate remained at about 35-40 live births per 1,000 population. Since 1947 the death rate declined gradually to a very low level of about 5 per 1,000 population. The expectation of life at birth in 2001 was 68 and 76 years for males and females, respectively. A gradual decline in the birth rate had begun in 1960 which further contributed to a reduction of the annual rate of growth. The birth rate, which stood at 37 per 1,000 population in 1960, had declined to 18 per 1,000 by 2001 (De Silva, 2008).

Fertility and population control: policies and targets

Population planning policies and targeted fertility decline adopted by successive Governments of Sri Lanka during the period 1960 to 2001 were largely responsible for the spectacular decline in the birth rate. Such policy drives had to be introduced because Sri Lanka had become one of the most densely populated countries in Asia. Persistent growth of the population and the consequent pressure on habitable land had been of increasing concern to successive Governments, because population growth was far more rapid than could be sustained by the economy. In 1871, the population density in Sri Lanka was only 37 persons per square km, but by 2001, a more than eightfold increase was reported and the density parameter had reached to almost 300 persons per sq km.

In Sri Lanka, the Ten-Year Plan of 1959-1968 for the first time expressed grave concerns about the rapidly increasing population (National Planning Council, 1959). Even though the formulation of fertility control policies in Sri Lanka date back to the 1950s, those concerns were not followed by any policy implementation measures. In 1965 the Government of Sri Lanka, by a cabinet decision, accepted family planning as a national policy and initiated implementation of the policy in 1968 by establishing the Family Health Bureau within the Ministry of Health (Dangalle, 1989).

Between 1968 and 1977, under the umbrella of that organization, there was a gradual expansion of family planning activities and those services were integrated with the already well-developed maternal and child health services provided by the Ministry of Health throughout the country. The Five-Year Plan (1972-1976), which was presented in 1971, stated that "a high birth rate in the context of low standards of living and malnutrition can lead to a general deterioration in the health of the population, an increase in the incidence of disease and a rise in infant mortality. It is essential therefore that facilities for family planning should be made available to all groups in the population and not confined to the privileged sections of the society" (Ministry of Planning and Employment, 1971).

In many instances, the Government of Sri Lanka had noted the need to curb the persistently growing population, and population control was seen as critical in balancing the available resources with the demands of an increasing population. Therefore, the Government, in its population policy statement issued in 1991 (Ministry of Health and Women's Affairs, 1992), set for the first time a more quantitative target of achieving replacement-level fertility, a TFR of 2.1, by the year 2000.

The 1991 policy statement envisaged that, in order to achieve a zero population growth rate, and a stable population condition (denoted by equilibrium between birth and death rates, in the context of low mortality), Sri Lanka needed to reduce its fertility to the replacement level, reaching an average of two children per family. As population projections indicated, if the country was able to achieve a two-child family average by the year 2000, then about half a century later, around 2050, the population would stop expanding and by that time the population would be about 25 million (Ministry of Health and Women's Affairs, 1993).

High to replacement-level fertility

Gradual decline in TFR, from high to low, towards the replacement level, is reflected in the rates calculated using data collected from the population censuses, the registration system and from survey data for more recent levels. TFR for selected years from 1953 to 2006-2007 are shown in table 1. TFR decreased from 5.3 in 1953 to 3.4 in 1981, or by almost two live births per woman, dropping further to 2.8 in the period 1982-1987 and to 2.3 during the period 1988-1993. Sri Lanka's fertility dropped about 20 per cent between the periods 1982-1987 and 1988-1993 (see table 1).

The hypothesis whether Sri Lanka had reached the replacement level of fertility before the target year has been presented in an earlier publication (De Silva, 1994). In the present paper, using data from several sources, such the Demographic and Health Surveys of 1987 and 1993, the census of 1981 and the Registrar General's

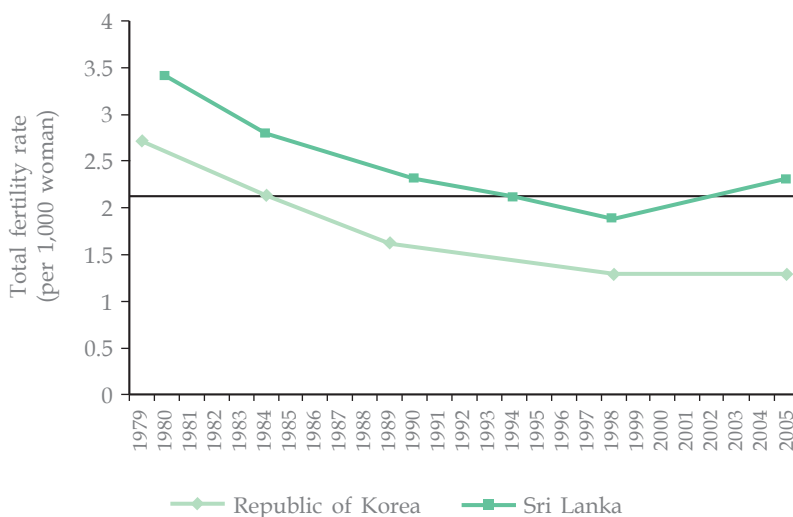
Table 1. Total fertility rate (live births per woman), Sri Lanka

Source	Year/period	Total fertility rate
Census, registration	1953	5.3
Census, registration	1963	5.3
Census, registration	1971	4.2
World Fertility Survey 1975	1974	3.6
Census, registration	1981	3.4
Demographic and Health Survey (DHS) 1987	1982-1987	2.8
DHS 1993	1988-1993	2.3
DHS 2000	1995-2000	1.9
DHS 2006-2007	2003/2004-2006/2007	2.3

Sources: Department of Census and Statistics (2002) and online from: www.statistics.gov.lk/dhs.

Department, it is noted that TFR in Sri Lanka had declined to replacement-level fertility by the mid-1990s. Data from the 2000 SLDHS confirms the above hypothesis. The SLDHS survey data for the period 1995-2000 have measured TFR in Sri Lanka to be in the range of 1.9 children per woman, which was even below the replacement level of 2.1. Thus, based on the above sources, figure 1 clearly indicates that TFR of Sri Lanka had reached the replacement fertility level by 1994 at the latest.

Figure 1. Change in total fertility rate in Sri Lanka and Republic of Korea



Sources: Data for Republic of Korea obtained online from: www.prb.org.
Data for Sri Lanka were obtained from Department of Census and Statistics.

Below replacement to above replacement

In the context of the economic transition that is taking place in Sri Lanka, it is logical to compare the fertility decline that had taken place in the country with that of a newly industrialized economy. Congruent patterns of fertility decline can be observed when declining fertility levels and patterns of Sri Lanka are compared with that of the Republic of Korea, a newly industrialized economy. As shown in figure 1, the similarities are clear. Both Sri Lanka and the

Republic of Korea show the same pattern of fertility decline, but Sri Lanka's fertility levels have always remained higher than those of the Republic of Korea, which dropped from 2.7 in 1980 to the replacement level in 1985, i.e. within a five-year period (KIHASA, 1992), whereas it took Sri Lanka about eight years for its TFR to drop from 2.7 in 1986 to the replacement level in 1994. The Republic of Korea had reduced fertility to below the replacement level (1.7) during the period 1990-1995 (Gubhaju, 2008) and subsequently by 1998 TFR in the Republic of Korea reached 1.3, which was very much below the corresponding fertility level of Sri Lanka.

The indices related to fertility transition in Sri Lanka, particularly TFR valued at 1.9 for the period 1995-2000 calculated from the SLDHS 2000, raised some expectation among researchers, considering that Sri Lankan fertility could have remained stable or even could have gone below the level reported by SLDHS (De Silva, 2007; Abeykoon, 1998). Nevertheless, at that juncture, it was not possible to predict the needed changes in the country's policies and programmes to deal with a fertility level equating to or even less than the replacement level.

Unexpected fertility transition: below to above replacement

The SLDHS 2006-2007 indicated an unexpected increase in TFR, and the hypothesis of replacement level fertility or even below that level in Sri Lanka in the new millennium was therefore challenged. The expectations of population planners were not fulfilled. TFR calculated to be 1.9 during the period 1995-2000 increased to 2.3 over a three-year period (2003/2004-2006/2007) according to SLDHS 2006-2007 (table 1). The achieved below replacement fertility level had increased to the above replacement-level. Simply put, a reversed trend is marked in Sri Lanka's fertility transition. The fertility level observed currently (TFR 2.3) is identical with the level observed in the 1993 SLDHS for the period 1988-1993.

Consequent to this, Sri Lankan fertility levels are now at par with those of a number of South Asian countries (table 2). In fact TFR of Bhutan, a landlocked country in South Asia, is 0.1 point less than that of Sri Lanka. Currently, TFR of Sri Lanka is still the second lowest in comparison with that of all other South Asian countries, but the matter for concern is that in these same countries, TFR had been gradually declining during the period 1995 to 2000 (table 2), whereas in Sri Lanka only it increased from 1.9 to 2.3 during the same period.

Table 2. Total fertility rate by country in South Asia

Country	Total fertility rate (live births per woman)			
	1990-1995	1995-2000	2000-2005	2007
Afghanistan	8.0	8.0	7.6	7.1
Bangladesh	4.1	3.6	3.2	2.9
Bhutan	5.5	4.3	3.0	2.2
India	3.9	3.5	3.1	2.8
Maldives	5.6	4.1	2.9	2.6
Nepal	5.0	4.4	3.8	3.3
Pakistan	5.9	5.0	4.1	3.5
Sri Lanka	2.2	1.9	2.1	2.3

Sources: ESCAP (2008); Sri Lankan data derived from table 1.

Changing age patterns of fertility

The broader picture of fertility behaviour can be understood through the analysis of age-specific fertility rates, because such age patterns indicate the tempo of childbearing, the age at which women begin to reproduce, the age at which they cease reproducing and any change in the pattern of childbearing occurring over time. For example, in Taiwan Province of China, where below replacement fertility has been achieved, fertility decline to the replacement level occurred at all ages of women in their reproductive years (Lee, 2009).

Recent changes in age-specific fertility rates in Sri Lanka further support the contention that fertility levels in Sri Lanka had been increasing during the period 2003/2004 to 2006/2007 (table 3). As shown in figure 2 and table 3, the age-specific fertility rates in Sri Lanka rise when women are in their early twenties, peak in the age group 25-29 years, slightly plateau in the subsequent years and then gradually decline along with the declining fecundity of women. Over many decades, there had been no change in this age pattern of fertility. Between 1975 and 1993, large fertility reductions had occurred among all age groups (table 3). Age-specific fertility had further declined significantly between 1993 and 2000. Thus, as depicted in figure 2 between 1975 and 2000, both older and younger women experienced a remarkable decline in fertility over this 25-year period.

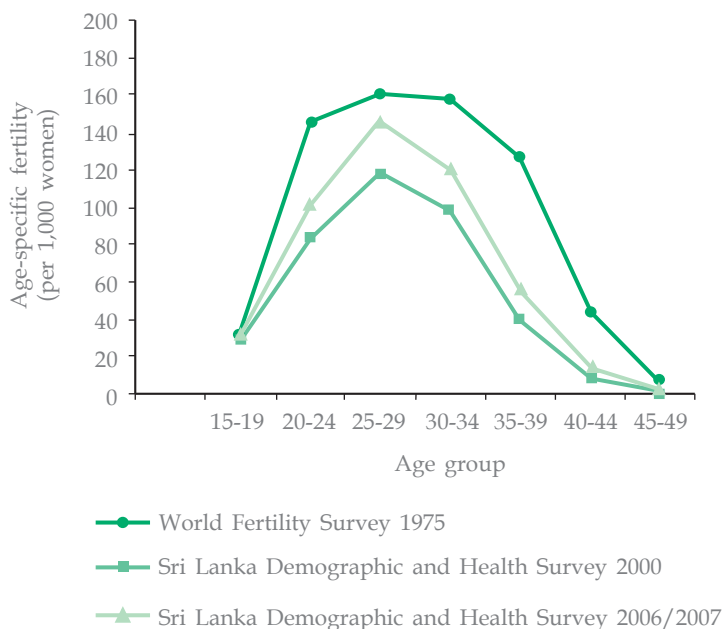
De Silva (1991), in examining the prevailing declining pattern of age-specific fertility rates (ASFR), concluded that “women in Sri Lanka are inclined to limit the number of children at a relatively

Table 3. Age-specific fertility rates of Sri Lanka

Age (Years)	World Fertility Survey 1975	Sri Lanka Demographic and Health Survey 1993	Sri Lanka Demographic and Health Survey 2000	Sri Lanka Demographic and Health Survey 2006/2007	Percentage change
	1974	1988-1993	1995-2000	2003/2004-2006/2007	1995-2000 to 2003/2004-2006/2007
15-19	31	35	27	28	3.7
20-24	146	110	83	102	22.9
25-29	161	134	118	147	24.6
30-34	158	104	98	122	24.5
35-39	126	54	40	57	42.5
40-44	43	14	8	14	75.0
45-49	6	4	1	1	0.0
TFR	3.4	2.3	1.9	2.3	21.0

Sources: Department of Census and Statistics (2002) and online from www.statistics.gov.lk/dhs.

Figure 2. Age-specific fertility rates, Sri Lanka



Source: Various sources of the Department of Census and Statistics.

early age". Until the year 2000, no change in the declining pattern of fertility had been observed among women from all socio-economic strata in Sri Lanka. With the dawn of the new century, the age pattern of fertility in all age groups, except between 45-49 years, changed significantly, demonstrating a sudden and unexpected increase. ASFRs for the 25-39 age group in the 2006-2007 SLDHS were even higher than the corresponding values reported in the SLDHS 1993 (see table 3).

The percentage change in ASFRs of the 2000 and 2006-2007 SLDHS shows that the largest increase was among the 35-44 age group. Although fertility had increased, the age group in which peak fertility occurred had not changed, and the age pattern of fertility had remained unchanged (see figure 2). Interestingly, the latest SLDHS data show that the peak ASFR of women in the 25-29 age group was 147 per 1,000 women in that age group, which is only 14 points less than the peak value of 161 per 1,000 women reported in the 1975 World Fertility Survey (see table 3).

The adolescent fertility rate of Sri Lanka increased by 3.7 per cent even though teenage fertility (age group 15 to 19) declined in most other developing countries, except for Pakistan, which indicates a 14-point increase (table 4). Substantial declines in adolescent fertility rates have occurred in Afghanistan, Bhutan and Nepal. Of these countries, Afghanistan and Nepal exhibited relatively higher TFRs throughout the period (table 2).

Table 4. Adolescent-specific fertility rate by South Asian countries

Country	Adolescent fertility rate (live births per 1,000 females aged 15-19)		
	1995-2000	2000-2005	2005-2010
Afghanistan	166.2	131.9	113.0
Bangladesh	151.5	149.2	124.5
Bhutan	73.2	50.9	36.8
India	99.5	68.9	61.8
Maldives	45.4	26.2	23.3
Nepal	127.2	122.2	114.6
Pakistan	68.8	22.0	35.6
Sri Lanka	27.0	28.0	28.0

Source: ESCAP (2008).

Determinants of decline and subsequent increase in fertility

Fecundity, a naturally complex process, is also affected by several socio-economic and biological variables. In addition, a decrease or increase in the fertility level in any given country is largely determined by three non-genetic factors, such as changes in the age at marriage, use of contraception and the practice of induced abortion. However, the impact of those changing agents on fertility also varies. For instance, an increase in the average age at marriage of females could have a negative impact on fertility, while a decrease in the age at marriage could affect the level of fertility in the opposite way (Jones, 2007).

Trends in marriage timing

The postponement of marriage contributes substantially towards a reduction in the level of fertility by limiting the total reproductive lifespan of the female, the cumulative effect of which influences the size of the individual families and the population growth rate of the country. In Sri Lanka, during the past century the female age at marriage increased by almost seven years. The delay in marriage and its impact on fertility led Krik (1969) to refer to Sri Lanka as “the Ireland of Asia”. Caldwell and others (1989) identified Sri Lanka as the leader in third world Asia for demonstrating a changing pattern in the age at marriage. By the mid-1970s, Sri Lankan women were marrying not at puberty but a decade after the onset of puberty.

Universal and early marriage of females is common in a large number of South Asian countries. Sri Lanka, where marriage occurs very late and may no longer be considered as universal, appears as an exception in the subregion. About 9 per cent of females in the age group 40-44 and 5 per cent in the age group 45-49 were never married and an upward movement of those never-married proportions had been a conspicuous general trend until recent times.

In terms of family formation the singulate mean age at marriage (SMAM) for females increased by almost 5 years, from 18.3 years in 1901 to 23.5 in 1971 (table 5). There was a slight decline in SMAM during the period 1975 to 1981, and since then the average age at marriage in Sri Lanka showed an increase. On average, by 1993, females were marrying at the age of 25.5 years. Many researches have indicated that up to 1970, marriage postponement in Sri Lanka was responsible for about 60 per cent of the fertility decline. The last two DHS surveys in 2000 and 2006-2007 show that, the average age at marriage of females in Sri Lanka gradually declined com-

pared with the average in the 1993 DHS. However, it is interesting to note that the latest SMAM of females (23.6 years) reported in the 2006-2007 SLDHS is very much comparable with the corresponding figure for 1971.

Data presented in table 5 indicate that SMAM for males has been about 28 years for some time since 1981, although data are not available to examine related trends during the recent past. Since the increase in the male age at marriage has been less rapid than that of females the sex differential has dropped from over 6 years in 1901 to just over 3 years in 1981. There is a strong likelihood that, along with the female age at marriage, the male age at marriage would have also declined in the recent past.

Table 5. Trends in singulate mean age at marriage in Sri Lanka

Year	Males (years)	Females (years)	Difference between males and females (years)
1901	24.6	18.3	6.3
1911	26.5	20.8	5.7
1921	27.0	21.4	5.6
1946	27.0	20.7	6.3
1953	27.2	20.9	6.3
1963	27.9	22.1	5.8
1971	28.0	23.5	4.5
1975 Sri Lanka World Fertility Survey (SLWFS)	28.2	25.1	3.1
1981	27.9	24.4	3.5
1987 Sri Lanka Demographic and Health Survey (SLDHS)	-	24.8	-
1993 (SLDHS)	-	25.5	-
2000 (SLDHS)	-	24.6	-
2006-2007 (SLDHS)	-	23.6	-

Sources: Various sources of the Department of Census and Statistics.

In Sri Lanka the exposure to issues related to conception is closely related to marital union. Therefore, it is logical to assume that increasing average age at marriage, particularly of females, is negatively related with fertility. Thus, the decreasing trend in female SMAM during the recent past would have at least partially contributed to the recent increase in fertility in Sri Lanka.

Trends in contraceptive use

High and effective prevalence of contraceptive methods is an important non-genetic determinant of the declining fertility level in a community. It is useful to examine the trends in the use of contraception in Sri Lanka and the recent changes in the prevalence rates, if any, to elucidate the causes of recent fertility increase in the country. After 1970, the key determinant in the fertility decline was the control of fertility within marriage and the decline in consequent marital fertility (Trussell, 1980; McCarthy, 1982). There was also evidence that the decline in such fertility in Sri Lanka had already started before the national family planning programme could have had much impact (Alam and Cleland, 1981; Langford, 1982). After the inauguration of the national family planning programme in 1965, the Government adopted a “cafeteria” approach whereby the users could select their contraceptive method of choice from a wide range made available to them through the national programme (Dangalle, 1989). In addition to the public sector, a number of non-governmental organizations (NGOs) provided family planning services.

The level of contraceptive use among Sri Lankan women increased rapidly in the period following 1970. Awareness of contraception increased not only for the purpose of ceasing childbearing but also for that of spacing births. The level of contraceptive use increased from 34 per cent in 1975 to 62 per cent in 1987 and further to 70 per cent in 2000 (table 6).

Emergence of a reversed pattern to the one previously observed -- an elevated use of contraception among fecund women in Sri Lanka -- is a relatively recent phenomenon. The SLDHS 2006-2007 reports

Table 6. Trends in current contraceptive use by modern and traditional methods among currently married women aged 15-49

Type of method	SLWFS 1975	SLCPS 1982	SLDHS 1987	SLDHS 1993	SLDHS 2000	SLDHS 2006-2007
Modern	20.2	31.8	40.6	43.7	49.5	52.5
Traditional	14.2	26.0	21.1	22.4	20.5	15.9
All	34.4	57.8	61.7	66.1	70.0	68.4

Sources: Various sources of Department of Census and Statistics.

Abbreviations: SLWFS = Sri Lanka World Fertility Survey;
 SLCPS = Sri Lanka Contraceptive Prevalence Survey;
 SLDHS = Sri Lanka Demographic and Health Survey.

only 68.4 per cent of contraceptive use among the currently married women of reproductive age (for more details, see: www.statistics.gov.lk/dhs). This decline is not very significant compared with the corresponding level of 70 per cent, reported in 2000. The decrease in the use of contraception among married women would also have partially contributed to the observed increase in the level of fertility in Sri Lanka.

The acceptance of modern contraception in Sri Lanka is a relatively recent development. According to the 1975 WFS, 59 per cent of users of contraception were relying on modern methods, while the SLDHS 1987 estimated that the proportion of modern method users had increased to 66 per cent. The SLDHS 2006-2007 indicated that the corresponding proportion had further increased to 77 per cent. However, even now, among current users, about one quarter rely on traditional methods (table 6). This clearly implies that a substantial proportion of users of contraception in Sri Lanka still rely on traditional methods.

Significant changes have taken place recently with regard to the preferred modern methods of contraception. Although modern temporary methods show a continuous increase in use, a similar increase has not occurred with regard to permanent ones. Findings from the latest SLDHS show that the proportions of individuals that use the most effective methods, identified as male and female sterilization, have declined remarkably. For instance, of currently married women in 1987, one quarter were relying on female sterilization. By contrast, by 2006-2007 the corresponding figure had dropped to 16.3 per cent (table 7). A similar pattern of preference can be observed regarding male sterilization.

Comparison of the two periods also confirms that a remarkable decline in the proportion of women relying on the use of non-reversible methods took place. When the period 2000 to 2006-2007 is compared with the previous one from 1987 to 2000, the proportions who used such methods, especially male and female sterilization, was higher during the previous phase than the proportion of users of terminal methods in the latest one. This trend raises a pertinent question: is there an unmet demand for sterilization among Sri Lankan women? And Is the imbalance in the service delivery of permanent methods of family planning caused by any unrevealed sociocultural and religious issues which would have an impact on the level of fertility among married women? Alternatively, it may also be a matter of choice where women may have diverted their reliance on contraception to induced abortion instead.

Table 7. Trends in current contraceptive use by method among currently married woman aged 15 – 49

Contraceptive method	Percentage currently using		
	SLDHS 1987	SLDHS 2000	SLDHS 2006-2007
Pill	4.1	6.7	8.1
IUD	2.1	5.1	6.5
Injection	2.7	10.8	14.8
Condom	1.9	3.7	5.7
Female sterilization	24.9	21.0	16.3
Male sterilization	4.9	2.1	0.7
Implant	0.0	0.1	0.3
Other (modern)	-	-	0.1
<i>All modern methods</i>	40.6	49.5	52.5
Rhythm	14.9	11.9	10.1
Withdrawal	3.4	7.1	5.8
Other method	2.8	1.5	0.1
<i>All traditional methods</i>	21.1	20.5	15.9
<i>All methods</i>	61.7	70.0	68.4

Sources: Department of Census and Statistics (2002) and online from: www.statistics.gov.lk/dhs.

Practice of induced abortion

The practice of induced abortion has recently emerged as one of the important determinants curtailing fertility in Sri Lanka. Precise national estimates are not available on the number of abortions undergone by Sri Lankan women because of their illegality. The term abortion is defined as the loss of an embryo or foetus either spontaneously (miscarriage) or induced (when a pregnancy is terminated on purpose) before the foetus is viable, which in developed countries is considered to be at 20 weeks (WHO, 2003). Thus, an abortion could either be spontaneous,² which means occurring on its own, or induced.

Despite the highly restrictive abortion law in Sri Lanka, indictments for criminal abortion hardly occur and offenders are rarely persecuted for such an act. In the past, a number of attempts were made by the Government of Sri Lanka to liberalize the country's strict abortion law but those attempts were opposed by anti-abortion leaders on moral grounds. Thus, abortion remains illegal in Sri Lanka under Article 303 of the Penal Code³ of 1883.

Researchers tend to consider that abortion in Sri Lanka is an unrecognized method of fertility control (Langford, 1982; Caldwell and others, 1987; De Silva, 1991). A survey conducted as early as 1984 using in-depth interviewing methods (Caldwell and others, 1987) showed that most couples in Sri Lanka believed that induced abortion occurred to a limited extent, while approximately one fourth of respondents felt that it was common. The majority of those against induced abortion held adverse views on the practice, on the ground that it was dangerous rather than owing to any immorality associated with the act. However, during the last two to three decades, abortion services have become increasingly therapeutic. Thus, serious post-abortion complications and deaths have been hardly reported.

Researchers engaged in abortion-related research tend to agree on the number of abortions estimated to be performed annually throughout the country, ranging from 125,000 to 225,000 induced abortions (De Silva, Dayananda and Perera, 2006). A community survey conducted in 1998, with a total population of over 100,000, gathered abortion experiences occurring within the community during the preceding three years. The study, which applied the randomized response technique, reported that on average the induced abortion rate of married women in the reproductive age group amounted to 10.89 induced abortions per 1,000 married women.

Although national surveys such as SLDHS had attempted to collect information on the incidence of induced abortion in Sri Lanka, the incidence was grossly underreported. According to SLDHS 2000, among 6,385 ever-married women of reproductive age, 76 induced abortions had taken place, which is even lower than the number of induced abortions reported in the SLDHS 1993, that is, 152. The above-mentioned pattern of reporting may be due to the stigma attached to the issue of abortion while it also confirms the difficulty of collecting reliable data on this sensitive matter through official national surveys.

Abortion services provided by non-governmental organizations and other service deliverers might have contributed significantly to the achievement of below replacement fertility in Sri Lanka. However, while researchers on the marital status of abortion seekers tend to agree that about 90-95 per cent of those clients were married, a number of studies attempted to examine the reasons for the termination of a pregnancy through abortion.

The following excerpts are some of the answers given by seekers of induced abortion in their responses to in-depth examination on the subject, or conclusions reached after in-depth interviews, according to a study undertaken by Rajapakse and De Silva (2000).

- (a) The most common reason given in all studies was that the “pregnancy was too soon after the last delivery”;
- (b) “Having completed the family” was the comment provided by abortion clients in many studies as the second most popular justification;
- (c) “Foreign employment, poverty and health reasons” are the next set of reasons reported by these women;
- (d) “About two thirds of the abortion clients were using some method of contraception at the time they became pregnant”.

The above-mentioned study also shows that even though a small proportion of abortion seekers were not relying on any form of contraception, among those who did use contraception, over two thirds relied on traditional methods, the failure rates of which are significantly higher than for modern methods. They might have relied on traditional methods to avoid conception, knowing that if they were to get pregnant, induced abortion services for termination would be available. Even though induced abortion is illegal, abortion services are available in many parts of the country at an affordable price.

Discussion and conclusions

In the 1950s and 1960s, fertility in Sri Lanka remained at a very high level with a TFR of 5.3, indicating that on average a Sri Lankan woman had about 5.3 live births over her lifetime. By 1994, the replacement level of fertility had been reached as TFR had decreased to 2.1 children per woman, but the decline continued. The SLDHS 2000 reported a TFR of 1.9 children per woman, confirming that Sri Lanka was becoming the first country among all developing countries in South Asia to reach a below replacement level fertility in 2000, even when the country’s per capita GDP amounted to only \$1,990.

The SLDHS 2006-2007 reported that the level of fertility, which was initially below replacement, had unexpectedly increased to 2.3 children per woman. This was contrary to what population experts had projected.

The Sri Lankan record in curtailing fertility had been impressive. The population planners had expected that replacement level fertility (TFR of 2.1) would be achieved by the year 2000, but it was achieved by 1994, ahead of the targeted date (De Silva, 1994). Many countries in South Asia had to postpone the targeted date by

which they wanted to achieve replacement-level fertility owing to the sluggish process of fertility decline in those countries. For example, the following quote is from Bhat (undated) in which the researcher reviews the fertility trends and future prospects for India, commenting also on the changing dates to attain replacement fertility level in the country.

The goal of reaching Net Reproduction Rate (NRR)⁴ of one was set for the year 2000. In plan documents this goal was postponed to 2006-2011 in the mid-1980s and further to 2011-2016 in the beginning of 1990s. Interestingly the National Population Policy announced in 2000 perhaps to underscore the renewed commitment to population stabilization had advanced the date to the year 2010.

In Sri Lanka, the key factors contributing to fertility decline at levels even below replacement include delay in age at marriage, which curtails the reproductive age span, particularly for females, high reliance on contraception and induced abortion. Even when fertility increased well above the replacement level, the same key factors had been at play, yet the trend was ultimately reversed. It is pertinent to examine the reasons behind such an unusual scenario.

During the period 2006-2009, the prolonged civil war in Sri Lanka intensified. A large number of young soldiers and many civilians died as war casualties. Additionally, in 2004, the Indian Ocean tsunami killed about 35,000 persons in Sri Lanka, the majority of whom were women and children (for more details, see: www.ruh.ac.lk/tsunami/statistics.html). Those events and the heavy involvement of young people in the civil war might have influenced Sri Lankan couples of reproductive age to replace the vacuum created in society. Presumably the change in fertility from below to above the replacement level occurred throughout those key periods.

According to Asian standards, particularly those prevailing in South Asia, entering into nuptial bonds should be done at an early age. For a long time, the average age of entry into marriage in Sri Lanka had been more than 25 years and 28 years for women and men, respectively. The SLDHS 2006-2007 however showed that this average did not apply anymore. Owing to a multiplicity of reasons a new trend has emerged among young Sri Lankan men and women who marry at an even earlier ages.

Marriageability for men in Sri Lanka is largely related to their employment status - firstly whether a man has a job or not and secondly the status of the job, whether or not it is a "permanent" one (Caldwell, Gajanayake, Caldwell and Caldwell, 1989). It is also important to note that, during the early part of the current decade,

the unemployment rate declined to a low of 5 per cent of the labour force. Seemingly almost all young males were employed, enabling the majority of them to enter into marriage. Also, a significantly large number of young men joined the armed forces -- the majority of them getting married at an early age. Owing to the risky nature of their employment, the newly married soldiers would generally be keen to conceive a baby as soon as possible.

Apart from the declining average age at marriage, conceptualization and dissemination of pronatalistic views among the majority of couples would have caused overall contraceptive use to decline. Owing to the pronatalist views disseminated by politicians, policymakers, medical and paramedical groups, directly and indirectly, the demand for contraceptive commodities and service delivery would have declined. After achievement of the replacement level and subsequently below replacement fertility, most of the family planning activities of the State, private sector and NGO sector slowed down.

Typically, when a family has achieved its desired family size, a modern or traditional family planning method is used to avoid further conception. However, for most soldiers engaged in the civil war, the outlook on family planning was slightly different. Usually soldiers come back home about once a month and in some cases only once in every two months. The couples may have not practised family planning very methodically assuming that the spouse was not at risk of getting pregnant because of the irregularity and infrequency of cohabitation. However, when unprotected sex occurred during the risk period, some women would have conceived; even though they may not have intended to, those women might have decided to carry on with their pregnancy owing to pronatalist views prevailing in society at that time.

Not only has the reported contraceptive prevalence rate declined, but the method mix has also changed significantly. Interestingly, among currently married women, the proportion who relied on permanent methods (sterilization) declined for many reasons. The higher level of side effects due to sterilization, as reported in many studies, would have caused the majority of couples to opt for modern temporary methods (De Silva, Dayananda and Perera, 2006). A number of public protests against sterilization occurred in many parts of the country. Typically, the Medical Officer of Health in each area would have been trained by the Family Health Bureau on sterilization techniques. As indicated by a number of key informants, the majority of the medical profession has become reluctant to perform sterilization procedures owing to the pronatalistic views held by an increasing number of persons, including those with a

higher level of education. Further, such views have also been held by a critical number of medical professionals who started avoiding regular training for the sterilization procedures – something which in turn would start creating an imbalance in the service delivery for sterilization.

In recent years, the stability of Sri Lankan couples has deteriorated (De Silva, 2005). Consequently many married men and women have not opted for terminal methods as the probability has increased that marital partners would change. This situation was further aggravated in the wake of the 2004 tsunami, during which many men and women who had been sterilized lost their children and had no chance of conceiving again.

However, when couples are unable to limit or space births using contraception, the majority may resort to abortion. Although no official statistics are available on this issue, abortion providers throughout the country agree that in recent years, there has been a significant drop in the caseload of abortion seekers. Yet, again this may be due to pressure from pronatalist groups or may be related to the emergence in recent years of a non-equilibrium situation between the demand for and supply of abortion services.

In general, causation for such a trend is both complex and multiple. In recent years, the Government has intensified its pressure on abortion centres, initiating vigorous persecution. By the beginning of the year 2007, the Government launched a well-coordinated drive to bring a halt to abortion services made available in the country by international and local NGOs and some private facilities. As a result, almost all abortion service centres were closed or are in the process of being closed, and legal action is being brought against the service providers. There has been no public reaction and rallies by defenders of women's rights against such raids, presumably owing to the prevailing strong pronatalist views in the country.

In Sri Lanka, the remarriage rate of women has increased during the recent past. Since the early part of the 1980s, as a result of the civil war, an increasing number of young women with small children have lost their husbands. Such young widows -- who needed a father for their children and a life partner to rebuild their lives -- tended to remarry. In the meantime, there also may have been attitudinal changes on the issue of widowhood and remarriage. The majority of families in such situations would be keen on having babies. Therefore, the increasing trend in remarriage would have contributed to an increase in the level of fertility.

In 2004, the Government of Sri Lanka issued a new circular on maternity leave for women working in the public sector (Public Administration Circular No/3./2004). Under this circular, a woman is entitled to a significantly long period of maternity leave. Accordingly, a government female officer who has given birth to a living infant can get up to 84 days (working days) of full-pay leave, 84 days of half-pay leave and another 84 days of leave without pay. This addresses a key challenge for working women: the issue of caring for children in their very first stage of life.

Recent evidence shows that there has been a clear shift in terms of priorities for family planning programmes implemented throughout the country. For example, the Population Division under the Ministry of Health, which had significantly contributed to enhanced knowledge on population issues including population growth, ageing, reproductive health, and contraception among the general public, received low priority within the Ministry during the past few years, and was abolished in 2006.

Following the achievement of below replacement-level fertility within a remarkably short timespan, population planning activities have largely slowed throughout the country. Also nationwide campaigns, such as those promoting the benefits of smaller families ("Smaller family is golden"), which were carried out successfully during the late 1970s and 1980s, also contributed to the trend. The focus of family planning programmes has shifted from "quantity" to "quality", which would also have indirectly affected the distribution and use of contraceptives. Other determining factors include the increasing number of pronatalist sympathizers who argue that the country needs a higher number of births to compensate for the number of casualties brought about by the 30 years of civil strife and the 2004 tsunami (views of key informants).

With this recent development in fertility, the child dependency ratio⁵ is likely to increase in the near future, as will the ageing of the population. A future demographic scenario for Sri Lanka indicates a difficult outlook at both ends of the population pyramid. In other words, a contradictory situation is emerging in which the ageing of the population will continue along with an increase in child dependency, thus increasing the dependency burden for the working population at both ends of the population pyramid. The current global economic crisis further compounds the situation. With increased child dependency over the coming years, the Government is expected to spend more on the young-age population, and this may drain the resources required for the development of the country.

Thus, reducing the level of fertility could again appear as an appropriate solution for many of the socio-economic problems facing the country.

Presumably, the increase in fertility observed during the early part of the new millennium will be short-lived. There may be a time in the near future when fertility will start declining again towards the replacement level. That particular point may be determined primarily by the degree to which pronatalist views and practices are once again reversed by the State and the Sri Lankan community.

Endnotes

- ¹ Replacement-level fertility implies a total fertility rate usually between 2.1 and 2.2 children per woman, depending on a country's level of mortality. Since the infant mortality rate of Sri Lanka is at a very low level, the country's replacement fertility is defined as an average of 2.1 children per woman. Usually a net reproduction rate (NRR) of 1.0 is considered as the more appropriate measure to represent replacement-level fertility. However, due to unavailability of NRR values for Sri Lanka during the recent past, only TFR values are being used to identify the replacement level in this study.
- ² Spontaneous abortions are commonly known as miscarriages and may occur in 25-30 per cent of all conceptions, often as a result of chromosomal anomalies. Although miscarriages are common, they hardly lead to deaths or serious complications unlike induced abortions. By contrast, induced abortions which are performed illegally in Sri Lanka, have become a major health risk for women.
- ³ Section 303 of the Penal Code provides that anyone voluntarily causing a woman with child to miscarry is subject to up to three years imprisonment and/or payment of a fine, unless the miscarriage was caused in good faith in order to save the life of the mother. A woman who induces her own miscarriage is subject to the same penalties.
- ⁴ The average number of daughters a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates and the mortality rates of a given period. It is expressed as number of daughters per woman.
- ⁵ In demographic terms, the child dependency ratio is defined as the number of children under 15 years of age for every 100 persons of working age.

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The Effect of Remittances on Return Migration and its Relation to Household Wealth: The Case of Rural Thailand

The present findings suggest that, while a household economics approach may be more practical in describing strategies pursued by rural-to-urban migrants in developing countries, theorists and policymakers need to pay more attention to the different types of motivations that migrants and households follow at various points on the wealth continuum.

By Yuying Tong and Martin Piotrowski*

When Ravenstein (1885) in writing on the “laws of migration” stated that each current of migration produces a compensating countercurrent, return migration has been acknowledged as important to any thorough understanding of migration. Yet, for many years the view of migration as primarily a one-way phenomenon dominated empirical inquiries. While studies have focused on the departure of migrants, the migration journey, arrival, settlement and integration, the return of migrants has received far less attention (King, 2000).

In spite of the lack of research, return migration is an important subject of inquiry, as return migrants can have substantial economic and social effects on migration-sending communities. Return migrants may replenish the loss of human capital resulting from

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differential migration of skilled migrants, and they can potentially bring with them the needed financial capital to start a family business. They may also introduce new ideas and innovations, or have the negative effect of introducing diseases or conditions contracted while residing in urban settings (for instance HIV/AIDS).

Recently, researchers have begun to utilize new data sources to empirically examine return migration (Lindstrom, 1996; Constant and Massey, 2002; Zhao, 2002), and theoretical links have been proposed between migrant remittances (money and goods sent by migrants to their home households) and a migrant's intention to return home (Hoddinot, 1994, Lucas and Stark, 1985). Various shortcomings in past research designs have left a dearth of high-quality empirical investigations into the subject matter. Further, although the role of household economic status has been the subject of theoretical arguments about migrant-to-household remittances (VanWey, 2004), empirical investigations of its effect on return are still lacking.

In this study, the authors attempt to fill this gap in the literature by examining the effect of remittances on return migration to rural areas of origin in a developing country. A basic question is raised: "How does sending remittances to an origin household affect return migration, given the economic status of the home household?" To examine the effects of remittances on return migration, longitudinal panel data are used from Nang Rong, a rural, agricultural district located in north-eastern Thailand. The richness of data made available enable the authors to overcome a number of limitations encountered in past studies, by examining the phenomenon over time, using explicit data on several varieties of remittances, as well as using a longitudinal sample which avoids some of the problems associated with sample selectivity inherent in many studies.

Theories of return migration

Similar to the case of out-migration, return migration is a complex process which is affected by a combination of factors, including characteristics of migrants and conditions in both sending and receiving communities. Many migration scholars -- most notably those working in the tradition of the new economics of labour migration (NELM) (Stark 1991; Taylor, Rozelle and De Brauw, 2003) -- view migration, and hence return, as part of a household strategy aimed at overcoming non-existent or imperfect markets in developing regions where local employment opportunities are scarce. Other research considers a different set of prerequisites for return, which do not involve a household strategy. For example, some see return preceded by the sending of remittances as an attempt by migrants

to maintain membership rights in their origin households or communities. These perspectives are discussed below to elaborate how they can be used to understand the role that remittances play in migrants' return decisions.

New economic theory

New economics scholars theorize that households develop strategies involving the migration of individual household members. Those individuals are target earners whose goal is to provide capital for joint consumption of all household members (Wood, 1981). Stark (1991) hypothesized that migrants play the role of financial intermediaries, enabling rural households to overcome credit and risk constraints during the transition from familial to commercial production. One or more migrants are sent out to earn money. Migrants remain a part of their origin household throughout the migration experience, and they send remittances back to those households.

By doing so, a migrant may be motivated by a desire to participate in a contemporaneous co-insurance scheme. Co-insurance occurs when a migrant and household take turns insuring each other from market fluctuations and risky ventures. For example, the household may provide a safety net to insure the migrant against involuntary unemployment, or a migrant may send remittances to enable a household to invest in a risky new production technology, such as a high-yielding crop variety (Stark and Lucas, 1988). This strategy is effective for reducing risk when the migrant moves to a location with a different risk profile.

Investment is a second type of motive. It tends to be sequential in nature, and there are several varieties. Investment can be initiated by the household. For instance, the household could bear the initial costs of a migrant's education, which enables the migrant to get a relatively stable, high-paying job. This type of job permits the migrant to earn more money, which in turn leads to higher remittances to the household. Investment may also be initiated by the migrant, such as when the migrant sends money to invest in the education of younger siblings, or when the migrant remits to the household in anticipation of future property bequests, such as land, housing or goods, from the household (Hoddinot, 1994). Either way, both the migrant and household benefit jointly from their mutual arrangement and both actors follow a mix of altruistic and self-interested motives (Lucas and Stark, 1985).

According to the previously mentioned theory, migrants return because their earnings target has been met, and return signifies the final step in a pre-arranged plan (Constant and Massey, 2002). Both

co-insurance and investment may suggest eventual return migration. If the migrant is following a co-insurance motive, it follows that the migrant's remitted earnings may be sufficient to insure the household from risk, at least for a time until the migrant's next migration. Therefore, if the sending of remittances is part of a co-insurance arrangement, the sending of remittances should make the migrant more likely to return, especially if sufficient money has been sent to provide the needed insurance. If the migrant is following an investment motive, one can make similar inferences. Either the migrant has sent sufficient amounts of remittances to repay for the household's initial investment in the migrant's education, or the migrant has sent sufficient amounts of remittances to safeguard property for eventual inheritance.

Signaling theory

In contrast to the notion that migrants are motivated by a household strategy, the more recent migration literature suggests that migration may be oriented more towards the individual self-interest of migrants. Rapoport and Docquier (2005) point out that sending remittances is not simply predicted by the migrants' and households' characteristics. Instead, the specific intentions of migrants are also very important when studying remittance behaviour. Labour migration usually occurs in less developed areas, and is often motivated by the desire to fill low-level jobs in the informal sector. Job security and wages are easily affected by the labour supply pool, as well as economic cycles in the receiving areas. Under such unpredictable conditions, migrants might see themselves as sojourners, who, from the very beginning of their migration journey, intend to return to their origin community. In order to keep the return option open, migrants need to maintain a close relationship with the place of origin. They do so by securing membership rights in their community or household during their period of absence (Osili, 2004).

To ensure those membership rights, migrants may choose to use remittances instrumentally. Perhaps before they can return, migrants must first remit some money to avoid losing face or alienating family members at the place of origin. In this case, sending remittances serves as a signal or gesture. While any amount sent could signal the intention to ultimately return, if the migrant is following a co-insurance or investment motive, a sufficiently large amount of money has to be sent to fulfil obligations to the household. Conversely, if the migrant is sending only small sums, those remittances are probably only token amounts intended to help maintain membership rights in the origin household. Such small amounts are undoubtedly lower than amounts sent by migrants remitting to fulfil co-insurance or investment obligations.

Indeed, not all households follow investment or co-insurance strategies when sending migrants. Migration may simply reflect a young adult's desire to explore opportunities for advancement when facing limited chances for receiving post-primary education. Some may see migration as an avenue for gaining valuable life experiences. In such a context, remittances may help meet the households' subsistence needs (Itzigsohn, 1995), but are not necessarily part of an arrangement between migrants and households. In sending remittances, even in small amounts, migrants can reinforce their membership in an origin community or household to which they someday hope to return.

Implications of household wealth in sending remittances

Having discussed two perspectives on the role of remittances in return migration, the authors now conjecture about the relationship between those two factors as they are conditioned by household socio-economic status. According to the perspective of the new economics of labour migration, remittances are not only sent in response to market failures, but are also related to the notion of relative deprivation. According to this idea, household utility is not only a function of absolute income but also of income position vis-à-vis other households within a reference group (Stark and Taylor, 1989). Members of households expecting income gains from migrants may have initially been influenced by their perceived level of disadvantage within the wealth distribution of their community, and migrant remittances are an avenue for advancing ahead of other households.

Alternatively, from a signaling perspective, migrants intending to return may still see their reference group as comprising the people who remain identified with their households and communities in the place of origin. The flow of money from the migrants to their home communities not only ensures that their social standing at home is validated, even if they are not present, but it also cements their emotional attachment to distant kin. These migrants are not necessarily concerned with the economic status of their origin household vis-à-vis other households, they simply send money to maintain their membership claims. Indeed, if migrants switch to a new reference group associated with their place of destination, that is, they experience reference group substitution, their motivation to remit diminishes (Sana, 2005). This is irrespective of how their household compares to other households in the community with regard to wealth. Moreover, if they send money, it is not necessarily an amount that can significantly improve the households' position in the community's wealth distribution.

Based on those two theories, one can predict that migrants may have different motivations in sending remittances, depending on the wealth status of their origin household. According to relative deprivation theory, poorer households should feel the greatest pressure to receive remittances relative to other households in their community or their reference group. Not having enough opportunity to follow an investment motive, they would probably opt for a consistent source of insurance because of their relatively disadvantaged position. They probably are not able to follow a signalling model when sending remittances because of their greater family need, which necessitates large transfers. In such cases, sending remittances and the amount of remittances sent would not lead to an increased likelihood of return. Migrants from poorer households may also follow a pattern of chain migration, whereby the return of one migrant encourages the migration of another one who assumes remittance responsibilities.

Furthermore, households situated in the middle of the wealth distribution arrangement are not struggling to meet basic subsistence needs unlike poorer households. They may be under pressure to keep up with the wealthiest households and seek capital gain in the form of remittances prior to receiving returning migrants. Alternatively, migrants from those households may simply have left to seek opportunity for their own sake. During their migration journey, their need to keep the return option open, especially during market failures at destination, is probably more important to their return when compared with the household's relative wealth position. With the fear of market failure and an intention to return, they need to keep close ties with their place of origin through remittances to claim their continuous membership in their origin household during their absence. Therefore, sending remittances -- even nominal amounts -- might be associated with their intention to eventually return.

For the wealthiest households, investment is the most likely household strategy, and the need for co-insurance is far less likely. Because of their wealth, those households have a reserve to draw upon in times of crisis, thus their need for risk insurance is relatively low. Moreover, those households probably have the most access to capital, and are in the best position to invest in the migrants' education. Also, they are likely to have access to property which they can use as strategic bequests. For those households, return migration is unlikely to be affected by remittances, except in cases in which households own property for which a returning migrant has been sending remittances to maintain.

Hypotheses

Given the preceding theoretical discussion, the present paper will examine two hypotheses. The first hypothesis is that, other things being equal, sending remittances is associated with return migration. If so, the authors will examine whether the NELM or signalling model is supported. If NELM is supported, sufficiently large amounts of money would need to be sent for the migrant's obligation to be paid. Otherwise and if only small amounts are sent, those might be token amounts which the migrant may hope to use to secure membership rights in the household. It may be necessary to send such money before returning.

Our second hypothesis is that the effect of sending remittances on return migration is conditional on household wealth. This hypothesis is a general one which can be broken up into many smaller ones. Poor households, which are likely to be following a co-insurance arrangement, are not expected to have a remitting migrant return. This is the case because their economic situation may require them to have a co-insurer available in a location with a different risk profile than their own. For middle-wealth households, it is expected that sending remittances would be positively related to return. If return is related to larger remittance amounts, it is likely that migrants are responding to the relative deprivation of their household in the wealth distribution of the community. Smaller amounts are more indicative of a signalling motive, as elaborated in the first hypothesis. Wealthy households are expected to follow an investment arrangement, thus return following remittances is expected only in cases in which the household owns inheritable property that is sought after by the migrant.

Having reviewed the relevant literature on remittances and return migration, and having discussed different hypotheses, one now considers the distinctive characteristics of the current research setting, and the ways in which contextual factors can mediate or intervene between sending remittances and return. In what follows, the authors describe the research setting, the data, the operationalization of variables and the analytical approach.

Setting

Nang Rong is a rural, agrarian district located near the Cambodian border in Buri Ram Province in north-eastern Thailand. The district was a frontier region until the 1970s, when road construction, electrification, telecommunications improvements and migration substantially changed the way that people lived (Curran, 1995).

Around that time, the pattern of migration changed from primarily in-migration to primarily out-migration. Most people in Nang Rong live in villages arranged into clusters of dwelling units that include an average of about 100 households (Rindfuss and others, 2003). The main occupation is subsistence rice farming, although increasingly farmers are growing rice and upland cash crops such as cassava to sell on the market. Overall the district is poor; although there is a range of wealth, and some villagers live well even by the standards of developed countries.

For the past several decades, the vast majority of job growth in Thailand has been concentrated in urban areas (Curran, 1995), and tremendous numbers of migrants have flowed into cities seeking jobs in the service, manufacturing and construction sectors. Bangkok and the central region of the country are major migration destination areas, while the north-eastern region is one of the major sending areas (Jampaklay, 2003). In Thailand, out-migration is an effective way for low-income households to quickly overcome a shortage of income, and remittances constitute a large portion of received income (Osaki, 2003). Often migration is only temporary, and typically it is seasonal or cyclical (Entwisle and others, 2003). Many migrants travel back and forth between their place of origin and their place of destination, thereby keeping close connections with their households and communities. Some migrants choose to settle in migrant destinations and may never return.

Data and sample

Data used in this article comes from the second and third waves of the longitudinal study of social change conducted in Nang Rong. The first wave of data was collected in 1984, when a household survey was administered to all households in 51 villages. Follow-up waves occurred in March 1994 and 2000, sometime between March and June, when complete censuses were again conducted in each of the villages included in the original sample. Each household survey collected data on all household members, including reports for anyone who was away at the time of the survey. Data were also collected on migration, monetary and in kind remittances, land and household assets, among other things. In addition, life history data were collected on anyone aged 13-41 who was located in the village in 2000. Life history data include information on individual migration histories since a person was 13 years of age.

Since the data used for this study are both longitudinal and origin-based, they avoid the problems inherent in many studies of return migration. Because of the geographical scatter of migrant-sending

communities, many destination-based studies have trouble following up return migrants. Some such studies (for example, Borjas, 1989) operationalized return migrants as those who left the sample, with the assumption that they returned to their origin community. This kind of measure wrongly attributes migrants who moved to locations other than their origin community as returnees. Destination-based studies with a longitudinal design have an easier time accurately identifying return migrants, but those studies have difficulty measuring who is at risk of being a migrant in the first place.

Origin-based approaches have limitations as well. For example, the authors' data use household reports for any household members known to be migrants in 1994; they then trace their residence in the year 2000. This process requires that information about the migrant comes from the origin household, yet this information is not always accurate.¹ Further, ascertaining migrants' motives for sending remittances cannot be addressed directly. Therefore, motives for sending remittances are inferred by studying the impact of sending remittances on return migration.

Sample

The authors limited their sample in several ways. First, the age range was restricted to those aged 13-55 years in 1994. This restriction appeared reasonable because people under 13 years of age are children and are probably migrating along with their parents. Moreover, migration begins around this age when compulsory education ends (Rindfuss and others, 2005). Also, people over 55 years have probably ended or are approaching completion of their working life. Preliminary analysis indicates that by the time they reach that age, they are unlikely to change their residence. Second, the sample was restricted to only those migrants who had been gone for at least one year prior to the 1994 survey.² This step ensured that the migrants had had enough time to stabilize their economic situation so that they were able to send remittances. Because data on remittances were measured one year prior to the 1994 survey, this step also ensured that each migrant was at risk of exposure to sending remittances throughout the entire duration.

Limiting the sample in this fashion was likely to eliminate some portion of circular migrants, but it would not necessarily have eliminated all circular migrants. The authors argue that this research design helped eliminate mainly seasonal migrants because they are the most likely to undertake migration spells lasting less than one year. In the light of past research findings that over half of all migrants in north-eastern Thailand are seasonal, repeat, or

temporary migrants (Chamrathirong and others, 1995), the authors felt it necessary to make a distinction between seasonal migrants and other types of circular migrants. It might be important to note that circular migration is defined here as a migration episode lasting two or more months and which starts and ends in the origin community. Seasonal migrants are defined as those who follow a circular migration pattern annually or semi-annually for a few months during the agricultural off-season.

There are many types of migration strategies that involve circular movement. For example, a migrant may move to an urban area to find employment as a construction worker. Such a migrant may return to the village after a few years when the construction project is finished. While the sample excluded a portion of circular migrants, such as seasonal agricultural workers, it did not exclude all circular migrants. In fact, the migrants excluded from the present analysis constituted less than 20 per cent of the overall population of migrants and probably included mainly short-term migrants who are gone for less than one year.

Operationalization

Dependent variable

As figure 1 illustrates, the Nang Rong data were well-suited for studying return migration because three panels of data were collected. This design made it possible to identify migrants by examining changes in residence between the first two waves of data. In this paper, migrants are defined as individuals who were household members in the first wave of data (1984) and who were living outside of the village for at least one year prior to the second wave of data (1994). Return migration, the dependent variable, was established using the third wave of data (2000). Return migrants are defined as those identified as a migrant in the 1994 wave of data collection, who were in the village at the time of the 2000 household survey.

Return migration was measured as a dichotomous variable equal to one, if the migrant returned, and equal to zero otherwise. Table 1 shows the frequency distribution of return migration for the entire sample and for migrants from households in three categories of household wealth. Results revealed that overall, just under one fifth (18.65 per cent) of all migrants returned. Moreover, migrants from middle-wealth households were more likely to return than households at the tails of the wealth distribution, although the differences are small.

Figure 1. Study sample across survey waves

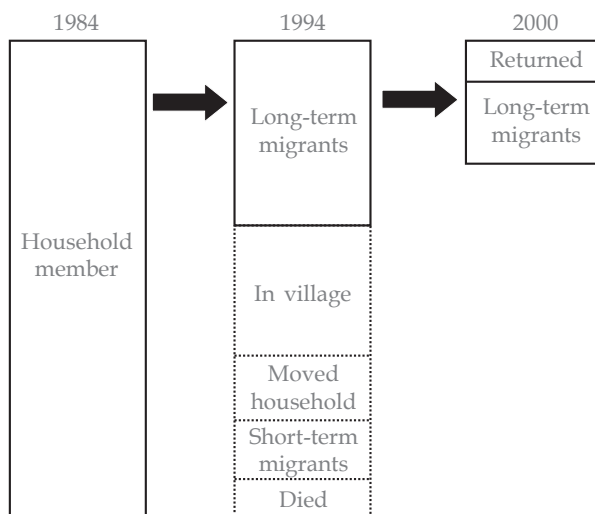


Table 1. Frequency distribution of return migration for migrants aged 13-55 in 1994

Category	Full sample		Lowest wealth		Middle wealth		Highest wealth	
	Freq	Per cent	Freq	Per cent	Freq	Per cent	Freq	Per cent
Did not return	5 318	81.35	1 303	81.49	2 768	80.96	1 247	82.09
Did return	1 219	18.65	296	18.51	651	19.04	272	17.91
Totals	6 537	100.00	1 599	100.00	3 419	100.00	1 519	100.00

One issue with the operationalization of return migration is that it may simply be one stop in an ongoing cycle of circular migrations. A preliminary analysis (results not shown) of the circular migration patterns was conducted based on the present sample. Using data from the 2000 life-history calendar, the authors examined the circular migration history of anyone who was located in the village in 2000 (which, in this sample, includes only return migrants). In the life-history data, a migration episode is operationalized as residence outside of the village for two or more consecutive months. Of the cases (N= 1,110) in the sample, about 77 per cent were matched (within the appropriate age range) to a life-history record.

While it is possible that return migration is only the end of one migration circulation episode and that future moves are forthcoming, results show that multiple movements are uncommon among return migrants. Nearly 70 per cent of those migrants had only one migration episode since they were 13 years old, and another 20 per cent had only two migration episodes. Migration durations tended to be fairly lengthy. Just under half were 6 or fewer years in duration, while three fourths were nearly 10 or fewer years in duration.

The authors also examined circulation among non-returning migrants, although it was only possible to do so indirectly. Since life-history data were not available for those living outside of the village in 2000, these data could not be used to examine multiple movements. Instead, authors examined the years since the migrant last lived with the household, using 2000 as a reference point. Migrants whose duration of absence was less than six years must have returned to the village sometime between 1994 and 2000. Results (not shown) suggest that just over 35 per cent of those migrants had been gone for fewer than 6 years.³ However, the nature and duration of their return is unclear. Those migrants may simply have returned for a short visit, perhaps to help their household with the rice harvest, or to care for an ailing parent.

The second issue related to the survey design is that the effect of remittances sent between 1994 and 2000 could not be measured, some of which may have been sent or brought back before the migrant's return. In considering that remittance data were available only for a one-year period exactly prior to return, remittances sent any time after that year, but preceding return, could also have influenced the migrant's return decision. Unfortunately, this remittance flow could not be measured, so the effect of remittances on return migration might have been underestimated. The authors argue that migrants send remittances in a more-or-less regular fashion; for example, migrants who made remittances in 1993 (which the data captured) were also likely to have sent remittances in all the other years during a migration episode. Indeed, previous literature has shown this to be the case. According to Stark (1991), remittances are often sent on a regular basis, rather than on an irregular one.

Since the sample is limited to migrants whose households were in the village in all three waves of data, another problem is that our design excludes cases in which an entire household moved out of the village. Migration and return are operationalized using changes in residence as reported by household members living in the village. Since migrants from households that moved had no household

living in the village in 2000, there is no way of identifying migrants from those households as returnees. Thus, the authors were forced to exclude them from the analysis. Sample attrition due to the moved households is low, accounting for 11 per cent of households between 1984 and 1994, 7 per cent between 1994 and 2000 and 15 per cent overall between 1984 and 2000. In results not shown, the authors compared migrants from their sample to demographically matched migrants (aged 13-55 who were gone for at least one year) from moved households (N=203). Because the data for 1984 are not as detailed as subsequent waves of data, the authors examined households that had moved between 1994 and 2000, using their 1994 characteristics.

Although it is unlikely that many migrants from moved households would have returned to their origin village, the authors caution that some of the variables on which there are differences may be slightly biased in the present statistical results. While one finds differences in some characteristics between moved and non-moved households, overall the majority of variables are similar across those groups. Specifically, differences were found with respect to characteristics, such as the presence of a migrant's parents, household wealth and variables associated with farming (ownership of land and agricultural equipment; prevalence of rice farming). As differences were slight, no substantial impact on the results was anticipated.

Remittances

Sending remittances is the key independent variable in the present analysis. Because return could have occurred anytime between 1994 and 2000, all independent variables in this analysis were measured in 1994 or earlier. This action ensured that the timing of the dependent variable did not occur prior to the measurement of the independent variables, while still keeping a relatively short timespan between the two time periods.⁴ Data on several types of remittances were used as well as two directions of remittance flow. The data set included not only migrant-to-household remittances, but also household-to-migrant transfers. The advantage of using two-directional data is that the NELM theory has implications for both directions of support, and information might be lost if one direction is ignored.

Remittance data were available for both monetary and in kind remittances.⁵ Having data on two types of remittances is theoretically interesting, since in-kind remittances may measure social ties between households and migrants that go beyond general monetary need, and may suggest an awareness of more specific needs concerning whoever is receiving the remittances.

In kind data (both migrant-to-household and household-to-migrant) came from a series of survey items that asked whether remittances in the form of clothes, food (totaling 100 baht⁶ or more), household items, electrical appliances, or vehicles were sent in the 12 months prior to the 1994 survey. Authors operationalized each type of remittance as a dichotomous variable equal to one, if the above item was sent, and zero otherwise. Data on monetary remittances came from a similar survey item about whether particular amounts of money (measured in Thai baht) were sent (both migrant-to-household and household-to-migrant). The authors operationalized monetary remittances as a series of dichotomous variables indicating whether money was sent in each of the following categories: no money, less than 1,000 baht, between 1,001 and 3,000 baht, between 3,001 and 5,000 baht, and more than 5,000 baht. Distinguishing the effect of different remittance amounts is important, because it helps to differentiate an investment/co-insurance motive from a signalling motive. In Thailand, remittance amounts on the order of 1,000 baht (about \$33 as of December 2010) or less per year are considered rather small, even by rural standards. For the co-insurance motive, higher amounts of remittances related to return were predicted, while for the signalling model, lower amounts were expected.

Results show that migrant-to-household remittances are more common than household-to-migrant remittances. The sending of remittances is also clearly related to household wealth, as evidenced by the rising proportion of remittances of larger monetary amounts and more expensive items as wealth increases.⁷ Over half the migrants (full sample) sent some form of monetary remittances, but food, clothing, and household goods or appliances were also popular remittance items. It is noteworthy that the highest remittance category (more than 5,000 baht) was the amount most commonly sent (see table 2). This is true across all household wealth categories.

Household wealth

Following work by Filmer and Pritchett (2001), the authors used a set of household assets to construct an index of household wealth using principal components analysis.⁸ Based on this index, each household was grouped into one of three categories. Because wealth tends to be concentrated in the hands of relatively few households, fewer households were included in the highest category. Households in the bottom third would be considered to be in the lowest category of the wealth distribution, those in the 34th to 79th percentiles were considered to be in the middle, while those in the top fifth would be considered as the highest category. Table 2, which shows descriptive statistics for all independent variables,

Table 2. Descriptive statistics for migrants aged 13-55 in 1994

Variable	Full sample		Lowest wealth		Middle wealth		Highest wealth	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Remittance variables								
<i>Migrant-to-household monetary remittance</i>								
Migrant sent less than 1,000 Baht	0.121	0.326	0.138	0.345	0.129	0.335	0.084	0.278
Migrant sent between 1,001 and 3,000 baht	0.127	0.333	0.140	0.347	0.126	0.332	0.117	0.321
Migrant sent between 3,001 and 5,000 baht	0.097	0.296	0.096	0.294	0.097	0.296	0.099	0.298
Migrant sent 5,001 or more baht	0.199	0.400	0.168	0.374	0.191	0.393	0.252	0.434
(Migrant sent no money)	0.456	0.498	0.459	0.498	0.458	0.498	0.448	0.497
<i>Migrant-to-household in kind remittance</i>								
Migrant sent clothing	0.326	0.469	0.313	0.464	0.306	0.461	0.382	0.486
(Migrant did not send clothing)								
Migrant sent food	0.333	0.471	0.328	0.470	0.317	0.465	0.376	0.485
(totaling 100 baht or more in value)								
(Migrant did not send food)								
Migrant sent household goods or electrical appliances	0.211	0.408	0.169	0.375	0.207	0.405	0.264	0.441
(Migrant did not send goods or appliances)								
Migrant sent vehicles	0.009	0.095	0.006	0.079	0.007	0.085	0.016	0.125
(Migrant did not send vehicles)								
<i>Household-to-migrant remittance</i>								
Household-to-migrant any remittance	0.194	0.395	0.170	0.376	0.178	0.382	0.254	0.436
(Household did not send remittance)								

(continued)

Table 2. (Continued)

Variable	Full sample		Lowest wealth		Middle wealth		Highest wealth	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Demographic variables								
Age	25.821	6.912	25.573	7.206	25.643	6.942	26.482	6.479
Male (Female)	0.544	0.498	0.540	0.499	0.551	0.497	0.532	0.499
<i>Details of migration</i>								
Number of years gone	4.094	2.729	3.907	2.634	4.076	2.740	4.330	2.785
Migration destination is north-eastern Thailand	0.339	0.473	0.341	0.474	0.337	0.473	0.342	0.474
Migration destination is not in greater Bangkok or north-eastern Thailand	0.264	0.441	0.250	0.433	0.267	0.442	0.273	0.446
(Migration destination is greater Bangkok)	0.397	0.489	0.410	0.492	0.396	0.489	0.385	0.487
Human capital								
<i>Education</i>								
Less than primary school	0.351	0.477	0.397	0.489	0.377	0.485	0.245	0.430
Higher than primary school (Primary school)	0.179	0.383	0.080	0.271	0.129	0.335	0.394	0.489
(Primary school)	0.470	0.499	0.523	0.500	0.494	0.500	0.361	0.481
<i>Occupation</i>								
Agricultural occupation (Non-agricultural occupation)	0.350	0.477	0.402	0.490	0.377	0.485	0.236	0.425

(continued)

Table 2. (Continued)

Variable	Full sample		Lowest wealth		Middle wealth		Highest wealth	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Co-residence								
<i>Location of parents</i>								
Both parents in origin household	0.605	0.489	0.593	0.491	0.592	0.492	0.648	0.478
Only mother in origin household	0.188	0.391	0.183	0.387	0.195	0.396	0.177	0.382
Only father in origin household	0.053	0.224	0.061	0.239	0.053	0.224	0.045	0.207
(Neither parent lives in the household)	0.154	0.361	0.163	0.369	0.160	0.367	0.130	0.337
<i>Marriage / spouse location</i>								
Spouse lives in origin household or village	0.020	0.141	0.017	0.129	0.018	0.132	0.029	0.168
Spouse is a migrant in same location	0.358	0.479	0.383	0.486	0.359	0.480	0.330	0.471
Spouse is a migrant in different location	0.043	0.204	0.041	0.198	0.047	0.212	0.038	0.190
Migrant is divorced or widowed	0.024	0.152	0.021	0.142	0.024	0.152	0.026	0.160
Spouse location unknown	0.120	0.325	0.142	0.349	0.121	0.326	0.096	0.295
(Migrant was never married)	0.437	0.496	0.398	0.490	0.434	0.496	0.484	0.500
<i>Location of children</i>								
At least one of the migrant's children lives in household	0.026	0.158	0.027	0.162	0.024	0.152	0.029	0.168
(Migrant's children do not live in the household)								

(continued)

Table 2. (Continued)

Variable	Full sample		Lowest wealth		Middle wealth		Highest wealth	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Household economy								
Natural log of amount of land owned (in 1,000 square wa)	7.879	3.984	7.712	4.166	7.574	4.322	8.742	2.651
Household grows rice (Household does not grow rice)	0.796	0.403	0.846	0.361	0.803	0.398	0.729	0.445
Household owns equipment (Household does not own equipment)	0.183	0.387	0.118	0.323	0.167	0.373	0.289	0.453
Bottom 33rd percentile of wealth distribution	0.232	0.422	-	-	-	-	-	-
Highest 20th percentile of wealth distribution (Middle 34th - 79th percentile of wealth distribution)	0.245	0.430	-	-	-	-	-	-
	0.523	0.500	-	-	-	-	-	-
Household demographics								
Number of people living in the household	2.598	1.843	2.712	1.830	2.497	1.839	2.704	1.854
Number of migrants	2.363	1.754	2.418	1.830	2.361	1.752	2.310	1.672
N	6537		1599		3419		1519	

demonstrates that most households (full sample) were in the middle category (52 per cent), while households in the lowest and highest categories each made up about a quarter of the households.⁹

Control variables

Control variables included measures of characteristics of the migrant (i.e., demographic variables, human capital and residential co-residence variables) and characteristics of the household (i.e., household economy and composition). Demographic variables were age, sex, migration duration and migration destination. Thai gender norms tend to bind women to their origin household through expectations that women should maintain close kinship ties and care for parents in their old age (Curran, 1995; DeJong, 2000). Authors measured migration duration as the number of years from the time of the 1994 survey that the migrant had been away. Massey (1987) argued that greater exposure to the destination society gradually increases a migrant's ability to handle risk, which is expected to decrease the likelihood of return. Thus, men who are long-term migrants might be less likely to return.

Migration destination was measured as a series of dummy variables for whether the migrant was living in the north-eastern region of Thailand, the greater Bangkok metropolitan area,¹⁰ or some other location. Table 2 shows that almost 40 per cent of the migrants (full sample) lived in greater Bangkok, while about one third were living in the north-eastern region. The rest of the migrants, who accounted for over a quarter of the sample, were living in other parts of Thailand, belonging to the urban sector. Thus, over two thirds of migration flows were rural-to-urban and the other one third rural-to-rural. Bangkok migrants were expected to be the least likely to return because Bangkok offers the most employment opportunities and the potential for higher pay than other parts of Thailand.

Human capital variables included education and occupation. Human capital was expected to be negatively associated with return, following research that argues for a skills bias in return migration (Borjas, 1989; Borjas and Bratsberg, 1996). The authors measured education as a series of indicator variables measuring whether a migrant had: less than a primary school education, only a primary school education, or a higher than primary school education. Occupation was also coded as a dummy variable indicating whether the migrant worked in an agricultural occupation.¹¹ Overall, about 35 per cent of migrants tended to have the lowest level of education, and about the same percentage were employed in agriculture.

As one would have expected, there were differences relating to the wealth of the migrant's origin household. Migrants from the poorest households had the lowest proportion, with a higher than primary school education (8 per cent), while those in the middle of the wealth distribution had the next lowest proportion (12 per cent). Those coming from the wealthiest households had by far the highest proportion with a higher than primary school education (39 per cent). There is a similar pattern for the lowest educational category, with the poorest households having almost 40 per cent of their migrants in this category, compared with about 25 per cent in the wealthiest households. Occupational differences also seemed to be related to household wealth. While 40 per cent of migrants from poorer households worked in agriculture, only 24 per cent of migrants from wealthier households did so. Migrants from middle-wealth households fell in between poorer and wealthier households.

Co-residence variables included separate measures for the location of the migrant's parents, spouse and children. The authors measured whether the migrant's parents were located in the origin household and specified one of the following: whether both parents lived in the household; only the migrant's mother lived in the household; only the migrant's father lived in the household; or neither of the migrant's parents lived in the household. Overall, both parents lived in the home household in about 60 per cent of the cases, while households with neither parent living in them constituted the minority.

The authors also controlled for whether the migrant's spouse and/or children lived in the origin household, with the expectation that return would be most likely if they lived there. In measuring spouse location, the authors also included the marital status of the migrant. Thus, whether the migrant was divorced or widowed, never married, or currently married was measured, as well as whether the spouse lived in the origin household or village; was a migrant in the same location as the migrant; a migrant in a different location; or whether the location was unknown. Overall, most migrants were never married (44 per cent), while many were married and living in the same migration location together with their spouse (36 per cent). Also controlled for was whether a migrant had a child who lived in the home household, which was rare.¹²

One downside of the design used here was that the effects of changes on return migration in the migrant's characteristics (such as family status, education, or occupation) during that time period could not be captured. In a separate analysis, the authors investigated the effect of some of those changes on return migration. Using binary logistic regression, the authors found that migrants who experienced a

change in their marital status (married, divorced/separated/widowed, other) were more likely to be return migrants compared with migrants who did not experience any such change. Data limitations did not allow the authors to determine whether changes in marital status preceded return migration or vice versa. Therefore, it cannot be argued that those changes caused a return to occur, although those are clearly associated with one another.

Turning to household-level measures, the authors controlled for aspects of the household's economy, including the natural log of the amount of land owned by the household (in square wa¹³), whether or not the household grew rice, and whether or not the household owned equipment (large tractor, small tractor, rice thresher, water pump, or electric generator). Generally, one expects that ownership of land and equipment will draw return migrants who have been sending remittances as a form of investment in the household's property.

The authors also controlled for characteristics of the household demographics, including a count of the number of people living in the household and the number of migrants from the household. As controls for specific family members of the migrant (spouse, parents, or child) were already included in the model, including them again would have resulted in double counting. To rectify this problem, those family members were excluded from the count of the number of people living in the household. This approach might make descriptive statistics for these variables look somewhat small. One expects that larger households would have less need to make up for lost labour from migrants, and therefore migrants would be less likely to return. Alternatively, migrants may not want to return to large households in order to avoid crowded conditions (Edwards and others, 1994).

The literature on migrant networks suggests that migration streams extend to similar migration destinations, thereby creating more contact with migrants from the same origin communities. Those migrants provide a measure of security and access to such things as employment and housing which lowers the risk of migration (Massey and Basem, 1992; Massey and others, 1993; Roberts and Morris, 2003). Therefore, one expects return migration to be negatively related to the number of migrants from a household, since having more contacts at the destination would make it easier for a migrant to stay there.

Analytical approach

Statistical regression modelling was used to determine the independent effect of remittances and various control variables on the

probability of return migration. Because return migration, the dependent variable in this analysis, was measured as a dichotomous variable, we used a binary logit model. The authors estimated four logit models: a model for the full analytical sample and separate models for households in the lowest, middle and highest categories of household wealth.

Since multiple migrants can come from the same household, and multiple households are located in the same village, the data were clustered and thus not independent of each other. Clustering artificially lowers standard errors associated with coefficients, thereby overestimating the significance of estimates. A multilevel model was used to correct for this problem, which helped rectify estimates of standard errors (for details, see Bryk and Raudenbush, 1992; Raudenbush and Bryk, 2002; and Snijders and Bosker, 1999).

For all the models, the dependent variable was a binary response that individual migrant i , who is a member of household j in village k is a return migrant (1 = return migrant, 0 = non-return migrant). The probability that the response was equal to 1 was defined as $p_{ijk} = \Pr(y_{ijk} = 1)$, where the standard assumption was used that y_{ijk} has a binomial distribution. The combined three-level model took the following form:

$$\ln \left[\frac{p_{ijk}}{1 - p_{ijk}} \right] = \gamma_0 + \sum_{h=1}^p \gamma_{h00} x_{hijk} + \sum_{g=1}^q \gamma_{g0} w_{gjk} + U_{0k} + V_0 \quad (3)$$

where:

γ are regression coefficients;

p is the number of x migrant variables;

q is the number of w household variables;

V_0 and U_{0k} are random effects accounting for variation at the village and household levels, respectively. The standard assumption was applied that both have an expected value of zero, while V_0 has a variance equal to ϕ^2 , and U_{0k} has a variance of τ^2 .

The SAS GLIMMIX macro was used to estimate fixed and random effects. Random effects were determined through empirical Bayes estimation, which calculates random coefficients by using data from the group level of analysis to which the effect is ascribed, and the fact that the error term is a normally distributed random variable with a mean of zero (Bryk and Raudenbush, 1992; Raudenbush and Bryk, 2002; and Snijders and Bosker, 1999).¹⁴

Table 3. Multilevel binary logit estimates of return migration in 2000 for migrants aged 13 – 55 in 1994

Variable	Coefficient	Std error	Odds ratio
Intercept	-0.745***	(0.234)	0.475
Remittance variables			
<i>Migrant-to-household monetary remittance</i>			
Migrant sent less than 1,000 baht	0.248*	(0.114)	1.281
Migrant sent between 1,001 and 3,000 baht	0.223*	(0.109)	1.250
Migrant sent between 3,001 and 5,000 baht	0.121	(0.121)	1.129
Migrant sent 5,001 or more baht (Migrant sent no money)	0.031	(0.107)	1.031
<i>Migrant-to-household in kind remittance</i>			
Migrant sent clothing (Migrant did not send clothing)	0.224*	(0.114)	1.251
Migrant sent food (totaling 100 baht or more in value) (Migrant did not send food)	-0.388***	(0.108)	0.678
Migrant sent household goods or electrical appliances (Migrant did not send goods or appliances)	0.092	(0.100)	1.097
Migrant sent vehicles (Migrant did not send vehicles)	0.449	(0.299)	1.567
<i>Household-to-migrant remittance</i>			
Household-to-migrant sent remittance (Household did not send remittance)	0.106	(0.089)	1.112
Demographic variables			
Age	0.010	(0.007)	1.010
Male (Female)	-0.335***	(0.065)	0.715
<i>Details of migration</i>			
Number of years gone	-0.18***	(0.015)	0.835
Migration destination is north-eastern Thailand	-0.447***	(0.095)	0.640
Migration destination is not in greater Bangkok or north-east (Migration destination is greater Bangkok)	-0.082	(0.082)	0.922
Human Capital			
<i>Education</i>			
Less than primary school	0.342***	(0.095)	1.407
Higher than primary school (Primary school)	-0.315**	(0.104)	0.730
<i>Occupation</i>			
Agricultural occupation (Non-agricultural occupation)	-0.161	(0.088)	0.851

(continued)

Table 3. (Continued)

Variable	Coefficient	Std error	Odds ratio
Co-residence			
<i>Location of parents</i>			
Both parents in origin household	0.169	(0.120)	1.184
Only mother in origin household	0.201	(0.132)	1.223
Only father in origin household (Neither parent lives in the household)	-0.095	(0.207)	0.909
<i>Marriage / spouse location</i>			
Spouse lives in origin household or village	1.644***	(0.204)	5.177
Spouse is a migrant in same location	-0.451***	(0.091)	0.637
Spouse is a migrant in different location	-0.407*	(0.169)	0.665
Migrant is divorced or widowed	-0.515*	(0.231)	0.598
Spouse location unknown (Migrant was never-married)	-0.353**	(0.114)	0.702
<i>Location of children</i>			
At least one of the migrant's children lives in household (Migrant's children do not live in the household)	0.476*	(0.220)	1.610
Household economy			
Natural log of amount of land owned (in 1,000 sq. wa)	0.015	(0.010)	1.015
Household grows rice (Household does not grow rice)	0.029	(0.110)	1.030
Household owns equipment (Household does not own equipment)	0.247*	(0.105)	1.280
Bottom 33rd percentile of wealth distribution	-0.030	(0.105)	0.970
Highest 20th percentile of wealth distribution (Middle 34th - 79th percentile of wealth distribution)	-0.004	(0.097)	0.996
Household demographics			
Number of people living in the household	-0.106***	(0.024)	0.899
Number of migrants	-0.086***	(0.025)	0.917
N		6537	
- 2 LL		31 998.400	
BIC		32 022.400	
AIC		32 004.400	
Random effects			
	Var Comp	Std Err	ICC
<i>Level-one random effects</i>			
$\text{var}(R_{ij}) = \pi^2/3$	3.29	-	-
<i>Level-two random effects</i>			
$\text{var}(U_{0i}) = \tau^2$	1.008	0.123	0.198
<i>Level-three random effects</i>			
$\text{var}(V_{0ij}) = \phi^2$	0.792	0.017	0.156

* p < 0.05 ** p < 0.01 *** p < 0.001 (two-tailed test).

Abbreviations: LL = Log Likelihood
BIC = Bayesian Information Criteria
AIC = Akaike Information Criteria

Results

With regard to the results of the regression analysis, table 3 shows the results for the full sample. Results reveal that household-to-migrant remittances have no effect on return, while several migrant-to-household monetary remittances measures had effects on return migration. The odds of migrants returning were about 28 per cent higher for those who sent home less than 1,000 baht, compared with those who did not send remittances. The odds were about 25 per cent higher for those who sent between 1,001 and 3,000 baht.

This result shows that remittances sent prior to return are associated with return migration. However, the amounts sent back were small and probably not consistent with fulfilment of contractual co-insurance or investment obligations. Instead, it is more likely that the migrants were sending these small amounts of money to re-establish or maintain membership in households to which they planned to return. Migrants were also more likely to return if they sent clothing, which may also be linked to the maintenance of membership rights in the origin household.

Oddly, migrants were less likely to return if they sent food. Qualitative work by Knodel and Saengtienchai (2005) in the north-eastern and central regions of Thailand suggests that gifts of food are commonly brought by visiting migrants. Such exchanges are unlikely to be of great economic value, rather they are brought as token gifts to commemorate special occasions such as Buddhist lent or the Songkran festival (the three-day Thai new year period observed in April).

Upon closer examination by household wealth, the relationship between sending remittances and return appears more complicated than the model of the full analytical sample would suggest. Table 4 shows regression results of separate models for households at the lowest, middle and highest levels within the overall distribution of household wealth. Those results show that the significant effect on return migration of a migrant sending remittances holds only for middle-wealth households. The odds of return for migrants remitting between 1,001 and 3,000 baht were close to 45 per cent higher compared with migrants that did not remit money.

Also, migrants from middle-wealth households were more likely to return if they had sent clothing or vehicles. Because so few vehicles were sent (see table 2), the effect of this variable should be interpreted with caution. The odds of return migration were about 53 per cent higher for migrants who had sent clothing. The finding that migrants who sent food were less likely to return is also present.

Table 4. Multilevel binary logit estimates of return migration in 2000 for migrants aged 13 – 55 in 1994 by household wealth

Variable	Low-wealth households		Middle-wealth Households		High-wealth Households				
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
Intercept	0.418***	(0.509)	1.519	-1.142***	(0.308)	0.319	-0.964***	(0.602)	0.382
Remittance variables									
<i>Migrant-to-household monetary remittance</i>									
Migrant sent less than 1,000 baht	0.424	(0.218)	1.529	0.155	(0.157)	1.168	0.242	(0.287)	1.273
Migrant sent between 1,001 and 3,000 baht	0.307	(0.219)	1.359	0.369*	(0.150)	1.446	-0.400	(0.259)	0.670
Migrant sent between 3,001 and 5,000 baht	-0.067	(0.258)	0.935	0.317	(0.165)	1.374	-0.204	(0.262)	0.816
Migrant sent 5,001 baht or more (Migrant sent no money)	0.167	(0.240)	1.182	-0.006	(0.152)	0.994	-0.038	(0.213)	0.963
<i>Migrant-to-household in kind remittance</i>									
Migrant sent clothing (Migrant did not send clothing)	-0.045	(0.250)	0.956	0.422**	(0.154)	1.526	0.004	(0.254)	1.004
Migrant sent food (totaling 100 baht or more) (Migrant did not send food)	-0.409	(0.247)	0.664	-0.508***	(0.145)	0.602	-0.193	(0.237)	0.824
Migrant sent household goods or electrical appliances	0.061	(0.216)	1.063	0.134	(0.141)	1.143	0.003	(0.210)	1.003

(continued)

Table 4. (Continued)

Variable	Low-wealth households		Middle-wealth Households		High-wealth Households	
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
(Migrant did not send goods or appliances)						
Migrant sent vehicles (Migrant did not send vehicles)	0.133	(0.776)	1.142	0.931*	(0.426)	2.537
<i>Household-to-migrant remittance</i>						
Household-to-migrant sent remittance (Household did not send remittance)	0.374	(0.198)	1.453	0.070	(0.127)	1.073
				0.081	(0.179)	1.084
				-0.055	(0.555)	0.946
Demographic variables						
Age	-0.028	(0.015)	0.973	0.021*	(0.010)	1.021
Male	-0.374**	(0.135)	0.688	-0.293**	(0.091)	0.746
(Female)						
<i>Details of migration</i>						
Number of years gone	-0.221***	(0.032)	0.802	-0.177***	(0.020)	0.838
Migration destination is north-eastern Thailand	-0.441*	(0.196)	0.643	-0.561***	(0.135)	0.571
Migration destination is not in greater Bangkok or north-east	-0.337	(0.172)	0.714	0.057	(0.113)	1.059
(Migration destination is greater Bangkok)				-0.214	(0.178)	0.807
Human capital						
<i>Education</i>						
Less than primary school	0.736***	(0.189)	2.088	0.256*	(0.130)	1.292
				0.074	(0.232)	1.077

(continued)

Table 4. (Continued)

Variable	Low-wealth households		Middle-wealth Households		High-wealth Households				
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
Higher than primary school (Primary school)	-0.645*	(0.305)	0.524	-0.501**	(0.157)	0.606	-0.208	(0.178)	0.812
<i>Occupation</i>									
Agricultural occupation (Non-agricultural occupation)	-0.145	(0.174)	0.865	-0.126	(0.121)	0.881	-0.372	(0.217)	0.689
Co-residence									
<i>Location of parents</i>									
Both parents in origin household	0.012	(0.241)	1.012	0.047	(0.161)	1.048	0.673*	(0.321)	1.959
Only mother in origin household	-0.478	(0.292)	0.620	0.204	(0.173)	1.226	0.896**	(0.337)	2.449
Only father in origin household	0.093	(0.389)	1.097	-0.198	(0.278)	0.820	-0.559	(0.628)	0.572
(Neither parent lives in the household)									
<i>Marriage / spouse location</i>									
Spouse lives in origin household or village	1.728***	(0.445)	5.629	1.685***	(0.295)	5.394	1.745***	(0.404)	5.727
Spouse is a migrant in same location	-0.241	(0.198)	0.786	-0.41**	(0.126)	0.663	-0.77***	(0.198)	0.463
Spouse is a migrant in different location	-0.887*	(0.412)	0.412	-0.203	(0.213)	0.816	-0.623	(0.431)	0.536
Migrant is divorced or widowed	-0.875	(0.519)	0.417	-0.576	(0.338)	0.562	-0.088	(0.423)	0.915
Spouse location unknown (Migrant was never-married)	0.124	(0.224)	1.132	-0.478**	(0.158)	0.620	-0.75**	(0.281)	0.472
<i>Location of children</i>									
At least one of the migrant's children lives in household (Migrant's children do not live in the household)	0.841	(0.477)	2.318	0.399	(0.309)	1.490	0.502	(0.481)	1.652

(continued)

Table 4. (Continued)

Variable	Low-wealth households		Middle-wealth Households		High-wealth Households				
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
Household economy									
Natural log of amount of land owned (in 1,000 sq.wa)	0.007	(0.022)	1.007	0.020	(0.013)	1.020	-0.010	(0.034)	0.990
Household grows rice (Household does not grow rice)	-0.140	(0.267)	0.869	0.130	(0.150)	1.139	0.142	(0.228)	1.152
Household owns equipment (Household does not own equipment)	-0.003	(0.265)	0.997	0.357*	(0.146)	1.430	0.230	(0.214)	1.258
Household demographics									
Number of people living in the household	-0.082	(0.050)	0.921	-0.112***	(0.032)	0.894	-0.127*	(0.055)	0.881
Number of migrants	-0.063	(0.052)	0.939	-0.069*	(0.033)	0.934	-0.169**	(0.061)	0.845
N		1599			3419			1519	
-2 LL		7 989.400			16 685.700			7 719.000	
BIC		8 009.200			16 707.700			7 725.000	
AIC		7 995.400			16 691.700			7 725.000	
Random effects									
Level-one random effects var(R_{ij}) = $\pi^2/3$	Var comp		ICC	Var comp	Std err	ICC	Var comp	Std err	ICC
Level-two random effects var(U_{ij}) = τ^2	3.29	-	-	3.29	-	-	3.29	-	-
Level-three random effects var(V_{ij}) = ϕ^2	1.236	0.297	0.053	0.898	0.163	0.033	1.375	0.312	0.054
	1.049	0.048	0.009	0.697	0.021	0.004	1.138	0.052	0.009

* p < 0.05 ** p < 0.01 *** p < 0.001 (two-tailed test)

These findings suggest a signalling motive rather than a co-insurance or investment motive, which is limited to households in the middle of the wealth distribution. This situation has implications for contemporary migration theory, which should be modified to recognize that migrant remittances are not necessarily part of household strategies and might be moderated by economic prosperity at the household level. Further implications of this finding are explored in the concluding section, and one now turns to findings for our control variables.

Demographic variables show that gender, migration duration, and migration destination are important determinants of return migration. Throughout all models, females were consistently found to be more likely to return than males. In the full sample (table 3), the odds of males returning were approximately 28 per cent lower compared with the odds of females returning. Table 4 shows that the effect was comparable for households at various levels within the wealth distribution, with males from middle-wealth households having the lowest odds of returning compared with females. The gender gap in return may be related to Thai norms that bind women to their home households (Curran, 1995; DeJong, 2000) through the expectation that they care for ageing parents.

Migration duration also had a consistent negative effect on return migration. In the full sample, the odds of return decreased by about 16 per cent for an absence of one year from the village. Results across different wealth categories are robust and similar in magnitude. Perhaps Massey (1987) is correct in arguing that greater exposure to the destination society gradually increases a migrant's ability to handle risk, which decreases the likelihood of return. Alternatively, some migrants may depart from their origin communities with the intention of settling in the destination community.

Migration destination behaves in unexpected ways. Compared with Bangkok migrants, migrants in north-eastern Thailand were less likely to return. The odds of them doing so were about 36 per cent lower. The direction of the effect is the same across the household wealth-category equations. It may be that most of those migrants were moving to other rural areas, perhaps to live with a spouse or start a new household through marriage. They may have had no intention of returning from the beginning of their migration journey. Interestingly, some additional analysis (not shown) suggests that migration destination may be a mediating factor in determining whether a migrant returns after sending remittances. The authors estimated a model which excluded migration destination and found several more statistically significant remittance results. One cannot reliably draw any conclusions from those results, because of the potential omitted variable bias associated with excluding the effect of destination.

Human capital variables have slightly different effects on return migration depending on a household's level of wealth. The strongest effects were related to education, while agricultural occupation had no consistent statistically significant effect. Results for education in the full model generally show that migrants with less education are more likely to return, which would argue in favour of the skills bias argument proposed by Borjas (1989) and Borjas and Bratsberg (1996). However, the education effect was not significant for the wealthiest households. This may be because lower- and middle-wealth households may have found it difficult to act as co-insurers for the migrant, or they may have had more trouble investing in the migrant's education in the first place.

Co-residence variables show that the location of the migrant's spouse was related to return migration. Although it is relatively rare for the migrant's spouse to live in the origin village or household (see table 2), migrants were more likely to return if this was the case. In the overall sample, the odds of migrants returning to the same location where their spouse lived were over four times greater compared with never-married migrants. Results from the household wealth models show that this effect is strong and robust.

Another consistent effect was that migrants were less likely to return if they lived in the same migration destination as their spouse. For the full sample, the odds of return for migrants whose spouse lives in the same migration destination were nearly 36 per cent lower than the odds of return for never-married migrants. This effect was consistent across different levels of household wealth, except for the relatively poorest households, in which the effect was not significant. Migrants seem to follow migration strategies that eventually make it possible for them to stay with their spouse.

Household economic variables showed very few consistent effects. For the overall sample, owning agricultural equipment made it more likely that a migrant would return. However, this was only true for middle-wealth households. Migrants from middle-wealth households were about 43 per cent more likely to return if a household owned agricultural equipment. It may be that migrants from these households had migrated temporarily to earn money, which they used to maintain agricultural equipment for use in family farms or for renting to others.

Household demographic variables showed some consistent effects. In the overall sample, as the number of people living in the household increased, so did the likelihood of return. However, this effect was not significant for low-wealth households. It may be that migrants from middle- and high-wealth households were less likely

to return to those households, since such households would be less reliant on them for labour, or perhaps the migrant wished to avoid excessive crowding.

The number of migrants from a household had a similar effect of lowering the likelihood of return migration, although the number of migrants was also not significant for households in the lowest wealth category. In other results (not shown), authors decomposed the number of household migrants into those who were living in the same destination as the ego migrant, and those who were living in a different migration location. This action is a test of migrant network theory (see Massey and Basem, 1992; Massey and others, 1993; Roberts and Morris, 2003), which argues that migrant networks at the destination provide a measure of security and access to resources which make it less likely for a migrant to return.

Results indicated that both these measures had a significant negative effect on return. While the effect of the number of household migrants at the same destination was consistent with migrant network theory, the finding that the number of migrants in other destinations also leads to a lower likelihood of return suggested that there is something more general about household out-migration that affects return migration. Also, the fact that this effect was dissimilar across households at different points on the overall wealth continuum may suggest the need for further research in this area.

Conclusion and policy implications

In this paper, the authors examined the effect on return migration of sending remittances, especially as it relates to household wealth. Overall, evidence supports the first hypothesis brought forward, which is that the sending of remittances by migrants is related to return migration. However, the effect of remittances on return migration exists only for small remittance amounts. This finding indicates that migrants are probably not following a household strategy motivated by co-insurance or investment. Rather, remittances they sent back home probably are only a gesture or signal to ensure their continued membership in the origin families or communities. Moreover, the seemingly simple relationship between remittances and return migration becomes more complex when households at different points on the wealth continuum are considered.

The best evidence for signalling, involving both the sending of remittances and the return of migrants, is for households in the middle-wealth category. Those households do not face the challenges of meeting their basic subsistence needs, which may

characterize the situation of poorer households. Although they may feel pressure to improve their household's standing vis-à-vis wealthier households, the fact that only small amounts of money precede return is not consistent with this explanation. Thus, such migrants are probably only exploring better individual opportunities through migration. They perhaps intend to eventually return from their migration journey and they use remittances to keep the return option open by maintaining membership in the origin household.

Results for households at the tails of the wealth distribution are less clear-cut, and unfortunately cannot be deduced from the present research design. Migrants from poorer households sending remittances are not related to return. This finding may suggest that, because of their lack of resources, these households need someone living in an area with a different risk profile than their own who could act as an insurer. Another possibility is that migrants from such households may never have had any intention of returning to an economically disadvantaged household, and thus, they are more likely to remit altruistically. Indeed, VanWey (2004) suggested that an altruistic motive is more likely for migrants remitting to relatively poorer households.

With regard to migrants from wealthier households, there is likewise no evidence showing association between remittances and return migration. Perhaps members of such households have less need for remittances compared with individuals from relatively poorer households, or maybe they can make up for the loss of labour resulting from migration by hiring local labour.

In general, the present findings suggest that, while a household economics approach may be more practical in describing strategies pursued by rural-to-urban migrants in developing countries, theorists and policymakers need to pay more attention to the different types of motivations that migrants and households follow at various points on the wealth continuum. Future work needs to be done to determine what types of migration motivations are undertaken by poorer households. Also, policymakers should notice that only a small number of migrants return. Therefore, policy efforts should focus on helping migrants at their destination, especially if they are living in slum housing or working in hazardous occupations, which may require better access to medical care.

This research had a number of shortcomings which could influence results. There were limitations to using an origin survey. For instance, information about migrant characteristics might be flawed as it was coming from proxy reports from the household. Also, ascertaining the motives for sending or not sending remittances on

the part of non-returning migrants was not feasible. Using a concurrent survey at the destination could overcome a number of such problems, but related data are difficult to acquire. Another problem stemmed from the time lag between the dependent variable and the measurement of independent variables. This time lag makes it difficult to assess the effect on return migration of changes in family status, education, occupation, remittances sent subsequent to the time period under observation, and the like.

Appendix Table

Table 1. Multilevel binary logit estimates of return migration in 2000 for migrants aged 13 - 55 in 1994 by household wealth

Variable	Low-wealth households		Middle-wealth households		High-wealth households				
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
Intercept	0.248***	(0.502)	1.281	-1.125***	(0.303)	0.325	-1.049***	(0.594)	0.350
Remittance variables									
<i>Migrant-to-household monetary remittance</i>									
Migrant sent less than 1,000 Baht	0.468*	(0.217)	1.597	0.172	(0.155)	1.188	0.263	(0.285)	1.300
Migrant sent between 1,001 and 3,000 baht	0.379	(0.216)	1.460	0.434**	(0.149)	1.543	-0.358	(0.257)	0.699
Migrant sent between 3,001 and 5,000 baht	-0.008	(0.256)	0.992	0.388*	(0.164)	1.475	-0.177	(0.261)	0.838
Migrant sent 5,001 baht or more (Migrant sent no money)	0.222	(0.239)	1.248	0.054	(0.151)	1.055	0.002	(0.210)	1.002
<i>Migrant-to-household in-kind remittance</i>									
Migrant sent clothing	-0.043	(0.249)	0.957	0.444**	(0.153)	1.559	0.018	(0.254)	1.018
Migrant did not send clothing)									
Migrant sent food									
(totaling 100 baht or more in value) (Migrant did not send food)	-0.415	(0.246)	0.661	-0.535***	(0.144)	0.585	-0.210	(0.236)	0.810

(continued)

Table 1. (Continued)

Variable	Low-wealth households		Middle-wealth households		High-wealth households				
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
Migrant sent household goods or electrical appliances	0.096	(0.215)	1.101	0.142	(0.140)	1.152	0.029	(0.209)	1.029
(Migrant did not send goods or appliances)									
Migrant sent vehicles	0.110	(0.779)	1.117	0.965*	(0.427)	2.625	-0.045	(0.554)	0.956
(Migrant did not send vehicles)									
<i>Household-to-migrant remittance</i>									
Household-to-migrant sent remittance	0.366	(0.197)	1.442	0.071	(0.126)	1.074	0.078	(0.178)	1.081
(Household did not send remittance)									
Demographic variables									
Age	-0.028	(0.015)	0.973	0.019*	(0.010)	1.020	0.017	(0.016)	1.017
Male	-0.399**	(0.134)	0.671	-0.317***	(0.090)	0.728	-0.431**	(0.142)	0.650
(Female)									
<i>Details of migration</i>									
Number of years gone	-0.221***	(0.031)	0.802	-0.179***	(0.020)	0.836	-0.14***	(0.031)	0.869
Human capital									
<i>Education</i>									
Less than primary school	0.723***	(0.188)	2.060	0.236	(0.129)	1.266	0.085	(0.231)	1.089
Greater than primary school	-0.682*	(0.303)	0.505	-0.541***	(0.156)	0.582	-0.229	(0.178)	0.795
(Primary school)									
<i>Occupation</i>									
Agricultural occupation	-0.293	(0.161)	0.746	-0.258*	(0.114)	0.773	-0.439*	(0.210)	0.644
(Non-agricultural occupation)									

(continued)

Table 1. (Continued)

Variable	Low-wealth households		Middle-wealth households		High-wealth households				
	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio	Coefficient	Std error	Odds ratio
Household grows rice (Household does not grow rice)	-0.122	(0.266)	0.885	0.128	(0.148)	1.137	0.140	(0.226)	1.150
Household owns equipment (Household does not own equipment)	0.001	(0.265)	1.001	0.345*	(0.143)	1.412	0.218	(0.212)	1.244
Household demographics									
Number of people living in the household	-0.079	(0.050)	0.924	-0.113***	(0.032)	0.893	-0.126*	(0.055)	0.881
Number of migrants	-0.060	(0.052)	0.942	-0.065*	(0.032)	0.937	-0.165**	(0.060)	0.848
N		1599			3419			1519	
- 2 LL		7 974.600			16 598.200			7 701.600	
BIC		7 994.400			16 620.200			7 721.100	
AIC		7 980.600			16 604.200			7 707.600	
Random effects									
<i>Level-one random effects</i>									
$\text{var}(R_{it}) = \rho^2/3$	3.29	-	-	3.29	-	-	3.29	-	-
<i>Level-two random effects</i>									
$\text{var}(U_{it}) = \tau^2$	1.228	0.296	0.130	0.843	0.157	0.105	1.337	0.305	0.125
<i>Level-three random effects</i>									
$\text{var}(V_{it}) = \eta^2$	1.049	0.048	0.021	0.645	0.020	0.013	1.098	0.050	0.021

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed test)

Endnotes

- 1 To assess the accuracy of this information the authors compared household reports at the origin to reports about migrants at the destination. A limited sample of migrants was used from a follow-up survey that targeted rural-to-urban migrants in four migrant destinations (greater metropolitan Bangkok, industrializing provinces of the Eastern Seaboard, Nakhon Ratchasima, and Buri Ram town) from 22 of the 51 origin villages (see Rindfuss and others, 2005 for details of the follow-up). The authors were able to match approximately 17 per cent of the overall sample to a migrant follow-up record in order to compare migrant characteristics (age, sex, education, occupation and remittances) between the two surveys. Some small differences were found in terms of characteristics, especially with regard to occupation. It is unclear whether those differences are due to an actual change in status, to a reporting error from the origin sample proxy report, or to the timing of the surveys – the follow-up occurred several months after the household survey. Also, less than one fifth of the migrants in the sample could be matched, and the migrants in the follow-up were not a random subset of the overall sample. Therefore, the reliability of those comparisons appears questionable.
- 2 The authors also limited the sample using list-wise deletion (i.e., complete case analysis) to deal with missing data. This procedure diminished the size of the sample by 7.5 per cent.
- 3 There is noticeable heaping on the 10-year duration, which suggests that those estimates are subject to recall bias and may not be accurate.
- 4 This enabled the authors to overcome a shortcoming faced in many studies that measure remittances and migration contemporaneously. Modeling the two as contemporaneous measures opens the possibility of endogeneity bias, that is, perhaps a set of unmeasured variables affects both variables, or the direction of causality is not from remittances to return migration, but vice versa.
- 5 Because neither monetary nor in kind remittances sent from households to migrants had an effect on return migration, these were collapsed into a single variable in the final models.
- 6 The currency of Thailand is the baht. In 1994, the exchange rate was approximately 25 baht per United States dollar.
- 7 This may simply be related to the greater availability of money or goods of wealthier households.
- 8 Household assets include the number of the following: black and white televisions, colour televisions, video cassette recorders, refrigerators, agricultural trucks, cars/trucks/pickups, motorcycles and sewing machines. In addition, dummy variables are included for whether a household: cooks with electricity or gas or does not do so; does or does not have windows with wood panes and shutters, glass panes, or insect screens; and has piped water. While the Nang Rong data do not contain information on individual income or household consumption expenditures, data were collected about household ownership of various consumer durables or assets. These variables can be used to create an index of assets that is a proxy for household wealth. In creating such an index, choosing an appropriate weight to attribute to each asset may be difficult. To calculate those weights, the authors applied principal components analysis (PCA), a well-known technique for reducing the dimensionality of a data set.

- ⁹ The wealth index was constructed using the entire population of households, some of which did not get into the final analysis sample. Therefore, the percentage of households in each of the wealth distribution percentiles are not identical to the one which could have been expected given the operational definition.
- ¹⁰ This includes the following provinces: Bangkok, Nonthaburi, Samut Prakan and Pathum Thani.
- ¹¹ Agricultural workers include primarily paddy rice farmers. Non-agricultural occupations include workers (mostly automobile or furniture repair employees, factory workers, construction workers and general/unskilled labourers), professionals (mainly clerical workers, police officers, soldiers, teachers, government employees and monks), service workers (made up mostly of domestic workers; "tuk-tuk" (motorized rickshaw), taxi, motorcycle or mini-bus drivers; salesmen; and small shopkeepers). Students and housewives were also considered as being involved in non-agricultural labour.
- ¹² Unfortunately, data limitations do not allow us to know whether migrants whose children do not live in the household are childless or whether their children live somewhere outside of the village.
- ¹³ A wa is a Thai unit of measure of area: 1 square wa = about 4 square metres.
- ¹⁴ As random effects are not of substantive interest in this paper, they are not discussed here in great details. Across all models variance components are quite low at the village level, with between 12-30 per cent of the variance occurring at the household level (depending on the model specification). Therefore, most of the variation occurs at the individual level.

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Determinants of Living Arrangements of Elderly in Orissa, India: An Analysis

In view of the changing socio-economic and demographic scenario of India, increasing levels of education and income along with a simultaneous decline in fertility, it is likely that a higher proportion of older persons in India will be living alone in the future. Therefore, policies and programmes related to older persons may have to be designed so that they adequately address the needs of older persons living alone.

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Demographic trends in many developing countries since the second half of the twentieth century are leading to an unprecedented increase in the absolute as well as relative size of older populations¹ (aged 60 years and older). Simultaneously, rapid social and economic changes have occurred that have potentially profound implications for the future of the elderly. At the global level the number of older persons is projected to increase from 603 million in 2000 to 2 billion in 2050. The increase will be especially dramatic in less developed regions where the size of older populations will more than quadruple, from 370 million in 2000 to 1.6 billion in 2050 (United Nations, 2009).

The magnitude of increase in the elderly population depends upon the pace of demographic transition. The world fertility rate has fallen from 5 children per women on average in 1950 to under 3 (2.67 children per women) in 2000, with a continued decline to 2 children per women (United Nations, 2009). Similarly, life expectancy recorded significant increases over the second half of the last

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century. This has led to a considerable shift in the age structure of the population, with shrinkage at the younger ages, and a bulge at the older ages.

India has one of the fastest-growing elderly populations in the world (Alam and Mukherjee, 2005; Gulati and Rajan, 1990; NSSO, 1998; Rajan, Mishra and Sarma, 2000; Sengupta and Agree, 2003). The population of India has increased from 361 million in 1951 to 1,027 million in 2001, while during the same period, the number of older persons has increased from 19 million (representing about 5 per cent of the total population) to 77 million (7.6 per cent of the total population). The number of older persons in India is projected to increase further to 159 million by the year 2025 and to 316 million by 2050 (United Nations, 2009).

Such a rapid increase in the size and proportion of the elderly population brings about several challenges for the country. Lack of ensured and sufficient income, absence of social security, loss of social status and recognition, lack of opportunities for using one's time creatively and persistence of ill health are some of the daunting problems faced by older persons in India. Another continuing major challenge is providing them with decent and comfortable living arrangements.

To date, living arrangements among older persons have not been an issue in most developing countries, including India, as their own families were expected to take care of them. However, issues concerning household structure and support for older persons in

Table 1. India's demographic scenario of ageing from 1950 to 2050

Years	Population (aged 60 and older) (in millions)	Percentages of total population	Growth rate (percentage)	
			Total population	Population aged 60 and older
1950	20	5.4	1.8	2.0
1975	35	5.6	2.3	2.9
2000	70	6.7	1.6	2.7
2025*	159	11.1	0.7	3.2
2050	316	19.6	0.3	2.2

Source: United Nations, 2009.

* Medium variant.

developing countries are becoming increasingly prominent as population ageing becomes a rising concern for many of these countries. Along with ageing, these countries are also experiencing socio-economic and demographic changes, more specifically increasing levels of education among women and their increasing involvement in paid employment. As economies grow, literacy levels rise and urbanization and modernization proceed rapidly, women bear fewer children and people live longer and healthier lives. The effects of these trends on families, households, kin networks and subsequent support of older persons are complex and not well documented. It is generally felt that the size and complexity of households decrease along with industrialization and urbanization. In traditional rural societies, families are more often extended than in modern urbanized settings where independent nuclear families predominate. In modern urban settings also, extended kinship ties tend to weaken and the nuclear family becomes more of an independent unit. These weakening ties lead to a reduction in social interactions and financial and physical support for the older generation, as well as to greater prevalence of separate living arrangements. In this context, issues related to older persons' living arrangements, which also have a bearing on their welfare, need proper attention. Against this backdrop of rapid demographic and family-related changes, it is important to explore the current nature of older persons' living arrangements in India.

Determinants of living arrangements: a review

Although many studies have been conducted on the type of living arrangements among older persons, the reasons for seeking a particular type of arrangement remains relatively unknown (Palloni, 2001; Kinsella and Phillips, 2005). Studies have identified a number of factors including age, sex, occupation, education, place of residence and number of children as important variables that shape such living arrangements (United Nations, 2005; Yadava, Yadava and Sarma, 1996; Jaiprakash, 1999). Velkoff (2001) found that living arrangements are influenced mainly by financial well-being, marital status, family size and structure as well as cultural traditions, but the relative importance of each of those factors has hardly been examined.

Living arrangements are generally studied as a dichotomous outcome whether living alone or co-residing with others. Earlier studies attempted to determine out the contributory factors leading to both of these arrangements. Data from Western countries show that over 60 per cent of the elderly² aged 65 and older live either alone or with their spouse (Palloni, 2001). However, data from

developing countries show a much lesser magnitude of elderly people living alone. A general agreement among researchers is that there is an increasing trend towards elderly people living alone or with spouse even in India. The National Sample Survey Organization (NSSO) report of shows that the percentage of older persons living alone or with their spouse is 15 per cent in rural areas and 12.5 per cent in urban areas (NSSO, 1998)

A strong association is usually observed among the elderly between socio-economic factors and decisions to co-reside (Chakraborty, 2004; Yadava, Yadava and Sarma, 1996; Jaiprakash, 1999; Sahayam, 1988; Zimmer and others, 2003). For instance, co-residence is inversely related to the socio-economic background of the family. The decision of the elderly people to live alone is often shaped by the nature of economic resources available to them. It is generally argued that older persons with fewer resources tend to co-reside with their children, unlike those with better resources. In circumstances where older persons can benefit from some social security measures, such as old-age pension and health insurance, the probability of living alone would systematically rise compared with those not covered by such measures. However, empirical evidence does not support this argument fully (Pal, 2004; Bhattacharya, 2005). The contradictory argument is that in cases when older persons have some economic backing, their children, particularly those unemployed, would be more likely to stay with them to take advantage of the resources available. NSSO data report higher incidence of elderly people living alone or with a spouse in rural areas. Various small-scale surveys have also highlighted the difficult conditions endured by older persons living alone in the Indian context (NSSO, 1998; Rajan, Mishra and Sarma, 1999).

Older persons' education is yet another important variable determining their living arrangements. It has been found that, with increases in education level, the pattern of co-residence systematically diminishes (Andrade, Drummond and DeVos, 2002; Bongaarts and Zimmer, 2001; Pal, 2004; Zimmer, Hermalin and Lin, 2001).

Yet another important variable of interest is the number of surviving children the elderly have and its relationship with the co-residence pattern. From a broad range of studies, it is known that co-residence between older parents and at least one adult child is a central feature of familial support systems in most developing countries (Bongaarts and Zimmer, 2001). Studies generally support the view that the number of living children is positively related with the probability of living with them (Martin, 1989). With the drastic decline in fertility in many states of India, co-residing with children becomes increasingly difficult. In addition, educated adult children

tend to migrate to urban areas in search of employment, leaving behind their elderly parents (Rajan, Mishra and Sarma, 1999; Bongaarts and Zimmer, 2001).

In the Indian context, not only does the number of children matter, but their sex and marital status also determines their co-residence pattern. In India, unlike in Western societies, sons are more likely than daughters to co-reside with their parents (Bongaarts and Zimmer, 2001; Chaudhury, 2004; Gulati and Rajan, 1990; De Silva, 1994; Zachariah, 2001). Studies in India have also found significant gender differentials among older persons' living arrangements, but these gender differentials are attributed to the higher incidence of widowhood due to the higher expectation of life among women (Chakraborti, 2004; Knodel, 1999; Knodel and Ofstedal, 2003; NSSO, 1998; Rajan, Mishra and Sarma, 2000).

The joint family system which persisted in the country for a long period of time has given way to the "nuclearization" of families. As a result, the earlier concept of older persons being provided with support by their children has also undergone drastic changes. This may also be due to other factors such as modernization, urbanization and the erosion of traditional cultural values (Bhattacharya, 2005; Mason, 1992; Rajan, Mishra and Sarma, 2000; Sahayam, 1988; Shah, 1999; Sumangala, 2003).

Although it is important to find out the significance of each of these factors in determining co-residence of elderly, there are certain inherent limitations for such an analysis. The relationship of each of these variables with living arrangements depends mainly upon the cultural context in which the studies are undertaken. For instance, while availability of resources with the elderly may enhance the chances of living alone in the West, the reverse may be true in the Indian context as children would be more willing to live with their the parents in such cases (Pal, 2004). Therefore, studies on determinants of living arrangement should also be carried out within a specific cultural context.

What explains the living arrangements of the elderly?

India is still characterized by its traditional ways of living where several generations live jointly within the same household. With improved health infrastructure and increased life expectancy, older persons are expected to live longer. However, joint family systems are on the decline and more and more families are becoming nuclear. In addition, older persons in India are facing several other

challenges affecting their lives, such as lack of ensured and sufficient income to support themselves, absence of social security, loss of social status and recognition, lack of opportunities to make use of their time creatively and persistence of ill health. Studies show that a higher proportion of older persons are facing a difficult life without much hope for improvement. Providing decent and comfortable living arrangements continues to be a major challenge. Against this background, it is important to explore the current nature of living arrangements and their determinants. Studies focusing on the socio-economic and demographic correlates of living arrangements are limited however. Hence, this paper analyses the socio-economic and demographic correlates of the living arrangements of older persons in the state of Orissa.

Objectives of the paper

The major objectives of this paper are to (a) examine the determinants of living arrangements of elderly in Orissa; (b) examine the socio-economic, demographic and gender differentials in living arrangements among older persons in Orissa; and (c) study the regional variations in the living arrangements among the elderly in that state.

Study area

The study was undertaken in the state of Orissa, in eastern India. This is one of the country's poorest states. At the same time, Orissa has a higher proportion of elderly persons in the population compared with the national average. Studies have shown that disabilities among the elderly are also higher in Orissa (Srivastava and Mishra, 2005). A higher level of poverty, combined with a larger share of the old-age population, poses a serious challenge in terms of providing decent living arrangements for older persons in the state.

Data and methodology

Data for the present paper are based on the 60th round of the National Sample Survey on the elderly for the state of Orissa. This survey was conducted by the NSSO and primarily focused on health care, education and on the problems faced by older persons (aged 60 years and older). This survey provides information on older members of the households, including the number of surviving sons, daughters and dependents, their economic status and usual activities, living arrangements, levels of mobility, disabilities, self-reported

health status, chronic health conditions, ownership and management of assets, management of social and religious matters, daily chores and availability of food, clothing and medicine. The total sample size was 1,238 older persons (660 males and 578 females). Data were collected through interviews conducted in the sample households.

Sampling design

The sample design adopted for the survey was essentially a two-stage stratified design, with census villages and urban blocks as the first-stage units (FSUs) for the rural and urban areas, respectively, and households as the second-stage units (SSUs). The survey period was from January to June 2004, split up into two subrounds of three months each. The rural and urban samples of FSUs were drawn independently in the form of two subsamples and equal numbers of FSUs of each subsample were allocated for the two subrounds.

In the first stage sampling unit 211 villages and 56 urban blocks were surveyed throughout the state of Orissa. Researchers decided to select 10 households as the second stage units to be surveyed in each selected FSU; Thus, 2,094 rural households and 560 urban households were surveyed. However, after cleaning the data, responses from only 1,238 respondents (aged 60 years and older) were used, including 984 from rural areas and the remaining 254 from urban areas.

Bivariate and multivariate statistical tools were used to establish the determinants of living arrangements of older persons in Orissa. During the first part of the data analysis, bivariate cross tabulation with chi-square test statistics was conducted to determine the relevant significant differences in living arrangements of the elderly with their background characteristics. In order to establish a strong association, an attempt has been made to use logistic regression analysis by controlling some of the important variables, such as age, sex, number of surviving sons and economic independence.

Analysis and discussion

The determinants that influence the likelihood of older persons living alone are the main focus of this paper. Older persons are considered to be "living alone" if they live alone or with their spouse but with no other kin. By contrast "co-residence" or "not living alone" occurs when the older person lives with any one of their kin, including children. NSSO questions on living arrangements gathered information on whether the older individual lives alone, whether he/she lives with spouse only, whether he/she lives

with spouse and children, with children only, or with other relatives and non-relatives. Socio-economic and demographic factors have been studied to determine the significant covariates of the living arrangement choices.

Table 2 shows the different living arrangement patterns of older persons in Orissa. It is evident from this table that 15.6 per cent of older persons live alone, while the rest (84.4 per cent) are in co-residence. It is interesting to note that the proportion of elderly who live alone is slightly higher than the Indian average of 14.5 per cent (Chaudhuri and Roy, 2007). However, studies have shown that the proportion of elderly who live alone in most European countries is much higher (Grundy, 2000) compared with that for India. Studies from South-East Asian countries too have shown that a much higher proportion of elderly live alone (Martin, 1989).

The majority of older persons (51.5 per cent), who are in co-residence, live with their spouses and children; roughly, one third live without a spouse but with children, while a small proportion (2.5 per cent) live with other relatives and non-relatives. These findings are almost in line with the expected behaviour of the Indian elderly -- that most elderly live with their children because of strong traditional value systems. However, the proportion of older persons living alone is likely to increase in the near future owing to a variety of socio-economic and demographic changes that have been taking place in Indian society. A number of researchers have pointed out that the Indian traditional joint family is disintegrating due to the forces of urbanization and modernization (Conklin, 1988; Dhurvarajan, 1988; Sharma and Dak, 1987). A study by Jamuna (2003) concluded that India is currently experiencing massive socio-economic change in the face of rapid industrialization, urbanization and globalization. Migration out of rural villages to cities for employment and increased rates of women entering into the workforce is threatening traditional familial support for the elderly, which brings about intergenerational conflicts. Even among adult children willing to provide necessary care, many are required to move to the industrial centres for employment, leaving older persons alone in their village. A study by Kaplan and Chadha (2004) found that the traditional Indian extended and joint family system has undergone significant changes owing to factors such as mobility from rural-to-urban centres. The authors strongly emphasized that mobility from rural to urban areas has certain economic benefits, but also some drawbacks, such as contributing to the nuclearization of families and the leaving behind of elderly parents, especially in rural settings. Such mobility affects the lives of older persons in various ways, especially since those persons are frail and in need of emotional and social support. Similarly, a study by Madhurima

Table 2. Distribution of living arrangements of the elderly by demographic variables in Orissa

Demographic variables	Living arrangements of elderly (percentage)				Total	
	Living alone	Living with spouse and other members	Living without spouse but with children	Living with others	Total	Observations (N)
Age*						
60-69 years	17.3	54.0	26.7	2.0	100	860
70-79	11.9	43.9	40.5	3.6	100	300
80 and older	7.3	46.8	40.7	5.2	100	78
Sex*						
Male	18.6	68.3	12.2	1.0	100	660
Female	11.9	32.0	51.6	4.5	100	578
Marital status*						
Never married	12.9	NA	65.1 ^a	22.0	100	7
Currently married	18.9	76.9	3.7	0.5	100	820
Widowed	8.7	NA	82.0	9.3	100	407
Divorced/separated	24.8	NA	75.2	0.0	100	4
Surviving children*						
None	50.5	16.6	NA	32.9	100	49
One	12.4	35.3	46.8	5.5	100	129
Two	25.2	42.6	29.2	3.1	100	173
Three or more	11.9	57.6	29.7	0.8	100	887

(continued)

Table 2. (Continued)

Demographic variables	Living arrangements of elderly (percentage)				Total	
	Living alone	Living with spouse and other members	Living without spouse but with children	Living with others	Total	Observations (N)
Surviving sons*						
None	42.9	27.4	16.2	13.5	100	149
One	12.4	48.4	36.8	2.4	100	366
Two	12.2	61.0	26.4	0.5	100	368
Three or more	11.1	54.0	34.4	0.5	100	355
Surviving daughters*						
None	18.8	33.3	41.8	6.1	100	230
One	15.1	54.0	27.8	3.1	100	348
Two	13.6	56.4	29.0	0.9	100	339
Three or more	15.1	56.6	27.1	1.1	100	321
Observations (N)	193	638	376	31		1 238
Percentage	15.6	51.5	30.4	2.5	100	

Source: Author's calculation

* $p < 0.001$ (Pearson's chi-squared test statistics)

^a This is because those elderly have never been married or that they have adopted children. Hence, in the present analysis 65.1 per cent of the elderly who have never been married are living without spouse, yet with children.

(2008) found that urban lifestyle and formal education have brought about a decline in the familial network of relationships, which is affecting the status and care of the elderly in India. The remainder of this article analyses the important factors that determine the living arrangements of older persons in Orissa.

Demographic determinants of living arrangements of the elderly in Orissa

The major demographic factors that determine the living arrangements of older persons considered in this study are, age, sex, marital status and surviving children.

Age and living arrangements

Studies have shown that the age of the elderly is one of the most important determinants of living arrangements. For the present analysis, the age of the elderly is categorized as *younger old*, *older old* and *oldest old*, for those in the age groups 60-69, 70-79 and 80 and older, respectively. The corresponding percentages of younger old, older old and oldest old in the sample were 69.5 per cent, 24.1 per cent and 6.3 per cent, respectively.

Table 2 presents the association between the age of the elderly and their living arrangements. It is quite evident from this table that as their age increases, the proportion of older persons living alone decreases. The proportion of elderly people living alone is highest in the age group 60-69 (17.3 per cent). This proportion decreases to 11.9 per cent when the elderly move to the age group 70-79 and is reduced further to 7.3 per cent when the elderly attain ages 80 and older, indicating lower chances of the elderly living alone when they grow old. This may be due to their declining capacity for self-care. Studies conducted elsewhere report similar findings (Shah and others, 2002; Liang, Gu and Krause, 1992; Ramashala, 2001; Zimmer and Kim, 2002). Further, irrespective of the age, living with spouse and children is the most common living arrangement observed in the state of Orissa. It is also interesting to note that a positive relationship exists between the age of the elderly and living without spouse, but with children. As the age of the elderly increases, the proportion of elderly living without spouse but with children also increases. This could be due to the fact that as age increases, there is a higher chance of widowhood among older persons and consequently they tend to live with children, but without their spouse. Similarly, the proportion of elderly living with others also goes up with increasing age. As in many other countries, age turns out to

be an important determinant of living arrangements in Orissa. The higher the age of the elderly, the lower are their chances of living alone. Pearson's chi-square test statistic also confirms that age and living arrangement relationships are statistically significant.

The age and living arrangement relationship may however be quite complex as there is a negative relationship between the age and living alone. Age alone may not affect patterns, but it could well be due to reasons of an economic nature as well. It may be argued that the economic condition of the elderly deteriorates with age even for those getting a pension, as pensions usually do not increase in line with the cost of living and therefore the real pension reduces over time. As the elderly grow older, they may depend economically on others and therefore tend to co-reside. Hence, the observed relationship between age and living arrangements may be as much due to economic reasons, as to age per se. Therefore, further in-depth analysis is required to deduce the exact relationship between age and living arrangements by considering a number of economic variables.

Sex and living arrangements

Sex of the elderly is another important demographic indicator that determines their living arrangements. Table 2 presents the relationship between the sex of the elderly and their living arrangements. The table shows that, in Orissa the proportion of elderly males who live alone (18.6 per cent) is higher than that of elderly females living alone (11.9 per cent). This is in contrast with the pattern observed elsewhere in the world wherein more elderly females live alone than elderly males. Nevertheless, in the Indian context females are not expected to live alone and therefore this proportion is lower.

Among those who are in co-residence, the majority of the males (68.3 per cent) live with spouse and children, but majority of females (51.6 per cent) live without their spouse but with children. Studies conducted elsewhere have also shown that more males than females live with their spouses (Bian and others, 1998; Chan, 1997; Bongaarts and Zimmer, 2001; Knodel and Ofstedal, 2003; Panda, 1997; Shah and others, 2002; Zimmer, 2005). As mentioned previously, this may be due to the higher incidence of widowhood among elderly females than among elderly males (Chan, 1997; Sobieszczyk, Knodel and Chayovan, 2003; Lee and Palloni, 1992; NSSO, 1998 and 2006, United Nations, 2005; Shah and others, 2002). Here again, it may be difficult to establish the relationship between sex and living arrangements unless marital status is controlled. The next attempt therefore is to look at the differentials in living arrangements according to marital status.

Marital status and living arrangements

Unlike in other countries, the association between marital status and living arrangements is not very prominent, mainly because marriage is almost universal in India. However, an attempt has been made to look into the relationship between marital status and living arrangements. The marital status of the elderly has been divided into four categories: never married, currently married, widowed and divorced/separated. In this sample, the majority of the elderly are either currently married (66.2 per cent) or widowed (32.9 per cent), while a small proportion is divorced/separated (0.3 per cent). The proportion never married (0.6 per cent) is negligible in this sample.

Table 2 also presents the association between marital status and living arrangements of elderly persons in Orissa. Since the numbers of persons who are never married and divorced/separated are very small, comparisons were given only for those who are currently married versus those widowed. It can be seen from the table that a relatively higher proportion of currently married older persons live alone³ (18.9 per cent) when compared with those who are widowed (8.7 per cent). However, the majority of the widowed (82.0 per cent) live with their children. It is likely that when both spouses are alive, they live together; when one of the partners dies, the other one may move with children or other relatives. In the Indian context, traditionally widowed elderly were generally looked after by their children. The chi-squared test also confirms the existence of a significant difference in living arrangements of elderly according to their marital status.

Surviving children and living arrangements

Another important demographic factor which determines the living arrangements of older persons is the presence of surviving children. In traditional societies, including India, it is generally believed that children furnish old-age security. In this sample, the percentages of elderly persons with no child, one child, two children and three or more children are 4.0 per cent, 10.4 per cent, 14.0 per cent, and 71.6 per cent, respectively.

Table 2 presents the association between the number of surviving children and the living arrangements of the elderly in Orissa. The majority of older persons without any surviving children either live alone (50.5 per cent) or with others (32.9 per cent). As expected, the number of children is negatively associated with living alone. For example, only 12.4 per cent of the elderly live alone when they have one surviving child, whereas 50.5 per cent of the elderly live alone when they do not have any children. Studies conducted elsewhere

also generally support the view that the number of children is positively related with the probability of living with them (Bian and others, 1998; Burch and Mathews, 1987; Martin, 1989; Rajan and Kumar, 2003; Zimmer and Kwong, 2003). The greater the number of surviving children, the higher are the chances of the elderly co-residing with them. The chi-squared test also confirms the existence of a significant difference in living arrangements of elderly according to the number of their surviving children.

Surviving sons and living arrangements

Not only is the number of surviving children important, but their sex composition also determines the living arrangements of the elderly. In India, a son is considered the most important care provider for parents in their old age. In this sample, it was found that 12.0 per cent of the elderly did not have a surviving son, 29.6 per cent had only one surviving son, 29.7 per cent had two surviving sons and 28.7 per cent had three or more surviving sons, respectively.

Table 2 presents the distribution of the elderly with the number of surviving sons by living arrangements. It is evident from the bivariate analysis that the number of surviving sons is negatively associated with the elderly living alone. For example, 42.9 per cent of the elderly with no surviving son were living alone compared with 12.4 per cent of the elderly with one surviving son. The proportion of elderly living alone further declines with increases in the number of surviving sons. Similarly, the proportion of elderly living with other members also declines with increases in the number of surviving sons. The result of Pearson's chi-squared test is also significant with respect to number of surviving sons.

Surviving daughters and living arrangements

Apart from the numbers of surviving sons that determine the living arrangements of elderly persons, the number of surviving daughters is equally important. In this sample, 18.6 per cent of the elderly did not have any surviving daughter, 28.1 per cent had one surviving daughter, 27.4 per cent had two, and 25.9 per cent had three or more surviving daughters. It is interesting to note that only 18.8 per cent of the elderly without any daughter lived alone whereas 42.9 per cent of the elderly with no sons lived alone, indicating the importance of surviving sons in determining the living arrangements of elderly. Further, the proportion of elderly persons living alone does not vary much with respect to the number of surviving daughters, indicating the importance of sons in determining the living arrangements.

From the above discussion, it is clear that demographic variables, such as age, sex and number of surviving sons, affect the living arrangement choice among the elderly. In Orissa, older persons that are in the younger age group, those that are males and without any surviving sons are more likely to live alone as compared with their counterparts.

Regional variations in living arrangements

The existence of wide interregional variations within states of India is a well-recognised fact. These regional disparities exist with respect to physical and social infrastructure and also with regard to various other development indicators. Many demographic indicators, such as fertility, mortality and age at marriage, differ across regions, and it is possible to assume that living arrangements of older persons may vary accordingly. It is generally presumed that the pattern of living alone is likely to be more common in a better developed region than in a lesser developed one, although mixed results have been observed based on data collected in developing countries. An attempt has therefore been made here to analyse the regional variation and living arrangements across regions of Orissa.

Geographically, Orissa is divided into three subregions: northern, southern and coastal. When various socio-economic indicators are considered, the coastal subregion is the better developed one followed by the northern subregion. By contrast, the southern subregion, in which the population is mostly tribal, is the least developed one. An attempt has also been made to see whether the living arrangement pattern differs among these three subregions of Orissa. Table 3 presents these results, clearly showing that the proportion of elderly living alone is much higher in the southern region (21.5 per cent) compared with the northern (15.8 per cent) and coastal (13.7 per cent) region. Here again one can see that in all the three subregions, as in the case of Orissa, a higher proportion of "younger olds" persons live alone compared with those elderly who are aged 80 and older. However, for each age group, the southern subregion has a higher proportion of elderly living alone as compared with Orissa's northern and coastal subregions. Similarly, in all these three subregions, the proportion of the elderly living alone is higher among males and elderly with no surviving children. Further, in every category, the proportion of elderly living alone is higher in the southern subregion than in northern and coastal ones. Hence, irrespective of the demographic characteristics, the proportion of elderly living alone is much higher in the southern part of Orissa than in the northern and coastal parts.

Table 3. Distribution of demographic indicators and living arrangements of elderly across geographical subregions within Orissa

Demographic variables	Coastal		Southern		Northern		Total	
	Living alone (per cent)	N	Living alone (per cent)	N	Living alone (per cent)	N	Living alone (per cent)	N
Age								
60-69	16.1	419	20.9	144	17.5	297	17.3*	860
70-79	10.6	173	20.1	26	12.1	101	11.9	300
80 and older	0.3	42	38.4	7	9.6	29	7.3	78
Sex								
Male	16.5	337	24.0	89	19.7	234	18.6*	660
Female	10.4	297	19.2	88	11.1	193	11.9	578
Marital status*								
Currently married	16.1	431	26.7	117	20.5	272	18.9	820
Widowed	8.1	198	11.9	58	8.0	151	8.7	407
No. of surviving children*								
None	49.1	15	62.3	19	38.2	15	50.5	49
One	27.2	49	7.1	34	3.3	46	12.4	129
Two	20.9	85	29.2	30	30.0	58	25.2	173
Three or more	9.8	485	15.9	94	14.1	308	11.9	887
No. of surviving son*								
None	50.5	56	48.5	34	34.9	59	42.9	149
One	11.3	174	14.2	62	13.2	130	12.4	366
Two	10.0	201	11.5	45	15.8	122	12.2	368
Three or more	10.7	203	23.3	36	7.6	116	11.1	355
Surviving daughters								
None	16.8	86	25.3	59	16.2	85	18.8*	230
One	17.9	185	24.9	48	6.6	115	15.1	348
Two	11.3	188	18.1	44	15.9	107	13.6	339
Three or more	9.8	175	11.9	26	23.6	120	15.1	321
Total	13.7	634	21.5	177	15.8	477	15.6	1238

Source: Author's calculation

N= number of observations

p* < 0.001

Socio-economic determinants of living arrangements of the elderly

Socio-economic and cultural factors are expected to have the strongest impact on the living arrangements of older persons. The major socio-economic variables considered for the analysis are place of residence, education, occupation, caste and older persons' income. Since information related to the latest variable is not directly available from the national sample survey data, other variables, such as monthly expenditure pattern, land ownership, state of economic independence and number of dependants, are taken as proxy variables that determine the economic status of the elderly.

Place of residence and living arrangements

Table 4 presents the living arrangements of older persons according to their place of residence. In the sample, 80 per cent of the elderly are from rural areas while 20 per cent are from urban areas. The data show that although co-residence is the most common living arrangement both in rural and urban areas, a slightly higher proportion (15.6 per cent) of older persons from rural areas live alone as compared with their urban counterparts (14.5 per cent). Similar findings are observed in studies conducted in India and elsewhere (Knodel and Chayovan, 1997; NSSO, 2006; Panda, 1997; Zimmer and Kim, 2002). As expected, among older persons who are in co-residence, the most common arrangement irrespective of their residence is living with spouse and children. Further, a small proportion of older persons live with other relatives or non-relatives. Here, the Pearson's chi-square test statistics are not significant, suggesting that there is no significant difference in living arrangements of elderly in Orissa according to their place of residence.

Education and living arrangements

The education of the elderly also plays an important role in determining living arrangements. It was found that, with increased educational level, the pattern of co-residence systematically diminishes (Andrade, Drumond and De Vos, 2002; Bongaarts and Zimmer, 2001; Pal, 2004; Martin, 1989; Shah and others, 2002). Generally, older persons with less education are more likely to live in traditional extended family households than those with a higher level of education. However, contradictory findings have also been observed across various countries. Studies show that the average proportion living with children is higher among those with some education in Africa, Latin America and the Caribbean, and among those in Asia with no education.

From table 4, it can be seen that the highest proportion of elderly persons living alone (32.3 per cent) is found among those with the highest (more than higher secondary) level of education than among older persons who are illiterate (15.5 per cent) or literate up to secondary education only (14.3 per cent). Hence it is evident that a certain level of minimum education rather than a few years of schooling is necessary for older persons to make decisions about living alone. Pearson's chi-squared test statistics are significant here too, meaning that there is a significant difference in the living arrangements of older persons according to their level of education.

Caste and living arrangements of elderly persons

It may be of some interest to see whether caste plays any important role in determining living arrangements, as many authors have pointed out that living arrangements of older persons are more culturally determined than determined by economic factors. Since most of the cultural variables have not been made available by the survey data, detailed analysis of the impact of cultural variables on living arrangements cannot be carried out at this stage. Nevertheless, an attempt has been made here to see whether caste plays any role in determining the living arrangements of older persons in Orissa. Table 4 presents the caste and living arrangements of older persons in Orissa. As can be seen from the table, although major differentials in living alone do not exist in different caste groups, a slightly higher proportion of other caste groups live alone as compared with scheduled castes, schedule tribes and other less developed castes. However, these findings are not sufficient to draw any major conclusions. The chi-square test statistics are found to be insignificant with the association of caste and living arrangements of elderly persons in Orissa. From this analysis, it is evident that there is no difference in caste by the living arrangements of elderly persons in Orissa.

Income and living arrangements

Income of older persons is one of the important determinants of their economic status. Studies in developed countries have concluded that, for a variety of reasons, the majority of older persons with higher income prefer to live alone than those with lesser income. However, results from developing countries give a mixed picture. As already pointed out, direct income of the elderly has not been collected through the NSSO survey; therefore per capita monthly expenditure, ownership of land and information on economic independence are used as the best proxies for the economic status of older persons.

Table 4 shows the pattern of living arrangements of the elderly by monthly per capita expenditure. It is generally presumed that the higher the per capita expenditure, the higher will be their income. Unlike findings from developed countries, there is no clear-cut evidence to support the notion that higher expenditure (presumably by people with higher incomes) leads to a higher proportion of older persons living alone. Pearson's chi-square test statistics are not significant here; in other words, the living arrangements of the elderly do not differ according to their income.

Possession of land and living arrangements

Although the per capita monthly expenditure pattern did not seem to have any effect on living alone, what is attempted next is to look into the association between land ownership and living arrangements. Possession of land is another important variable that determines the economic position of the elderly. Table 4 shows that the ownership of land does not appear to influence living arrangements as the proportion of older persons living alone does not show any clear pattern with an increase in land ownership, while the majority of older persons live in co-residence irrespective of the possession of land. It was found that the association between the land possessed and living arrangements is not significant. In other words, there is no significant difference in the living arrangements according to possession of land.

Therefore, it is clear that the economic variables, such as monthly per capita expenditure pattern and ownership of land, do not influence the living arrangements of older persons in Orissa. This may be due to the fact that in Orissa cultural variables may be playing a more important role in shaping living arrangement choices than economic variables. Yet another reason could be that those variables do not really measure the economic status of the elderly individual but rather the economic status of the household. Probably, the economic status of the individual may be more important in shaping the living arrangement rather than the economic status of the household. In order to know the economic status of the elderly per se, the variable state of economic dependence has been considered below.

Level of economic dependence and living arrangements

The state of economic dependence is categorized as elderly who are not dependent on others, those that are partially dependent and those that are fully dependent. The main aim of linking the state of

Table 4. Distribution of socio-economic determinants of living arrangements of the elderly in Orissa

Socio-economic variables	Living arrangements of elderly (percentage)				Total	
	Living alone	Living with spouse and other members	Living without spouse but with children	Living with others	Total	Observations (N)
Place of residence						
Rural	15.6	50.8	31.1	2.6	100	984
Urban	14.5	55.7	27.3	2.5	100	254
Social caste						
ST (Scheduled Tribe)	13.3	42.7	38.8	5.2	100	217
SC (Scheduled Caste)	15.3	57.5	25.1	2.1	100	232
OBC (Other Backward Caste)	15.0	53.5	29.8	1.7	100	483
Upper caste	18.6	48.9	29.9	2.6	100	306
Level of education*						
Not literate	15.5	40.6	40.3	3.6	100	808
Literate up to secondary	14.3	75.4	9.8	0.5	100	396
Higher than secondary	32.3	65.9	1.8		100	34
Monthly per person expenditure(Rs.)						
Less than Rs. 250	13.4	49.7	33.5	3.4	100	250
Between Rs. 251 and 500	17.6	52.4	27.4	2.6	100	645
Between Rs. 501 and 1000	11.8	46.4	40.1	1.7	100	267
More than Rs. 1,001	14.8	65.7	17.3	2.1	100	76

(continued)

Table 4. (Continued)

Socio-economic variables	Living arrangements of elderly (percentage)				Total	
	Living alone	Living with spouse and other members	Living without spouse but with children	Living with others	Total	Observations (N)
State of economic dependence*						
Not dependent on others	28.0	60.6	9.8	1.6	100	338
Partially dependent on others	12.6	68.0	17.9	1.5	100	209
Fully dependent on others	10.0	41.6	45.0	3.5	100	691
No. of dependants*						
None	58.0	41.0	1.0		100	17
One	43.2	48.8	7.5	0.5	100	100
Two	32.9	52.8	9.6	4.7	100	104
Three or more	2.7	83.1	14.0	.2	100	117
Land ownership (hectares)						
Less than 0.2	15.4	50.9	31.7	2.0	100	610
Between 0.2 and 1	16.6	49.1	31.0	3.2	100	411
Between 1.01 and 3.0	12.4	58.0	26.8	2.8	100	184
More than 3.01	11.6	49.4	33.3	5.7	100	30
Observations (N)	193	638	376	31		1238
Percentage	15.5	51.2	30.7	2.6	100	

Source: Author's calculation.

*P < 0.001

A \$1.00 = about 45 rupees

economic dependence with living arrangements is to know how economic dependence shapes the living arrangements of older persons in Orissa. Table 4 presents the data on living arrangements according to the state of economic independence. The data show that only around 28 per cent of the elderly are economically independent in Orissa. The majority of the elderly are either fully (55 per cent) or partially dependent (17 per cent) on others. This table clearly shows that the decision on living alone is often shaped by the person's level of economic independence. Nearly 28 per cent of the economically independent elderly live alone: this proportion is much less for the elderly who are fully dependent on others (10 per cent) or partially dependent (12.6 per cent). The effect of economic independence on living alone is strong even after controlling for their age. Even among the "older olds" (in this case, those aged 70 and older), 31.1 per cent live alone when they are fully independent compared with those who are fully or partially dependent on others (table 5). This finding confirms the fact that the income of the elderly per se is more important than the income of the household in determining living arrangements. Pearson's chi-squared test statistics are significant, which implies that there is a clear difference in living arrangements with reference to the state of economic independence.

The co-residence of elderly with their children is often seen as a unidirectional relationship where the older persons need support and they benefit from co-residence. However, studies have shown

Table 5. Age, state of economic dependence and living arrangements of elderly in Orissa

State of economic dependence	60-69 years (percentage)			70 years and older (percentage)		
	Living in co-residence	Living alone	Total (N)	Living in co-residence	Living alone	Total (N)
Not dependent on others	72.6	27.4	100 (284)	69.0	31.0	100 (56)
Partially dependent on others	87.4	12.6	100 (160)	87.0	13.0	100 (48)
Fully dependent on others	88.1	11.9	100 (416)	93.0	7.0	100 (274)
Total	82.7	17.3	100 (860)	89.1	10.9	100 (378)

Source: Author's calculation.

that the economically active elderly make substantial contributions to support the household (Chan, 1997; Hermalin, 1997). Studies have also shown that the presence of dependents who depend on the elderly also promotes co-residence. In this context, it is interesting to see the level of economic support older persons furnish to households. A question was directed in the survey to those non-dependent elderly in order to determine the number of dependents among older persons.

It is interesting to note that nearly 95 per cent of the economically independent elderly have dependents. Roughly, 30 per cent of older persons have one or two dependents and nearly 35 per cent have three or more. Pearson's chi-square test statistics are significant, meaning that there is a strong difference in living arrangements of the elderly according to the number of dependents. This establishes the fact that in co-residence, older persons may not always be the recipient of care and support; they also support others in multiple ways.

The regional variations (table 6) in living arrangements with respect to the socio-economic variables have shown that the overall pattern of living alone remains nearly the same across socio-economic categories, except in the case of place of residence. In the earlier analysis, it was found that a slightly higher proportion of rural elderly live alone as compared with their urban counterparts. However, the regional analysis has shown that, in coastal and southern subregions, a much higher proportion of urban elderly live alone than those in the rural areas.

From the preceding section, it is clear that, irrespective of the region or place of residence, education and state of economic independence play an important role in determining the living arrangements among older persons. The regional variation in living alone was also observed, with a higher proportion of older persons living alone in the southern subregion than in the coastal and northern subregions. However, the observed relationship between demographic and socio-economic factors and living arrangements of older persons, could be mediated by several other factors. Therefore, a multivariate analysis is necessary to determine the determinants of living arrangements.

Analysis of logistic regression

The analysis and discussions in the previous sections clearly underscored the differentials in living arrangements according to older persons' socio-economic and demographic characteristics. However,

Table 6. Distribution of socio-economic indicators and living arrangements of the elderly across geographical subregions within Orissa

Socio-economic variables	Coastal		Southern		Northern		Total	
	Living alone (per cent)	N	Living alone (per cent)	N	Living alone (per cent)	N	Living alone (per cent)	N
Place of residence								
Rural	12.7	495**	20.8	148	17.5	341*	15.6	984
Urban	21.8	139	33.7	29	0.4	86	14.5	254
Social caste								
ST (Scheduled Tribe)	9.0	20	18.6	73	10.8	124	13.3	217
SC (Scheduled Caste)	15.1	146	30.4	20	11.4	66	15.3	232
OBC (Other Backward Caste)	10.8	257	18.4	55	20.2	171	15.0	483
Upper Caste	17.1	211	31.4	29	17.9	66	18.6	306
Level of education								
Not literate	12.1	398*	23.6	141**	16.5	270	15.5*	808
Literate up to secondary	14.3	215	9.6	34	15.1	147	14.3	396
Higher than secondary	51.7	21	0.0	2	0.0	10	32.3	34
Per capita expenditure (Rs.)								
Less than Rs.250	7.8	70	16.2	83	15.2	97	13.4	250
Between Rs. 251 and 500	14.6	351	29.0	75	19.1	218	17.6	645
Between Rs. 501 and 1000	13.2	169	15.0	14	8.8	84	11.8	267
Greater than Rs. 1 001	19.2	44	20.3	5	7.3	28	14.8	76
Possession of land (hectares)								
Less than 0.2	14.1	338**	29.6	80*	12.9	192	15.4	610
Between 0.2 and 1	14.0	214	24.4	58	17.8	139	16.6	411
Between 1.01 and 3.0	13.0	72	7.3	35	17.7	78	12.4	184
More than 3.01	0.0	10	0.0	4	21.0	18	11.6	30

(continued)

Table 6. (Continued)

Socio-economic variables	Coastal		Southern		Northern		Total	
	Living alone (per cent)	N	Living alone (per cent)	N	Living alone (per cent)	N	Living alone (per cent)	N
State of economic dependence*								
Not dependent on others	25.2	168	40.2	47	27.5	125	28.0	338
Partially dependent on others	8.6	104	22.6	51	11.3	53	12.6	209
Fully dependent on others	9.6	362	10.3	79	10.4	249	10.0	691
No. of dependants*								
None	48.4	10	97.7	4	51.5	3	58.0	17
One	48.6	45	20.8	10	42.0	45	43.2	100
Two	20.5	53	64.5	21	34.8	30	32.9	104
Three or more	2.9	59	0.0	12	3.1	46	2.7	117
Total	13.7	634	21.5	177	15.8	477	15.6	1238

Source: Author's calculation

N= Number of observations $p^* < 0.001$ $p^{**} < 0.05$

A \$1.00 = about 45 rupees.

the relative contribution of those variables cannot be fully examined using the bivariate tables presented earlier, although these have provided fruitful insight into the nature of the relationship. Since living arrangements are governed by a host of socio-economic and demographic variables, it is necessary to control the effect of other variables in order to determine the net effect of each of the individual variables. Therefore, a multivariate analysis is needed to help bring out the net effect of each of these variables. In order to quantify the effect of these background variables on living arrangements, a logistic regression analysis has been carried out. Since in the present analysis the dependent variable is dichotomous in nature whether living alone (1) or in co-residence (0), a logistic regression is appropriate to assess the influence of the explanatory variables on the dependent variable. The independent variables in the model are categorized as demographic, social and economic. Under the demographic variables age, sex, marital status and number of surviving sons and daughters are included as explanatory variables. Similarly, under the social and economic variables place of residence, level of education, social caste, possession of land and state of economic independence are included.

The results of the logistic regression analysis are presented in table 7. The results confirm that, after controlling for different background variables, the “number of surviving sons”, “level of education”, “state of economic independence” and “subregion” turned out to be the most significant variables in determining the living arrangements of older persons in Orissa. The direction of the relationship between “number of surviving sons” and “living alone” is negative -- the higher the number of surviving sons, the lower is the chance of the elderly living alone. The relationship of education to living alone shows that, although education is an important variable that determines the decision to live alone, only a few years of schooling may not necessarily equip older persons to lead an independent life. Significantly fewer older persons live alone if they have up to a secondary level of education compared with those who are illiterate, whereas a significantly higher proportion of elderly persons live alone when they have a higher than secondary level of education. Similarly, after controlling for all the variables, “subregion” turned out to be an important variable that determines the decision to live alone. Significantly, a higher proportion of elderly live alone in the southern subregion compared with the other two subregions. “Economic independence” is yet another variable that determines the choice of living alone. Significantly, a higher proportion of elderly who are economically independent live alone compared with those who are partially or fully dependent on others. Although bivariate analysis showed the existence of differentials in living arrangements with respect to demographic variables such as age, sex and marital status, they are not significant in predicting the choice of living arrangements when the effects of other variables are controlled.

Table 7. Binary logistic regression of living alone versus co-residence among the elderly in Orissa

Variables in the equation	Coefficient (β)	S.E.	Sig.	Odds ratio Exp(β)
Age				
60 - 69 years (ref.)			0.391	1.000
70 - 79 years	0.043	0.217	0.844	1.044
80 years and older	-0.654	0.499	0.190	0.520
Sex				
Male (ref.)				
Female	0.011	0.221	0.959	1.011
Marital status				
Never married (ref.)			0.000	1.000
Currently married	1.459	1.170	0.212	4.300
Widowed	0.411	1.179	0.727	1.509
Divorced/separated	1.917	1.670	0.251	6.802

(continued)

Table 7. (Continued)

Variables in the equation	Coefficient (β)	S.E.	Sig.	Odds ratio Exp(β)
No. of surviving sons*				
0 (ref.)			0.000	1.000
1	-1.547	0.246	0.000	0.213
2	-1.767	0.260	0.000	0.171
3 or more	-1.775	0.265	0.000	0.170
No. of surviving daughters				
0 (ref.)			0.813	1.000
1	-0.127	0.253	0.614	0.880
2	-0.247	0.260	0.341	0.781
3 or more	-0.180	0.263	0.494	0.835
Place of residence				
Rural (ref.)				
Urban	-0.358	0.277	0.197	0.699
State subregion**				
Coastal (ref.)			0.098	1.000
Southern	0.521	0.261	0.046	1.685
Northern	0.012	0.207	0.953	1.012
Social group				
Scheduled Tribe (ref.)			0.864	1.000
Scheduled Caste	0.218	0.304	0.472	1.244
Other Backward Caste	0.217	0.267	0.417	1.242
Upper Caste	0.209	0.310	0.501	1.232
Level of education**				
No education (ref.)			0.007	1.000
Up to secondary	-0.516	0.216	0.017	0.597
Secondary and above	0.562	0.463	0.225	1.753
Land holding (in hectares)				
Less than 0.2 (ref.)			0.263	1.000
0.2 - 1.0	-0.140	0.197	0.476	0.869
1.01 - 3.0	-0.430	0.277	0.121	0.650
More than 3.0	-1.080	0.767	0.159	0.340
State of economic dependence**				
Not dependent on others (ref.)			0.007	1.000
Partially dependent	-0.456	0.250	0.068	0.634
Fully dependent	-0.690	0.224	0.002	0.502
Constant	-0.926	1.180	0.432	0.396

Source: Author's calculation

p* < 0.001 p** < 0.05

Conclusion

It is observed that, as the number of surviving sons increases, significantly fewer older persons live alone, thus confirming the presence of sons as an important variable that determines co-residence. However, in order to get a more detailed picture, the characteristics of children, their marital status, location and income would also be useful in determining living arrangements, although unfortunately information in that connection is not available.

Similarly, the likelihood of living alone among older persons with higher education is much higher compared with those who are either illiterate or have had only a few years of schooling. Economic independence is also an important variable in determining the chances of living alone. There is less likelihood of the elderly living alone when they are fully or partially dependant on others, indicating the significance of individual income over household income in the decision on living arrangements. Similarly, subregion is yet another significant variable that determines the chances of living alone. In Orissa, a significantly higher proportion of the elderly residing in the southern subregion live alone as compared with their counterparts in the northern and coastal subregions. The significant difference in living arrangements with respect to subregions in Orissa might be true, especially since these three subregions are culturally different.

In view of the changing socio-economic and demographic scenario of India, increasing levels of education and income along with a simultaneous decline in fertility, it is likely that a higher proportion of older persons in India will be living alone in the future. Therefore, policies and programmes related to older persons may have to be designed so that they adequately address the needs of older persons living alone.

Endnotes

- ¹ Here “older population” is defined as that proportion of the population aged 60 years and older.
- ² In developed countries the elderly are defined as 65 years and older, whereas in developing countries the elderly are defined as those at 60 years and older.
- ³ A higher proportion of currently married elderly persons are living alone mainly owing to “living alone” being defined as: an older person living alone or with spouse but with no other kin.

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Asia-Pacific Population Journal

Guidelines for contributors

Original contributions are invited, especially papers by authors from or familiar with the Asian and Pacific region. Ideally, such papers would discuss the policy and/or programme implications of population issues and solutions to problems, reporting on experiences from which others could benefit.

All material submitted for the consideration of the Editorial Board should be in the English language. The paper should not exceed 6,000 words, including tables, figures, references and other material. It should include a short abstract (100-200 words) of the issues addressed and the most important findings. The manuscript should be prepared in one of the major word-processing programs and be double-spaced. The margins should be at least 3 cm (roughly 1 inch) wide, preferably more for the left-hand margin. If possible, please submit the manuscript as an e-mail attachment to the address given below. If e-mail attachment is not possible, send a hard copy (a single-sided print copy on A4-sized paper), together with an e-file of the text on CD-ROM or floppy disc.

A complete list of references arranged alphabetically by the surname of the author(s) should also be included at the

end of the manuscript together with a few keywords. Please refer to examples in any issue of the Journal or contact the Editor for a copy of the editorial guidelines. Figures and tables should be supplied separately either as e-mail attachments or in the e-file, preferably in Microsoft Excel or any major spreadsheet program.

Manuscripts are accepted on the understanding that they may be edited. Contributors should submit only material that has not previously been published or submitted for publication elsewhere; and they should so state in their covering letter.

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Manuscripts may be sent by e-mail to the Editor, APPJ, at escap-population@un.org; or by airmail post to: Editor, APPJ, Social Development Division, ESCAP, United Nations Building, Rajadamnern Nok Avenue, Bangkok 10200, Thailand.

ASIA-PACIFIC POPULATION JOURNAL

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ESCAP is planning a special issue of the *Journal* on the topic of population and environmental sustainability in Asia and the Pacific.

This topic has been selected to highlight the important and complex linkages between population dynamics, environment and sustainable development. The special issue will provide a platform for discussion on ways to manage demographic change and limited natural resources.

It is hoped that this special issue of the *Asia-Pacific Population Journal* will bring renewed attention to such linkages and the need to deal with them in a holistic manner.

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