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Impact of Microcredit Program on Rural Out-Migration for Employment: Evidence from Village Revolving Fund Program in Kanchanaburi Province, Thailand

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Abstract

The government of Thailand has introduced the innovative microcredit scheme, the Village Revolving Fund program (VRF) since 2001, aiming to uplift living conditions of the poor.

Using data from the 2003 and 2004 rounds of Kanchanaburi Demographic Surveillance System (KDSS), this study aims to explore the impact of this microcredit scheme on rural out-migration for employment. A multilevel model is used to elicit this impact by controlling for characteristics of individual, household, and community.

Important findings from multilevel models indicate that amount of money households borrowed from the Village Revolving Fund program is statistically significant in reducing the probability of rural out-migration for employment (-.00010, p<.001) when other relevant factors from individual and household levels as well as village related characteristics are controlled. For a given loan of 20,000 Baht from the Village Revolving Fund program (VRF), the probability of individual rural out-migration for employment is reduced by 2 percent higher than non-borrowing households. This suggests that increasing loan from the Village Revolving Fund program to households resulted in decreasing probability of rural out-migration for employment. Use of loan from this program for agricultural activities can significantly reduce rural out-migration for employment among the poor households.

Keywords: development, migration, microcredit program

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Introduction

Microcredit has been a key component in agricultural development in developing countries. Notably, existing evidence from the World Bank in 1978 shows that benefits from institutional microcredit have accrued to large farmers. Small farmers have been excluded by many microcredit institutions as a result of conditions such as collateral, land title and credit references being placed on loans. Although microcredit has been considered as instrumental in agricultural development, no empirical study has focused explicitly on the association between this service and rural-urban migration. It is observed, however, that a number of studies speculate that the unavailability of credit has caused out-migration (Rhoda, 1983).

In Thailand, rural poverty remains a major development concern despite the country having less than 10 percent of poor people living in rural areas. Thailand has struggled with different rural development strategies to improve the living conditions of the rural poor (Routray, 2007). Tremendous efforts and investments have been spent to overcome this rural poverty. Significantly, in 2001, an innovative microcredit scheme, the Village Revolving Fund (VRF) was introduced by the government of Thailand, aiming to provide a million baht to every village and urban community in Thailand as working capital for locally run rotating credit associations. The budget of about 2 billion US dollars in total was quickly disbursed to locally-run committees in almost all of the 74,000 villages in Thailand and over 4,500 urban communities. It was reported that by May 2005 the committees of the Village Revolving Fund program had lent a total of about 8 billion US dollars, with an average loan of $466 (Boonperm, Haughton & Khandker, 2007).

It is surprising to note that the Village Revolving Fund program is an innovative microcredit scheme which is different from many other microcredit schemes in developing countries because it is a pro-poor program. The impacts of this microcredit scheme on income or expenditure per capita, and on household assets were explicitly documented. The results based on 2002 and 2004 data from Thai socioeconomic surveys indicated that the credit scheme borrowing did appear to have an impact, raising expenditure by 3.3 percent and income by 1.9 percent on average. In addition, the Village Revolving Fund borrowing had an effect on the accumulation of household assets too. For instance, phone ownership among borrowers of the Village Revolving Fund program was 5.4 percent higher than among comparable non-borrowers. Similar effects were found for other assets such as fridges, washing machines and motorized transport. Most of the effect of this credit scheme borrowing was concentrated in the poorest quintile of the population, as it raised spending by 5.2 percent, revealing that the program was markedly pro-poor. Further, the effect of the credit scheme appeared to work most convincingly through its influence on farm income. The short-term nature of the loans from this credit scheme made them suitable for farmers, allowing for the financing of inputs during a crop cycle (Boonperm, Haughton & Khandker, 2007). This reflects the fact that the one million-baht microcredit program could have multiple effects on income and expenditure of the rural households, thus, likely increasing wages and job opportunities as well.

Although the impact of this microcredit scheme on the improvement of living conditions was systematically documented (Boonperm, Haughton & Khandker, 2007), further impact of the scheme on rural out-migration for employment has not yet been investigated explicitly. Therefore, it is of interest to explore whether or not this microcredit scheme is worthwhile in reducing rural out-migration for employment.

This paper first discusses the review of migration theories, followed by the conceptual framework, materials and methods, results, discussion, and conclusion and recommendations.

Theoretical Review of Migration

The following theories are reviewed to provide explanations regarding development and rural out-migration, particularly to shed light on the changing pattern of migration proposition from an individual level to a multilevel model (including individual, household, and community) in terms of development and rural out-migration for employment. It is observed that most migration theories focus on individual explanations of migration behavior, and only a few theories incorporate multilevel characteristics including individual, household, and community in the analysis model.

The classical migration model as traced in the Lewis Dual Economy Model consists of a capitalist sector and a non-capitalist sector. In practice the capital sector refers to an urban economy and the non-capitalist sector refers to agriculture or the rural economy. The capitalist sector hires labor and the non-capitalist does not. Initially, the labor force is concentrated in the non-capitalist sector, but as the capitalist sector expands, it absorbs labor from the non-capitalist sector. As the capitalist economy is concentrated in urban areas, the labor is transferred from the rural areas. Although Lewis does not propose an explicit migration model, his model sheds light on the fact that labor may be withdrawn from rural areas and employed in urban economies resulting in rural-to-urban migration for employment (Lewis, 1954). However, Lewis's model offers limited insights into the explanation of the interaction between migration and rural development because it treats the rural sector as a black box from which surplus labor is drawn for employment in an expanding urban economy.

Moreover, neoclassical economic models of migration were founded on individual behavior. For instance, Todaro (1969) suggests that people migrate from rural to urban areas as long as the expected wage differential is substantial even if the unemployment rate in urban destinations is high. Potential migrants are seen as calculating their expected earnings in their place of origin in comparison to various places of destination. The main idea of his model is that migration is mostly an economic decision of an individual in which each potential rural-to-urban migrant decides whether or not to move based on an expected-income maximization objective. But this model does not include household and community factors in the proposition (Ezra & Kiros, 2001).

On the other hand, the traditional social models of migration were founded on a wide range of associated factors such as characteristics of origin, destination, intervening obstacles, and individual as well as development contextual factors. For instance, "a theory of migration" demonstrated by Lee (1966) is more a conceptual theory, but it is generally sufficient to explain rural out-migration. His theory already covers other social models to explain rural out-migration. Significantly, he argues that no matter how short or how long, how easy or how difficult, every act of migration involves an origin, a destination, an intervening set of obstacles and personal factors. Notably, the nineteenth century geographer Ravenstein (1885; 1889) developed the "laws of migration". He saw migration as an inseparable part of development, and he asserts that the major causes of migration are economic, and migration patterns are further influenced by factors such as distance and population densities (Haas, 2008). Most traditional economic models of migration overlook potential factors beyond the individual, whereas traditional social models even include household and community factors, but there is a lack of empirical evidence. They are commonly based on a hypothesis or assumption. In any case, it is observed that migration theories have incorporated both macro and micro level analysis in explanations of migration behavior since the multilevel model or contextual modeling proved to be quite fruitful for applications in the 1980s (Findley, 1987; Snijders & Bosker, 1999). The 1980s marked a significant general paradigm shift in migration theory from either micro or macro theories to the interaction of both levels, allowing for a greater variety of explanations of migration behavior. Over the 1980s and 1990s, the major contributions to the explanation of migration and development interaction were from the "family or household strategy".

The household strategy model provides a more nuanced perspective on migration and development that integrates micro and macro levels, and gives room for explaining the migration and development process (Haas, 2008). The emergence of "livelihood strategies or family strategies" is a departure from the neoclassical theory of migration towards a household-level based theoretical perspective to explain migration behavior by incorporating both individual and household level influences on migration (Lieten & Nieuwenhuys, 1989). Basically, a livelihood is composed of the capabilities, material and social resources, and activities required to earn a living (Carney, 1998). A livelihood encompasses not only the income generation activities of the households, but also the social institutions, intra-household relations and mechanisms of access to resources through the life cycle (Ellis, 1998). Therefore, migration is seen as one of the key elements of the strategies to diversify, secure and improve rural households, which is combined with other strategies, such as agricultural intensification and local non-farm activities.

Similar to the Household Strategy Model, the new economics of migration has emerged to challenge neoclassical migration theory. This theory criticizes the neoclassical models as too individualistic and not sufficiently holistic to explain the complex realities of development and migration. The new economics of migration postulates that migration decisions are not made by isolated individual actors, but by larger units of related people—family or households—in which people act collectively not only to maximize expected income, but also to minimize risks and to loosen constraints associated with lack of supporting opportunities in the origin (Massey, et al., 1993).

It is therefore clear that there is a pattern of change regarding the theoretical model to explain migration behavior, from the individualistic level to multilevel (household and community). Multilevel analysis of migration behavior provides a more holistic approach to examine rural out-migration as a function of individual, household, and community factors.

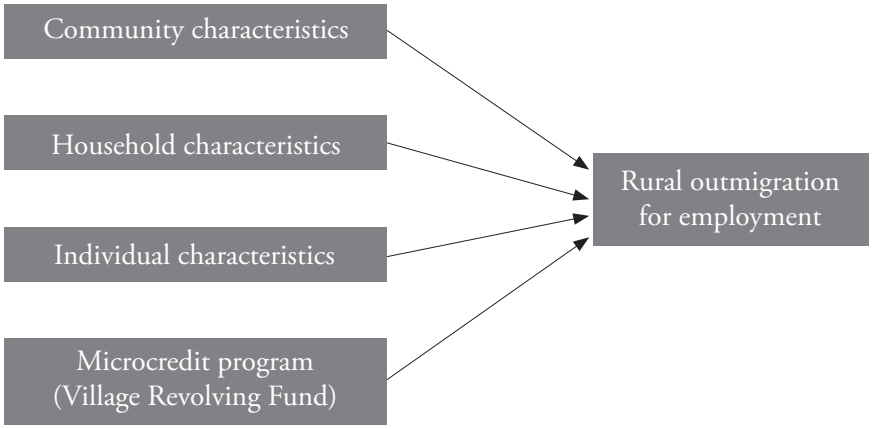
Conceptual Framework

Although there is no clear-cut answer concerning the overall relationship between rural development intervention programs and rural out-migration for employment, in the formulation of a theoretical framework to studying this issue, "a theory of migration" developed by Lee (1966) provides a useful prototype. The advantage of this theory in this study is that it incorporates a number of migration factors, reflecting the fact that the net impact of rural development on rural out-migration for employment varies according to the types of development and contextual levels, whether making rural areas attractive or reducing intervening obstacles that may stimulate rural out-migration to sustain a family's economic condition.

Despite Lee (1966) having formulated "a theory of migration" long before the introduction of the multilevel model to explain migration events, his theory encompasses several influencing factors at different levels. Thus, his theory is honored and used in this study as it pinpoints migration events by including different factors reflecting the nature of multilevel analyses, namely, factors associated with the area of origin, factors associated with the area of destination, intervening obstacles and personal factors. In this study, the factors associated with the area of destination are assumed to be constant.

Basically, this theory provides a theoretical framework for the explanation of rural out-migration. The conceptual framework which guides this investigation is illustrated in Figure 1. This exploratory study does not attempt to assess the possible impact on out-migration of interactions among this microcredit scheme and cross-level interactions among individual, household and community characteristics. Its main aim is to explore the impact of the Village Revolving Fund program (microcredit scheme) on rural out-migration for employment.

Figure 1: Conceptual framework for the impact of microcredit program on rural out-migration for employment



Study Setting: Kanchanaburi Province

Kanchanaburi is a province located in the western part of the central region of Thailand. It is about 130 kilometers west of Bangkok, the capital city, a two-hour drive away. Kanchanaburi is the third largest province in the country, covering an area of 19,486 square kilometers. It shares a long border with Myanmar and contains a variety of ethnic groups and migrants, both documented and undocumented, from Myanmar and neighboring hill areas.

Kanchanaburi province is divided into 13 districts, 98 sub-districts, and 887 villages, including one city municipality and 26 sub-district municipalities. The total population [at the time of the study] was 734,400, of which 23.5 percent were located in municipal areas. Significantly, 56.7 percent of the population worked in the agricultural sector (National Statistical Office, 2000).

Materials and Methods

Data

Kanchanaburi Demographic Surveillance System (KDSS) was set up by the Institute for Population and Social Research (IPSR), Mahidol University, with financial support from the Wellcome Trust United Kingdom, to enumerate data annually from 2000 to 2004, using a population census for every household and for every individual aged 15 years old and over in each village/block in the study area. Each household from which data were collected was given a unique code (IPSR, 2003). By these characteristics, the data are considered as longitudinal. The demographic surveillance system area comprises of 100 villages/enumeration districts, scattered throughout Kanchanaburi province (Yoddumnern-Attig, et al., 2009).

KDSS data were collected annually. There were five rounds of census enumerations. The first round data were collected between July 01 and August 15, 2000 under [the terms of] this project. The fourth round census was carried out from 1st July to 27th August 2003, and the last round of data (round 5) was collected between July 01 and August 2004. Datasets from the fourth round (2003) and fifth round (2004) of the KDSS are used. In addition, since the individual migration history in the fifth round (2004) was retrospectively recorded from July 2003 to August 2004, the 2003 KDSS data (including variables related to the characteristics of individuals, households, and communities) are employed to examine migration in the fifth round KDSS (2004).

Measurement of Variables

Dependent variable

The dependent variable is a binary variable indicating whether or not an individual aged 15 years and over has ever moved out of the rural village of residence (to another village, municipality, Bangkok, or abroad) for at least one month for the purpose of employment. Hence, code 1 is assigned for an individual who has at any stage migrated out for employment (including for work, looking for a job, and seasonal work), and 0 if otherwise. Any individual who has moved out of the rural village of residence for purposes other than employment, e.g., study, military service, or vacation, is regarded as not migrated and thus assigned value 0.

Independent Variable

Since this study applies a multilevel model, the operational definition and measurement of other explanatory variables are presented at each level as follows.

(1) Individual characteristics (level 1): variables associated with individual characteristics include age: this is measured by age at last birthday (in years); gender is coded as 0 = female and 1 = male; ethnicity is coded as 0 = non-Thai and 1 = Thai; marital status is coded as 0 = unmarried and 1 = married. Level of education is coded as 0 = no schooling and 1 = primary education and above. Employment status is coded as: working is referent category; looking for job = 1 and 0 = otherwise; student = 1 and 0 = otherwise; housewife = 1 and 0 = otherwise; do not work = 1 and 0 = otherwise.

(2) Household characteristics (level 2): the household characteristics related variables are operationally defined as follows.

Household facility level (HFL): questions about household facilities are used to measure the household facility level. The components of household facility include households with electricity, households with tap water, households that use gas or electricity for daily cooking, households with a sufficient water supply, households that purchase drinking water, households that use tap water for household consumption and households with their own toilets.

Socio-Economic Status (SES): household possessions and amenities are used to measure socio-economic status. These items include color television, VDO/VCD/DVD/karaoke player, satellite disk, audio equipment stereo, mobile phone, telephone, computer, water pump machine/ electricity machine, air conditioner, sewing machine, washing machine, microwave, refrigerator, boat (use motor), bicycle, motorcycle, *tuk tuk* (local-made truck used only in the agricultural sector), car, pickup/van (four wheels), truck/bus/coach (six wheels or more), and tractor/harvest tractor/threshing machine/plowing machine. The principal components analysis (PCA) is used to develop composite indicators of household facility level, and the socioeconomic status of households.

Amount of money borrowed from the Village Revolving Fund: is measured by the amount of money in baht that any member of a household has borrowed from the scheme.

Uses of loan from Village Revolving Fund: classified into three main categories. The binary variable of each category is constructed as: consumption is a referent category; agricultural activities = 1 and 0 = otherwise; economic activities = 1 and 0 = otherwise.

*(3) Village/Community Characteristics (level 3)***:** the village or community characteristics comprise of the following variables.

Population in a village: is measured by the total number of people in each village.

Community facility level (CFL): The items used to construct community facility level include villages with piped water purified before allocation, villages with access to bottled drinking water, villages with pipe-line water, and villages with access to television.

Community accessibility level (CAL): The items employed in the construct of this index include villages with the following facilities: number of public telephones, mobile phones, internet, community broadcasting tower, radios for communication, main paved road within the village, paved roads from village to district, and villages with a regular bus route.

Principal component analysis (PCA) is employed to construct the index of community facility level (CFL), and the index of community accessibility level (CAL) above.

The number of factory workers in a village: is measured by the total number of workers of all factories in a village (0 is assigned for villages without a factory).

Study Design

A Cross-sectional multilevel model is used in this study to measure the impacts of microcredit program on rural out-migration for employment. While longitudinal data from Kanchanaburi Demographic Surveillance System (KDSS) in 2003 and migration data in 2004 is employed, the nature of the design in this study is cross-sectional. The reason is that general data from the 2003 community census is used to predict rural out-migration for employment which is derived from 2004 census. The 2004 census contains only dependent variables which recorded individual migration history from July 2003 to August 2004. The 2003 data contain all independent variables (characteristics of individual, household, village, and development programs), whereas 2004 data contain migration variables (dependent variables). Migration data from the 2003 census are not appropriate for application in this study because data were collected between July and August 2003, and the migration data were recorded back to the timeframe between July 2002 and August 2003. A sample of individuals, households, and communities, was obtained about two years after the intervention programs.

Statistical Analysis

Multivariate analysis is employed in this study. While the dependent variable is in a binary form, multiple regression and multilevel regression are applied. This statistical method provides an analytical framework to address the nature of hierarchical data and the condition that outcome variables are hypothesized to be influenced simultaneously by various factors from different levels—individual, household, and community. Therefore, it is of interest in taking account of the variability associated with each level. This application is effective to control individual, household, and community level contextual factors simultaneously in a single model.

Since linear mixed-effect models with maximum likelihood estimation are employed in this study (*xtmixed* command with *mle* option in STATA), this model is in the form of multilevel regression analysis. It is important to note that the outcome variable is in a binary form. Hence, the outputs from multilevel regression, using *xtmixed* command, must be interpreted carefully because the value is between 0 and 1, not a ratio scale. Multilevel regression is used in level 2 (household level) and level 3 (community level). At level 1 (individual level), multiple regression is employed. Thus, the interpretation follows the rule of the linear probability model (LPM), with conditional expectation or conditional probability that lies between 0 and 1. Besides this, in the process of estimations, only the significant variables from level 1 are included in the models of level 2, and the significant variables from level 2 are pursued in the final level 3.

Results

Description of Sample

Individual characteristics

The age distribution of the sample is positively skewed, with a mean age of 42.5 years and a standard deviation of 15.68. Detailed distribution of the age of respondents is presented in classified groups in Table 1. Most respondents are Thai (89.6 percent), while non-Thais constitute only 10.4 percent. The proportion of females is higher than males (55.8 percent versus 44.2 percent).

It is also interesting to note that 18.5 percent of the sample has not received schooling, while those who have primary education and above comprise 81.5 percent. In addition, respondents who have at any stage moved out of rural villages for employment account for 2.4 percent of the total sample. Other individual related variables are illustrated in Table 1.

Table 1: Individual characteristics

Variable		**Percent**
Age	15-24	12.7
	25-34	20.9
	35-44	24.9
	45-54	19.3
	50+	22.2
	Total	**100 (20,193)**
Sex	Female	55.8
	Male	44.2
	Total	**100 (20,193)**
Ethnicity	Non-Thai	10.4
	Thai	89.6
	Total	**100 (20,193)**
Marital status	Unmarried	25.3
	Married	74.7
	Total	**100 (20,193)**
Education	No schooling	18.5
	Primary and above	81.5
	Total	**100 (20,193)**
Employment status	Working	78.4
	Looking for a job	0.8
	Student	3.8
	Housewife	7.8
	Do not work	9.3
	Total	**100 (20,193)**
Rural out-migration for employment	Ever moved	2.4
	Never moved	97.6
	Total	**100 (20,193)**

Household characteristics

The majority of rural households (73.3 percent) lived in and below the medium facility level. It is important to note that 62.8 percent of rural households fall at and below medium socio-economic status. Besides this, on average, a household borrowed 16,270 baht from the Village Revolving Fund program.

Table 2: Household characteristics

Variable		**Percent**
Facility level of household	Very low	22.6
	Low	25.6
	Medium	28.1
	High	4.4
	Very high	19.3
	Total	100 *(9,453)*
Socio-economic status	Very low	20.2
	Low	20.9
	Medium	21.7
	High	20.4
	Very high	16.7
	Total	100 *(9,453)*
Amount of money borrowed from the Village Revolving Fund (in Thai baht)	Mean	16,270.77
	Std. deviation	9,973.27
	Median	15,000.00
	Mode	20,000.00
	Number of borrowers	100 (4,615)

Community characteristics

The majority of sample villages are classified at a medium and low level of facility (67.8 percent). Similarly, 68.7 percent of the villages fall within a medium and lower accessibility level (Table 7). The average population in a village is 683, and the average numbers of factory workers in a village with a factory are 280 (Table 3).

Table 3: Characteristics of community variables-categories

Variable		Percent
Level of community facility	Low	33.3
	Medium	34.5
	High	32.2
	Total	100 (87)
Level of community accessibility	Low	34.5
	Medium	33.3
	High	32.2
	Total	100 (87)
Population in a village	Mean	682.89
	Std. deviation	302.330
	Number of villages	87
Number of factory workers in a village	Mean	280
	Std. deviation	338.923
	Number of villages	87

Results from Multilevel Analysis

Individual model (level 1)

Age has a negative effect on rural out-migration for employment. The probability of those who have ever moved out of their rural villages declines as age increases. Similarly, sex is statistically significant as an influence on this type of migration as the probability of males who have ever moved out of rural villages is higher than for females.

In addition, education is also statistically significant as an influence on out-migration. For those who have received primary education and above, the probability of ever-moving-for-employment is lower than for those who have not received schooling.

It is worth noting that for people who are students and housewives, the probability that they have ever moved out of rural villages for employment is higher than for those who are working. Other employment categories, particularly, do-not-work and looking-for-job, are not statistically significant in explaining this type of migration (Table 4).

Table 4: Multiple regression: Effect of individual characteristics on rural out-migration for employment

Variable	Coefficients	Std. Err.	Sig. Level
Age	-.00091	.00008	0.000
Sex-male	.01523	.00225	0.000
Ethnicity-Thai	-.03847	.00421	0.000
Marital status-married	-.01133	.00268	0.000
Education-*primary+*	-.00718	.00338	0.034
Employment status			
(1) Working-referent category			
(2) Looking for job	.00591	.01238	0.633
(3) Student	-.02196	.00628	0.000
(4) Housewife	-.00866	.00417	0.038
(5) Do not work	.00171	.00416	0.680

N1 = 20193, R-squared = 0.0185, F = 42.28, DF = 9, Sig. = 0.000

Individual and household models (level 2)

The individual characteristics that have the statistical significance to influence rural out-migration for employment at level 1 are included in this level 2. In level 2, multilevel regression is employed to examine the impact of a loan from the Village Revolving Fund program (VRF) on rural out-migration for employment, controlling the influence of individual and household characteristics. This multilevel model considers the individual within a household.

In Model 1 and Model 2 of Table 5, the actual amount of money a household borrowed from the VRF program is examined to see the potential impact on the magnitude of rural out-migration for employment before and after controlling for the influence of facility level and the socioeconomic status of households.

Results from multilevel regression in Table 5 show that the amount of money a household borrowed from VRF program is statistically significant as having a negative impact on the magnitude of rural out-migration for employment even if the facility level and socio-economic status are controlled. This means that the probability of rural out-migration for employment of an individual from a household which borrowed more money from the VRF program is lower than for an individual from a household that borrowed less money from this program. But the coefficient slightly declines from -.00017 in Model 1 (before controlling for the effects of facility level and the socioeconomic status of a household) to -.00011 in Model 2 (after facility level and socioeconomic status are controlled).

Table 5: Multilevel regression: Impact of loan from Village Revolving Fund program (VRF) on rural out-migration for employment

Variable	**Model 1**	**Model 2**
Individual level		
Age	-.00987*** *(.00088)*	-.00981*** *(.00088)*
Sex-*(1 = male; 0 = female)*	.01603*** *(.00182)*	.01568*** *(.00182)*
Ethnicity-(1 = Thai; 0 = non-Thai)	-.02963*** *(.00461)*	-.01832*** *(.00488)*
Marital status-(1 = married; 0 = unmarried)	-.01011*** *(.00242)*	-.00989*** *(.00243)*
Education-(1 = *primary+; 0 = no schooling)*	-.00364 *(.00324)*	-.00036 *(.00327)*
Household level		
Amount of money borrowed from VRF program	-.00017*** *(.00004)*	-.00011* *(.00004)*
Facility level of household		-.00318** *(.00112)*
Socio-economic status		-.00402*** *(.00077)*

****p<.001; **p<.0.01; N1 = 20193; N2 = 9453; Model 1: Log likelihood = 10421.922, Intra-class Correlation = 0.439, R2 = 0.0096, Wald Chi2 = 335.05, DF = 6, Sig. = 0.000; Model 2: Log likelihood = 10446.464, Intra-class Correlation = 0.438, R2 = 0.0111, Wald chi2 = 385.10, DF = 8, Sig. = 0.000*

It is interesting to note that in Model 2 of Table 5, the facility level and socioeconomic status of households are statistically significant factors having a negative impact on rural out-migration for employment. This means that for individuals from households with higher level of facility and socioeconomic status, the probability that they have ever moved out of rural village for employment is lower than for individuals from households with a lower level of facility and socioeconomic status. In addition, in these models, individual characteristics also have statistically significant influences on this type of migration behavior, with the exception of education.

Individual, Household and Community Model (level 3)

At this level, community related factors are included in the model so their generic influences on rural out-migration for employment can be controlled to examine the impact of rural development programs on this type of migration. The level of development in the village is represented by two composite indicators, community facility level and level of community accessibility. The number of village factory workers is also included in the model to control the influence of employment development in the village. Besides this, the potential push factor related to demographic variable, namely, the total population in a village, is controlled as well.

Following the process of multilevel analysis, therefore, only loans from the credit scheme and other significant characteristics of individuals and households are included in the final model of this level 3 in addition to community related variables.

Empirical results of this final multilevel regression model demonstrate that individual and household related characteristics remain significant influences on rural out-migration for employment, while other village related factors such as the number of factory workers in each village, improvement of community facility and accessibility reveal negative patterns of effect on the magnitudes of rural out-migration for employment, but are not statistically significant (Table 6).

It is important, however, to note that the amount of money a household borrowed from the Village Revolving Fund program is strongly significant as a negative impact on rural out-migration for employment (-.00010, $p<.001$) when other significant factors from individual and household levels as well as village related characteristics are controlled.

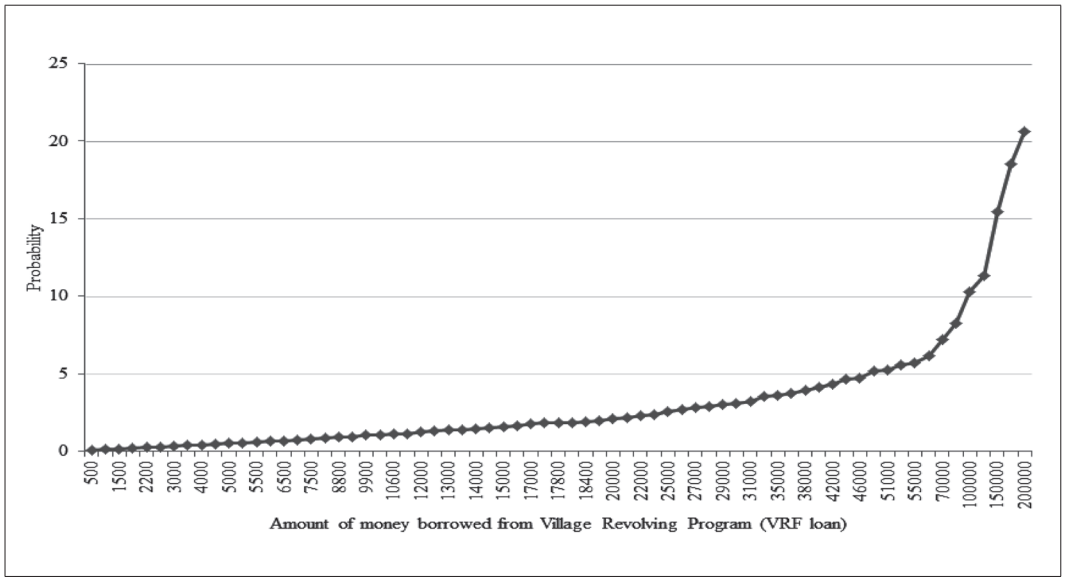
Table 6: Multilevel regression: Impact of loan from Village Revolving Fund program (VRF) on rural out-migration for employment, controlling for the characteristics of individuals, households, and community

Variable	**Coefficients**
Individual level	
Age	-.00971*** *(.00084)*
Sex-*(1 = male; 0 = female)*	.01561*** *(.00179)*
Ethnicity-*(1 = Thai; 0 = non-Thai)*	-.01209* *(.00510)*
Marital status-*(1 = married; 0 = unmarried)*	-.01094*** *(.00243)*
Household level	
Facility level of household	-.00261* *(.00120)*
Socio-economic status	-.00325*** *(.00083)*
Amount of money a household borrowed from VRF	-.00010* *(.00048)*
Community level	
Total population in a village	.00049 *(.00036)*
Number of factory workers in a village	-.00044 *(.00033)*
Level of community facility	-.00034 *(.00181)*
Level of community accessibility	-.00037 *(.00165)*

****p<.001; **p<.0.01, N1 = 20193, N2 = 9453, N3 = 87, Log likelihood = 10474.275, Intra-class correlation = 0.47, R-squared = 0.0271, Wald chi2 = 322.21, DF = 11, Sig. = 0.000*

In other words, if households borrowed 20,000 baht from the Village Revolving Fund program (VRF), the probability of individual rural out-migration for employment is reduced by 2 percent more than for non-borrowing households (Table 6). This also reflects the fact that increasing the VFR loan size to households resulted in decreasing probability of rural out-migration for employment. The simulation of the impact of increasing the loan from the VRF program on probability of rural out-migration for employment is illustrated in Figure 2, when other characteristics of individual, household, and community are held constant.

Figure 2: Impact of increasing amount of money (in Thai baht) borrowed from the VRF program on probability reduction of rural out-migration for employment (simulation from Multilevel Model-level 3)



Furthermore, Table 7 reveals that the probability of rural out-migration for employment among poor households that used loans from this microcredit scheme for agricultural activities is lower than among the poor households that used this loan for consumption (-.03611, $p<.05$). But this loan use for agricultural activities among the rich households is not statistically significant as an influence on rural out-migration for employment (Table 7). Thus, it is possible to pinpoint precisely that the Village Revolving Fund program is a pro-poor microcredit scheme which can reduce rural out-migration for employment among the poor households if they use the loan for agricultural activities.

Table 7: Multilevel regression: Impact of loan uses from Village Revolving Fund program on rural out-migration for employment-Poor and Rich Households

Variable	**Model 1 Poor Households**	**Model 2 Rich Households**
Individual level		
Age	-.01557** *(.00472)*	-.00410* *(.00171)*
Sex-*(1 = male; 0 = female)*	.02161* *(.00931)*	.00886* *(.00371)*
Ethnicity-(1 = Thai; 0 = non-Thai)	-.00503 *(.02552)*	-.02340 *(.01979)*
Marital status-(1 = married; 0 = unmarried)	-.01735 *(.01401)*	-.00592 *(.00470)*
Household level		
Use of loan from VRF		
(1) Consumption-referent category		
(2) Agricultural activities	-.03611* *(.01767)*	-.00731 *(.00584)*
(3) Economic activities	.00112 *(.03156)*	.00268 *(.00697)*
Community level		
Total population in a village	.00359** *(.00112)*	.00015 *(.00048)*
Number of factory workers in a village	.00053 *(.00138)*	.00039 *(.00037)*
Level of community facility	-.01007 *(.00607)*	-.00197 *(.00209)*
Level of community accessibility	-.00858 *(.00546)*	-.00193 *(.00222)*

****p<.001; **p<.0.01; p<.05; Model 1: N1 = 1108, N2 = 551, N3 = 73, Log likelihood = 338.34, Intra-class Correlation = 0.473, R2 = 0.19, Wald Chi2 = 43.48, DF = 10, Sig. = 0.000; Model 2: N1 = 3147, N2 = 1211, N3 = 83, Log likelihood = 2604.26, Intra-class Correlation = 0.246, R2 = 0.41, Wald chi2 = 22.62, DF = 10, Sig. = 0.000*

Discussion

The empirical results from this statistical analysis demonstrate that the individual characteristics and living conditions of households across all models and levels of analyses have statistically significant effects on rural out-migration for employment. This indicates that rural out-migration for employment is associated with the characteristics of the migrants and living standards of households. Thus, individual characteristics are not the absolute factor in influencing rural out-migration for employment, but household living conditions are also a prominent factor in altering this form of migration behavior.

Multilevel models also pinpoint the impact of household socioeconomic status on the probability of rural out-migration for employment, indicating that as the socioeconomic status of households improves, the probability of rural out-migration for employment significantly decreases. Similarly, improving the facility of households also reduces the probability of rural out-migration for employment. Thus, it is obvious that when the standard of living of these rural families improves, the probability of their members moving out for employment decreases too.

Noteworthy findings illustrate that the amount of money households borrowed from Village Revolving Fund program (VRF) has a negative impact on the magnitude of rural out-migration for employment as other influencing factors of individual, household, and community are held constant. Furthermore, it is interesting to note that the use of loans from the Village Revolving Fund program for agricultural activities is statistically significant in reducing the probability of rural out-migration for employment among the poor households, but it is not statistically significant among rich households. This is true because the Village Revolving Fund program is a pro-poor program which influences farm income. In particular the short-term nature of the VRF loans made them suitable for farmers during a crop cycle (Boonperm, Haughton & Khandker, 2007).

This significant effect may be because the households borrowed money from this credit scheme to secure their livelihoods rather than sending out members for employment to get this amount of money. In other words, if there was no loan from this credit scheme, households might send any member from their rural village for employment so that they can find money to meet household needs.

Overall, these findings reflect the fact that rural out-migration decisions are made at household level, not only by isolated individuals. The results of this study, therefore, reflect the relevancy of the hypothetical model, a theory of migration, by Lee (1966) in explaining rural out-migration. In addition, it also confirms the reality of migration theory, which views migration as a "household livelihood strategy". This theory of household livelihood strategy suggests that migration is undertaken as part of a household strategy to provide sustenance, economic improvement and risk diversification rather than only as an absolute individual decision.

Conclusion and Policy Recommendations

Empirical findings from this study suggest another important impact of loans from the Village Revolving Fund program on the reduction of the probability of rural out-migration for employment in addition to previous studies where the impacts of this program are on the improvements of household living conditions (increasing incomes, expenditure, and household assets). Furthermore, it also reflects the fact that rural out-migration for employment is negatively related to the living conditions of rural households. Thus, based on this robust evidence, the Village Revolving Fund program should be strengthened and funds should be secured (increasing budget allocation for poor people in rural areas) to ensure that the amount of money borrowed by poor households is sufficient to improve their living conditions. In this context, the government can reduce rural out-migration for employment, particularly among the rural poor, by increasing capital markets in which the rural households can acquire capital to make additional investments either in the farm or non-farm sectors.

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