Environment and Planning A 1999, volume 31, pages 925–945

Determinants of fast repeat migrations of the labor force: evidence from the linked national survey data of Taiwan

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Received 26 November 1997; in revised form 2 April 1998

Abstract. In this paper we study the determinants of job-related fast repeat migrations of the labor force of Taiwan, based on the linked microdata of national migration surveys from 1980 through 1989. The main findings are as follows. First, the propensity to make fast return migration is negatively affected by the level of education and positively affected by the duration of unemployment, which suggests that those with a limited labor-market knowledge and an unsuccessful job search are more prone to make a return migration. Second, the propensity to make fast onward migration is strongly enhanced by the number of previous moves and negatively affected by the duration of unemployment, which suggests that more experienced and more successful previous migrants are more prone to make an onward migration. Third, those whose reason for the previous migration was job search are more likely to make a fast return migration than those whose reason for the previous migration was job change or job transfer, which suggests that those who have secured a job at the destination before moving are less likely to be disappointed and to make a fast return migration than those who migrated before securing a job. Fourth, gender selectivity in fast onward migration is very strong in terms of both overall level and age pattern, which reflects the strong dominance of patriarchal ideology on Taiwanese society.

1 Introduction

Labor migration is an important process for matching demand and supply in the spatial labor market. It may serve the purpose of improving workers economic well-being and the productivity of the economic system. However, the prevalence of fast repeat migrations (defined operationally in this paper as remigrations that take place within a year of previous migration) suggests the low efficiency of this process, because fast return migrations quickly cancel out previous migrations, whereas fast onward migrations inflate the costs of moving to desired destinations in a roundabout way. Thus, in order to formulate an effective policy to improve efficiency in the functioning of the labor market, it is important to have an in-depth understanding of fast repeat migrations.

Another important reason for studying fast repeat migrations is that the selectivity in these migrations is likely to be quite different from the selectivity in nonfast migrations. From an analysis of the PSID (Panel Study of Income Dynamics) data, Morrison and DaVanzo (1986) found that, among fast repeat migrants, return migrants differed sharply from onward migrants with respect to several key personal attributes: the former were less well educated, less likely to have salaried professional and managerial occupations, and more likely to be unemployed before the previous migration. In contrast, they found that, among nonfast repeat migrants, return and onward migrants did not differ significantly with respect to these personal attributes. The knowledge of such differences between fast and nonfast migrations is essential for proper interpretation of the information obtained

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from migration data that do not allow a clear distinction between these two types of migrations (for example, the five-year migration data from US and Canadian censuses).[1]

The analysis of fast repeat migrations is a relatively new field in demography, although demographers have been aware of the prevalence of repeat migrations, at least indirectly, since the late 19th century when Ravenstein (1889) reported from his analysis of British census data that each main stream of migration was accompanied by a large counterstream. The importance of repeat migrations as a factor in high mobility rates was highlighted several decades ago by Goldstein (1958). However, an in-depth investigation of fast repeat migrations was hindered by the lack of suitable data until the late 1960s and early 1970s when detailed microdata files with some temporal depth became available through either specifically designed surveys or the linkages of administration records of successive years (Lansing and Mueller, 1967; Morrison, 1971). New findings from these data stimulated the development of theories on repeat migrations in the mid-1970s and early 1980s (Allen, 1979; DaVanzo, 1981; Herzog and Schlottmann, 1983; Yezer and Thurston, 1976).

To achieve an in-depth and broad understanding, it is important to test the hypotheses derived from these theories against various types of data taken from different countries. So far the multivariate tests of the hypotheses about fast repeat migrations have been conducted on only a few data sets of the United States and Canada (DaVanzo, 1981; 1983; Grant and Vanderkemp, 1986). Perhaps with the exception of the widely used longitudinal data from the PSID, most of these data sets have shortcomings that are serious enough to cause researchers to warn that their empirical findings are at best suggestive.[2] It is certainly very important to find alternative data sets to continue the empirical investigation.

The main objectives of this paper are (1) to identify the determinants of job-related fast repeat migrations of individuals in the civilian labor force of Taiwan, and (2) to examine whether the effects of these determinants are largely consistent with the existing theories and with the findings of other empirical studies. Our study is based on the linked microdata of the annual national migration surveys of Taiwan from 1980 through 1989.

The organization of this paper is as follows. In section 2 we review the main theories of repeat migrations and formulate a set of hypotheses that can be tested against the Taiwanese data. Our data and statistical method are described in section 3. The empirical findings are presented in section 4. The main points are summarized in section 5.

2 Theories and hypotheses

It has been pointed out by Grant and Vanderkemp (1986) that a repeat migration can happen in many different ways. It can occur when the outcome of the previous migration turns out to be disappointing or suboptimal. It can be part of a person's preplanned arrangement (for example, returning home after finishing college, or returning to a university after sabbatical leave). It can also result from an unforeseen

[1] For example, to the extent that fast return migrations occur more frequently among disappointed workers, the income gains of migration computed from the five-year migration data of the censuses tend to be inflated.

[2] The longitudinal data set of Canada used by Grant and Vanderkamp (1986) was constructed from the linkages of income tax records of successive years and hence does not contain the important information on educational attainment. The 1966–67 panel data file of the Survey of Economic Opportunity used by Morrison (1971) does allow the distinction between residential moves and migrations in 1967. This is because the survey did not follow the movers to their 1967 locations. The Social Security Continuous Work History Sample used by Morrison (1971) shows only the locations of the employers (instead of the locations of employees) so that an intercounty relocation of a firm was taken as an intercounty migration of the firm's employees. In the widely used PSID file, families with relatively low incomes are overrepresented.

change of circumstance (such as the migrations back to the Atlantic region of Canada from Alberta when Alberta's economic base was suddenly undermined by the sharp decline in oil price in the early 1980s). In some cases, it may not be the result of a decision made by the migrant (for example, a soldier being transferred from one military base to another; an engineer returning from a short-term project contracted by his company; a prisoner being released from an overcrowded jail). Some repeat migrations may simply reflect the migrants' psychological trait of preferring new living environments. However, it seems that the job-related fast repeat migrations of the members of the civilian labor force are mainly generated by either (1) disappointment in the outcome of a previous migration or (2) the attraction of a better job opportunity elsewhere.

There are two somewhat overlapping major theories that are particularly useful for studying fast repeat migrations: one is attributed to Yezer and Thurston, the other to DaVanzo and Morrison. Although these theories are not very comprehensive, they serve the important purposes of generating testable hypotheses and suggesting the key questions to be asked in migration surveys. The negative results from the testing of hypotheses can also help the refinement, extension, or reformulation of the theories.

2.1 The Yezer–Thurston theory

The Yezer–Thurston theory is an extension of the human capital theory (Sjaastad, 1962) which adds (1) a realistic assumption of imperfect information and (2) a job-search theory to account for repeat migration (Yezer and Thurston, 1976). The job-search theory explains the previous migration as an outcome of a potential migrant's maximization of the present values of his or her expected future income streams among a set of places, which are net of the sum of the moving cost, the differential in psychic income between origin and destination, and the search cost. Owing to the imperfection of information used in the previous migration, it is possible that the destination chosen by a migrant may turn out to be disappointing or suboptimal. The theory then explains repeat migration as an outcome of the adjustment process at the destination whereby the migrant revises his or her expected wage and search duration. Depending on the relative wage levels of alternative places, he or she may decide to stay put or make a repeat migration (back to the origin or onward to a third place).

This theory was extended somewhat by Allen (1979) who pointed out that perceptions of psychic income can also be affected by imperfect information so that migrants who overestimate psychic income at the new destination are also more prone to make a repeat migration. It was also extended by Herzog and Schlottmann (1982) and Grant and Vanderkemp (1985), who further divided onward (that is, nonreturn repeat) migrations into backward and forward types, according to the relative distances of the second destination to the origin and the first destination.

This theory has been used to generate various hypotheses about the factors of repeat migration, mainly via their impacts on the quality of the information used in the decisionmaking process. These factors include the distance of the previous migration, the number of previous migrations, the educational attainment and age of the migrant, and the migrant stocks in different regions (Herzog and Schlottmann, 1983).

2.2 The DaVanzo–Morrison theory

The DaVanzo–Morrison theory of repeat migrations is based on two central concepts: information costs and location-specific capital. "Information is not costless and uncertainty is a fact of life" (DaVanzo, 1981, page 47). A potential migrant will continue to collect information only as long as the benefit is perceived to be greater than the cost. Thus, information used as the basis for the previous migration may be imperfect and hence may result in disappointment. This disappointment may in turn trigger a repeat migration.

Location-specific capital is defined as any factor that ties a person to a particular place (for example, homeownership, or a job-related asset such as an existing clientele, seniority, a nonvested pension, knowledge of an area, a kinship/friendship network). It has the property of being immovable or highly expensive to move from one location to another. It also has the properties of (1) taking substantial amounts of time or money to build up at a location and (2) depreciating with an increase in the duration of absence. A repeat migration may occur when a recent migrant is drawn by the location-specific capital of one of the places he or she used to live.

This theory allows the generation of various hypotheses about the factors of repeat migration, via their impacts on the information costs and the location-specific capitals in different places. As information cost is closely related to information imperfection, most of the hypotheses that can be generated by the Yezer–Thurston theory can also be generated by this theory. On the basis of the notion of location-specific capital, this theory can also generate additional hypotheses about the effects of such factors as the duration of stay at a previous residence, the duration of absence from a previous residence, and occupation (DaVanzo, 1981).

2.3 Additional considerations: budget constraints and societal context

An important matter that has not been incorporated in these two theories is the financing of migration and of subsequent adjustments. The previous migration may have used up a large portion of the migrant's savings so that he or she may not be able to finance another migration soon afterwards. As going into debt need not be readily acceptable, tight budget constraints may have significant impacts on the feasibility and selectivity of fast repeat migrations. The ways to overcome budget constraints may depend not only on the migrant's willingness to become a debtor but also on the existence and diversity of lenders.

The difficulty in financing fast repeat migrations may differ between societies as well as among individuals. Our personal observations suggest that people in Taiwan are in general less willing to go into debt and more dependent on informal lending sources such as relatives and friends than are Americans. This difference suggests that ways of overcoming budget constraints should be incorporated into theories of fast repeat migrations.

To understand selectivity in fast repeat migrations in Taiwan, it is also useful to consider them in a general societal context in which labor market forces are constrained and facilitated by the traditional value system and government policies. The government's active promotion of married women's labor force participation since the late 1960s and the continued domination of patriarchal ideology in Taiwan have resulted not only in a significant increase in the married women's share of labor force but also in a strong differentiation between the expected roles of men and women in the labor market (Hsiung, 1996). The general expectation of a family in Taiwan is that men are the major breadwinners, whereas women serve not only as housekeepers but also as secondary income earners when an employment opportunity exists.[3] Another important influence of the patriarchal system lies in its ability to produce

[3] For example, a program used by the government to create job opportunities for married women in Taiwan was the so-called 'living-rooms-as-factories' program (Hsiung, 1996). Many living rooms were indeed turned into simple 'factories' in the 1970s. In the meantime, numerous so-called 'satellite factories' were built in urban neighborhoods and rural villages, providing job opportunities to females and males at low wages. As they were at the bottom of an export-oriented manufacturing system, the cheap labor of married women in these factories became a contributing factor for the Taiwanese 'economic miracle'. The labor force participation rate of married women increased from 27.2% in 1967 to 42.7% in 1988, whereas that of single women increased from 57.3% in 1967 to 62.3% in 1973 and then decreased to 54.6% in 1988 (Hsiung, 1996, page 40).

docile young adult females who are particularly preferred by certain industries (for example, electronics) whose production requires high precision and cleanliness. Most of the jobs for these females in these industries are dead-end jobs and contribute to their high job mobility. Because occupational career is not a primary concern, females often retreat from the labor market after marriage or giving birth. The implications of this societal context on repeat migration propensities will be discussed under hypothesis 9 in the next section.[4]

2.4 The hypotheses

On the basis of existing theories as well as our knowledge of Taiwanese society, we now derive a set of hypotheses that can be tested on the Taiwanese data.

Hypothesis 1. The propensity for fast repeat migration is a convex function of the previous migration distance: it first increases and then decreases as the distance increases.

The positive relationship in this hypothesis is based on the idea that the reliability of the information used in the previous migration is a decreasing function of the distance from the previous origin. With less reliable information, the potential migrants in a more distant place are more likely to form erroneous expectations of wages at potential destinations. The so-called *pessimists* who underestimate the expected wages are more prone to stay put, whereas the so-called *optimists* who overestimate the expected wages are more likely to out-migrate. Thus, the migrants from more distant places are more likely to be overrepresented by the optimists, who upon arrival are more likely to be disappointed and hence more prone to make a repeat migration (Yezer and Thurston, 1976). The negative relationship in this hypothesis occurs when the information effect becomes overwhelmed by the direct cost effect. Owing to budget constraints, the longer the distance of the previous migration, the less the remaining budget available for covering the direct cost of a fast repeat migration.[5]

Hypothesis 2. The convex effect of the previous migration distance on the propensity for fast repeat migration is mainly shaped by its convex effect on the propensity for fast onward migration.

The main reason for this hypothesis is that the negative effect of budget constraints is likely to be weaker for fast return migrations than for fast onward migrations, as the increasing negative effect of budget constraints at an increasing distance from the destination of return migration (which is likely to be the home place) can be countered by the positive effect of the help from the kinship and/or friendship network there. Another reason is that the fast return migration propensity is likely to be rather insensitive to the negative effect of distance, as both the knowledge of the opportunities at the previous residence and the location-specific capital left there are unlikely to vary with the previous migration distance, especially after only one year's absence.

[4] As a consequence of the greater availability of better migration data for developing countries in recent years, the importance of influences of cultural systems on migration behaviors has become increasingly clear. For example, in the patriarchal system of Zimbabwe the main burden of farmwork falls on females, so that the urban-to-rural migration rates of females remain very high through all working ages, whereas the corresponding rates for males are much lower through all working ages and then increase sharply at the end of waged work (Liaw and Hayase, 1997). Failure to control for the effects of cultural systems on migration behaviors may result in a careless rejection of sensible theories that are derived from the assumption of rational behavior.

[5] It was pointed out by Allen (1979) that the effect of previous migration distance on the incidence of repeat migration can be "ambiguous", as the direct cost effect may or may not be weaker than the information effect. The 1960 census data of the United States used by Yezer and Thurston (1976) and DeVanzo (1976) suggest that on repeat migrations back to the region of birth, the

Hypothesis 3. The propensity for fast repeat migration is a convex function of the number of previous moves: it increases with the number of previous moves at a decreasing rate. The shape of this function comes mainly from the convex effect of the number of previous moves on the propensity for fast onward migration.

There are two main reasons for the positive relation in this hypothesis. First, migration is a 'learning-by-doing' process. The frequency of previous moves tends to increase (1) the skill in gathering and assessing information on the opportunities of other potential destinations for future migration, (2) the number of locations where some location-specific capitals have been left behind, and (3) the capacity to adapt to new circumstances. These effects in turn increase the propensity for fast onward migration directly and the propensity for fast repeat migration indirectly. Second, the number of previous moves may reflect the strength of a person's psychological predisposition to enjoying new environments.

The positive effect of the previous number of moves can be partially weakened by the negative effect of the budget constraint, which becomes increasingly important as the number of previous moves increases.[6] The budget constraint reduces the feasibility of making too many migrations within a short time interval. As fast return migrants can benefit from the help of the kinship and friendship network at the origin of the previous migration, the negative effect of the budget constraint is greater on fast onward migration than on fast return migration.

Hypothesis 4. The duration of unemployment at the chosen destination has a positive effect on both the propensity for fast repeat migration and the propensity for fast return migration.

Previous migrants with a longer duration of unemployment are more likely to recognize that their economic failure was a result of their overestimation of the expected wage at their chosen destination (rather than a short-term transitional problem). Consequently, they are more likely to reduce their expected wage of the chosen destination and hence increase their probability of making a fast repeat migration. As the individuals with longer durations of unemployment are in general more likely to have exhausted their financial resources and are less able to adjust to new labor markets, their fast repeat migrations are more likely to be oriented toward their previous residence where they may be sheltered and assisted by the kinship or friendship network.

Hypothesis 5. Relative to employers and the self-employed, employees are more prone to make repeat migrations.

As employees tend to possess less location-specific capital that is essential to running a successful business, they tend to suffer less from a disappointing migration. Thus, they tend to be less careful in gathering and assessing the information for making the previous migration and are hence more likely to make a fast repeat migration as a corrective measure. Furthermore, owing to the difference in location-specific capital, when there is a mismatch between employers and employees, the latter are more likely to move than the former.

Hypothesis 6. Those who migrated to look for a job are more prone to make a repeat migration than those whose migration reason was job change/transfer.

Those who migrated to look for a job were more likely to have migrated before a job was secured, whereas those whose reason for migration was job change or transfer were

[6] Another reason for the decreasing positive effect of the previous number of moves is that the migrants who have made moves are more likely to have found an 'optimum' place to settle down and are hence less likely to move again.

more likely to have secured a job before migration. Therefore, the former are more likely to be disappointed and hence to make a fast repeat migration than are the latter.

Hypothesis 7. The level of education has a negative effect on the propensity for fast return migration.

As the less-educated individuals tend to be less capable of obtaining reliable information about the opportunities at potential destinations, they are more likely to experience postmigration disappointment and are hence more likely to be compelled to make a repeat migration. As the less-educated repeat migrants tend to have relatively little information about the opportunities in locations other than their previous origin, their repeat migrations are more likely to be of the return type. Therefore, educational attainment is expected to have a negative effect on the propensity for fast return migration.

Hypothesis 8. The single marital status has a positive effect on the propensity for fast repeat migration.

Previous migrants who are single are more prone to make fast repeat migrations for several reasons. First, their migration costs tend to be relatively low. Thus, they are less susceptible to the negative effect of budget constraints. Second, as they are without children, they do not have to worry about the negative effects of fast repeat migrations on school-age children. Third, as they are alone, they can be easily accommodated in the homes of their parents, if the next job site is close to their parental homes.

Hypothesis 9. Owing to the influence of strong patriarchal ideology, Taiwanese men and women have substantially different levels and age patterns in their propensities to make fast onward migrations.

Under the patriarchal system, men as major income earners are more likely to behave as 'maximizers' whose propensities to look for a 'greener pasture' on an ongoing basis tend to remain relatively high through all working ages. In contrast, women as secondary income earners are more likely to behave like 'satisficers' whose propensities to make a fast onward migration tend to decrease with age. The young adult females under the patriarchal system are expected to have rather high propensities to make onward migrations owing to their high job mobility. With child-raising and housekeeping responsibilities, women who have passed their late twenties are less likely to choose onward migration as a corrective measure when their wages or work conditions turn out to be less than optimal.

3 Data, measurements, and methodology

3.1 Data and measurements

Our data source is the October round of the monthly Survey of Human Resources (SHR), which contains the supplementary questions on the internal migration in Taiwan. These national surveys with the supplementary questions on migration were conducted by the Census Bureau of the Directorate-General of Budget, Accounting, and Statistics on an annual basis from 1980 to 1989.[7] With households as sampling units, these surveys followed a two-stage stratified sampling design with unequal weights, and the sample size for each survey was kept at about 0.4% of the current total population.

The questionnaire of each SHR asks for information on the attributes of each sampled household and the personal characteristics of its members. In addition, information on

[7] The October round of the SHR did not include the supplementary questionnaire on migration in 1990, as the 1990 census was supposed to provide adequate migration information. To reduce costs, the supplementary questionnaire on migration has been attached to the SHR only once

labor force factors such as employment status and experience, industry, occupation, and working status are collected on individuals aged 15 and over. Supplementary questions on internal migration yield the migration information (for example, the number of previous moves, reasons for moving, previous and current places of residence) as well as additional labor force information prior to and after the move for those who moved during the previous year.

The geographic units we use to define migration are the 336 low-level administrative districts that cover the whole territory of Taiwan (figure 1). A migration is defined in this study as a relocation of residence crossing at least one district boundary.[8] We link the individual records of successive years to generate information for determining fast repeat migration status. As about half of the sampled households of each survey remained in the succeeding survey, only about half of the individual records in two consecutive surveys can be linked. The linkage is based on the household identification coding and the geographical coding in the survey, together with the age and sex of the household members. As the sampling scheme does not allow any household to be surveyed for more than two consecutive years, the linkage of records for three or more years is impossible.

As we are interested in the fast repeat migrations of the individuals in the labor force, we further restrict our sample to include only those who were aged 15–64 and who migrated for job-related reasons[9] in the first year of the linked two-year period.

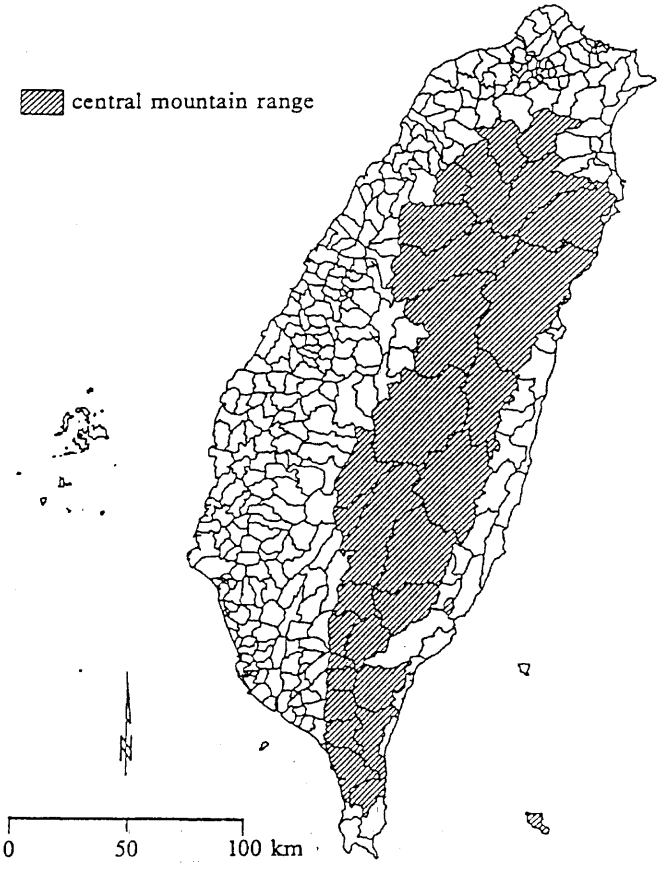


Figure 1. The administrative districts of Taiwan used to define fast repeat migrations.

[8] We use the 1992 boundaries of these 336 administrative districts. In general, the numbers and the boundaries of these low-level administrative districts have been very stable over time.

[9] Job-related reasons for migration in the survey questionnaire fall into two broad categories: job-transfer/job-change reasons and job-seeking reasons.

We further exclude those whose second (intradistrict and interdistrict) moves were because of education, housing, or marriage, as the moves resulting from these reasons are not directly related to the theories of interest in this paper. The resulting sample contains 2583 'previous migrants'. Note that the previous migration status is based on positive answers to the following two questions in the questionnaire in the first year. Have you moved in the last 12 months? Was your previous residence in a different administrative district?

For each previous migrant, the migration status in the second year is determined by comparing the current district of residence of the second survey l, the current district of residence of the first survey k, and the district of residence in the 12 months before the first survey j. If l is not equal to k and j then the individual is a 'fast onward migrant'. If l is not equal to k but is equal to j then the individual is a 'fast return migrant'. A 'fast repeat migrant' is either a fast onward migrant or a fast return migrant. A 'stayer' is a previous migrant who is not a fast repeat migrant.

3.2 The statistical model and methodology

Our statistical model is the polytomous logit model used by DaVanzo (1983) and Grant and Vanderkamp (1986). For each previous migrant i, the probability of choosing an alternative A is explained by the model:

$$P_i(A) = \frac{\exp(V_{A,i})}{\sum_{A' \in C} \exp(V_{A',i})}, \qquad \text{with } V_{A,i} = B_A X_{A,i}, \quad A \in C, \tag{1}$$

where $P_i(A)$ is the probability of choosing alternative A from the choice set C which includes the options of fast return migration, fast onward migration, and staying put; $V_{A,i}$ is the utility of alternative A perceived by the ith previous migrant; B_A is a row vector of unknown parameters; and $X_{A,i}$ is a column vector of observable explanatory variables. With 'staying put' being the reference alternative, the first two variables in $X_{A,i}$ are alternative-specific dummy variables representing the alternatives of 'fast return migration' and 'fast onward migration', respectively. The remaining variables in $X_{A,i}$ are the interactions (that is, products) of these alternative-specific dummy variables and the substantive explanatory variables (for example, the dummy variables representing college and university education, respectively).

With the dependent variable in our input data matrix as the sample weight attached to each observation, we use the maximum quasi-likelihood method to estimate the unknown parameters (Liaw and Ledent, 1987; McCullagh, 1983). Whether a parameter has significant effect is determined by its associated t-value (that is, the estimated parameter divided by its estimated asymptotic standard error). As our linked data consist of over 2000 observations, the associated t-value can be regarded as a standard normal variate. To avoid artificially inflating the t-values, we scale the sample weights so that their sum is identical to the number of observations in the sample.[10]

[10] The original weights were set at a level that will allow the sum of weights to be equal to the size of the underlying population (that is, the total labor force of Taiwan). If these weights were directly used in the estimation procedure, the magnitudes of the t-values would be artificially inflated. To avoid the artificial inflation, users of the LOGISTIC and CATMOD procedures (SAS Institute Inc.) should also scale the sample weights so that their sum is made to be equal to the sample size. Instead of CATMOD, we use our own GAUSS program which can handle a much larger data set. Our maximum quasi-likelihood method and the IRLS (iterative reweighted least squares) method used in LOGISTIC and CATMOD procedures yield the same estimated values for the unknown coefficients. The asymptotic covariance matrices yielded by these two methods differ by the multiplication of a scalar that approaches 1 as the sample size approaches infinity. Because our sample size is very large, these two estimation methods yields practically the same covariance matrix and hence the same t-values.

The goodness-of-fit of a specification of the model is measured by the ρ^2 statistic,

$$\rho^2 = 1 - \frac{L}{L_0}, \tag{2}$$

where L is the maximum quasi-loglikelihood of the specification in question, and L_0 is the maximum quasi-loglikelihood of the null model (in other words, the model that possesses only the two dummy variables representing the return and onward alternatives, respectively). Note that this statistic is bounded between a minimum of 0 and a maximum which is much less than 1, such that a value of 0.2 can represent a very good fit (McFadden, 1974).

We call the specification with all relevant explanatory variables the 'general model'. By removing most of the statistically nonsignificant variables from the general model, we obtain the so-called 'best model'.[11] To evaluate the relative importance of two subsets of explanatory variables, we delete each subset in turn from the general model and observe the resulting decreases in the logarithm of quasi-likelihood. In each deletion, the decrease in the logarithm of quasi-likelihood has an asymptotic χ^2 distribution, with the degrees of freedom being the number of explanatory variables in the deleted subset. The p-value implied by the χ^2 statistic can then be used to judge the relative importance of the deleted subset: the smaller the p-value, the more important the subset.

3.3 The explanatory factors

The explanatory factors used to test our hypotheses are as follows. For simplicity, the terms 'first year' and 'first survey' will be used in the rest of the paper to mean the first year and the first survey of a linked two-year period. The terms 'second year' and 'second survey' also refer to the latter half of the same linked two-year period. The terms 'he' and 'his' represent 'he or she' and 'his or her', respectively. The distinctions in each categorical explanatory factor are represented by one or more dummy variables.

(1) *Distance of previous migration* For each person, this factor is the Euclidian distance in kilometres between geographic centers of (a) his current district of residence in the first survey and (b) his district of residence before the previous migration[12].

(2) *Number of previous moves* For each stayer, this factor is his number of moves in the previous 12 months reported in the first survey. For each fast repeat migrant, this factor is the sum of (a) his number of moves in the previous 12 months reported in the first survey and (b) his number of moves in the previous 12 months reported in the second survey subtracted by 1.

(3) *Duration of unemployment* For each person, this factor is his duration of unemployment (in weeks) reported in the first survey.

(4) *Reason for the previous move* With 'job transfer/change' as the reference category, this factor is represented by a dummy variable, 'job search', which assumes the value of 1 if the reason for the previous move was 'looking for a job' reported in the first survey.

(5) *Employment status* With 'employer/self-employed/unpaid family worker' as the reference category, this factor is represented for each person by two dummy variables representing the employee status and unemployed status, respectively.

[11] Because of the large sample size, we consider a magnitude of 1.96 for a t-value as an indication of statistical significance (at the 0.05 level). The 'best model' is defined as the specification that contains all the statistically significant variables and two nearly significant variables. With slightly smaller t-values (-1.8 and -1.9), the interaction terms (Senior High×Return, and College×Return) are retained in the 'best model', because their coefficients, together with that of At-least University×return, have a substantively meaningful pattern (see table 1, section 4).

[12] However, in case a district falls into the category of officially designated mountain district (see figure 1, section 3), its associated population center instead of geographic center is used to calculate previous moving distance.

(6) *Level of education* With 'less than junior high school' level as the reference category, this factor is represented for each person by four dummy variables, representing 'junior high school', 'senior high school', 'college', and 'at-least university' levels, respectively, as reported in the first survey.
(7) *Age* For each person, this factor is the age (in years) determined by the month and year of birth reported in the first survey.
(8) *Sex* This factor is the sex reported in both surveys (female, male). To study the sex-specific effects of age on migration choices, we define both female and male dummy variables and replace age by female×age and male×age in the model. [See footnote (13) for a detailed explanation of this way of specifying the explanatory variables.]
(9) *Marital status* This factor is the marital status reported in the first survey (single, married, divorced/separated, widowed).
(10) *East–west division by the central mountain ranges* Because it is very difficult to move across these high and rugged mountain ranges which run from the northern extreme to the southern extreme, the Euclidian distance tends to understate the actual travel distance if the origin and destination are on different sides of it. Therefore, we introduce two dummy variables: (a) east–west, which assumes the value of 1 if the origin and destination of the previous migration are on different sides of the Central Mountain Ranges; and (b) non-east–west, which is the complement of east–west. In our multivariate model, these two dummy variables are multiplied to the previous migration distance in order to control for the effect of this physical barrier.[13]

Last, to allow for nonmonotonic effects of a noncategorical explanatory factor X on the probability of choosing an alternative, we let the contribution of X to the utility function be expressed in the form of $A \ln X + BX$, where A and B are unknown parameters. The shapes of this function are much more flexible than that of the commonly used quadratic function. The qualitative properties of this function are as follows. First, if either A or B is zero with the other being nonzero, the effect of X is either positive or negative, depending on the sign of the nonzero parameter. Second, the effect of X is positive if both A and B are positive, whereas the effect of X is negative if both A and B are negative. Third, the effect of X becomes convex if $A > 0$, and $B < 0$, and concave if $A < 0$, and $B > 0$. Graphically, the shape of $A \ln X + BX$ resembles that of the logarithm of the Gamma function.

4 Empirical findings

Our linked data on the individuals of the Taiwanese civilian labor force who previously migrated for job-related reasons among the 336 districts of Taiwan reveal that fast repeat migrations were very common: as many as 18% of the previous migrants who had migrated for job-related reasons migrated again within a year for reasons other than pursuit of education, marriage and housing considerations. If we do not impose a restriction on the reasons for the fast repeat migrations, the proportion is increased from 18% to 44%. As much of this increase is accounted for by housing reasons, there seems to be a rather common phenomenon of a job-related move followed soon by a housing-related move.

[13] Let X be distance, D be the east–west dummy variable, and R be the dummy variable representing the return option. There are two equivalent ways to generate east–west and non-east–west distance effects on return migrations. First, we can use the form $b_1 XR + b_2 (XD)R$, where b_1 and b_2 are unknown coefficients. Second, we can use $c_1 (XD)R + c_2 [X(1 - D)]R$, where c_1 and c_2 are unknown coefficients. The estimation results will guarantee that $c_1 = b_1 + b_2$ and $c_2 = b_1$. We use the second way, because the estimated coefficients are easier to visualize. We also use the second way to estimate the distance effects on onward migrations and the sex-specific effects of age on both return and onward migrations.

Table 1. Estimation result of multivariate logit model for job-related repeat migration of labor force aged 15–64, based on the Linked National Survey data of Taiwan.

Explanatory variable	General model		Best model		Relative importance	
	coefficient	*t*	coefficient	*t*	*P*-value	rank
A. Constant terms						
Return migration	−1.9746	−0.6	−5.4622	−8.6		
Onward migration	−6.0269	−2.0	−6.7461	−6.6		
B. Effect of personal characteristics						
1. Age and sex					9.1535×10^{-6}	2
Age of males						
Male×ln(age/100)×return migration	1.2964	0.9	-	-		
Male×(age/100)×return migration	−4.2702	−0.8	-	-		
Male×ln(age/100)×onward migration	−2.5890	−2.0	−2.4621	−5.6		
Male×(age/100)×onward migration	7.2385	1.7	7.0789	4.8		
Age of females						
Female×ln(age/100)×return migration	1.3282	0.9	0.2088	2.0		
Female×(age/100)×return migration	−5.4251	−1.0				
Female×ln(age/100)×onward migration	−3.2917	−2.8	−3.1387	−5.6		
Female×(age/100)×onward migration	0.0516	0.0	-	-		
2. Education (ref at-most primary education)					1.3297×10^{-2}	5
Junior high school level ×return migration	−0.0556	−0.2	-	-		
Senior high school level ×return migration	−0.4266	−1.7	−0.3182	−1.8		
College level×return migration	−0.6866	−1.8	−0.6228	−1.9		
At-least university level ×return migration	−1.6058	−2.7	−1.5182	−2.7		
Junior high school level ×onward migration	−0.1174	−0.5	-	-		
Senior high school level ×onward migration	−0.2827	−1.3	-	-		
College level×onward migration	0.1908	0.7	-	-		
At-least university level ×onward migration	0.0960	0.3	-	-		
3. Marital status (ref married)					1.3301×10^{-2}	6
Single×return migration	0.6834	2.7	0.6574	3.1		
Divorced/separated/widowed ×return migration	−0.0316	0.0	-	-		
Single×onward migration	0.5308	2.3	0.5364	2.5		
Divorced/separated/widowed ×onward migration	−0.3749	−0.5	-	-		
C. Labor force factors						
1. Employment status (ref employer/self-employed/family worker)					7.7125×10^{-4}	4
Employee×return migration	0.8395	2.5	0.8819	3.1		
Unemployed×return migration	3.0524	1.1	-	-		

Table 1 (continued).

Explanatory variable	General model		Best model		Relative importance	
	coefficient	t	coefficient	t	P-value	rank
C. (continued)						
Employee×onward migration	0.8847	2.9	0.8108	3.0		
Unemployed×onward migration	4.2626	1.6	-	-		
2. Duration of unemployment (weeks)					1.3607×10^{-2}	7
Ln(number of weeks/100) ×return migration	1.0056	1.1	-	-		
(Number of weeks/100) ×return migration	0.6409	0.1	5.7692	4.0		
Ln(number of weeks/100) ×onward migration	0.8949	1.3	-	-		
(Number of weeks/100) ×onward migration	−9.2361	−1.2	−0.2487	−2.0		
D. Attributes of previous moves						
1. Previous migration reason (ref job change/transfer)					7.1360×10^{-2}	8
Return×job search	0.4139	2.2	0.3922	2.3		
Onward×job search	−0.0216	−0.1	-	-		
2. Previous moving distance (kilometers)					5.7842×10^{-4}	3
Ln(distance/500) ×non-east–west prior move ×return migration	−0.4515	−2.8	−0.4634	−2.9		
(Distance/500) ×non-east–west prior move ×return migration	3.4262	3.4	3.5376	3.6		
Ln(distance/500) ×east–west prior move ×return migration	−0.6649	−2.4	−0.6752	−2.5		
(Distance/500) ×east–west prior move ×return migration	2.8299	2.1	2.9394	2.2		
Ln(distance/500) ×non-east–west prior move ×onward migration	0.5049	3.3	0.5008	3.3		
(Distance/500) ×non-east–west prior move ×onward migration	−3.1123	−3.3	−3.0332	−3.3		
Ln(distance/500) ×east–west prior move ×onward migration	0.6808	2.6	0.6972	2.7		
(Distance/500) ×east–west prior move ×onward migration	−2.5664	−2.1	−2.5216	−2.1		
3. Number of moves in the past two years					2.1581×10^{-11}	1
ln(previous moves) ×return migration	1.9259	1.5	1.2275	4.1		
(Previous moves)×return migration	−0.4440	−0.6	-	-		
Ln(previous moves) ×onward migration	3.1648	3.3	1.6744	7.4		
(Previous moves) ×onward migration	−0.8928	−1.6	-	-		
ρ^2	0.0956		0.0910			

Notes: reference alternative ≡ staying; ref, reference category.

Although the geographical units are not directly comparable, it is useful to mention the corresponding figures of Canada and the United States. By using the linked income tax data of Canada, Grant and Vanderkamp (1984) found that among the 337 localities which covered the whole country,[14] 22% of those who migrated in 1968–69 did so again in 1969–70.[15] By using the 1968–75 PSID longitudinal data of the United States, DaVanzo (1983) showed that 23% of the family heads who migrated among the 603 'labor markets' (229 Standard Metropolitan Statistical Areas and 374 State Economic Areas, covering the whole country) made a fast repeat migration.

Despite the fact that the population of each of the 336 districts represents only a very small fraction of the total population of Taiwan, we found that the fast repeat migrants were very strongly drawn back to the original district: 38% of the fast repeat migrants ended up as return migrants, which suggests that the overwhelming importance of the location-specific capital in the original district has not yet been depreciated by an extended period of absence. If no restriction is imposed on the reasons for the repeat migrations, this proportion is increased to an even higher value of 58%. In the above-mentioned Canadian and US studies the corresponding figures are 42% and 55%, respectively (DaVanzo, 1983; Grant and Vanderkamp, 1984).

The estimated results of the logit analysis are shown in the general and best models of table 1. A comparison of the estimated coefficients in these two models shows that the explanatory powers of our chosen explanatory factors overlap to some extent. Note that the removal of nonsignificant explanatory variables from the general model to create the best model has caused the redefinition of the reference category of an affected factor. For example, the reference category of marital status has been changed from "married" in the general model to "married/divorced/separated/widowed" in the best model (table 1).

To show graphically the functional forms of the effects of a noncategorical explanatory factor in the context of all other explanatory factors, we create a fictional 'mean person' whose values for the other explanatory factors are set at the sample mean.[16] For this mean person, we then vary the value of the explanatory factor in question to yield different predicted values for the probabilities of making fast repeat, onward, and return migrations, based on the estimated parameters in the best model. The resulting functional relationships are shown in figure 2.

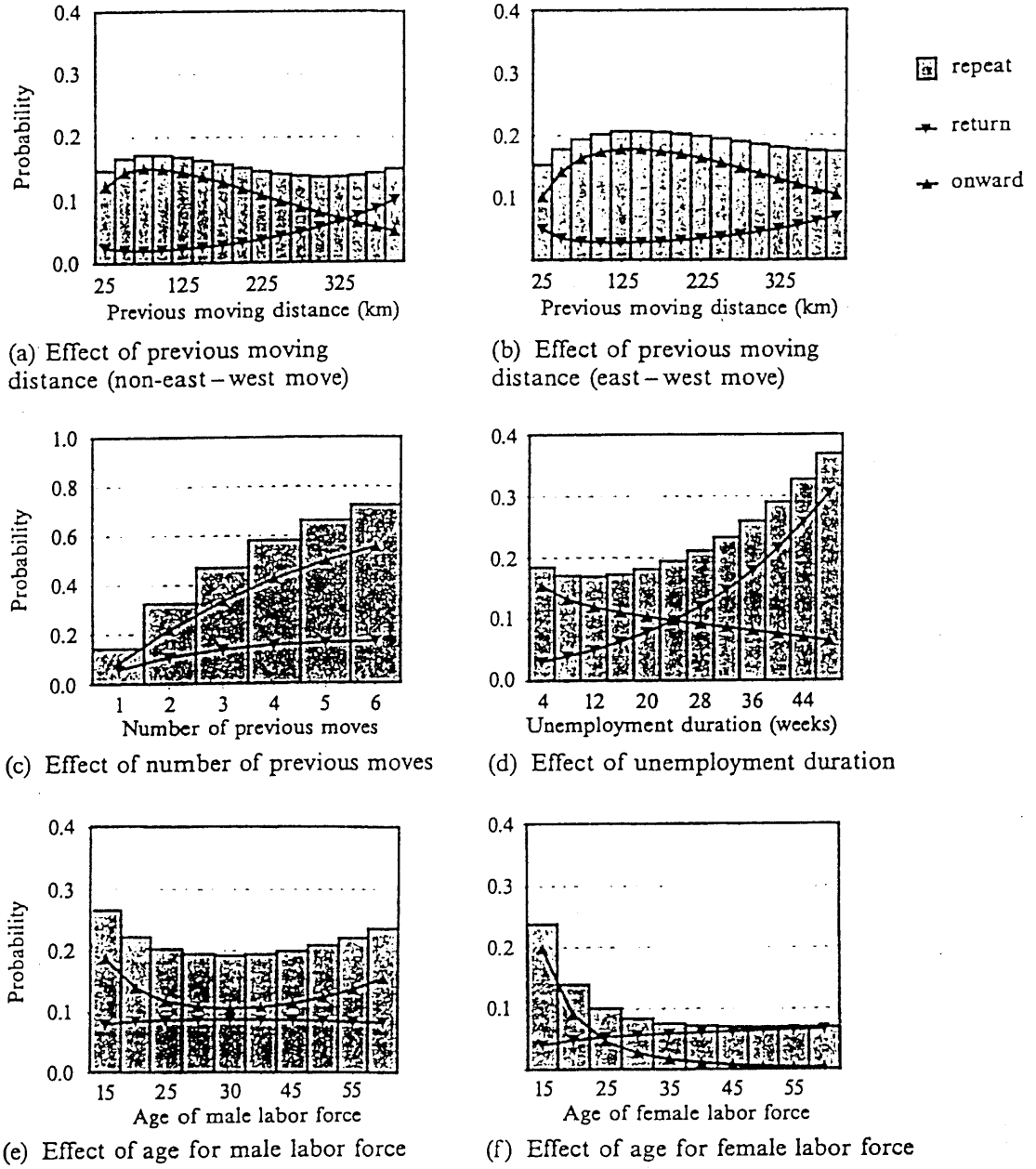
The best model provides statistically significant support for all of our hypotheses, with the support for hypothesis 7 (educational effect) being partial (table 1). Most of the estimated rates of fast repeat migrations from the best model are very close to the corresponding observed rates (table 2, see over). The main empirical findings are as follows.

Effect of previous migration distance For both types of previous migrations (non-east–west and east–west), we found that (1) the previous migration distance indeed had a convex effect on the predicted probability of fast onward migration, which suggests that the importance of budget constraints tended to increase with previous moving distance;

[14] These 337 localities "cover all counties and census subdivisions as well as 100 major urban areas identified separately" (Grant and Vanderkamp, 1984, page 65).

[15] By restricting the sample to those with continuous tax records for all the years in 1968–71, the Canadian data understated the migration level, as the sample "discriminates against new entrants into the labor market after 1966 as well as those leaving the labor force before 1971" (Grant and Vanderkamp, 1984, page 64). In other words, individuals who are more migratory and are more likely to be excluded from the sample.

[16] For example, the mean of the dummy variable "job search" is 0.511, which means that 51.1% of the individuals in the sample had 'job search' as their reason for the previous move. In evaluating the effects of the number of previous moves, the fictional 'mean person' is somewhat more similar to those with the 'job search' reason than to those with other reasons.



(a) Effect of previous moving distance (non-east–west move)

(b) Effect of previous moving distance (east–west move)

(c) Effect of number of previous moves

(d) Effect of unemployment duration

(e) Effect of age for male labor force

(f) Effect of age for female labor force

Figure 2. Predicted probabilities of fast repeat, return, and onward migrations of the 'Mean Person'.

(2) the predicted probability of fast return migration remained at a low level through short and middle distances and showed an upward slope at very long distances, which suggests that owing to the help of kin at the original home place, the negative effect of budget constraints was not strong enough to counter the disappointment effect. As they are mainly determined by the shape of the probability of fast onward migration, the shape of the probability of fast repeat migration turned out to be basically convex [figures 2(a) and 2(b)]. Thus, hypotheses 1 and 2 are confirmed.

Effect of the number of previous moves Our empirical results provide strong support for hypothesis 3. We found that the number of previous moves did have a very strong positive effect on fast onward migration, with the marginal effect becoming smaller as the number of previous moves becomes very large. As its effect on fast return migration was very small, the shape of the probability of fast repeat migration was indeed mainly determined by that of the probability of fast onward migration [figure 2(c)].

Table 2. Observed and predicted rates of job-related repeat, return, and onward migrations for Labor Force Aged 15–64: based on the Linked National Survey data of Taiwan.

Variable	At-risk population		Migration rate (%)						Observed odds	
	size (persons)	comp. (%)	repeat		return		onward		repeat stay	onward return
			obs	pred	obs	pred	obs	pred		
Total	2583	100.0	18.0	18.0	6.9	6.9	11.1	11.1	0.2	1.6
A. Personal characteristic										
1. Sex										
Male	1352	52.3	20.7	20.6	8.2	8.1	12.5	12.5	0.3	1.5
Female	1231	47.7	15.0	15.1	5.5	5.6	9.5	9.5	0.2	1.7
2. Age (male)										
15–19	305	22.6	29.1	29.0	11.1	10.8	18.0	18.2	0.4	1.6
20–24	364	26.9	19.8	22.3	6.0	9.1	13.8	13.2	0.2	2.3
25–29	336	24.9	22.3	17.8	10.3	7.1	12.0	10.7	0.3	1.2
30–34	158	11.7	8.0	13.8	4.6	5.6	3.4	8.3	0.1	0.7
35–44	114	8.4	16.0	12.9	6.9	5.1	9.1	7.8	0.2	1.3
45–64	74	5.5	17.4	17.1	6.5	6.7	10.9	10.4	0.2	1.7
3. Age (female)										
15–19	414	33.6	24.9	25.4	5.7	7.1	19.2	18.3	0.3	3.4
20–24	384	31.2	16.9	14.4	9.3	6.0	7.6	8.4	0.2	0.8
25–29	248	20.2	4.8	6.9	1.8	3.9	3.0	3.0	0.1	1.7
30–34	96	7.8	3.7	5.2	2.6	3.8	1.1	1.4	0.0	0.4
35–44	49	4.0	0.0	3.8	0.0	3.2	0.0	0.6	0.0	-
45–64	40	3.2	4.6	3.2	4.6	3.0	0.0	0.2	0.0	0.0
4. Education level										
At-most primary	568	22.1	15.0	14.6	6.6	6.5	8.4	8.2	0.2	1.3
Junior/ senior high	1649	64.0	19.4	20.1	7.6	7.7	11.8	12.4	0.2	1.6
College	196	7.6	19.1	16.2	5.8	5.8	13.3	10.4	0.2	2.3
At-least university	164	6.4	12.5	11.1	2.0	2.0	10.5	9.1	0.1	5.3
5. Marital status										
Single	1647	63.9	23.2	23.2	8.6	8.6	14.6	14.6	0.3	1.7
Married	871	33.8	8.8	8.8	3.8	3.8	5.0	5.0	0.1	1.3
Divorced/ separated/widowed	59	2.3	6.7	8.5	3.9	4.5	2.8	4.0	0.1	0.7
B. Labor force factors										
1. Employment status										
Employer/ self-employed	195	7.5	4.8	7.1	2.1	2.9	2.7	4.2	0.1	1.3
Employee	1956	75.7	21.1	21.1	7.9	7.9	13.2	13.2	0.3	1.7
Unemployed	122	4.7	20.9	19.8	8.6	8.6	12.3	11.2	0.3	1.4
Unpaid family worker	311	12.0	5.6	4.5	2.7	2.2	2.9	2.3	0.1	1.1
2. Length of unemployment (weeks)										
0–12	74	71.8	20.2	18.1	3.5	5.3	16.7	12.8	0.3	4.8
13–24	17	16.5	27.9	19.7	20.8	12.1	7.1	7.6	0.4	0.3
25+	12	11.7	35.7	38.2	30.5	32.8	5.2	5.4	0.6	0.2

Table 2 (continued)

Variable	At-risk population		Migration rate (%)						Observed odds	
	size (persons)	comp. (%)	repeat		return		onward		repeat stay	onward return
			obs	pred	obs	pred	obs	pred		
C. Attributes of previous moves										
1. Previous migration reason										
Job search	1 321	51.1	21.4	21.5	8.3	8.3	13.1	13.1	0.3	1.6
Job change/ transfer	1 262	48.9	14.3	14.4	5.4	5.4	8.9	9.0	0.2	1.6
2. Number of moves in the past two years										
1	2 367	91.6	16.1	16.2	6.4	6.4	9.7	9.7	0.2	1.5
2	189	7.3	37.0	35.3	12.0	11.8	25.0	23.6	0.6	2.1
3+	27	1.1	51.8	56.6	13.2	14.9	38.6	41.7	1.1	2.9
3. Previous moving distance (non-east–west)										
0–<50	1 006	43.4	16.9	16.7	6.5	6.4	10.4	10.3	0.2	1.6
50–<100	289	12.5	21.9	20.1	4.6	4.8	17.3	15.3	0.3	3.8
100–<150	243	10.5	13.8	18.8	2.8	5.5	11.0	13.3	0.2	3.9
150–<200	255	11.0	21.9	20.1	10.3	6.9	11.6	13.2	0.3	1.1
200–<250	199	8.6	15.5	18.7	5.6	8.1	9.9	10.6	0.2	1.8
250+	327	14.1	19.4	17.6	10.9	10.3	8.5	7.3	0.2	0.8
4. Previous moving distance (east–west)										
0–<50	49	18.7	15.4	17.2	7.9	8.9	7.5	8.3	0.2	0.9
50–<100	43	16.2	26.2	15.6	12.6	6.3	13.6	9.3	0.4	1.1
100–<150	75	28.3	10.2	17.5	2.7	6.5	7.5	11.1	0.1	2.8
150–<200	34	13.0	27.4	19.6	4.4	6.5	23.0	13.1	0.4	5.2
200–<250	35	13.4	22.0	19.6	13.2	8.6	8.8	11.0	0.3	0.7
250+	28	10.4	12.7	18.4	7.1	8.1	5.6	10.3	0.1	0.8

Notes: repeat/stay, odds of repeat migration versus odds of staying; onward/return, odds of onward migration versus odds of return migration; obs, observed; pred, predicted; comp, composition.

Effect of the duration of unemployment The predicted effect of the duration of unemployment on the propensity for fast repeat migration was indeed positive [figure 2(d)], as stated in hypothesis 4. This positive effect resulted from the combination of (1) a strong positive effect on the propensity for fast return migration and (2) a moderate negative effect on the propensity for fast onward migration.

Effect of the employment status Relative to employers/the self-employed/unpaid family workers, employees were found to be significantly more prone to make fast return and fast onward migrations in the best model (table 1). Thus, hypothesis 5 is confirmed. Although the unemployed were very similar to employees in terms of their observed rates of making fast return and onward migrations (table 2), our multivariate analysis shows that unemployment status was not a significant factor in the context of unemployment duration (table 1). When we deleted unemployment duration from the general model, however, we found that unemployment status turned out to have significant positive effects both on return and on onward migrations.[17] This is consistent with DaVanzo's (1983) finding from the PSID data that unemployment status had a significant positive effect on fast return migration and a nearly significant positive

[17] The coefficients of the interactions of unemployment status with the dummy variables representing the return and onward options became 0.89 and 0.92 after the unemployment duration was deleted from the general model of the model. The associated *t*-ratios became 1.9 and 2.3.

effect on fast onward migration. Thus, we have not only substantiated DaVanzo's earlier finding about the effect of unemployment status but also shown that its effect on fast return migration increases sharply with the unemployment duration.

Effect of reason for the previous migration We found that 51% of previous migrants migrated to look for jobs; this suggests that about half of the previous migrants migrated before securing a job. They indeed turned out to have higher rates of return and onward migrations (8.3% and 13.1%, respectively) than those whose reason was job change/transfer (5.4% and 8.9%, respectively). In the best model, the effect of 'job search' relative to "job change/transfer" is shown to have a significant positive effect on the propensity for fast return migration (table 1). Thus, hypothesis 6 is also confirmed.

Effect of education The estimated coefficients in the best model show that educational attainment had an increasingly negative effect on the propensity for fast return migration beyond the level of junior high school. Except for the similarly high tendencies of making return migrations among those with the lowest two levels of educational attainment, hypothesis 7 is thus confirmed. We found that this negative effect became even more evident for those with "at-least university" education, who were seen to have an observed return rate of as low as 2.0%. In contrast, educational effect on fast onward migration turned out to be nonsignificant in the model (table 1).

Effect of marital status With "married" as the reference group, the estimated coefficients in the best model show that single people were indeed far more prone to make both return and onward migrations than were those of other marital statuses (table 1). Thus, hypothesis 8 is confirmed. The observed return and onward migration rates of the singles were 8.6% and 14.6%, respectively, which were much higher than the corresponding figures for the married category (3.8% and 5.0%, respectively) and the divorced/separated/widowed category (3.9% and 2.8%, respectively).

Effect of sex and age Our estimation result also shows that gender selectivity in fast repeat migrations was very strong in terms of overall level and age pattern. Males were more prone to make both types of fast repeat migrations than females (table 2). The patterns of the male and female onward migration schedules differed markedly: the former remained at a rather high level through all working ages and displayed a U-shaped pattern, whereas the latter declined sharply from a high level in late teens to an extremely low level beyond their late 20s [figures 2(e) and 2(f)]. In other words, beyond the late twenties, fast onward migrations became almost exclusively a male phenomenon. Thus, hypothesis 9 is also confirmed.

Last, we notice from the p-values in table 1 that the factors with the greatest explanatory powers were (1) the number of previous moves, (2) gender and age, and (3) previous migration distance. Thus, the most salient features are (1) the strong positive effect of the number of previous moves on the propensity of onward migration, (2) the sharp contrast between male and female onward migration schedules, and (3) the strong convex effect of previous migration distance on the propensity of fast onward migration. In short, chronicity (Morrison, 1971), patriarchal ideology (Hsiung, 1996), and budget constraints appeared to be the most important underlying factors of fast repeat migration behaviors of the labor force in Taiwan.

5 Conclusions

Based on the theories of Yezer–Thurston and DaVanzo–Morrison and our knowledge of Taiwan's societal context, we have derived a set of hypotheses about the effects of the experiences and personal attributes of previous migrants in the Taiwanese labor force on their propensities to make fast repeat migrations. Using the linked microdata of the annual national migration surveys from 1980 through 1989 on the members of the labor force who were aged 15–64 and had migrated among the 336 districts of

Taiwan for job-related reasons, we have tested these hypotheses in a multivariate context by a polytomous logit model. The hypotheses are well supported by our empirical data. Our main findings are as follows.

The nature and outcome of the previous migration had significant effects on the propensities to make fast repeat migrations. First, mainly through the balance between its information effect and its direct cost effect, the previous migration distance had a strong convex effect on the propensity of making fast onward migration and a mild positive effect on the propensity of making fast return migration. The difference in the effects between the onward and return choices reflects the availability of greater location-specific capital (including the help from kin to reduce the negative effect of budget constraints) to the latter choice. Second, mainly through the dominance of its 'learning-by-doing' effect on its direct cost effect, the previous number of moves had a strong positive effect on the propensity of making fast onward migration, which remains positive even at six or seven moves. Third, the duration of a previous migrant's unemployment had a strong positive effect on his or her propensity to make fast return migration and a moderate negative effect on his or her propensity to make fast onward migration so that the effect on the propensity to make fast repeat migration turned out to be positive. It was the prolonged unemployment duration, rather than simply the status of unemployment, that strongly enhanced the tendencies to make fast return migration. Fourth, those whose previous migration reason was job search were more prone to make a fast return migration than were those whose previous migration reasons was job change/transfer. As they had migrated before securing a job, the former were more likely to have disappointing labor-market outcomes and hence were more prone to make a fast return migration.

Several personal factors also had significant effects on the fast repeat migration choices. First, employees and the unemployed were more prone to make fast repeat migration than were employers, the self-employed, and unpaid family workers, which reflects that the former had less location-specific capital to tie them down and were less careful than the latter in making the previous migration, probably because they had a lower adjustment cost when the expectation failed to materialize. Second, the educational attainment of a previous migrant had a strong negative effect on the propensity of making a fast return migration but had no systematic effect on the propensity to make a fast onward migration. It is important to note that this finding is contrary to the common finding from census migration data of North America that educational attainment has a strong positive effect on the propensity to make onward migration and has practically no effect on the propensity to make return migration (Long, 1988; Newbold and Liaw, 1994). On the basis of the 1990 Taiwanese population census it was found that the propensity for onward labor migration increased markedly with educational attainment, whereas the propensity for return labor migration was somewhat lower for the better educated than for the less educated. This finding in Taiwan is mainly a result of the fact that the census had captured both fast and non-fast returnees (Lin, 1998). In light of the contrast between fast and non-fast repeat migrations revealed by Morrison and DaVanzo (1986), this difference is not surprising. Third, we found that gender selectivity in fast onward migration was very strong in terms of both overall level and age pattern. Males were more prone to make both types of fast repeat migrations than females. The patterns of the male and female onward migration schedules differed markedly: the former remained at a rather high level through all working ages and displayed a U-shaped pattern, whereas the latter declined sharply from a high level in late teens to an extremely low level beyond the late twenties. This can be considered as a reflection of the strong dominance of the patriarchal ideology of the Taiwanese society.

In sum, our major findings on the fast repeat migrations from the Taiwanese data are mostly consistent with the previous findings from the North American data and

provide additional evidence on the effects of budget constraints and patriarchal ideology. The most important underlying factors of fast repeat migrations in Taiwan appeared to be chronicity, patriarchal ideology, and budget constraints. As neither chronicity nor patriarchal ideology can be easily and quickly affected by policies, the basic features of fast repeat migrations may be rather resistant to policy measures, although our findings about the effects of educational attainment and unemployment duration on fast return migrations suggest that improvement in education and provision of information on job opportunities via such means as the internet can help reduce the level of unnecessary fast repeat migration.

It is useful to note that our data span the 1980s, a period of economic restructuring and globalization that had rather uneven impacts on different regions of Taiwan (Lin and Liaw, 1998). It seems that the high level of fast repeat migrations helped relocate labor quickly, so that the unemployment rates of lagging regions remained at about the same low level as those of the surging regions. To get a better sense about whether fast repeat migrations were efficient, we plan to expand our database by linking the socioeconomic attributes of the geographical units to the personal records so that we may assess whether repeat migrants are strongly responsive to the pulls of destinations with better economic opportunities. To ascertain the generality of the empirical findings, we recommend a similar analysis of the data for other periods (say, during an economic recession) and for other countries.

Acknowledgements. The authors would like to thank two anonymous reviewers for their helpful comments, and are grateful to Taiwan's Census Bureau of DGBAS for providing the data, and to its two officers, Ms Hong-Jing Chao and Ms Ming Chen, for downloading the data and providing additional information and advice.

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