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PATHWAYS FROM POVERTY TOWARD MIDDLE CLASS: DETERMINANTS OF SOCIO-ECONOMIC CLASS MOBILITY IN THE RURAL PHILIPPINES[*]

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Abstract
Exploiting a unique set of longitudinal household data collected in a Philippine village over a thirty year period (1962-1994), this paper seeks to identify the pathways of exiting rural poverty and also the determinants of middle class stability. We also test the changes in the returns on assets in exiting poverty after the 1980s. We find that better access to land facilitates accumulation in agriculture while schooling has positive effects on upward mobility in both agricultural and non-agricultural sectors. Macroeconomic growth was, however, the key determinant of poverty-exit probabilities until the early 1980s. After the 1980s, poverty exit-paths through 'agricultural ladder' narrowed, schooling *and* growth became equally crucial determinants due to the increased returns to schooling (mainly due to the expansion of the international migration opportunities), and labor endowments also became important for the lower, but not upper, social strata (providing an economic incentive to have *more* children for the poor). Unlike the typical findings from poverty dynamics in the US, we find no evidence of state dependence in the poverty spells. This suggests that the village economy under study is quite dynamic so that policy interventions addressing the observed determinants (especially access to education and economic growth) could well go a long way in pulling the poor out of poverty in the rural Philippines.

key words: economic mobility, poverty dynamics, human capital, rural poverty, Philippines

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1. Introduction

Poverty dynamics in developing countries is a relatively under-studied area of research.[1] If major pathways for exiting poverty are empirically identified in country(or region)-specific contexts, policy interventions could be designed for facilitating escape from poverty. One reason for the paucity of such studies, despite their immediate policy relevance, is the lack of appropriate data. While a long panel such as the Michigan Panel Study of Income Dynamics (PSID) has been utilized for analyzing poverty dynamics in the United States, equivalent data sources, and studies based on such data, in developing countries remain rare. This paper exploits a unique set of longitudinal micro data covering the period between 1962 and 1994 in the rural Philippines, and seeks to identify determinants of exiting poverty and of middle class stability by examining the processes of socio-economic class mobility among households within the village community.

This paper builds on three branches of the economics literature. First, the conceptual framework adopted in this paper is based on the theoretical literature on the evolution of social stratification, where the introduction of the assumption of credit market imperfections into the household model framework has led to the development of the models deriving various patterns of social stratification as multiple equilibria (e. g., Banerjee and Newman 1993, Galor and Zeira 1993 and Ljungqvist 1993).[2] Secondly, this paper intends to extend the empirical literature on poverty dynamics in the United States (or in other developed countries) by allowing us to address the question: how do the poverty dynamics differ between rich and poor countries? Studies based on PSID have found, for example, that age, race, education, female headship (or more generally, changes in the household composition), higher macroeconomic growth are significant determinants of the exit probabilities from poverty and also that the length of poverty 'spells' (i.

e., the length of past incidence of being in poverty) significantly affects the probability of exiting or entering poverty (e. g., Bane and Ellwood 1986, Stevens 1994, 1995, Hanratty and Blank 1992, Sawhill 1988). Since poverty in developing countries (including that in the Philippines) is a predominantly rural phenomenon while a major portion of poverty is found in urban areas in rich countries (especially in the United Stats), for instance, the determinants of poverty dynamics could potentially differ between these two groups of countries. This paper can be seen as a crude initial step toward addressing such a question.

Thirdly, this paper extends the relatively small empirical literature on the determinants of economic mobility in developing countries. While most of the earlier empirical studies of economic mobility in developing countries use transition matrices to characterize the *degree* of mobility,[3] there have recently emerged studies that examine the *determinants* of mobility. They have identified factors such as household asset holdings, human capital, and life-cycle, among others (e. g., Gaiha and Deolalikar 1993, Fuwa 1999, Grootaeat, et al. 1995, Jalan and Ravallion 2000, etc. See Baulch and Hoddinot 2000 for a survey). These studies typically examine changes over time in income or consumption expenditures for a relatively short period of time (mostly up to 5 years).[4] Recent studies on income or consumption mobility also find, however, that a relatively large portion of such mobility observed contains so called 'transitory' poverty resulting from the changes in income due to short term misfortunes or good luck, as well as measurement errors (e. g., Baulch and Hoddinott 2000, McCullock and Baulch 2000), and that factors affecting transitory poverty are quite different from those affecting 'chronic poverty,' which is what really matters for policy makers (e. g., Helme forthcoming, Jalan and Ravallion 2000). Furthermore, partly due to the relatively short time horizons observed, few studies have examined the impact of economic environments (e. g., the speed of macroeconomic growth), changes over time in the

relative importance among the determinants of poverty dynamics, or potentials for state dependence. This paper fills in such gaps in the empirical literature on poverty dynamics in developing countries.

The rest of this paper is organized as follows. The next section briefly describes the study village and the unique features of our data set. Section 3 describes the class structure in the village, its changes, and the household class mobility patterns during the thirty year period. Section 4 presents a theoretical framework for analyzing socio-economic mobility and then derives our empirical specification. Section 5 presents the estimation results and interpretations. In section 6 we return to those questions raised in this section in relation to the existing literature. And Section 7 draws our conclusions with some policy implications.

2. The Village Setting And The Data Features

Our study village is located in the central part of Pangasinan province on Luzon island in the Philippines. The village is located roughly 170 km north of Manila. While the village did not have a telephone line, 67% of the households had access to electricity as of 1994. The size of the village is roughly one square mile. The principal food crop in the village is rice. Also cultivated during our data period were sugar, tobacco, vegetables (corn, mongo beans, tomatoes, beans and eggplants) and a variety of fruits (e.g., mango). Most of the farmers adopted high yielding rice varieties (HYV) during the mid- to late-1970s. Unlike some other parts of Central Luzon, however, the village farmers have not been able to acquire the maximum benefit from the adoption of HYV due to insufficient irrigation.

House-to-house censuses by total enumeration were conducted in the village six times between 1962 and 1994: 1962, 1966, 1971, 1976, 1981 and 1994. Our data include information on household demographics and some asset holdings such as land but little information is

collected on income (except in 1994) or on consumption expenditures.[5] As a result, while the study of economic mobility can typically use as the outcome variable either (continuous) income or consumption expenditures applying component-of-variance models (e. g., Lillard and Willis 1978) or (discrete) state transitions—such as the entry into and exit from poverty— applying transition probability or hazard rate models (e. g., Bane and Ellwood 1986, Stevens, 1994, 1995), we take the latter approach focusing on the movements of households across socio-economic classes (to be defined in the next section in terms of land holdings and occupations).

Our focus on class mobility has a few advantages over the studies based on income or expenditure mobility as typically found in the literature. First, our approach is suitable for identifying poverty dynamics among the 'chronically poor' rather than the 'transitory poor.' Past studies on poverty dynamics and economic mobility have found that observed poverty dynamics based on such welfare measures as income or consumption expenditures contain a large portion of the 'transitory poor,'[6] and that the determinants of the transitory poverty are different from those of the chronic poverty (e. g., Jalan and Ravallion 2000). Dreze, Lanjouw and Stern (1992) further argue that the group of 'poor' people (or poor households) identified based on occupational categories (e. g., such as agricultural laborer) tend to be more stable where the majority are the chronically poor, and thus certain occupational categories could be a better indicator of chronic poverty than income or expenditure. Helme (forthcoming) also advocates departure from income or consumption expenditure-based definitions toward a focus on assets in identifying chronically poor. Our approach in this paper follows such arguments. Our unit of observation is a change (or no-change) in social class status of a household over a period of five years; a five year period is likely to be long enough to observe at least some degrees of changes in land holdings and occupations which tend to be more stable than typical welfare measures.[7] In

addition, we also include tests of state dependence in the household class position, which amount to examining mobility dynamics over 10 year periods. By examining the mobility in social classes over the long term, our attempt here is to focus on the changes in the level of economic welfare that are likely to have lasting effects on the households.

The second advantage in our approach is that land holdings and occupational categories are easier variables to measure than are typical welfare measures. Measurement errors typically pose major difficulties in identifying poverty dynamics based on income or consumption expenditures since they inflate the variances of the 'true' welfare measures (e. g., Bauluch and Hoddinot 2000). Our analysis of economic mobility based on social class categories is likely to suffer less of such difficulties.

An additional advantage of our data set is the fact that all the households in the village at the time of each survey are included (i. e., total enumeration). In collecting longitudinal survey data in a large scale, there typically is a tradeoff between obtaining a representative sample and tracking individual dynamics (e. g, Deaton 1997, p.20). A usual limitation of panel data where a same set of sample households is followed over time is that a representative sample in the initial time period tends to become increasingly less representative as the composition of the population changes, a limitation that becomes exacerbated as the observation period becomes longer. Since our dataset covers all the households at every survey we can observe the representative (in fact, the entire) patterns of the mobility dynamics within the village throughout the thirty year period.

To be balanced against these advantages, however, are a few limitations of the data set. One obvious limitation of our study is its being a single village study; conclusions derived from our study may not necessarily be generalized to cover other parts of the rural Philippines. Another limitation is the fact that our data do not follow those households that moved out of the

village (we will discuss the implications of this in the next section and Appendix).

3. Class Structure And Mobility Patterns In The Village

In order to identify alternative exit paths from poverty in the study village, we categorize village households into four socio-economic classes and analyze the determinants of the movements of households across class boundaries. Our notion of socio-economic class follows that of Anderson (1964) and is based on the degree of access to agricultural land and the occupation type of the main income earner of the household,[8] consisting of: *Irregularly-Employed*; *Tenant-Farmer*; *Small-Owner*; and *Regularly-Employed*. The class of *Irregularly-Employed* consists of landless-laborer households who have little or no access to agricultural land nor to secure employment; the main income earners of these households are engaged in various casual agricultural (e. g., planting, harvesting) or non-agricultural (e. g., carpentry, hired tricycle driving) jobs. *Tenant-Farmer* households are the households where the main income earners are farm operators without land ownership. On the other hand, *Small-Owner* households own agricultural land of at least one third of a hectare.[9] In addition to these social strata based on access to land, there is a distinct class of the non-agricultural *Regularly-Employed* households which derive primary income from secure non-agricultural employment or enterprise (e. g., school teachers, full-time employees in private businesses, owner-operators of local transport services, variety store owners, etc.). This class category also includes the households deriving the major portion of their income from household members working abroad. Although all the households in the Regularly-Employed class are not uniformly wealthy, the wealthiest households in the village have tended to belong to this class and they constitute a part of the middle-class at the national level in the Philippines.

Table 1 summarizes per capita household income and poverty incidence as of 1994 by

social classes. It shows that the average per capita incomes among the Irregularly-Employed and Tenant farmers are similar and are below the poverty line of P6,000,[10] while the average per capita income among Small-Owners is above the poverty line and that of the Regularly-Employed is more than twice the Small-Owners'. The incidence of poverty follows similar patterns across class categories. In our following discussions, we consider the households belonging to the Irregularly-Employed and the Tenant classes as the "poor households."[11]

Table 2 shows the changes in the village class structure over the thirty year period. We can see that the degree of dependence on the agricultural sector for livelihood among the village households declined significantly throughout the thirty year period, as reflected in the sharp decline in the proportion of the Small-Owner households and in the moderate decline in the proportion of the Tenant-Farmer households. On the other hand, the proportion of the poorest section of the village community, the Irregularly-Employed, increased substantially through the 1960s and the 1970s and then declined moderately after the 1980s. The share of the Regularly-Employed households increased drastically during the thirty year period, thereby becoming the largest social class category by 1994, partly due to the increasing number of households relying on their children who have secure non-agricultural occupations (many of them abroad, as we will see below) for their main income support.

As a rough summary of the mobility patterns over the thirty year period, Table 3 shows the changes in the class status of a panel of households between 1962 and 1994, as obtained by tracing only the 262 households found in the first round of the census in 1962. Not surprisingly a majority of the original 262 households, 32 years later, were no longer found in the village as of 1994 (either by emigration or by household dissolution mostly precipitated by the death of the household head). Among those still present as of 1994, there are very few cases of downward

mobility among the initial Small-Owners and the Regularly-Employed. Among the lower strata of the Irregularly-Employed and Tenant farmers, however, there appears to be a polarization of a sort; among the Tenant-Farmers as of 1962, roughly the same numbers of households are found in 1994 across the Regularly-Employed (i. e., upwardly mobile), Tenant (i. e., no mobility), and the Irregularly-Employed (i.e., downwardly mobile), and roughly the same numbers of what used to be Irregularly-Employed households as of 1962 are found, in 1994, in the Irregularly-Employed (i. e., no mobility) and in the Regularly-Employed (i. e., upwardly mobile) class. Taken together, it appears, there was more upward mobility (mostly toward the Regularly-Employed status) than downward mobility among the village households between 1962 and 1994.

Table 2 (the bottom row) and Table 4 indicate that much of the sharp increase in the share of the Regularly-Employed between 1981 and 1994 can be attributed to the upward mobility due to the expansion of international migration opportunities. As we can see in Table 2 (the bottom row), while relatively small numbers of households depended on foreign income during the 1960s and the 1970s, the number increased dramatically during the 1980s. Table 4 shows that a majority (53%) of the households who moved into the Regularly-Employed class from the other social classes between 1981 and 1994 depended on the 'international migration strategy' as their means of upward mobility.

More detailed patterns of household mobility can be summarized by a transition matrix for each observation period, as shown in Table 5. We can see that in the period between 1962 and 1981 a majority of the households did not cross their own class boundary over the five year period; all the diagonal entries are greater than 0.5. Similar transition matrices constructed from other developing countries based on relative expenditure (income) rankings typically find that

between 30 to 40% (around 25%) of the households remained in the same expenditure (income) quintile over a five year period (Baulch and Hoddinott 2000). Thus, our estimates of more than 50% of the households remaining in the same social class are consistent with our expectation that our notion of social-class mobility would indicate the kind of economic mobility that is of longer-term consequences than is mobility indicated by income or expenditure mobility. The 5 year-poverty exit (i. e., movements toward the Small-Owner or the Regularly-Employed status) probabilities among the Irregularly-Employed were typically below 10% except for the 1971-76 (see footnote 12 below) and 1981-94 periods when exit probability exceeded 20%, while poverty exit probabilities among Tenant farmers were between 10 to 20% except for the 1981-94 period when it was 30%. The quite low exit rate of below 10% appears comparable to the poverty exit rate observed among the chronically poor blacks found in the United States (Stevens 1995, p.39).

During the 1981-1994 period, the transition probability of staying in the same class is significantly lower except for that of the Regularly-Employed class, although the 1981-94 transition matrix cannot be directly compared with the five-year transition matrices in the previous periods. Among the four class categories, the Regularly-Employed class was generally the most stable class; once a household reaches this class it is less likely to move downward than a household belonging to the lower strata.

Within our framework, exit paths from poverty (i. e., upward mobility out of the Irregularly-Employed or Tenant status) could potentially take either through the "agricultural ladder" toward the Small-Owner status or through non-agricultural regular employment. Table 6 shows that the proportion of upward mobility going through the regular employment, rather than through the agricultural route, tended to increase over the past three decades both among the Irregularly-Employed and Tenant-Farmers (with the only exception being the period between

1976-81[12]).

We can also see from the transition matrices (Table 5) that typically 10 to 15% of the Irregularly-Employed and the Regularly-Employed households and 10 % or less among Tenant farmers or Small-Owner households moved out of the village.[13] It appears therefore the households from either the top (the Regularly-Employed) or the bottom (the Irregularly-Employed) of the village strata who are more likely to migrate out of the village. Or alternatively, farm households tend to be geographically less mobile than non-farm households. One would expect that Regularly-Employed households emigrate (only) if they find better economic opportunities outside the village; this would suggest that, to the extent that the out-migration of the Regularly-Employed results in upward mobility, our estimated stability (in the sense of the high probability of not moving downward) of the Regularly-Employed class could be underestimated. On the other hand, out-migration among the Irregularly-Employed class could result either from rural-urban migration seeking better economic opportunities or from rural-rural migration resulting in relatively little improvement in socio-economic status.[14] Thus, to the extent that the former type (urban migration accompanied by upward economic mobility) dominates the out-migration among the Irregularly-Employed, our estimate of poverty exit probability is likely to be underestimated; if the latter type (rural-rural migration accompanied with little improvement in socio-economic status) dominates, on the other hand, our estimated poverty exit probability could be overestimated. The fact that our data set does not include information on the households that moved out of the village, therefore, is a major limitation of our analysis. In order to partially rectify this data limitation, we conducted some sensitivity analyses with alternative assumptions about the out-migration of the poor, and the results are summarized in Appendix.

4. The Model

4.1. Conceptual Model

We first introduce a simplified conceptual model that leads to our empirical specification. Our model follows the spirit of the theoretical models such as Banerjee and Newman (1993), Galor and Zeira (1993) and Ljungqvist (1993) in that social stratification and mobility emerge as a result of the credit market failure and the indivisibility of an investment activity. A village household maximizes discounted utility derived from aggregate consumption and leisure:

$$\max \sum_{t=0}^{T} \delta^t U\left(C_t, L_t^L\right), \; U_C>0 \text{ and } U_{L^L}>0, \tag{1}$$

where C_t is aggregate consumption and L_t^L is leisure, respectively, at time t and δ is a discount factor. The household asset consists of land and human capital stock of household members and income is generated based on the household's assets:

$$\begin{aligned} Y_t &= f\left(p_t^F, A_t, L_t^F\right) + h(H_t,Z_t)\, L_t^{NF} \\ &= C_t + I_t^F + I_t^H, \end{aligned} \tag{2}$$

where Y_t is the total household income at time t; $f\left(p_t^F, A_t, L_t^F\right)$ is the farm profit that depends on agricultural terms of trade, p_t^F, land, A_t, and labor input, L_t^F; $h(H_t,Z_t)$ is the return of off-farm work that depends on human capital stock, H_t, degree of off-farm work opportunities, Z_t, and off-farm labor L_t^{NF}. Income is either consumed (C_t) or invested in land (I_t^F) or in human capital (I_t^H). The assumption here is that there is no credit market and thus the household is cash constrained. The total labor endowment of the household is given by:

$$L_t = L_t^F + L_t^{NF} + l\left(I_t^H\right) + L_t^L, \tag{3}$$

where L_t is the total household labor force at time t, and $l\left(I_t^H\right)$ is the labor force enrolled in

schools, which is linked to the level of human capital investment I_t^H. The household can control its total labor force endowment L_t through fertility decision.

$$L_{t+1} = L_t + DL_t, \tag{4}$$

where DL_t is the change in household labor force.

Given the initial asset endowment (A_0, H_0), initial labor endowment L_0, and a terminal condition, the household's problem is to choose optimal investment in land and human capital (I_t^F and I_t^H), consumption C_t, change in the total labor force DL_t, and labor force deployment among on-farm work, off-farm work, schooling and leisure (L_t^F, L_t^H, $1(I_t^H)$ and L_t^L).

At any period t, it is possible to distinguish three social "class" categories based on household asset accumulation (land and human capital). These are:

(Class 1) Landless Irregularly Employed Class : $A_t=0,\ H_t<\tilde{H}$.

(Class 2) Farmer Class : $A_t>0,\ H_t<\tilde{H}$.

(Class 3) (Non-Agricultural) Regularly Employed Class : $A_t \geq 0,\ H_t \geq \tilde{H}$.

where $\tilde{H}$ is the threshold level of human capital stock that is required for an economically secure occupation (i. e., Regularly Employed status)[15]. Given the above definition of "social classes," "class mobility" is induced by changes in land ownership (A_t) and in human capital stock (H_t), which in turn are determined by household investments (I_t^F and I_t^H). Denoting the conditions for transition from class j at time t to class k at time t+1 as $TR_{jk}(t)$;

$$\begin{aligned}
TR_{11}(t) &= \left\{H_t < \tilde{H}, A_t = 0 \text{ and } I_t^H < \left(\tilde{H} - H_t\right), I_t^F = 0\right\} \\
TR_{12}(t) &= \left\{H_t < \tilde{H}, A_t = 0 \text{ and } I_t^H < \left(\tilde{H} - H_t\right), I_t^F > 0\right\} \\
TR_{13}(t) &= \left\{H_t < \tilde{H}, A_t = 0 \text{ and } I_t^H \geq \left(\tilde{H} - H_t\right), I_t^F \geq 0\right\}
\end{aligned} \tag{5}$$

$$TR_{21}(t) = \left\{H_t < \tilde{H}, A_t > 0 \text{ and } I_t^H < \left(\tilde{H} - H_t\right), I_t^F = -A_t\right\}$$

$$TR_{22}(t) = \left\{H_t < \tilde{H}, A_t > 0 \text{ and } I_t^H < \left(\tilde{H} - H_t\right), I_t^F > -A_t\right\}$$

$$TR_{23}(t) = \left\{H_t < \tilde{H}, A_t > 0 \text{ and } I_t^H \geq \left(\tilde{H} - H_t\right), I_t^F \geq -A_t\right\}$$

$TR_{31}(t) \equiv 0$[16],

$TR_{32}(t) \equiv 0$, and

$$TR_{33}(t) = \left\{H_t \geq \tilde{H}, A_t \geq 0 \text{ and } I_t^H \geq 0, I_t^F \geq -A_t\right\}.$$

4.2. Empirical Specification

Our empirical specification follows McFadden (1973) in deriving multinomial logit specification as a reduced form based on the household model described above. We assume that at any time period t the household maximizes its utility over the next five year horizon by setting optimal investment in land (I_t^F) and human capital (I_t^H) and the change in labor endowment (DL_t) and its allocation (L_t^F, L_t^H), given land (A_t), human capital stock (H_t) and total household labor endowment (L_t) at the beginning of period t. We then define the indirect utility function in a usual manner:

$$\max \sum_{s=t}^{T} \delta^s U\left(C_s, L_s^L\right) \equiv V(t, A_t, H_t, L_t, Z_t, p_t^F), \tag{6}$$

where period "T" means the date five years from period t in terms of calendar time. By denoting the set of state variables as a vector $\mathbf{X}_t^i$ and assuming that the indirect utility can be approximated by a linear relation, i. e.,

$$\mathbf{X}_t^i \equiv \{t^i, A_t^i, H_t^i, L_t^i, Z_t, p_t^F\}' \text{ and} \tag{7}$$

$$V_{t\,\Big|\,\text{class k at T}}^{i\,\Big|\,\text{class j at t}} \approx \mathbf{X}_t^{i\prime}\beta_{jk}, \tag{8}$$

, where "$V^{i}_{t\,|\,\text{class j at t}\,|\,\text{class k at T}}$" represents the level of the indirect utility of household i when the household move from class j in period t to class k in period T, we estimate the transition probability:

$$P^{i}_{jkt} = \frac{\exp\left(\mathbf{X}^{i}_{t}{}'\beta_{jk}\right)}{\sum_{h=1}^{M}\exp\left(\mathbf{X}^{i}_{t}{}'\beta_{jh}\right)}, \tag{9}$$

where P^{i}_{jkt} is the probability that household i moves from class j in period t to class k in period T, β_{jk} is the parameter vector to be estimated, and M is the total number of class categories (= 4).

4.3. The Uneven Data Interval

One complication in applying the usual multinomial logit specification to our data set is the uneven data interval; while the census was conducted in every (almost) five years between 1962 and 1981, there was a thirteen year interval between 1981 and 1994. Assuming that the class mobility processes follow a first-order Markov chain, we decompose the observed class mobility between 1981 and 1994 into three sequential transitions — between 1981 and 1985, between 1985 and 1989, and between 1989 and 1994.[17] Then the observed transition probability of a household i moving from class j in 1981 to class k in 1994, denoted by $P^{i}_{jk}(1981-94)$, can be written as:

$$P^{i}_{jk}(1981-94) = \sum_{l=1}^{4}\sum_{m=1}^{4} P^{i}_{jl}(1981-85)P^{i}_{lm}(1985-89)P^{i}_{mk}(1989-94), \tag{10}$$

where j, k, m, and l index social-class categories. Using equation (9) and (10), we obtain the log likelihood function for the entire data set as follows:

$$\ln L(\beta|\mathbf{X}) = \sum_{t=1962}^{1976}\sum_{i=1}^{N(t)}\sum_{k=1}^{4}\sum_{j=1}^{4}\left[y^{i}_{j}(t)y^{i}_{k}(T)\left\{\mathbf{X}^{i}_{t}{}'\beta_{jk} - \ln\left(\sum_{h=1}^{4}\exp(\mathbf{X}^{i}_{t}{}'\beta_{jh})\right)\right\}\right] +$$

$$\sum_{i=1}^{N(1981)}\sum_{j=1}^{4}\sum_{k=1}^{4}\left[y_j^i(1981)\,y_k^i(1994)\ln\sum_{m=1}^{4}\sum_{l=1}^{4}\left\{ \frac{\exp(\mathbf{X}_{1981}^i{}'\beta_{jl})}{\sum_{h=1}^{4}\exp(\mathbf{X}_{1981}^i{}'\beta_{jh})}\frac{\exp(\mathbf{X}_{1985}^i{}'\beta_{lm})}{\sum_{h=1}^{4}\exp(\mathbf{X}_{1985}^i{}'\beta_{lh})}\frac{\exp(\mathbf{X}_{1989}^i{}'\beta_{mk})}{\sum_{h=1}^{4}\exp(\mathbf{X}_{1989}^i{}'\beta_{mh})} \right\} \right] \tag{11}$$

where $y_j^i(t)$ is an index taking value one if household i belongs to class j in period t and zero otherwise, $y_j^i(T)$ is the same index for the period five years after period t, and N(t) is the total number of observations in period t.[18] The first term of the right hand side is the usual multinomial logit log likelihood, which applies to the observations between 1962 and 1981, and the second term is the modified likelihood function for the data period between 1981 and 1994. For each origin class j, the coefficient vector β_{jj} is normalized to be zero.

4.3. Explanatory Variables

Our explanatory variables consist of household characteristics and economic environments. Household characteristics include the age of the household head, its square and three types of household endowments —labor endowment (as measured by the total number of living children *regardless of their location of residence*); land (measured by the size of the land *cultivated* in hectares for Tenant Farmer households and the size of the land *owned* for Small-Owners); and human capital (as measured by the total years of schooling of the household head and his/her spouse plus the average years of schooling among children of age over 10). For the Small-Owner class, we also include a dummy variable for 'owner-tenant', which takes the value one if the household's cultivated land size is larger than the size of the owned land (by renting in additional lands). We interpret the owner-tenant dummy to capture an aspect of heterogeneity among farmers; being an owner-tenant indicates a strong commitment to (or preference for) farming as an occupation.[19] The variables representing economic environments include:[20] the

national GDP growth rate (annual average over the five year transition period); real wage rate (averaged over the five year transition period) –for Irregularly-Employed and Regularly-Employed Class; agricultural terms of trade[21] (average over the five year transition period)—for Tenant Farmer and Small Owner Class.[22]

In addition, a potential source of economic mobility is the change in the returns on endowments (e. g., Gunning, et. al. 2000). In the study village during our observation period, there were major changes during the 1980s, such as the drastic explosion of international migration opportunities as we saw earlier, which could potentially have major impacts on the prospects for household mobility. We thus test a hypothesis that the returns to household endowments (labor, land and human capital), as measured by their impact on the upward mobility probability, changed after the early 1980s by including interaction terms between these endowment variables and a dummy taking the value one for the observations on the transition between 1981 and 1994. Descriptive statistics of the covariates are shown in Table 7.

5. Estimation Results

5.1. Exit Paths from Poverty: Class Mobility from Irregularly-Employed and Tenant-Farmer Status

The first three columns in Table 8 report the estimated coefficients, with t-statistics in parentheses, on the determinants of the probability of household class mobility from the Irregularly-Employed to the other three classes (relative to the probability of remaining in the class of the Irregularly-Employed), and the first five rows in Table 9 show the estimated marginal impacts on transition probabilities of the statistically significant covariates. None of our explanatory variables turns out to be statistically significant in determining the transition probability of moving from the Irregularly-Employed to the Tenant Farmer class. This is not

surprising, however; based on our informal interviews with farmers in the village, it appears that a typical way for a landless laborer to become a tenant farmer or for a tenant farmer to expand his operating farm size is that, given the land scarce and labor abundant environment, a landowner selectively approaches his prospective tenants based on the reputation such as 'being hard working' or 'a good farmer.' Thus, the acquisition of the tenant status appears to be mainly dictated by the combination of such innate ability and personal connections which are observable, via reputation within the community, to landowners but unobservable to outside researchers.

The statistically significant determinants of the transition probability of moving from the Irregularly-Employed to the Small-Owner class, on the other hand, are the GDP growth rate and, after the early 1980s (but not before), the number of children; one percentage point increase in (or one standard deviation increase in) GDP growth rate is associated with a 10 (or 32) percentage point increase in the transition probability and having one (or one standard deviation) additional child raises the transition probability by 8.7 (or 21) percentage points.

In contrast, the significant determinants of the household mobility from the Irregularly-Employed toward the Regularly-Employed class are the human capital stock and the GDP growth rate. As expected, education is a key to obtaining the Regularly-Employed status; one additional year of (or one standard deviation increase in) schooling is associated with a 0.2 (or 1.3) percentage point increase in the transition probability during the 1960s and the 1970s. Furthermore, the marginal impact of the years of schooling on the transition probability increased fourfold after the 1980s compared to the 1960s and the 1970s. This appears to reflect the expansion in the international migration opportunities, which, as we saw earlier, is a main avenue toward the Regularly-Employed status during the period.

We thus find that higher macroeconomic growth facilitates upward mobility either through the agricultural route (via the Small-Owner status) or through the Regularly-Employed status in the non-agricultural sector. During the 1960s and 1970s, it appears, macroeconomic growth was a quantitatively more important determinant of the mobility from the Irregularly-Employed to the Regularly-Employed status than was the years of schooling; the marginal impact of a one standard deviation increase in GDP growth rate was more than five times the marginal impact of a one standard deviation increase in schooling. However, due to the massive increase in the 'returns to education' the relative importance of the marginal impacts of schooling and of GDP growth became much closer after the 1980s.

Coefficient estimates for the determinants of class mobility among Tenant farmers are found in the third through the sixth columns in Table 8, and the associated marginal impacts of the statistically significant covariates in the sixth through the eleventh rows in Table 9. While none of the observable (to the researcher) household characteristics was found to be a significant determinant of the household mobility from the Irregularly-Employed to the Tenant status, once a household obtains the Tenant-Farmer status, the key to maintaining that status (i. e., preventing itself from slipping down to the Irregularly-Employed status) is the farm size; the larger the size of the farm that a household cultivates the less likely is the household to move down to the Irregularly-Employed class—an additional 1 hectare of (or one standard deviation change in) cultivated land is associated with a 0.02 (0.01) percentage point decrease in the probability of such downward mobility. As we discussed earlier, however, this variable could be picking up the effects of unobserved innate ability of farmers.

As for upward mobility among Tenant-Farmers, the transition probability of moving from the Tenant to the Small-Owner class is significantly affected by the level of education,

agricultural terms of trade and GDP growth rates. Among the household characteristics, the level of the human capital stock seems to be a more important determinant of the upward mobility toward the Small-Owner status than the farm size, which is not a significant determinant. While schooling is a statistically significant determinant, however, its quantitative impact appears to be very small—an additional year of schooling (or one standard deviation increase in schooling) is associated with only a 0.003 (or 0.02) percentage point increase in the transition probability. In addition, higher agricultural terms of trade apparently provide an incentive for Tenant-Farmers to invest in agricultural land and to become Small-Owners; one standard deviation increase in the agricultural terms of trade is associated with a 0.3 percentage point increase in the transition probability. The significantly negative effect of higher GDP growth rates on the upward mobility toward the Small-Owner class, however, is puzzling. One possible explanation might be that when the GDP growth rate is high the *members of* Tenant-Farmer *households* may seek non-agricultural occupations (while maintaining their farms) rather than investing in agricultural land to become Small-Owners.

Among Tenant-Farmer households, one of the key factors for their upward mobility via the non-agricultural route toward the Regularly-Employed status is again the years of schooling; an additional year of schooling (or one standard deviation increase in the years of schooling) is associated with a one (or 5) percentage point increase in the transition probability. In addition, after the early 1980s (but not before), a larger household labor endowment (after controlling for the average schooling among children) tended to facilitate upward mobility through the non-agricultural sector. Again this likely reflects the rapid expansion of the international migration opportunities which could be better captured if a household has a larger number of household members to deploy overseas. Unlike in the case of Irregularly-Employed households, however,

the estimated coefficient on the GDP growth rate was not significantly different from zero.

While the exit paths from poverty could potentially take agricultural (toward the Small-Owner status) or non-agricultural (toward the Regularly-Employed status) route, we noted earlier that the pathways through the 'agricultural ladder' narrowed dramatically after the 1980s. In light of this observation, therefore, a search for exit paths from poverty should perhaps focus on the non-agricultural path. Crucial determinants for poor households to be able to take such a path are expanding economic opportunities (such as higher economic growth or overseas employment) combined with access to education.

5.2. Searching for the Determinants of a Stable Rural Middle Class: Small-Owners and the Regularly-Employed

We now turn to the determinants of class mobility among households belonging to the upper strata within the village class structure: i. e., the Small-Owner Class and the Regularly-Employed Class (as shown in the 7^{th} through 12^{th} columns in Table 8 and the 12^{th} through the last rows in Table 9). While the stability of the tenant farmer status is mainly determined by the farm size, the significant determinants of the downward mobility from the Small-Owner to the Irregularly-Employed status are the number of children, the human capital stock, the size of land ownership, and the dummy variable for the 'owner tenant' status reflecting a strong commitment to farming as an occupation. Among them, the impact of the number of children apparently increased after the early 1980s. While an additional child (or one standard deviation increase in the number of children) was associated with a 0.03 (or 0.09) percentage point *increase* in the transition probability toward the Irregularly-Employed status during the 1960s through the 1970s, the marginal impact of labor endowments increased further by more than threefold after the early 1980s. Thus, having a larger number of children appears to have opposite effects between the

lower and the upper strata within the village; higher fertility facilitates *upward* mobility among the lower social strata (as we saw earlier) but it facilitates *downward* mobility among Small-Owners. An additional year of (or one standard deviation increase in the years of) schooling is associated with a 0.02 (or 0.1) percentage point decrease in the (downward) transition probability. An additional hectare of (or one standard deviation increase in) land ownership is associated with a 0.16 (or 0.19) percentage point decrease in the downward transition probability, while being an owner tenant is associated with a 0.6 percentage point decrease in the transition probability. On the other hand, the key determinants of the downward mobility from the Small-Owner to the Tenant-Farmer status are the number of children (after the 1980s only) and the size of land ownership. An additional child (or one standard deviation increase in the number of children) is associated with a 0.02 (or 0.06) percentage point increase in the downward transition probability, while an additional hectare (or one standard deviation increase in the landholding size) is associated with a 0.17 (or 0.2) percentage point decrease in the downward transition probability.

Main determinants of the transition probability of moving from the Small-Owner class to the Regularly-Employed class throughout our observation period are the years of schooling and the 'owner-tenant' dummy. In addition, after the early 1980s, the impact of schooling increased, and the size of land ownership also emerged as a significant determinant of the mobility from the Small-Owner to the Regularly-Employed status. While an additional year of (or one standard deviation increase in) schooling was associated with a 0.1 (or 0.6) percentage point increase in the transition probability during the 1960s and the 1970s, such impact of schooling increased almost fourfold after the early 1980s. On the other hand, the marginal impact of the land size appears quite large; an additional hectare of land, after the 1980s, is associated with an 11

percentage point decrease in the transition probability. The size of landholding among Small-Owners may partly reflect the household's preference or commitment to farming and thus a larger landholding could indicate less willingness to exploit the expanding non-agricultural employment opportunities in general and the international migration opportunities in particular.

The class of Regularly-Employed households is the most stable class with the highest probability of staying in the same class (which can be seen from the high diagonal transition probabilities in the Transition Matrices in Table 4). Among the Regularly-Employed households, the human capital stock is the key determinant of not moving downward either to the Irregularly-Employed or to the Tenant-Farmer status. In the case of the downward mobility toward the Irregularly-Employed class, a higher wage rate in the skilled labor market is also associated with a lower likelihood of downward mobility. Significant determinants of the transition from the Regularly-Employed to the Small-Owner status, on the other hand, are the household labor endowment (only after the early 1980s), wage rates and the GNP growth rates. It appears that both higher wage rates and higher macroeconomic growth induces the Regularly-Employed households to invest in agricultural land. One conspicuous feature of the transition probabilities for the Regularly-Employed class, however, is that the marginal impacts of the covariates are very small in magnitude across all transition probabilities; the absolute values of the transition probabilities are not affected very much by a change in any of the covariates (the last six rows in Table 9).

5.3. Testing for Potential State Dependence

Our empirical specification assumes that the social class position of a household five years later is determined by the class position and other household characteristics at the initial year but is not affected by the history prior to the initial year. Such an assumption could be

violated if, for example, the probability of moving out of poverty is affected by the length of past 'spells' in poverty. We thus examine whether the transition probability of class mobility is potentially affected by state dependence by including lagged dummy variables taking the value one if the household belonged to the same social class five year prior to the 'initial year' (so we test the possibility that the household class position 10 years ago has any additional explanatory power, on and above its class position five years ago, of the current household class position).[23]

The results of our likelihood ratio tests are shown in Table 10. When the joint significance of the lagged-same class dummies is tested simultaneously across all origin classes the null hypothesis that the lagged-class dummies have no significant effect (across all classes) is rejected. When the significance of the lagged class dummies is tested for each origin class separately, however, then the null hypothesis of no state dependence is *not* rejected for the origin class of the Irregularly-Employed and Tenant, but it is rejected for the Small-Owner (at 5% level) and the Regularly-Employed (at less than 1% level) classes. When the significance of the state dependence is tested individually for each origin-destination class pair (as shown in the t-statistics in Table 11), then the lagged-same class dummy has significant (negative) effects for the transition probability of moving from the Regularly-Employed to the Small-Owner and to the Tenant classes. The negative coefficients on the dummy variables suggest that if the household belonged to the Regularly-Employed class five years prior to the initial year, then the household is less likely to move out of that class within the next five years after the initial year. Based on the series of test results taken together, therefore, our results on the significance of the state dependence are somewhat mixed, but, to the extent it exists, it is among the upper social strata (especially the Regularly-Employed) that the state dependence matters. But there is little indication of state dependence among the lower social strata once observable household

characteristics and economic environments are controlled.

6. Discussions

6.1. Comparison with the Existing Studies on LDC Poverty Dynamics

Our empirical results confirm the importance of the major determinants of (chronic) poverty dynamics that have typically been identified in past studies, such as schooling, access to land and other household assets, and changes in the returns to (rather than the accumulation of) endowments (e. g., human capital) (e. g., Gaiha and Deolaliker 1993, Jalan and Ravallion 2000, McCullock and Baulch 2000, Gunning, et al. 2000). It is reassuring to obtain broadly similar findings in terms of household-level determinants of poverty dynamics despite the use of quite different definitions of being 'chronically poor.'[24] One major contrast of our findings with previous findings, however, concerns the effects of the household size on poverty. Both static and dynamic analyses of poverty determinants have typically found that a larger household size is positively associated with the probability of being poor. In contrast, we find that a larger number of children (after controlling the average level of education) had a *positive* impact on the probability of *exiting* poverty, especially after the 1980s. In the Philippines, the population growth has remained relatively high in the recent few decades and the spread of family planning has been slow. Such a phenomenon has often been attributed to cultural or religious reasons (e. g., the Filipinos being dominantly Roman Catholic) given the typically-found negative associations between larger household size and household welfare. Instead, our results suggest that such behavior of the poor could in fact be economically rational as well.

Furthermore, the long observation period of our dataset has allowed us to address issues that had not been examined in the existing literature such as the effects of macroeconomic environments on poverty dynamics,[25] the relative importance between household characteristics

and economic environments in determining poverty exit, and the potential state dependence in poverty exit. Our findings suggest, in particular, that the relative importance among the determinants of poverty dynamics —and therefore the effective policy interventions for poverty reduction— could change over time.

6.2. Comparison with the U. S. Poverty Dynamics

While this paper has also identified a similar set of determinants of poverty dynamics as those found in the studies in the United States such as schooling, demographic composition of the household, and macroeconomic growth (e. g., Hanratty and Blank 1992, Sawhill 1988, Stevens 1995), there are some marked differences in the determinants of poverty exits between our findings and those from the United States. Among the more obvious differences are the major role of agricultural land played in the rural Philippines and the importance of race and the government transfer in explaining poverty dynamics in the United States. Furthermore, while female headship is among the major determinants of the U. S. poverty dynamics female headship in the rural Philippines does not seem to be an important explanatory variable of poverty dynamics.[26] The relationship between household demographics and poverty dynamics appears to be one of the areas that require closer scrutiny in country (or region within a country) specific contexts.

In addition, another major contrast is our finding that there is little evidence of potential state dependence in poverty dynamics after controlling for the household characteristics and economic environments. The U. S. studies tend to find the persistence of poverty status being significantly correlated with past spells in poverty (e. g., Bane and Ellwood 1988, Stevens 1995). While a portion of the poor in the United States appears to constitute a social 'underclass' whose poverty status may be self-perpetuating, the poor countries are (or, at least the village under study

is) sufficiently dynamic so that persistent poverty due to state dependence (or due to unobserved heterogeneity) may not be as serious as in the United States. In other words, policy interventions addressing the observed determinants (especially access to education and economic growth) could well go a long way in pulling the poor out of poverty in developing countries.

7. Conclusions

We find that the size of initial endowments (labor, land and human capital) is a significant determinant of economic mobility, as predicted by the theoretical models of household asset accumulation with a credit market failure. Furthermore, we find evidence that the returns to the household endowments increased significantly in some particular contexts after the early 1980s when opportunities for international migration from the village expanded substantially. For example, the returns to human capital (for the Irregularly-Employed) and labor endowments (for Tenants) in acquiring the Regularly-Employed status increased significantly. Since a parallel increase in the returns to land is not observed, the relative importance for upward mobility of the human capital among the household endowments increased relative to that of land after the early 1980s. In addition, having a larger number of children had *positive* impacts on *upward* mobility, especially after the early 1980s, among the lower social strata, but had positive impacts on *downward* mobility among Small-Owners. Thus a larger family size seems to help the poor but to hurt the middle class.

There is some evidence that higher agricultural terms of trade help accumulation in the agricultural sector. In light of our observation of the rapid narrowing of the 'agricultural ladder,' however, the effectiveness of this route as a major pathway from poverty might be questioned. The key to the pathways out of rural poverty through the non-agricultural path is the combination of human capital investment and rapidly expanding economic opportunities as reflected in higher

economic growth. While in the 1960s and the 1970s economic growth was a quantitatively more important determinant than the human capital investment, the substantial increase in the returns to schooling after the early 1980s has made both factors more or less equally important for poverty exit paths. Finally, unlike the findings from the U.S. data, we do not find evidence that 'poverty spells' significantly affect the probability of poverty exit.

What implications can we draw in designing policies to facilitate exits from poverty in the rural Philippines? First, we should (once again) note that the role of the 'agricultural ladder' as a pathway out of poverty diminished dramatically after the 1980s; thus, agricultural development and land reform *alone*, for example, would perhaps not be able to lift the mass of the rural poor out of poverty. Pulling the mass out of rural poverty through the non-agricultural path requires investment in human capital and higher economic growth. We find that international migration also played a major role in pulling the landless poor into a higher economic status for those who could take advantage of the opportunities with human capital endowments. Secondly, we find evidence that returns to labor endowments also increased among the lower social strata (but not among the upper strata within the village). A possibly disturbing implication is that policy efforts at promoting family planning among the poor could be frustrated (and have been frustrated indeed in the Philippines) due to such an economic incentive. Finally as a somewhat optimistic note, the lack of state dependence in poverty dynamics could suggest that, in contrast with the poverty in the United States, policy interventions affecting the observed determinants may well go a long way in pulling the rural poor out of poverty in the rural Philippines.

APPENDIX: Potential Sampling Biases Due To Out-Migration

As noted in Section 3, one limitation of our dataset is the fact that the households who

emigrated in their entirety were not followed, potentially leading to biased inferences about poverty dynamics. In order to address this issue, albeit partially, we made some attempts to check the robustness of our results. In one set of exercises we make some additional assumptions about either upward or downward mobility among emigrating households at the time of their migration and re-estimate the determinants of transition probabilities to see if qualitative conclusions are affected. In the second exercise we add 'emigration' as the 5th destination state in our transition probability estimation (added to the four social class categories) and check if the inferences about the determinants of class mobility dynamics *within the village* are affected.

Since relatively higher proportions of households emigrate among the Regularly-Employed and the Irregularly-Employed classes than among the other two classes, we re-estimated the logit transition probabilities with additional assumptions about the welfare changes for the emigrants originating from the Regularly-Employed and the Irregularly-Employed classes. Among the Regularly-Employed, it appears more likely that the welfare level of emigrating households would be at least as high at the destination (possibly in urban areas) as before migration (otherwise they would not choose to migrate). Thus, we made an additional assumption that all the out-migrating households from the Regularly-Employed class belong to the Regularly-Employed class after migration. For the Irregularly-Employed households, on the other hand, the welfare level of emigrating households could be either higher (possibly through urban migration with better jobs) or about the same (possibly rural-rural migration ending up with the same Irregularly-Employed status in the new location) after migration, and it is difficult to predict *a priori* which pattern would dominate. We thus tried two opposite cases with extreme assumptions: one assuming that all the emigrating Irregularly-Employed households move toward the Regularly-Employed status in the destination location, and the other assuming that all the emigrating Irregularly-Employed households remain Irregularly-Employed in the destination.

While the majority of our qualitative results (i. e., sign and statistical significance) regarding the determinants of mobility are largely robust, there are a few that may be somewhat sensitive to potential sampling bias. In particular, assuming that emigration of a Regularly-Employed household does not involve any downward mobility and that all emigrating Irregularly-Employed households remain Irregularly-Employed in the destination location, the observed increases after the 1980s in the marginal impact of education on movements from the

Irregularly-Employed to the Regularly-Employed status and of the number of children on movements from the Irregularly-Employed to the Regularly-Employed are still positive but not statistically significant.[27] Under the (rather unlikely) assumption that *all* the out-migrating Irregularly-Employed households obtain the Regularly-Employed status in the destination location (and that emigration of a Regularly-Employed household does not involve any downward mobility), on the other hand, both higher GDP growth rates and the years of schooling before the 1980s become insignificant determinants of the mobility from the Irregularly-Employed toward the Regularly-Employed status.[28]

In our second approach to checking the robustness of our findings against potential sampling biases, we examine whether qualitative findings are affected when 'emigration' is explicitly included as the 5th choice alternative (in addition to the four social-class destinations). We re-estimate our model as a 5 state-multinomial logit, and compare the coefficients between the model with and the one without the emigration option. The qualitative results are mostly unaffected by the addition of this 5th state (except that the number of children now has negative and significant effects on the transition from the Irregularly-Employed to the Regularly-Employed status). In addition, the robustness of *quantitative* results can be tested formally by applying Hausman and McFadden's (1984) test for the independence from irrelevant alternatives (IIA) property. If IIA assumption is not rejected by the data, then the inclusion or exclusion of the additional destination state of 'emigration' would not affect the estimation results focusing on the class transitions within the village. Our test results reject the IIA assumption indicating that while our qualitative findings are largely robust the quantitative results may be sensitive to the addition of the 5th state.

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Notes

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1. See Baulch and Hoddinott (2000) and Helme (forthcoming) for survey of recent literature.

2. Eswaran and Kotwal (1986) is a classic contribution in this theme in the static framework and more recent theoretical models, such as Banerjee and Newman (1993), Galor and Zeira (1993) and Ljungqvist (1993), further extend this theme in dynamic model frameworks. These dynamic models generally show that the combination of credit market imperfections and some kind of indivisibility of one of the investment activities (e. g., human capital investment) leads to various patterns of social stratification as steady-state equilibria that are dependent on the patterns of initial distribution of wealth. Earlier, Loury (1981) showed that the existence of credit market imperfection alone did not necessarily generate long-run stratification patterns that depended on the initial distribution. Thus, both the credit market failure and indivisibility conditions are necessary to generate the kind of social stratification patterns discussed in these models (e. g., Bardhan and Udry 1999, p. 130)

3. Examples include: Adelman, et al. (1992), Dreze, Lanjouw and Stern (1992), Swaminathan (1991), etc.

4. Fuwa (1999) actually examines social class mobility rather than income or expenditure mobility and covers a 20 year period, of which this paper is a direct extension in numerous directions, including the number of years covered by the data. Also, Gaiha and Deolalikar (1992) use the ICRISAT data set covering a 10 year period.

[5.] Household censuses between 1962 through 1981 were collected by James N. Anderson, an anthropologist at University of California at Berkeley, and 1994 census was carried out by the author.

[6.] See, for example, Dreze, Lanjouw and Stern (1992), Jalan and Ravallion (2000) and Swaminathan (1991). Bauluch and Hoddinot (2000) includes a survey.

[7] Helme (forthcoming) provides additional rationales for the 5 year cut-off for defining chronic poverty.

[8.] During the period between 1962 and 1981 roughly 95%, and 83% in 1994, of the main income earners were the (self-reported) household heads in the survey.

[9.] Thus, those farm households who have land ownership of less than one third of a hectare are categorized as Tenant-Farmers in our classification.

[10.] The poverty line used here is based on a daily caloric requirement of 2000 Kcal plus a portion of non-food consumption with regional cost of living adjustment (for Pangasinan Province) as obtained in Balisacan (1999).

[11.] Based on Table 1, it might seem pointless to distinguish between the Irregularly-Employed and the Tenant class. We do maintain this distinction in our empirical analysis, however, since there are a few reasons, which are not reflected in the income figures, to believe that the difference between these two classes could still be significant, especially during the early period (the 1960s to the 1970s) of our data set; (a) the non-agricultural income opportunities for the Irregularly-Employed were likely to be more limited and thus there possibly could have been a significant income differential in the earlier periods (though we do not have data to verify), (b) as Anderson (1964) noted in the village, tenant farmers have potential access to informal insurance or credit transactions through the 'patron-client' type relationships with the landowners (although such relationships apparently weakened over time and had mostly disappeared by the mid-1990s), and (c) becoming a tenant farmer from the Irregularly-Employed status could be seen as a significant first step through the 'agricultural ladder' toward upward mobility.

[12.] A possible reason for the high mobility toward the Regularly-Employed status in the 1971-76 period is the construction boom in Manila during the early years of the Marcos martial law regime during the 1970s. Our census data indicate that a large number of relatively young tenant farmers as well as irregularly-employed workers were employed as contract workers in the

metropolitan Manila area in the early to mid 1970s. Many of them came back to the village and became (back to) tenant farmers after the boom in the late 1970s.

[13.] The only exception was the 24% of the Regularly-Employed who moved out during the 1966-1971 period.

[14.] Based on the author's informal interviews with village residents, one common reason for rural-rural migration in this village appears to be that, during their early periods of their married life, they live alternately close to the parents of both the household head and of his spouse who are usually from nearby villages.

[15.] For simplicity, unlike in our empirical analysis, distinction is not made here between the 'tenant farmer' and the 'small owner' classes.

[16.] Since human capital (unlike land) cannot generally be "liquidated," human capital investment (I_t^H) here is assumed to be non-negative. Consequently class transition from the "Regularly Employed" class to other classes cannot occur through household investments in our framework, which is denoted as "$\equiv 0$" for $TR_{31}(t)$ and $TR_{32}(t)$. These transitions can, and do, occur in reality through the choice of total labor endowment (such as retirement and household split) or through exogenous changes (such as loss of a job that the main income supporter of the household used to hold or death of household members). This model predicts, however, that the Regularly-Employed class is likely to be more stable than the other class categories.

[17.] Here we are additionally assuming that the difference between the assumed 5 year transition and actually applied data years (i. e., 4 years) in some portions -- i. e., 1962-66, 1981-85, 1985-89 -- is negligible.

[18.] While our specification does not require information on the class position of households in 1985 or 1989, it does require the $\mathbf{X}_t^i$ vectors for those years. Among the household characteristics included in the $\mathbf{X}_t^i$ vector, age of the household head and the number of children (abstracting from infant/child mortality) are obtained from the 1981 and 1994 data and land holding and average years of schooling among (current) household members are estimated as weighted average of the 1981 and 1994 data.

[19.] This interpretation is based on Anderson (1964), which contains a detailed discussion of the distinct characteristics of owner-tenants among the small owner farmers. The 'owner-tenants' in

our study village tend to be committed farmers who are relatively more "innovative and progressive."

[20.] Since these macroeconomic variables are common across all households, the only source of variability in these variables comes from their variation over time.

[21.] Measured by the ratio of rice price to the weighted average of the CPI and an index of farm expenditure. The index of farm expenditure was constructed as the weighted average of farm wage index and fertilizer price index. The weighting for the cost side was based on the data from Hayami *et al* (1978).

[22.] Theoretically, both wage rates and agricultural terms of trade could affect class mobility across all class categories. However since it would be difficult to identify the differential impacts of two price variables in our model due to the small number of data points (since the only source of variation in the macroeconomic variables are changes over time), only one of the two price variables that is likely (on *a priori* basis) to have a more direct connection to each origin class is included.

[23.] The correlation between the current and the past states could result either from the 'true state dependence' or from 'spurious state dependence' due to unobserved heterogeneity (e. g., Heckman 1981). This possible distinction, however, is not pursued further here since, as we see below, we find no evidence of potential state dependence among the poor.

[24.] Additional determinants of economic mobility/poverty dynamics that are found in the existing empirical literature but are not addressed here include: variability of asset holding (e. g., Jalan and Ravallion 2000), credit access (e. g., Wydick 1999) and access to social capital (e. g., Mauliccio, et al. 2000).

[25.] As an exception, Gaiha and Deolalikar (1993) include a time trend as an explanatory variable in their study of the 10 year ICRISAT panel which they interpret as the effects of macroeconomic environments.

[26.] At one point, we included the dummy variable indicating female headed households in our specification but the coefficient was not statistically significant in any of the class transition probabilities. Thus we excluded it from the final results reported in the previous section.

[27.] In addition, the effects of education on movements from the Small-Owner to the Regularly-Employed status and of the number of children on movements from the Small-Owner to the

Irregularly-Employed status are also no longer statistically significant. While detailed results are not reported here, they are available from the author upon request.

[28] There are additional variables that are no longer statistically significant under these assumptions: the effects of education on movements from the Regularly-Employed to the Tenant status, the effects of education on movements from the Small-Owner to the Regularly-Employed and the effects of the number of children on movements from the Small-Owner to the Irregularly-Employed.

Table 1. Mean Income and Poverty Incidence by Social-Class Categories 1994

	Irregularly employed	Tenant	Small owner	Regularly employed
average per capita income	P 5,934	P 5,230	P 8,620	P 20,575
Poverty incidence*	0.6643	0.7188	0.5588	0.1787

* poverty line: P 6,091.62. (source: household censuses collected by James N. Anderson and the author. See text.)

Table 2. Percentage Distribution of Households by Social Class and Number of International Migrants, 1962-1994

Year	1962	1966	1971	1976	1981	1994
1. Irregularly employed	24.4%	28.8%	28.6%	28.3%	33.1%	29.3%
2. Tenant	32.1%	28.8%	30.9%	27.1%	28.2%	20.1%
3. Small owner	29.0%	24.0%	17.6%	17.9%	14.1%	7.1%
4. Regularly employed	14.5%	18.5%	22.9%	26.7%	24.5%	43.6%
(% OFW* supported)*	(1.2%)	(1.1%)	(2.0%)	(3.3%)	(7.2%)	(17.4%)
Total	100%	100%	100%	100%	100%	100%
Total number of Households	262	271	301	329	347	478
Total number of Households with OFWs**	1	4	14	21	44	212

* :Percentage of the household mainly supported by international migrants or 'OFWs' (Overseas Filipino Workers)
** The number represents the number of heads, spouses or children of the households in the village (who did or did not make income contributions to these households) or others who gave financial support to the households residing in the village. (source: household censuses collected by James N. Anderson and the author. See text.)

Table 3. Original Households in 1962 by Social Class and Their Destination in 1994

Class in 1962	Destination in 1994					Class total in 1962
	Irregularly employed	Tenant	Small owner	Regularly employed	not present	
Irregularly employed	6	0	2	7	49	64
Tenant	12	13	1	13	45	84
Small owner	3	2	6	12	53	76
Regularly employed	0	0	1	9	28	38
Total	21	15	10	41	175	262

(source: household censuses collected by James N. Anderson and the author. See text.)

Table 4. Upward Mobility toward Regularly-Employed Status and International Migration between 1981-1994

	Origin class			Total moved into Regularly-employed class
	Irregularly-employed	Tenant	Small-owner	
Number of upwardly mobile households	25	24	8	57
Upwardly mobile households with international 'migration strategy'	14 (56%)	10 (42%)	6 (75%)	30 (53%)

(source: household censuses collected by James N. Anderson and the author. See text.)

Table 5. Transition Matrices

Transition Matrix 1962-1966

1962 \ 1966	irreg.employed	tenant farmer	small owner	reg.employed	hh dissolution	emigration
irreg.employed	**0.531**	0.109	0.047	0.016	0.141	0.156
tenant farmer	0.131	**0.571**	0.119	0.036	0.071	0.071
small owner	0.132	0.105	**0.513**	0.079	0.066	0.105
reg.employed	0.026	0.000	0.079	**0.605**	0.132	0.158
hh formation	0.317	0.268	0.195	0.220	NA	NA
immigration	0.391	0.174	0.087	0.348	NA	NA

Transition Matrix 1966-1971

1966 \ 1971	irreg.employed	tenant farmer	small owner	reg.employed	hh dissolution	emigration
irreg.employed	**0.564**	0.128	0.013	0.038	0.115	0.141
tenant farmer	0.115	**0.679**	0.090	0.013	0.038	0.064
small owner	0.092	0.077	**0.585**	0.108	0.062	0.077
reg.employed	0.040	0.020	0.040	**0.600**	0.060	0.240
hh formation	0.357	0.333	0.071	0.238	NA	NA
immigration	0.250	0.250	0.050	0.450	NA	NA

Transition Matrix 1971-1976

1966 \ 1971	irreg.employed	tenant farmer	small owner	reg.employed	hh dissolution	emigration
irreg.employed	**0.547**	0.081	0.081	0.128	0.093	0.070
tenant farmer	0.118	**0.570**	0.118	0.075	0.054	0.065
small owner	0.113	0.170	**0.604**	0.075	0.038	0.000
reg.employed	0.014	0.058	0.043	**0.725**	0.043	0.116
hh formation	0.429	0.321	0.143	0.107	NA	NA
immigration	0.421	0.184	0.053	0.342	NA	NA

Transition Matrix 1976-1981

1976 \ 1981	irreg.employed	tenant farmer	small owner	reg.employed	hh dissolution	emigration
irreg.employed	**0.531**	0.109	0.047	0.016	0.141	0.156
tenant farmer	0.131	**0.571**	0.119	0.036	0.071	0.071
small owner	0.132	0.105	**0.513**	0.079	0.066	0.105
reg.employed	0.026	0.000	0.079	**0.605**	0.132	0.158
hh formation	0.317	0.268	0.195	0.220	NA	NA
immigration	0.391	0.174	0.087	0.348	NA	NA

Transition Matrix 1981-1994

1981 \ 1994	irreg.employed	tenant farmer	small owner	reg.employed	hh dissolution	emigration
irreg.employed	**0.357**	0.035	0.009	0.217	0.217	0.165
tenant farmer	0.153	**0.408**	0.051	0.245	0.082	0.061
small owner	0.041	0.122	**0.245**	0.163	0.306	0.122
reg.employed	0.035	0.035	0.024	**0.588**	0.165	0.153
hh formation	0.322	0.217	0.066	0.395	NA	NA
immigration	0.353	0.118	0.047	0.482	NA	NA

(source: household censuses collected by James N. Anderson and the author. See text.)

Table 6. Upward Mobility Probabilities: Agricultural vs. Non-agricultural Routes

Period	Irregularly-Employed		Tenant-farmer	
	agriculture[1]	non-agriculture[2]	agriculture[3]	non-agriculture[4]
1962-66	0.156	0.016	0.119	0.036
1966-71	0.141	0.038	0.090	0.013
1971-76	0.162	0.128	0.118	0.075
1976-81	0.156	0.016	0.119	0.036
1981-94	0.044	0.217	0.051	0.245

[1] transition probability of moving from the Irregularly-Employed to the Tenant or the Small-Owner class.
[2] transition probability of moving from the Irregularly-Employed class to the Regularly-Employed class.
[3] transition probability of moving from the Tenant to the Small-Owner class.
[4] transition probability of moving from the Tenant to the Regularly-Employed class.
(source: household censuses collected by James N. Anderson and the author. See text.)

Table 7. Descriptive Statistics for Regression Covariates

Variable	mean	std.dev	min	Max
HH age	45.449	13.080	20	90
Number of children[1]	4.875	2.621	0	12
Education[2]	13.854	6.786	0	38
Land size, cultivated (hectare)	0.658	0.912	0	8
Land size, owned (hectare)	0.390	0.887	0	9
Ag. terms of trade[3]	10.693	1.400	8.610	12.766
Wage rate index, unskilled[4]	2.451	0.607	1.699	3.251
Wage rate index, skilled[4]	2.679	0.726	1.895	3.682
GDP growth rate[4]	4.063	3.077	-1.933	6.671
Number of observations	1199			

[1] total number of the children of the household head, including those living outside the household. [2] sum total years of schooling among the household head, his/her spouse and the average years of schooling among the children older than age 10. [3] ratio of rice price to the weighted average of CPI and an index of farm expenditure which is constructed as the weighted average of farm wage index and fertilizer price index (averaged over the 5 year transition period). [4] averaged over the 5 year transition period (1972=1.00)
(source: household censuses collected by James N. Anderson and the author. See text.)

Table 8. Estimated Coefficients (Maximum Likelihood Estimation)[+]

Number of observations: 1199 Log likelihood: -915.099 Pseudo-R squared: 0.1819

Independent Variables	origin class = Irregularly-Employed			origin class = Tenant			origin class = Small owner			origin class = Regularly-Employed		
	destination class =			destination class =			destination class =			destination class =		
	Regularly-Employed	Small-Owner	Tenant Farmer	Regularly-Employed	Small-Owner	Irregularly-Employed	Regularly-Employed	Tenant Farmer	Irregularly-Employed	Small-Owner	Tenant Farmer	Irregularly-Employed
Constant	-4.1166	-16.0459	3.2365	6.2851	-11.6208	2.7888	0.7021	-3.1010	5.0720	-24.4500	-4.8255	6.0099
	(-1.01)	(-3.25)	(1.08)	(1.35)	(-2.64)	(0.97)	(0.17)	(-0.73)	(1.04)	(-2.80)	(-0.68)	(0.71)
HH Age	-1.6749	0.8983	-1.4130	-5.3790**	-0.6112	-1.6175*	-0.8449	0.7744	-1.043	5.4831*	1.3062	2.2600
	(-1.19)	(0.43)	(-1.20)	(-2.78)	(-0.47)	(-1.69)	(–0.81)	(0.51)	(-0.91)	(1.73)	(0.37)	(0.72)
HH Age squared	0.1777	-0.1357	0.1296	0.5382**	0.1061	0.1935*	0.0814	-0.1156	0.0628	-0.5084*	-0.2090	-0.2739
	(1,20)	(-0.57)	(1.01)	(2.74)	(0.79)	(1.97)	(0.84)	(-0.74)	(0.58)	(-1.65)	(-0.47)	(-0.82)
No. Children	0.0289	0.0439	0.1255	0.2298	-0.0695	0.0418	0.0765	0.0231	0.1900*	-0.0829	0.2129	0.0867
	(0.26)	(0.24)	(0.98)	(1.26)	(-0.76)	(0.48)	(0.69)	(0.25)	(1.87)	(-0.43)	(0.67)	(0.61)
No. Children*80s	-0.7701	1.1892**	-1.3088	3.0027*	0.1305	0.4155	0.3909	0.4303*	0.6643*	0.5188*	0.3325	-3.0302
	(-1.35)	(2.01)	(-0.74)	(1.89)	(0.18)	(0.92)	(1.61)	(1.69)	(1.84)	(1.80)	(0.69)	(-0.26)
Education	0.0880*	0.1098	0.0101	0.1452*	0.1643**	-0.0307	0.0631*	0.0273	-0.0907*	-0.0846	-0.1446*	-0.0992**
	(1.65)	(1.60)	(0.22)	(1.95)	(3.39)	(-0.60)	(1.71)	(0.71)	(-1.85)	(-1.47)	(-1.81)	(-2.06)
Education*80s	0.3167**	-0.1662	0.0088	-0.6860	-0.3378	0.1250	0.1673**	0.0295	-0.0767	0.1279	0.0309	-0.3184
	(2.19)	(-0.71)	(0.03)	(-1.12)	(-0.97)	(0.84)	(2.01)	(0.37)	(-0.41)	(1.52)	(0.17)	(-0.50)
Land size				-0.5993	0.3851	-0.7731**	-0.0170	-3.0226**	-0.9193**			
				(-1.00)	(1.39)	(-2.75)	(-0.10)	(-3.21)	(-2.22)			
Land size *80s				-10.2238	-3.5492	-9.9631	-6.5724**	-4.2297	-5.7847			
				(-1.08)	(-0.89)	(-1.54)	(-3.47)	(-1.40)	(-1.04)			
Owner Tenant							-2.0551**	0.4246	-2.6767**			
							(-3.48)	(0.79)	(-4.54)			
Ag. Term of Trade				-0.6802	1.8806**	0.1350	0.0187	0.0824	-0.3784			
				(-0.99)	(3.65)	(0.35)	(0.05)	(0.24)	(-0.76)			
Wage	-0.1255	0.8823	0.0733							1.1039*	-1.1313	-1.3020**
	(-0.21)	(0.87)	(0.20)							(1.87)	(-1.21)	(-2.35)
GDP Growth	0.8195**	1.4296**	-0.4183	1.5303	-2.3573**	-0.3576	-0.2753	0.1957	0.5586	1.1150**	0.7565	-1.4522
	(2.34)	(3.50)	(-1.32)	(1.45)	(-3.45)	(-0.63)	(-0.84)	(0.48)	(0.84)	(2.38)	(1.25)	(-1.57)

[+] t statistics in parentheses (standard errors obtained by BHHH method.); **: significant at 5% level *: significant at 10% level;
(source: household censuses collected by James N. Anderson and the author. See text.)

Table 9. Marginal Impacts on Transition Probability of Statistically Significant Covariates

Class Transition and statistically significant covariates:	Marginal impact on probability as measured by: dP/dx	dP/dx*std. deviation	Elasticity
From Irregularly-Employed to Small-Owner:			
Number of Children (after 80s)	0.0870	0.2131	4.9966
GDP growth rate	0.1003	0.3232	5.1724
From Irregularly-Employed to Regularly-Employed:			
Education	0.0024	0.0127	0.8822
Education (after 80s)	0.0099	0.0527	3.6745
GDP growth rate	0.0212	0.0682	2.6729
From Tenant-Farmer to Irregularly-Employed:			
Land size	-0.0002	-0.0001	-0.2350
From Tenant-Farmer to Small-Owner:			
Education	0.00003	0.0002	0.3506
Ag. terms of trade	0.00188	0.0027	20.4162
GDP growth rate	-0.00222	-0.0070	-8.9080
From Tenant-Farmer to Regularly-Employed:			
Number of children (after 80s)	0.2000	0.5345	1.1234
Education	0.0096	0.0513	0.1228
From Small-Owner to Irregularly-Employed:			
Number of children	0.0003	0.0009	0.9781
Number of children (after 80s)	0.0011	0.0030	3.4079
Education	-0.0002	-0.0010	-1.3785
Land size	-0.0016	-0.0019	-1.0818
Owner-tenant dummy	-0.0058		
From Small-Owner to Tenant-Farmer:			
Number of children (after 80s)	0.0002	0.0006	2.1932
Land size	-0.0017	-0.0021	-3.5662
From Small-Owner to Regularly-Employed:			
Education	0.0010	0.0064	0.9358
Education (after 80s)	0.0027	0.0169	2.4773
Land size (after 80s)	-0.1076	-0.1311	-7.6194
Owner-tenant dummy	-0.0390		
From Regularly-Employed to Irregularly-Employed:			
Education	-9.936D-13	-8.0957 D-12	1.8515
Wage rate	-1.3048 D-11	-8.7447 D-12	-3.2731
From Regularly-Employed to Tenant-Farmer:			
Education	-0.0001	-0.0009	-2.7008
From Regularly-Employed to Small-Owner:			
Number of children (after 80s)	9.8736 D-06	0.00003	2.3674
Wage rate	0.00002	0.00001	2.7795
GDP growth rate	0.00002	0.00007	4.3149

(source: household censuses collected by James N. Anderson and the author. See text.)

Table 10. Likelihood Ratio Test Results for State Dependence

1. State dependence tested simultaneously among all origin classes

H_0 (null hypothesis)	H_1	Chi-square test statistic (d.f.)	P-value
Lagged-same-class dummies has no effects (full model with no lagged-class dummy)	Unrestricted full model with lagged-same-class dummies across all classes	26.9010 (12)	0.008**

2. State dependence tested separately for each origin class

Origin class	H_0 (null hypothesis)	H_1	Chi-square test statistic (d.f.)	P-value
Regularly-Employed	Lagged-same-class dummies have no effects on a particular class origin.	Unrestricted full model with lagged-same-class dummies among all classes	12.8281 (3)	0.0050**
Small-Owner			7.6883 (3)	0.0529*
Tenant Farmer			0.8644 (3)	0.8340
Irregularly-Employed			4.5584 (3)	0.2071

**: significant at 5% level *: significant at 10% level

(source: household censuses collected by James N. Anderson and the author. See text.)

Table 11. Estimated Coefficients on the Lagged-Same Class Dummy in a Model with State Dependence+

Number of observations: 776 Log likelihood: -571.642 Pseudo-R squared: 0.2314

	destination class =			
Origin class	Irregularly- Employed	Tenant Farmer	Small- Owner	Regularly- Employed
Irregularly- Employed	—	-0.5768 (-0.99)	-2.0937 (-1.06)	-1.0828 (-1.21)
Tenant Farmer	-0.4282 (-0.71)	—	-0.3502 (-0.50)	-0.1022 (-0.12)
Small- Owner	-1.1956 (-1.38)	-0.5771 (-0.90)	—	1.0817 (1.31)
Regularly- Employed	-1.1188 (-1.09)	-1.9611 (-1.76)*	-1.7766 (-2.08) **	—

+Covariates included in addition to the lagged-same class dummies are identical to those included in Table 9. Coefficient estimates for those other covariates are not reported here but available upon request from the author.

++ t statistics in parentheses; **: significant at 5% level *: significant at 10% level; standard errors obtained by BHHH.

(source: household censuses collected by James N. Anderson and the author. See text.)