

RESEARCH ARTICLE

Examining Chronic and Transient Poverty using the Community-Based Monitoring System (CBMS) Data: The Case of the Municipality of Orion

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With poverty reduction as the government's primary goal, monitoring the poverty situation of households or individuals is deemed necessary. In the Philippines, several local government units (LGUs) have adopted the Community-Based Monitoring System (CBMS) as a local poverty monitoring tool. This study used the constructed CBMS panel data for the municipality of Orion in Bataan province covering the period 2006, 2009, and 2012 to identify chronic and transient poor households based on the duration of poverty. A comparison between chronic and transient poor households revealed differences in their characteristics. For instance, chronic poor were generally found to have bigger household size, higher dependency ratio, higher dependency on agriculture as a source of income, and worse housing conditions, and with household heads having lower educational attainment. The results can help local policymakers in identifying interventions that are appropriate for chronic and transient poor households. The method employed in this study may also be replicated in other LGUs in the Philippines, particularly those with more than one round of CBMS implementation.

Keywords: poverty, community-based monitoring system, chronic poverty, transient poverty

JEL Classifications: I31, I32

The government plays an important role in addressing poverty in the country. With poverty reduction as an ultimate goal, monitoring of the poverty situation of households or individuals is deemed necessary to determine if the country is achieving its goal. In the literature, poverty studies either focus on static poverty analysis or poverty dynamics. Static poverty analysis examines data from a cross-section of households or individuals

using a single time period. On the other hand, poverty dynamics, which deal with longitudinal data and track households or individuals over time, can provide richer information to policymakers. The use of panel datasets in poverty studies has one important advantage—it can address many of the methodological problems in the estimation as it allows control for time-invariant unobservable characteristics.

Despite the advantages of using panel data, it is not always the option chosen by many poverty studies as there are challenges involved. For instance, the collection or generation of panel data may be very complex and costly, especially if several revisits must be done on the same households over time. In practice, households are difficult to track if the likelihood of migrating or moving to another place is relatively high, and the probability of splitting is also high, which may affect the representativeness of the panel households. Related to this challenge is the attrition bias whereby there exists a possibility that the households not included in the panel may differ systematically from those who are retained in the panel dataset. This implies that the households in the panel datasets may no longer be representative of the original population. When necessary, estimations should account for the attrition bias (e.g., Fitzgerald et al., 1998; Beckett et al., 2008).

Poverty estimates are usually and more regularly monitored at the national level. In the Philippines, the most recent figures reported by the Philippine Statistics Authority (2019) revealed a decline in the proportion of families considered poor, from 17.9% in 2015 to 12.1% in 2018. These figures provide policymakers with information on the aggregate direction of change in the poverty incidence over time but do not necessarily track the same set of families during this period. Unless a panel data containing matched families is generated, the usual reporting cannot inform policymakers about the duration of poverty experienced by these families.

There are relatively few studies in the Philippines that examine the movements of households in and out of poverty. This is mainly due to the difficulty in obtaining or generating panel data that can be used to analyze such movements. In some poverty studies in the Philippines, the different waves of existing nationally-representative surveys (e.g., Family Income and Expenditures Survey [FIES], Annual Poverty Indicators Survey [APIS]) have been used to generate household panel datasets (e.g., Mina & Imai, 2016; Reyes et al., 2011). These generated panel datasets are then used to examine the changes in households' poverty status over time and hence, determine the duration of poverty among households. Meanwhile, at the local level, the poverty-related data are collected by several local government units (LGUs) in the Philippines through the Community-Based Monitoring System (CBMS). Although several LGUs have already

completed CBMS for at least two rounds, most LGUs simply report or utilize the aggregate poverty measures (e.g., at the barangay or municipal level). In fact, data from these LGUs have not been fully explored in examining the movements in and out of poverty among households.

Given the above, this study examines the changes in the individual households' poverty status using the CBMS household panel dataset of Orion in Bataan, which is generated by matching the same households over the three periods. As such, it presents a description of the extent of chronic and transient poverty in Orion and determines the characteristics of the different groups of households, depending on the patterns and duration of poverty. It demonstrates how other LGUs, particularly those with more than one round of CBMS implementation, can use their CBMS data in identifying chronic and transient poor, which will then help them design more appropriate programs and projects for these groups of households.

Data and Methods

This study uses the CBMS household datasets of the municipality of Orion in Bataan, covering the periods 2006, 2009, and 2012. CBMS is an "organized process of data collection, processing, validation and integration of data in local development processes" (Reyes et al., 2014). It is mainly used as a local poverty monitoring tool of several LGUs in the Philippines, capturing the different dimensions of poverty, including health, nutrition, housing, water and sanitation, basic education income, employment, and peace and order. The CBMS database generated for one particular period contains household and individual level information that can be used to identify the poor and possibly, the qualified beneficiaries of specific government programs and projects. Many LGUs have recognized the usefulness of CBMS and hence, implemented it for more than one round.

As of February 27, 2019, CBMS has been implemented in 78 provinces in the Philippines (33 of which are province-wide). This covers 1,091 municipalities and 111 cities with a total of 30,827 barangays (CBMS-Philippines, 2019). As of 2019, there are approximately 300 LGUs in the Philippines with more than one round of CBMS implementation. Although the cross-section CBMS datasets already provide LGUs some useful

information in identifying the poor and their characteristics, the panel data consisting of matched households can be even more useful in monitoring the poverty situation in their localities. Local government units, in general, have not optimally used their CBMS data in this way.

This study attempts to adopt the CBMS definition in matching the same household over time. However, I relaxed it a bit by dropping the condition that the household should be living in the “same dwelling unit” given the difficulty in matching and validating the addresses provided in the datasets. This is also justifiable because this will allow the dataset to capture the changes in the housing conditions in case a household moves to a different dwelling unit within the municipality. Therefore, a household can be included in the matched household as long as it is covered in the CBMS censuses conducted in Orion during the reference period. Given this, a household in the current time period is considered the same as the one in the previous time period if there is at least one common member (except household helper) in both periods, as adopted by Sobreviñas (2017).

Furthermore, specific rules are followed for split and merged households. For instance, when a household splits in the next period, the same household ID is assigned to the household by tracking the members in the following order: (1) head, (2) spouse, (3) son/daughter, (4) father/mother, (5) son-in-law/daughter-in-law, (6) grandson/granddaughter, and (7) other relatives. This means that if the household head is absent in split households, the spouse is the next person to track, followed by the other members in this order of priorities. In case both the head and the spouse are no longer present in the split households and the children produce split households, the eldest child will carry the same household ID. Meanwhile, for merged households, the same household ID previously assigned to the household of the current head is used. It makes sense to prioritize members who have strong familial links to the head of the household when defining the same household. Applying these rules to the CBMS datasets of Orion for the period 2006–2009–2012 produces a total of 4,299 households present in the three time periods. (Sobreviñas, 2017)

In generating the panel dataset, some of the important challenges encountered include the following:

1. Different household identification numbers (hcn) were used for some households, which are supposed to be the same over time based on the CBMS definition. Although LGUs are trained and encouraged in recent years to assign the same hcn as in the previous round to the same household during the data collection stage, there are instances when this method was not fully adopted by some LGUs during the actual implementation as in the case of Orion in the earlier periods. Therefore, this becomes a challenge when matching the same households since hcn cannot be used as one of the key variables in identifying the same household. To address this challenge, the information collected for individual members of the household were used to determine if there is at least one member of the household who is present in the three periods, following the definition of the same household.
2. Different versions of the CBMS Household Profile Questionnaire (CBMS-HPQ) are used for the three rounds of CBMS implementation. In particular, the CBMS-HPQs that were administered by LGU-Orion include CBMS-HPQ version 11-2004-11, version 06-2009-01, and version 01-2011-01, which were used in 2006, 2009, and 2012, respectively. This also implies that the encoded CBMS data for each period follow different structures.

After matching the same households over the three periods, tests were conducted to determine if there is attrition bias. Based on the first test following Fitzgerald et al. (1998), the null hypothesis of random attrition is rejected. In addition, the pooling test based on Beckett et al. (2008) revealed that the null hypothesis that attrition is random is also rejected. Given these results, attrition bias is accounted for in the estimations. This is done by using the inverse probability weights in all estimations, which is the ratio of the predicted probabilities from the unrestricted attrition to the predicted probabilities from the restricted attrition probit.

General Profile of Orion

The municipality of Orion is a good area to study the movements in and out of the poverty of individual households because this is one of the few LGUs with at least three rounds of CBMS data. Orion also implemented CBMS in regular three-year intervals, covering 2006, 2009, and 2012. Located in the province of Bataan in Central Luzon, the municipality of Orion is bounded by Manila Bay in the east, the municipality of Pilar in the north, the municipality of Limay in the south, and the municipality of Bagac in the west (Figure 1). Orion covers a total land area of 6,541 hectares and consists of 23 barangays (14 urban and nine rural barangays). About 79.4% of the land in Orion is classified as agricultural land, whereas only 0.2% is classified as commercial land (LGU-Orion, 2013). Although fishing is an important source of income for many, some residents also rely on their income from wholesale and retail trade, transportation, and storage industry. Other residents also take advantage of the employment opportunities in nearby municipalities (e.g., Limay, where several heavy industries are operating) and cities (e.g., City of Balanga, the provincial capital).

Empirical Results

This section discusses the empirical results based on the constructed CBMS panel dataset of Orion covering the period 2006, 2009, and 2012. The panel dataset is used to examine the poverty profile of the municipality of Orion, as well as to identify the factors that determine poverty.

Poverty Profile of Orion

Following the definition of the same household discussed earlier, the constructed panel of households in Orion consists of 4,299 households, which are considered the same for the three rounds of CBMS implementation (i.e., 2006, 2009, and 2012). Based on the aggregate measure, Orion exhibited a general improvement in the poverty situation over time, as reflected by the decline in the proportion of poor households over time. Figure 2 shows that although there are few barangays that recorded no improvement (or even became worse off compared to other barangays) during the period 2006–2012, there are more barangays that exhibited better conditions. The latter is reflected by the increase in the number of green-colored barangays in the map, which are mostly located in the town center or *población*. It is deemed that more economic opportunities are present in the town center, which may be linked to the improvement in the living conditions of households in nearby communities.

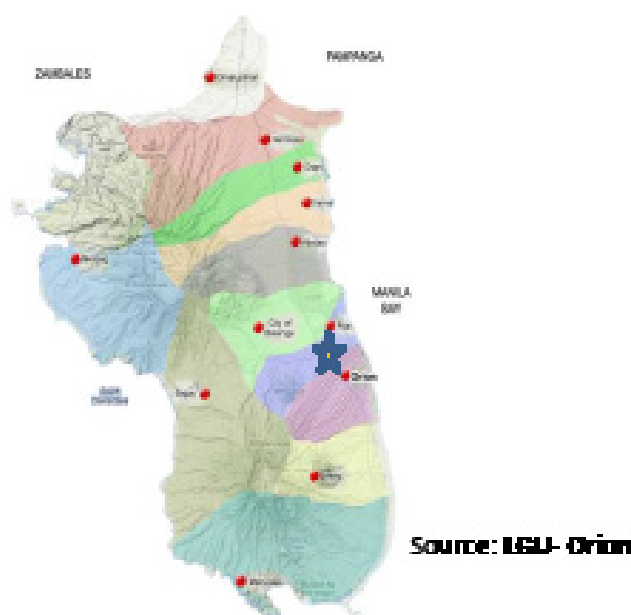


Figure 1
Location of the Municipality of Orion in Bataan

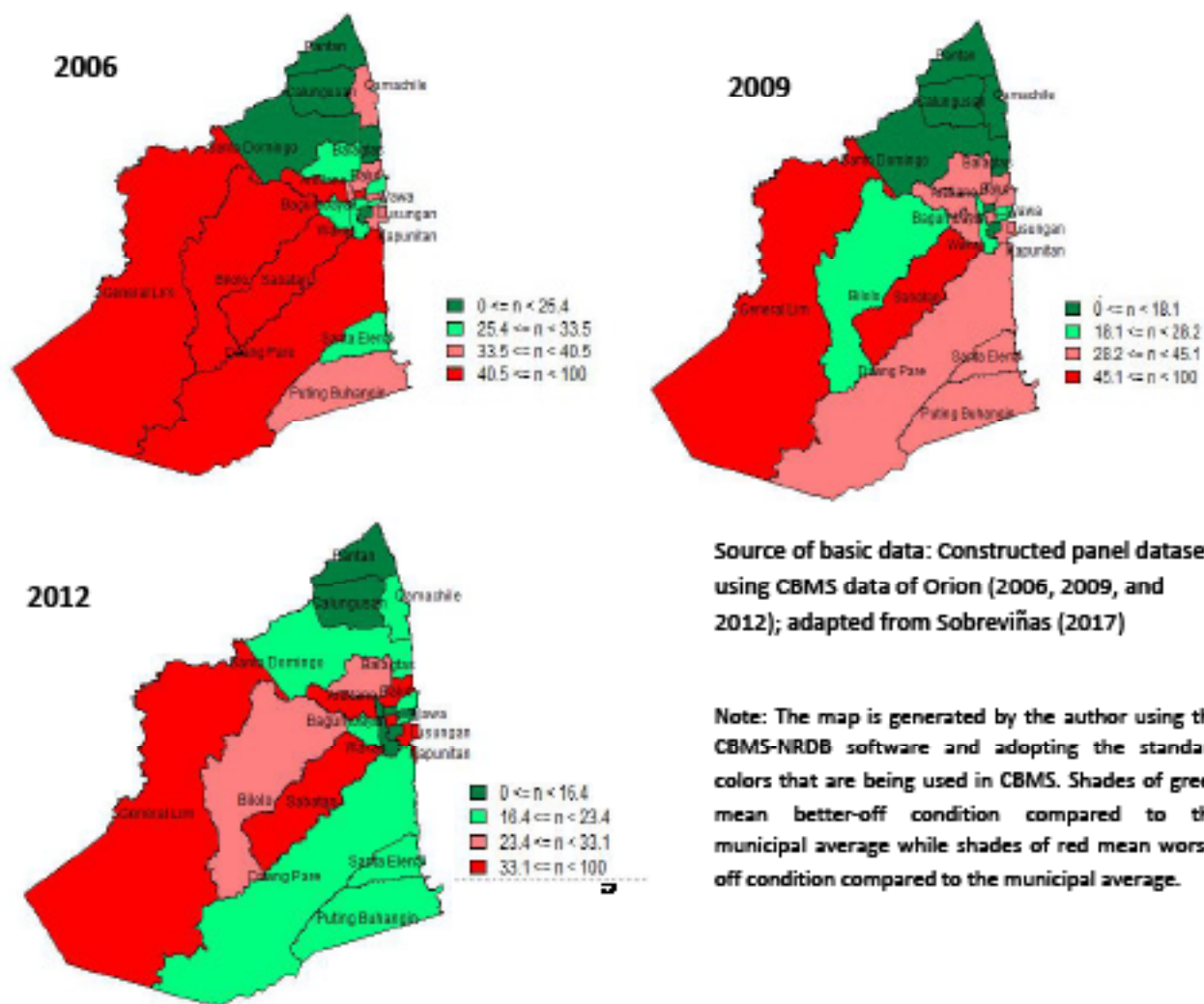


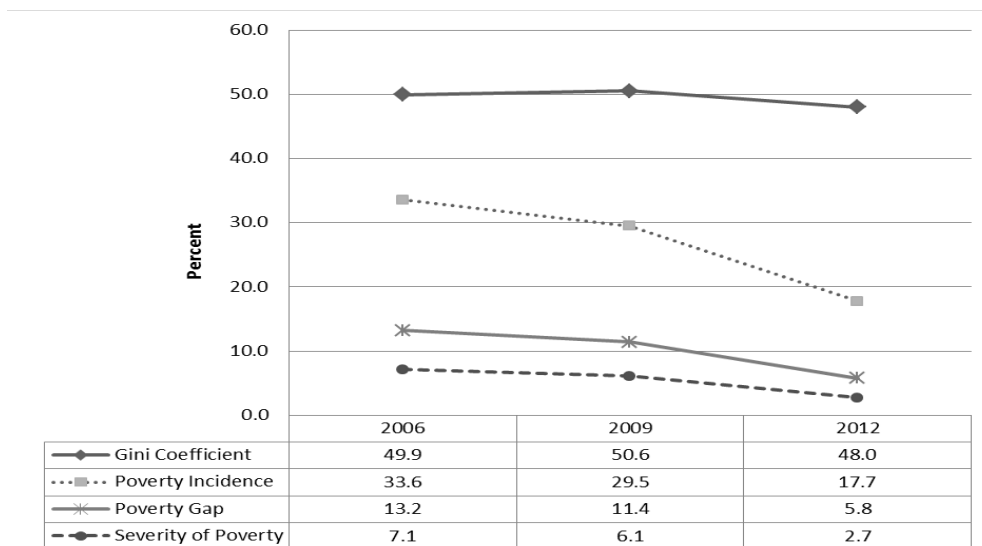
Figure 2
Proportion of Income Poor in Orion by Barangay: 2006, 2009, and 2012

Looking at the different measures of poverty, Orion exhibited a general improvement in the living conditions of its panel households, as evidenced by the decline in the poverty incidence, poverty gap, and poverty severity (Figure 3). In fact, poverty incidence decreased by 15.9 percentage points from 33.6% in 2006 to 17.7% in 2012. In terms of the poverty gap,¹ estimates also showed a decline from 13.2% in 2006 to 5.8% in 2012. The severity of poverty² also continued to decrease during the period covered in this study, reaching 2.7% in 2012 from 7.1% in 2006. However, income inequality, as measured by the Gini coefficient, increased slightly in 2009 before declining in 2012.

Looking at the other dimensions of poverty, interesting patterns can also be observed (Figure 4). In general, although income poverty generally

declined during the period, it appears that Orion has not completely addressed its problem concerning the health and education of children. In terms of health, the problem of malnourishment remains because 2.3% of the households in the municipality have children under 5 years old who were reported to be malnourished. Meanwhile, in terms of education, there was an increase in the number of children 6–16 years old who are not enrolled in school. Although there is an improvement in the access to safe drinking water and sanitary toilet facilities and housing conditions (based on housing materials used), there was an increase in the proportion of informal settlers.

Furthermore, despite the decline in the proportion of food poor households and in the unemployment rate, there was a slight increase in the proportion of



Note: Inverse probability weights are used to account for attrition based on Fitzgerald et al. (1998).

Source of basic data: Constructed panel dataset using CBMS data of Orion (2006, 2009, and 2012); Adapted from Sobreviñas (2017)

Figure 3
Poverty Incidence, Gap, Severity and Gini Coefficient in Orion: 2006, 2009, and 2012

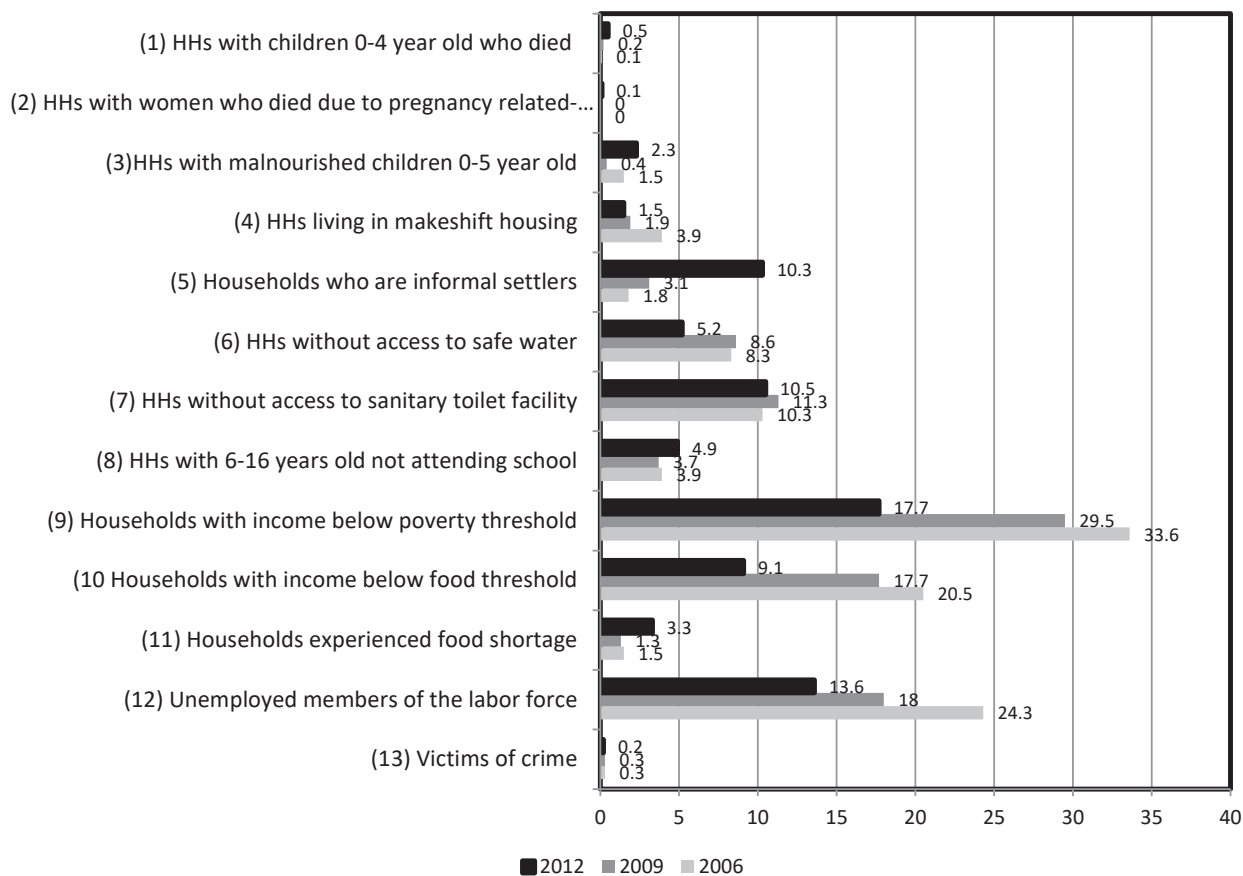


Figure 4
CBMS Core Poverty Indicators in Orion: 2006, 2009, and 2012

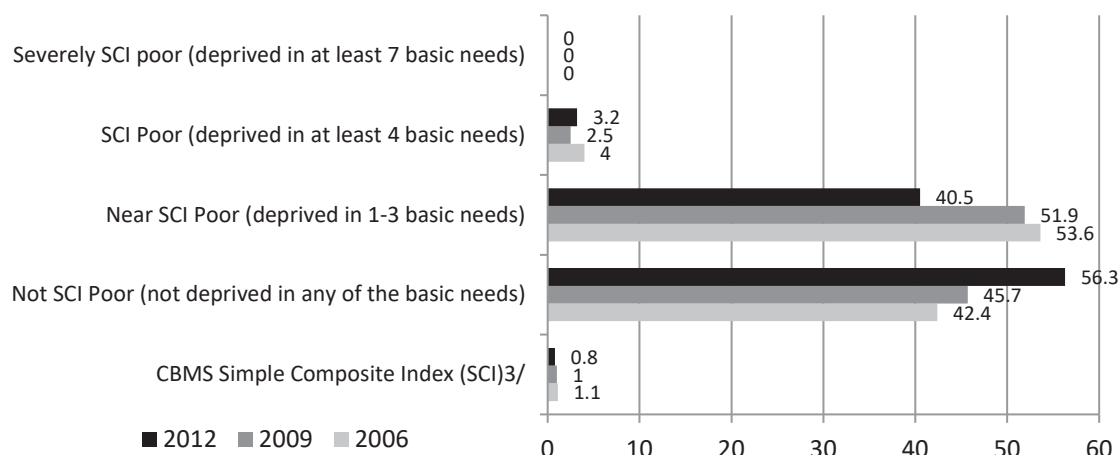


Figure 5
CBMS Simple Composite Indicator in Orion: 2006, 2009, and 2012

households that experienced food shortage during the last three months before the interview. These patterns may imply that despite the improvements in the income poverty situation of households in the municipality, there were some dimensions of poverty that have not been addressed yet.

In examining the CBMS simple composite indicator (SCI), which is an index used in CBMS to summarize the poverty situation of the households, an improvement in the overall poverty situation has been observed. In particular, based on the estimated CBMS SCI for Orion, the panel households in Orion generally experienced a decline in the number of unmet needs or unattained indicators over the period 2006–2012. In fact, the CBMS SCI is estimated at 1.1, 1.0, and 0.8 during the years, 2006, 2009, and 2012, respectively (Figure 5). Majority of the households are deprived of 1–3 basic needs (or Near SCI poor) in 2009, whereas the majority of the households are not deprived of any of the basic needs in 2012.

Extent of Chronic and Transient Poverty

In the literature, one of the operational definitions of chronic poverty is based on the duration of poverty and defines chronically poor households as those who are poor (i.e., with per capita income below the poverty threshold) at each, or at most, observation points (Baulch & Hoddinott, 2000). Meanwhile, transient poor households are considered poor at a given point in time but with per capita income above the poverty line in most observation points. Using the constructed

CBMS household panel datasets in Orion, the same definitions were adopted in this study when identifying transient and chronic poor households.

Figure 6 presents the movements in and out of poverty among households in Orion during the period 2006, 2009, and 2012. Given the definition adopted in this study, data showed that 23.5% of the panel households are chronic poor, that is, poor in all or most periods. About 5.9% are consistently poor (PPP) from 2006 to 2012. The other households, which are also classified as chronically poor, include the following: (a) those who were nonpoor in 2006 but poor in the succeeding periods (NPP=4.3%); (b) those who were nonpoor in 2009 but poor in 2006 and 2012 (PNP=6.2%); and (c) those who were nonpoor in 2012 but poor in 2006 and 2009 (PPN=7.1%). Meanwhile, 32.3% of the households are considered transient poor (i.e., nonpoor in most observation points). This includes the following: (a) those who were poor only in 2012 but nonpoor in 2006 and 2009 (NNP=7.9%); (b) those who were poor only in 2006 but nonpoor in the succeeding periods (PNN=13.9%); (c) those who were poor only in 2009 but nonpoor in the other periods (NPN=10.5%). Given these figures, most of the households in Orion experienced poverty in at least one period. However, it can be noted that there are more transient poor households (32.3%) than chronic poor households (23.5%). Meanwhile, there is also a significant proportion of the households which were never poor (NNN). They account for 44.2% of the panel households.



Note: The figures reflect the share of the population subgroup to the total number of households in the panel, which implies that the percentages for each year add up to 100. However, note that some figures may not add up to 100 due to rounding.

Source of basic data: CBMS Census of Orion, Bataan (2006, 2009, and 2012).

Figure 6

Movements In and Out of Poverty Among Households in Orion, Bataan 2006, 2009, and 2012

Characteristics of Chronic and Transient Poor Households

In 2012, majority of all households in the municipality resided in urban areas (60.8%; see Table 1). Based on the demographic characteristics of the different groups of households, it is very evident that the average household size among chronic poor households is consistently higher than that recorded for transient poor households throughout the entire period covered in this study. The household size may be one

of the important characteristics that is highly correlated with the poverty situation of individual households, especially when looking at income poverty. Holding total household income constant, bigger households tend to have lower income per capita than smaller households.

Furthermore, a relatively higher dependency ratio is estimated for the chronic poor households compared to transient poor households during the same period. This implies that each productive member of the

Table 1
Characteristics of Chronic and Transient Poor Households in Orion, Bataan

	Chronic poor		Transient poor		Never poor (NNN)		TOTAL		
	2006	2009	2012	2006	2009	2012	2006	2009	2012
No. of HHs		1,013		1,386		1,900		4,299	
Share to total HHs (%)		23.5		32.3		44.2		100.0	
HHs living in urban areas (%)	40.4	39.6	53.8	42.8	41.9	58.7	42.8	42.3	66.1
Household size	5.8	5.7	4.4	5.1	5.3	4.0	4.9	4.8	3.8
Dependency ratio	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
Proportion of male-headed HHs (%)	87.0	83.5	88.0	80.1	76.7	82.5	71.7	67.7	80.3
Proportion of HH heads who are at least high school graduate	33.0	34.2	33.6	45.8	47.6	43.4	55.8	55.2	50.3
Proportion of households with agriculture as a source of income	20.0	33.6	29.3	10.8	22.4	17.2	10.1	15.9	13.7
Living in makeshift housing	8.8	2.3	2.7	4.3	1.9	1.6	2.8	1.2	0.8
Informal Settlers	3.2	2.8	11.3	1.9	3.2	6.1	1.5	1.9	4.5
Without access to safe water	11.7	8.7	5.9	8.7	7.1	5.1	7.3	9.3	4.3
Without access to sanitary toilet facilities	20.6	21.9	22.2	10.2	12.2	11.6	4.8	5.4	5.9
HHs with unemployed members	25.1	19.3	18.1	27.1	21.3	15.7	25.2	18.6	12.0
Unemployment rate	22.3	15.9	14.5	22.9	16.8	11.8	19.0	15.5	9.7

Sources of basic data: CBMS Census of Orion, Bataan (2006, 2009, 2012)

chronic poor households experienced a heavier burden than those in transient poor households because they need to provide for more members in their respective households, including children and the older persons.

Interestingly, the proportion of male-headed households among the chronic poor is consistently higher compared to transient poor during the period covered by the study. Further examination of the data revealed that those who head the chronic poor households have lower educational attainment, in general. It is noted that the proportion of high school graduates among those who head the chronic poor household is lower than those who head transient poor households. In 2012, for instance, only 33.6% of the chronic poor households had heads who completed at least high school, whereas 43.4% of the transient households were headed by individuals who finished at least high school. The estimates for both chronic and transient poor are consistently lower compared to households who were never poor during the entire period.

As mentioned earlier, agriculture is one of the sources of income of households in Orion. In particular, some households were engaged in crop farming and gardening, livestock and poultry production, and fishing and forestry. In general, households that are dependent on agriculture as a source of income (particularly small scale agriculture) earn lower incomes than their counterparts in the non-agriculture sector. Data showed that the proportion of chronic poor households (i.e., between 20.0% to 33.6%), which rely on income from agriculture, is generally higher than that estimated for transient poor households (between 10.8% to 22.4%). This relative pattern is true for the entire period of the study. For instance, in 2012, about 29.3% of chronic poor households are dependent on the agriculture sector, which is 12.1 percentage points higher than the estimate for transient poor households during the same period.

Chronic poor and transient poor households generally have poorer living conditions compared with the never poor households, as initially expected. However, it appears that the chronic poor has poorer household conditions than transient poor households, as reflected in the higher proportion of households living in houses with poor quality. For instance, 2.7% of chronic poor in 2012 were living in makeshift housing, whereas only 1.6% of transient poor are reported to be in the same condition. Moreover, the proportion

of informal settlers is 5.2 percentage points higher for chronic poor than transient poor households. Moreover, a larger proportion of chronic poor households did not have access to safe water and sanitary toilet facilities when compared with transient poor households. In 2012, among chronic poor households, 5.9% did not have access to safe water and 22.2% did not have access to sanitary toilet facilities. On the other hand, the estimate for transient poor households for these indicators is at 5.1% and 11.6%, respectively. In terms of employment, the proportion of households with unemployed members and recorded unemployment rates are higher among transient poor households than among the chronic poor households in 2006 and 2009. It appears that while chronic poor households were able to work during the period, the income they received was not enough to allow them to meet their basic needs and hence, continue to remain poor. Meanwhile, in 2012, an opposite pattern is observed. In particular, the unemployment rate is 2.7 percentage points lower in transient poor households than in chronic poor households. Despite this change in the pattern in the latter period, what remains is the fact that chronic and transient poor households recorded higher unemployment rates compared to households that were never poor.

Effects of Natural Calamities and Employment Shocks Experienced by Households in 2009

Natural calamities, employment shocks, or health-related shocks experienced by households may push some of them to poverty, especially those immediately above the poverty line. For instance, natural calamities, such as strong typhoons and severe flooding, can damage properties and assets owned by these households. These shocks may affect the households' total income, and those who are vulnerable households may fall below the poverty threshold. For instance, the income of farming households may be affected when natural calamities damage their crops. Furthermore, households with members who suddenly lost his or her job may experience an immediate decline in their total income. Sickness of a household member, especially the productive member, may also lead to a reduction in the household's income, particularly if it prevents the member from going to work and earn for their family. Even the sickness of a child in the household may require time and care from an adult member, which, in some instances, diverts the adult member's time away

from work, thereby affecting their income, especially for long-term illnesses.

As the 2009 CBMS dataset of Orion provides information on whether households experienced natural calamities, unemployment, or health-related shocks, it is used to examine the possible immediate effects on the poverty situation of households. This study does not claim attribution but rather simply examines the relationship between the poverty status of households and being affected by these shocks. For the purpose of this study, a household is said to have been affected by natural calamities if it experienced during the last 12 months prior to the interview at least one of the calamities identified in the CBMS questionnaire, including typhoon, flood, drought, earthquake, volcanic eruption, and fire. Meanwhile, a household is said to have experienced an employment shock in this study when all its adult members were employed in 2006 but recorded having an unemployed adult member in 2009. The adult members considered are only those who are part of the labor force.

Based on the 2009 data, 6.1% of the households were affected by natural calamities, whereas 13.2% had an unemployed member in 2009 (Table 2). It is interesting to note that transient poor households recorded slightly higher estimates (compared to the chronic poor and never poor households), with 7.0% of them affected by natural calamities and 13.8% affected by the employment shock. It is also interesting to note that 18.4% of the households were affected by either shock, although less than 1% were affected by both shocks during the same period.

Further examination of the changes in the poverty status of affected households revealed some interesting observations. There were households that were

non-poor in 2006 but were reported to be poor in 2009. Although this study does not claim complete attribution, it is possible that the shocks experienced by these households pushed them to poverty. In particular, 17.6% of the households affected by calamities in 2009 became poor in 2009, and 19.2% of the households with an unemployed member in 2009 became poor in the same year (Table 3). Focusing on households that are dependent on agriculture income (including those households engaged in crop production, livestock and poultry production, and fishing), it is estimated that 27.0% of them became poor in 2009 when they experienced natural calamities during the period. Meanwhile, very few households experienced both shocks during the period, with 17.5% of them experiencing a change in their poverty status from being non-poor in 2006 to being poor in 2009.

In terms of health-related shocks, the CBMS data of Orion in 2009 revealed that 75.1% of the households had a member who got sick during the period (Table 4). The proportion is slightly higher among the transient poor households, which is estimated at 76.1%. It is worth noting that only around half of the households were found to have access to the PhilHealth program. This means when a member gets sick, many of the households cannot rely on the benefits of the PhilHealth program for treatment or hospitalization. This will be a bigger concern for chronic poor and even the transient poor households because it is more difficult for these groups of households to afford the increasing cost of any medical treatments. This also points to one important area for improvement in program targeting, as the government aims to achieve universal coverage for PhilHealth. In fact, the government is implementing the PhilHealth Sponsored program, which subsidizes

Table 2

Proportion of Chronic Poor and Transient Poor Households in Orion, Bataan Affected by Natural Calamities or Employment Shocks in 2009

	No. of HHs	% Affected by natural calamities (A)	% With an unemployed member (B)	% Affected by (A) OR (B)	% Affected by (A) AND (B)
Chronic poor	1,013	6.4	13.3	18.6	1.2
Transient poor	1,386	7.0	13.8	19.8	0.9
Never poor	1,900	5.2	12.7	17.2	0.8
ALL HOUSEHOLDS	4,299	6.1	13.2	18.4	0.9

Source of basic data: CBMS Census of Orion, Bataan (2006, 2009, 2012)

Table 3

Number and Proportion of Households in Orion, Bataan Affected by Natural Calamities or Employment Shocks in 2009 That Became Poor in 2009

	No. Of HHs	Proportion (%)
HHs affected by calamities which became poor	46	17.6
HHs dependent on agriculture income and affected by calamities which became poor in 2009	17	27.0
HHs with unemployed household member in 2009 which became poor	109	19.2
HHs affected by calamities <i>OR</i> with an unemployed member in 2009 which became poor	148	18.8
HHs affected by calamities <i>AND</i> with an unemployed member in 2009 which became poor	7	17.5

Note: Households that became poor refer to those who were non-poor in 2006 but became poor in 2009.; Source of basic data: CBMS Census of Orion, Bataan (2006, 2009, 2012)

Table 4

Proportion of Chronic Poor and Transient Poor Households in Orion With Members Who Got Sick and With Access to PhilHealth in 2009

	No. Of HHs	% HHs with member who got sick	% HHs with access to PhilHealth
Chronic poor	1,013	72.8	47.4
PPP	254	68.5	44.9
NPP	184	69.0	39.7
PNP	268	71.6	50.8
PPN	307	79.5	51.1
Transient poor	1,386	76.1	50.7
NNP	340	73.5	49.7
PNN	596	75.8	51.7
NPN	450	78.2	50.0
Never poor (NNN)	1,900	75.6	51.5
ALL HOUSEHOLDS	4,299	75.1	50.2

the premium contributions of indigents and other marginalized individuals or families.

Factors that Determine the Poverty Status of Households

To identify the factors that determine the income-based poverty status of households, this study adopted the model employed by Reyes et Al. (2011). In particular, a logistic panel regression model is estimated with the poverty status of households as the dependent variable. The logistic panel regression model is estimated as follows:

$$Y_{it} = \alpha_i + X_{it}\beta + \mu_{it}$$

where: $Y_{it} = \text{logit}(p_{it}) = \log [p_{it}/(1-p_{it})]$, p_{it} = probability of being poor of household i at time t ;

α_i is the individual effect, which is constant over time and specific to individual cross-section unit i ;

X_{it} is the vector of independent variables or characteristics of household i at time t ;

β is a vector of coefficients or effects of household characteristics on poverty status;

μ_{it} refers to the error term;

i denotes the cross-sectional units or subjects, 1,2,3,..., n ;

t denotes time.

Table 5*Summary Statistics for the Key Variables, Orion: 2006, 2009, and 2012*

Indicator	2006				2009				2012			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Income poor (poor=1; nonpoor=0)	0.331	0.471	0	1	0.278	0.448	0	1	0.243	0.429	0	1
Household head profile												
Sex (Male=1; Female=0)	0.780	0.414	0	1	0.743	0.437	0	1	0.812	0.391	0	1
Age (in years)	47.5	14.0	19	90	48.9	13.7	16	89	51.5	13.9	16	90
Educational attainment												
Preparatory educ. or no grade at all	0.019	0.138	0	1	0.013	0.113	0	1	0.020	0.140	0	1
Elementary undergraduate	0.238	0.426	0	1	0.199	0.399	0	1	0.197	0.397	0	1
Elementary graduate	0.116	0.320	0	1	0.147	0.354	0	1	0.154	0.361	0	1
High School undergraduate	0.155	0.362	0	1	0.164	0.370	0	1	0.146	0.354	0	1
High School graduate	0.312	0.464	0	1	0.299	0.458	0	1	0.320	0.466	0	1
College undergraduate	0.065	0.247	0	1	0.100	0.299	0	1	0.082	0.274	0	1
College graduate or postgraduate	0.094	0.292	0	1	0.079	0.269	0	1	0.081	0.273	0	1
Household characteristics												
Household size	5.189	2.066	1	19	5.184	2.094	1	16	4.023	2.032	1	16
Dependency ratio	0.736	0.724	0	7	0.736	0.742	0	6	0.688	0.735	0	6
OFW indicator	0.177	0.382	0	1	0.211	0.408	0	1	0.177	0.382	0	1
Agriculture as source of income	0.126	0.332	0	1	0.222	0.415	0	1	0.185	0.388	0	1
Housing characteristics												
Makeshift housing	0.047	0.211	0	1	0.017	0.127	0	1	0.015	0.121	0	1
Informal settler	0.020	0.140	0	1	0.025	0.157	0	1	0.066	0.248	0	1
Access to basic facilities												
Without access to safe water	0.087	0.282	0	1	0.084	0.278	0	1	0.049	0.217	0	1
Without access to sanitary toilet facilities	0.103	0.303	0	1	0.115	0.319	0	1	0.116	0.320	0	1
Location												
Living in urban area (urban=1; 0=rural)	0.422	0.494	0	1	0.415	0.493	0	1	0.608	0.488	0	1
Community (barangay) characteristics												
Employed persons in the agriculture	0.126	0.332	0	1	0.222	0.415	0	1	0.185	0.388	0	1
Average years of schooling among adults	9.161	2.599	0	21	9.318	2.520	0	21	8.826	2.685	0	18

Notes: The official poverty thresholds used in identifying the poor are as follows: a) for 2006: rural=P13,756; urban=P14,484; b) for 2009: rural=P17,339; urban= P18,258; c) for 2012: P19,023; urban=P20,107. The number of observations is 4,299 for each year. The dependency ratio is estimated as the ratio of those not typically not in the labor force (members aged 0-14 years old and those aged 65 years old and above) to those who are in their productive age (members aged 15-64 years old). Adult members refer to members who are at least 15 years old, which is the minimum age for an individual to be a part of the labor force based on the Labor Force Survey (LFS), either employed or unemployed.

Source: Author's estimation based on the constructed panel dataset using CBMS data of Orion (2006, 2009, and 2012)

The poverty status of households is derived by comparing their per capita income with the official poverty threshold for the province of Bataan during the reference period with urban-rural disaggregation. A household is considered poor if the per capita income is below the poverty threshold. The dependent variable is equal to 1 if the household is poor and 0 if nonpoor. Meanwhile, the independent variables include household socio-economic indicators that are available in the CBMS database. These include:

- (a) household head profile (sex, age, educational attainment, sector of employment);
- (b) household characteristics (household size, dependency ratio, OFW indicator, share of agriculture to total household income);
- (c) housing characteristics (makeshift housing, informal settlers);
- (d) access to basic amenities and social services (safe water, sanitary toilet facilities); and
- (e) location (urban/rural).

Table 5 shows the summary statistics for these key variables.

An examination of the profile of the household head revealed that majority of the households remained to be headed by males throughout the period covered by this study, although the highest proportion is recorded in 2012 (81.2%). The average age of the household heads is also highest in 2012 at 51.5 years. Around one-third of the household heads during the three periods were high school graduates, whereas around one-fifth were able to obtain only elementary education. There are only a few household heads who reached at least a college education. The average years of schooling among adult members of the population is at least eight during the period covered in this study. The highest estimate is recorded in 2009 at 9.3 years. With this figure, it appears that the average adult in the municipality has reached only secondary education.

A decline in average household size is also observed during the period. This decline may be due to the actual decrease in the number of children per couple. It is also possible that the original households split in the later period. The splitting may happen when the adult children of the original household got married and moved to another household. Furthermore, a slight decline in the dependency ratio is also observed

in 2012, which suggests that the burden for each productive member of a household decreased.

Interestingly, 17.7% of the households have an OFW member in 2006 and 2012, although a higher proportion is recorded in 2009 at 21.2%. This may be due to the splitting of some households, such that the OFW member of the original household moved to another household. In addition, it should be recalled that some countries were affected by the global financial and economic crisis in 2009–2010, which led some OFWs who are working in these countries to return to the Philippines, and the decline in the OFWs could possibly be reflected in the 2012 estimates.

In terms of sources of income, it appears that many households in Orion still depend on agriculture income. About 22.2% of households in 2009 reported agriculture as one of their income sources. This proportion is higher when compared to 2006 (12.6%) and 2012 (18.5%). About 12.6% of employed individuals in the municipality work in the agriculture sector in 2006. The figure increased in 2009 at 22.2% but declined in 2012 at 18.5%. It has been noted that during the period covered in this study, there were still households classified as informal settlers, living in makeshift housing, and without access to safe drinking water and sanitary toilet facilities.

With the income poverty status of households as the dependent variable (i.e., poor=1 and non-poor=0), fixed effects models were estimated. The adoption of the fixed effects model is supported by the results of the Hausman test, which confirms the rejection of the null and suggests that the fixed effects model is preferred over the random effects model. Given this, it is assumed that something within the household may affect or bias the predictor or outcome variables, which needs to be controlled.

Table 6 shows the estimation results for the different models using the key variables presented in Table 5. Based on Model 1, it can be noted that the square of the age of household head and his educational attainment are significant factors that explain the probability of being poor. In particular, there appears to have a nonlinear relationship between the likelihood of being poor and the age of household head. For every year increase in the age of household, the likelihood of being poor may increase, but it will start to decline at a certain point. Moreover, households with heads who are more educated (particularly elementary graduates, high school graduates, college undergraduates, college

Table 6
Fixed Effects Logit Models (Using Attrition Weights)

(Dependent variable: Income poverty status: 1=poor; 0=nonpoor)

Indicator	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Household head profile								
Sex (Male=1; Female=0)	-0.0002	0.0992	-0.0089	0.0997	0.0024	0.0992	-0.0153	0.0998
Age (in years)	0.0257	0.0167	0.0326	0.0170	0.0277	0.0168	0.0330	0.0171
Age (in years) - squared	-0.0004	0.0002	-0.0005	0.0002	-0.0004	0.0002	-0.0005	0.0002
Educational attainment (base category: preparatory educ. or no grade at all)								
Elementary undergraduate	-0.3524	0.2288	-0.3535	0.2280	-0.3324	0.2295	-0.3210	0.2289
Elementary graduate	-0.4845	0.2354	-0.4635	0.2348	-0.4646	0.2361	-0.4326	0.2356
High School undergraduate	-0.3088	0.2382	-0.2874	0.2374	-0.2930	0.2387	-0.2690	0.2382
High School graduate	-0.7888	0.2339	-0.7530	0.2330	-0.7531	0.2347	-0.7099	0.2340
College undergraduate	-0.9577	0.2625	-0.9052	0.2621	-0.9196	0.2634	-0.8619	0.2632
College graduate or postgraduate	-0.9703	0.2752	-0.9592	0.2746	-0.8979	0.2772	-0.8855	0.2767
Household characteristics								
Household size	0.2878	0.0189	0.2777	0.0206	0.2832	0.0190	0.2804	0.0207
Dependency ratio	0.4052	0.0540	0.4096	0.0543	0.4090	0.0543	0.4132	0.0545
OFW indicator	-2.4067	0.1470	-2.3982	0.1472	-2.3925	0.1472	-2.3871	0.1475
Agriculture as source of income	0.0489	0.1770	0.1221	0.0877	0.0061	0.0870	0.0714	0.0888

Indicator	Model 1			Model 2			Model 3			Model 4		
	Coefficient	Std. Error		Coefficient	Std. Error		Coefficient	Std. Error		Coefficient	Std. Error	
Housing characteristics												
Makeshift housing	0.1479	0.1770		0.1062	0.1781		0.1753	0.1779		0.1430	0.1793	
Informal settler	0.2744	**	0.1462	0.3239	**	0.1485	0.2765	*	0.1465	0.3064	**	0.1487
Access to basic facilities												
Without access to safe water	0.4467	***	0.1160	0.4297	***	0.1166	0.4198	***	0.1171	0.3952	***	0.1176
Without access to sanitary toilet facilities	0.5162	***	0.1084	0.5335	***	0.1091	0.4872	***	0.1088	0.5019	***	0.1096
Location												
Living in urban area (urban=1; 0=rural)	0.1993	**	0.0824	0.2238	***	0.0845	0.2467	***	0.0852	0.2397	***	0.0876
Community (barangay) characteristics												
Share of employed persons in the agriculture to total number of employed							0.0108		0.0069	0.0181	**	0.0074
Average years of schooling among adults in each barangay							-0.3538	**	0.1492	-0.2710	*	0.1509
Year dummies												
2009 dummy				-0.2437	***	0.0611				-0.2803	***	0.0631
2012 dummy				-0.2035	***	0.0702				-0.1511	**	0.0714
No. of observations				6,049			6,049			6,049		
LR Chi ²				857.29			857.08			876.99		
P-value				0.0000			0.0000			0.0000		

Notes: *** significant at 1% level; ** significant at 5% level; * significant at 10% level

Source: Author's estimation using the constructed CBMS panel data of Orion (2006, 2009 and 2012)

graduate, or postgraduate) tend to have less probability of being poor than those with no grade completed. At the same time, it appears that having an OFW member decreases the probability of being poor. This may be due mainly to the remittances sent by the OFW members to their households, which contribute to higher income. Meanwhile, bigger households and households with a higher dependency ratio are more likely to be poor. In terms of household characteristics, housing tenure status appears to be a significant factor in explaining the poverty situation of households as results show that informal settlers are more likely to be poor. At the same time, households without access to safe water, without access to sanitary toilet facilities, and living in urban areas are more likely to be poor. A test was conducted to determine if the coefficients for all the year dummies are jointly zero. Using the *testparm* command in Stata, results show rejection of the null hypothesis that the coefficients are jointly equal to zero. Given this result, time fixed effects are included in Model 2. The signs of the coefficients for each of the variables in Model 2 are the same as in Model 1. At the same time, the year dummies included in Model 2 are significant in explaining the probability of being poor, which implies that there were significant events that happened in 2009 and 2012 that affected the poverty status of households.

It is also acknowledged that some community-level characteristics can influence the poverty status of individual households. For instance, households in communities that are highly dependent on agriculture as a source of income may have a higher likelihood of being poor. This may be because persons employed in the agriculture sector have lower incomes than their counterparts in the non-agriculture sector, in general. The limited employment opportunities in a highly agriculture-dependent community/barangay may lead some members of the labor force to look for a job elsewhere. Some of them look for work in another barangay or nearby municipalities. In fact, some employment is available for the residents of Orion in nearby communities or nearby municipalities, including Limay (where several heavy industries are operating) and Balanga City (which is the capital of the province of Bataan).

Meanwhile, households living in communities where the population is more educated (as measured by the average years of schooling among adults) tend to have less likelihood of being poor. These patterns

are seen in Model 3. Including the community characteristics and the year dummies at the same time is reflected in Model 4, whereby these sets of variables are found to be significant in influencing the likelihood of being poor.

Summary and Conclusion

This study demonstrated how the CBMS datasets for different periods could be used to analyze poverty and identify chronic and transient poor. Although the cross-section CBMS datasets can provide useful information in estimating poverty, the panel data consisting of matched households can be very useful in understanding poverty dynamics. Using the generated panel dataset of Orion in Bataan, this study revealed some interesting patterns in terms of the poverty status of households over time. Chronic poor households are those who were considered poor in most periods. In this particular study, these are the households that are poor in at least two (of the three) periods covered. Meanwhile, transient poor households are those that are nonpoor in most observation points (or nonpoor in at least two of the three periods).

The panel CBMS data of Orion revealed that about 23.5% are chronic poor, whereas 32.3% are transient poor. Through the identification of chronic poor and transient poor households, local policymakers can identify more appropriate interventions that consider the differences in their needs. A comparison of the characteristics of these two groups of households revealed that chronic poor households generally have:

- (a) larger household size,
- (b) higher dependency ratio,
- (c) mostly male-headed households,
- (d) less-educated household heads,
- (e) more dependent on agriculture as a source of income,
- (f) larger proportion living in makeshift housing,
- (g) larger proportion of informal settlers,
- (h) larger proportion without access to safe water, and
- (i) larger proportion without access to sanitary toilet facilities.

Given these characteristics, it appears that chronic poor households will require interventions that will help them increase physical and human assets. Having a

large household size may not necessarily be a problem per se as long as the household can provide for the needs of the members. However, one of the reasons for the big household size among the chronic poor is the lack of access to information and services that will allow them to plan the number of children they will have.

The higher dependency ratio for chronic households is also evident, which confirms that more children/elderly need to be supported by each productive member of the household. However, as long as adult members of the households who are part of the labor force can find decent employment, having a large household size may not necessarily be a huge concern. The difficulty in providing for the family among the chronic poor households is also linked to the lower educational attainment of their household heads, in general. Less-educated individuals usually find it more difficult to get a job that will provide sufficient income to support their household. Although chronic poor households recorded a lower unemployment rate than transient poor households in 2006 and 2009, there was no evidence that their employment provided them income that is enough to support their basic needs. Chronic poor households may need improvement in their skills (through training and education), which will eventually allow them to find better employment opportunities and earn a much higher income. One interesting result from the model estimated in this study is the significance of the educational attainment of the household head in reducing the probability of being poor. In line with this, policies should focus on improving the educational level of poor households (especially the chronic poor).

Meanwhile, chronic poor households also generally have poor living conditions, particularly in terms of housing and access to facilities, such as safe water and sanitary toilet facilities. Some of the programs and interventions that are appropriate to this group of households to address these poor conditions include housing projects, construction of safe drinking water facilities and sanitary toilet facilities wherein beneficiary households will be directly involved in the planning, implementation, and maintenance to help ensure sustainability.

Meanwhile, transient poor households, or those who were non-poor in most observation points, include those who experienced economic or natural shocks, which pushed them to poverty at one particular point in time.

For instance, households affected by natural calamities (e.g., severe flooding, typhoons), including farmers whose crops are damaged, may experience poverty due to losses caused by these calamities. Without any crop insurance, it is very likely that affected farmers will experience poverty. Moreover, households with a member who suddenly lost his or her job may lead these households to poverty as well, especially if the households do not have other stable sources of income. Some of them may be able to recover without relying heavily on government intervention, but most of them would require some assistance. This group of households may need insurance that will protect them against various economic and natural shocks. They may need programs that will help them manage their risks and stabilize their income.

Notes

¹ This is a measure of the income shortfall, expressed as a proportion to the poverty threshold, of households with income below poverty, divided by the total number of households.

² This measures the total of the squared income shortfall, expressed as a proportion to the poverty threshold, of households with income below poverty threshold, divided by the total number of households.

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