Dynamics of Impoverishment Impact of Healthcare Payments in Nepal

An Analysis of Synthetic Panel Data

Shiva Raj Adhikari
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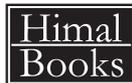
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ABSTRACT

Poverty dynamics discusses the length of time people experience poverty and explains the movement into and out of poverty, and the evidence on poverty dynamics is important for policy makers to design appropriate anti-poverty policies. The dynamics of poverty are also determined by the healthcare payments, and panel data is central to obtaining a better understanding of poverty dynamics. Due to the absence of panel data, the paper constructs a synthetic panel dataset using two rounds of cross sectional surveys in 2003/04 and 2010/11 in Nepal to assess the poverty dynamics. The results indicate that chronic poverty, without adjusting healthcare payments, is almost 21 per cent for 2003/04 and 2010/11, and chronic poverty increases by one per cent due to healthcare payments. Additionally, the movement of non-poor to poor is increased by healthcare payments, and the capacity of households to move from poor to non-poor is reduced by the healthcare payments. Chronic poverty exists in all regions, marginalised and ethnic groups, and Dalit (occupational caste) groups. The limitation of this approach is that the incidence of poverty estimated from a hybrid dataset may not be directly comparable with the estimation of poverty through a conventional approach. This dynamic approach captures the economic mobility of households and supports the design of appropriate anti-poverty policies that are required to address chronic or transitory poverty.

Key Words: Poverty Dynamics, Healthcare Payment, Transitory Poverty, Chronic Poverty, Nepal

Introduction

Poverty has dramatically declined in Nepal recently, going down from 42 per cent in 1996 to 31 per cent in 2004, and to 25 per cent in 2011 (Fig 1).[1] Many economists however question these dramatic changes in poverty levels. The intention of this paper is not to join this debate but to begin with the premise that poverty has reduced in the country and to argue for continued research and debate on poverty in order to keep poor people on the national agenda.

Figure 1: Trends in Incidence of Poverty (%)

	NLSS I	NLSS II	NLSS III
Nepal	41.8	30.9	25.2
Urban	21.6	9.6	15.5
Rural	43.3	34.6	24.5

Nepal Living Standard Surveys

Nepal   Urban   Rural
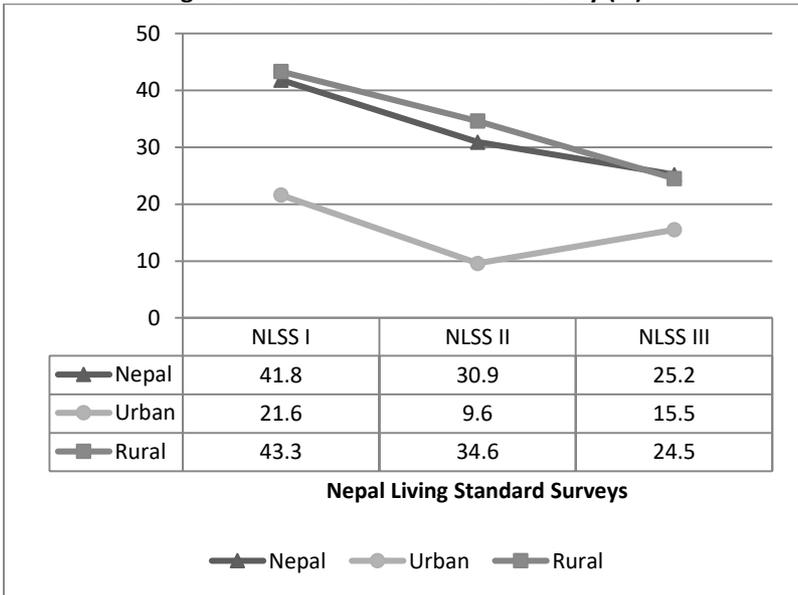
Source: CBS, 1996; 2004; and 2011

Poverty estimates provide critical data and information to facilitate the designing, monitoring, and implementing of appropriate evidence-based policies aimed at reducing poverty.[2] Monetary

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[1]   CBS 2005, 2011.
[2]   Haughton and Khandker 2009.

poverty refers to quantitative measures of poverty that utilise a poverty-line threshold and per capita consumption. Consumption-based national poverty line is used to measure poverty, and incidences of poverty depend on the poverty line. The poverty line plays the role of a threshold of the given level of consumption. Higher levels of the threshold determine higher incidences at the given per capita consumption. In order to ensure wide acceptance of a poverty line, it is important that the poverty line chosen resonates with social norms, and the common understanding of what represents the minimum. In addition, poverty that continues for a long period time is called chronic poverty, and people who move in and out of poverty are said to experience transitory poverty (also known as transient poverty). Generally, the reduction of poverty requires policy-makers, researchers and academics to develop a deeper understanding of poverty dynamics, and this paper was inspired by recent literature on poverty and specifically aims at making a complementary contribution to measuring poverty dynamics in Nepal.

The three measures of poverty – incidence of poverty, intensity of poverty, and severity of poverty – are frequently used to estimate the levels of poverty in a country. The Foster, Greer and Thorbecke (FGT) poverty index makes use of the official national absolute poverty line for per capita consumption, and is popular in measuring the poverty level for a country. The FGT poverty index can be written as:[3]

$$\text{Poverty index} = \frac{1}{N} \sum_{i=1}^{n} \left[\frac{P_L - Y_{Pi}}{P_L} \right]^{\lambda}$$

Where, N = the size of the population of the study setting, n = the number of people below the poverty line, P_L = the poverty line consumption (or income); Y_{Pi} = below poverty line consumption (or income). Values for λ = 0, 1, and 2, give a headcount index, poverty
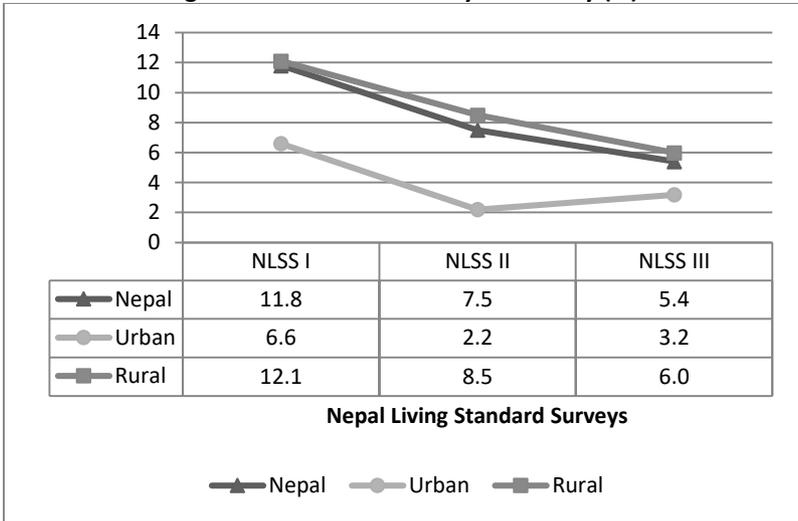
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[3]   Chaubey, P.K. 1995.

gap ratio and severity of poverty respectively. The index is sensitive to changes in consumption (or income) when $\lambda > 0$ and to the transfer to consumption (or income) when $\lambda > 1$. A large value of λ gives greater emphasis to the poorest of the poor. If λ is very large, it considers the least poor. Hence, as λ increases the value of severity, poverty decreases for a given distribution of consumption.

Incidences of poverty are the share of the population whose consumption is below the poverty line. It means that this is the portion of the population that cannot afford to buy basic goods and services. Intensity of poverty is estimated by the poverty gap ratio, which provides information regarding how far households are from the poverty line. The poverty gap indicates the average distance below the poverty line, as the non-poor have zero poverty gaps. Therefore, the measures of intensity and severity of poverty (squared of poverty gap) are important complements of the incidences of poverty. The sum of the poverty gaps reflects the minimum amount of consumption that needs to be transferred to bring all the poor up to the poverty line.

Poverty severity indicates not only the distance separating the poor from the poverty line (the poverty gap), but the inequality among the poor as well and is sensitive to the distribution of consumption among the poor. The squared of poverty gap considers the incidence, intensity, and the inequality dimensions of poverty.

The Nepal Living Standards Surveys (NLSS) I (1995/96), II (2003/2004) and III (2010/2011) are the most systematic surveys aimed at measuring poverty levels of the country, and demonstrate the remarkable progress in poverty reduction. Levels of poverty (incidence, intensity, and severity) have declined very sharply over a period of 15 years (Figures 1, 2, and 3). The survey methods, coverage, and some definitions of consumption have subsequently been improved in the different rounds of the surveys. Therefore, the levels of poverty may not be directly comparable, as the poverty trends provide indicative results.

Figure 2: Trends in Intensity of Poverty (%)

	NLSS I	NLSS II	NLSS III
▲ Nepal	11.8	7.5	5.4
● Urban	6.6	2.2	3.2
■ Rural	12.1	8.5	6.0

Nepal Living Standard Surveys

▲ Nepal   ● Urban   ■ Rural

Source: CBS, 1996; 2004; and 2011

Figure 3: Trends in Severity of Poverty (%)

	NLSS I	NLSS II	NLSS III
▲ Nepal	4.7	2.7	1.8
● Urban	2.7	0.7	1.0
■ Rural	4.8	3.1	2.0

Nepal Living Standard Surveys

▲ Nepal   ● Urban   ■ Rural
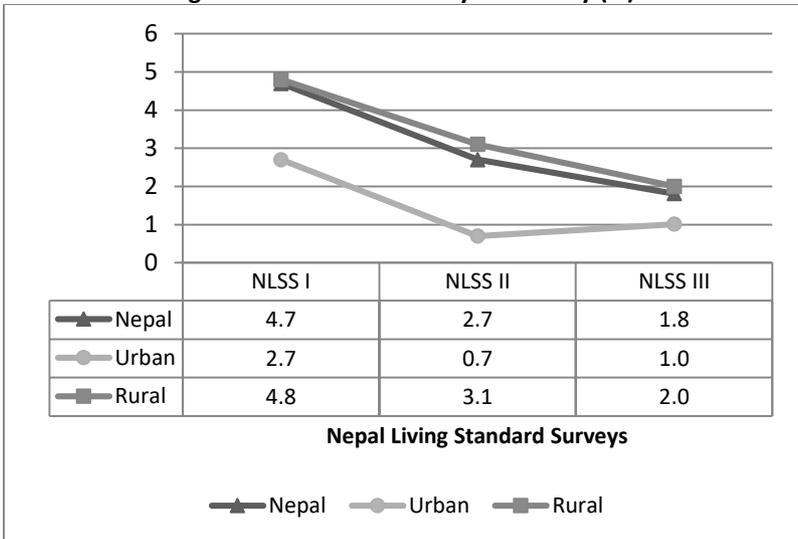
Source: CBS, 1996; 2004; and 2011

Figure 4 demonstrates the negative association between incidences of poverty and the level of education, which shows that incidences of poverty are skewed towards illiteracy or low levels of education. This indicates, as expected, that educated people are less likely to be poor.

Figure 4: Incidence of Poverty (%) and Levels of Education

	Illiterate	5 or less	6 to 7	8 to 10	11+
NLSS I	50.9	35.7	28.5	19.8	11.4
NLSS II	42.0	28.2	23.3	8.4	1.6
NLSS III	33.5	27.0	19.5	12.9	7.1

Levels of Education
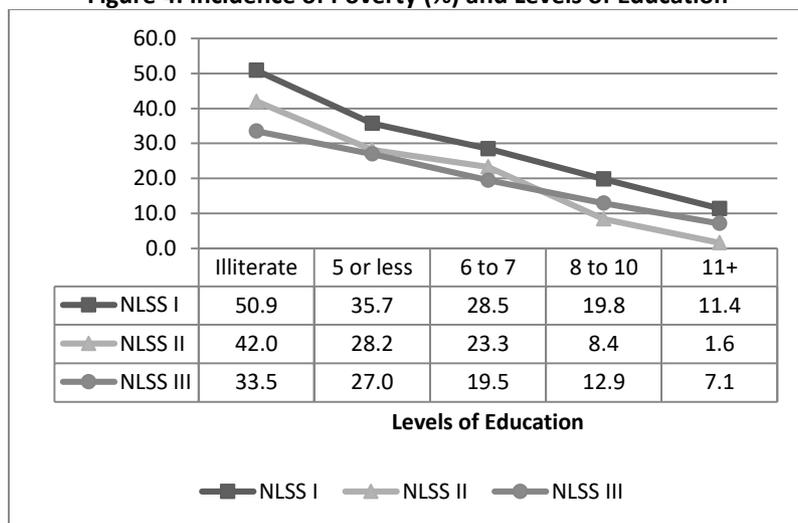
Source: CBS, 1996; 2004; and 2011

Figures 4 and 5 illustrate the associations between the incidences of poverty and socio-economic characteristics. The results suggest that the incidences of poverty increases with the increase in the number of children. There is also a positive association between the incidences of poverty and household size. However, a negative association between the incidences of poverty and the education level of the household head is found, as demonstrated by Figure 4. Overall, the evidence confirms that poverty is a demographic phenomenon.

Figure 5: Incidence of Poverty (%) and Household Size

	1	2	3	4	5	6	7 or more
NLSS I	7.7	14.5	22.9	28.1	35.9	43.8	49.7
NLSS II	7.2	11.0	11.7	19.3	24.9	33.5	41.4
NLSS III	3.3	7.4	7.5	12.8	21.1	32.4	37.6

Household size

NLSS I — NLSS II — NLSS III
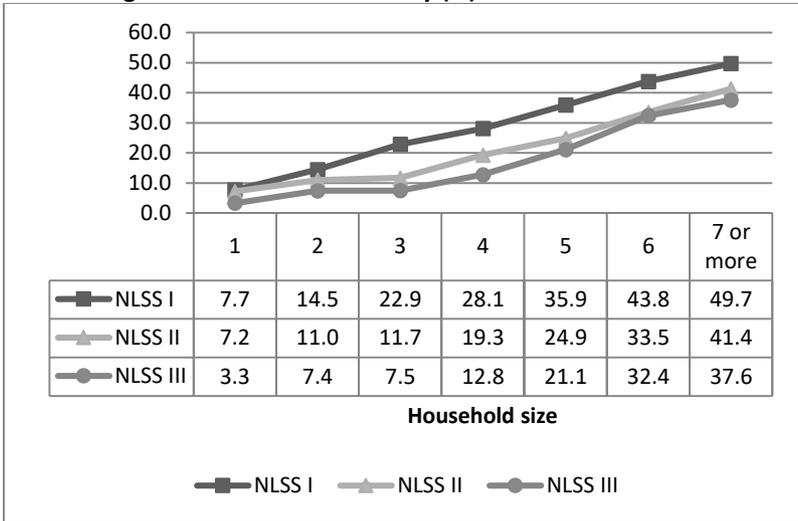
Source: CBS, 1996; 2004; and 2011

Figure 6: Incidence of Poverty (%) and Number of Children

	0	1	2	3 or more
NLSS I	23.5	39.9	49.4	56.9
NLSS II	13.7	29.3	41.6	54.0
NLSS III	12.3	25.2	41.5	46.6

Number of Children

NLSS I — NLSS II — NLSS III
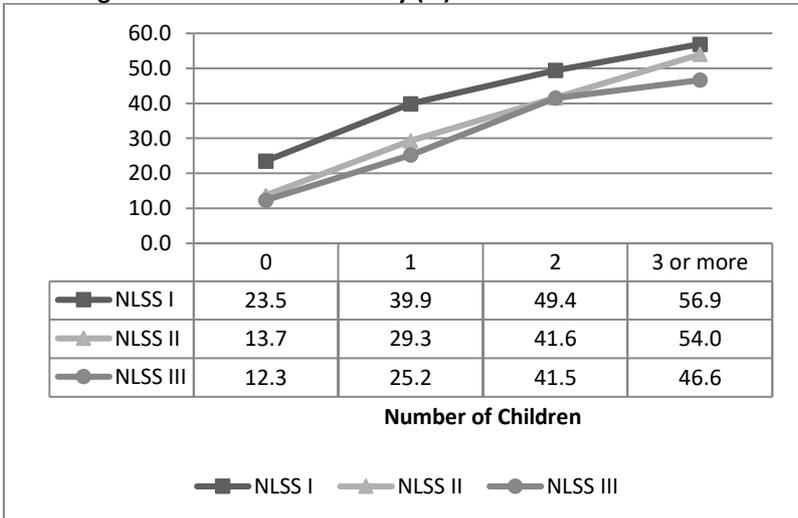
Source: CBS, 1996; 2004; and 2011

Analysis of the single cross-sectional household data provides static data on the nature of poverty. Therefore, static analysis has limited explanatory power regarding the persistence of poverty, and since the fluctuations of poverty trends do not explain the dynamics of poverty, comparative static methods are applied to analyse the trends of poverty.

According to Clark and Hume (2005), breadth, depth, and duration are key dimensions of poverty. As mentioned above, poverty depth shows the distance below the poverty line. Poverty breadth refers to the multidimensionality or coverage of poverty, and poverty duration indicates the length of time people experience poverty and explains the movements in and out of poverty.[4] This is what is known as poverty dynamics, and much research has been conducted into analysing the poverty trends in Nepal, but the estimation of poverty dynamics has received much less attention. The Government of Nepal has targeted the reduction of poverty from the current level of 21.6 to 6 per cent by 2030.[5] To estimate the poverty dynamics, a hybrid dataset was constructed from the cross-sectional data: NLSS II and III.

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[4] Jean-Yves, D., J.A. Araar & J. Giles. 2010. Chronic and transient poverty: Measurement and estimation, with evidence from China

[5] NPC 2015.

Healthcare Payments and Poverty Dynamics

Within a period of five years, from 2004 to 2009, there was a significant change in the health system in Nepal, and the public health expenditure increased significantly. Data drawn from World Health Organisation's Global Health Expenditure Database (2015), suggested that the government's health expenditure translated to only 2.2 per cent of Gross Domestic Product (GDP), and the total health expenditure accounted for 5.5 per cent of the country's GDP. Public allocations to fund the health sector at that time were around 10 per cent of total government expenditure. This was higher than the average of 8.1 per cent for other low-income countries and demonstrates the government's commitment to fund the health sector. Nepal was reliant on donor financing which accounted for almost a fifth (19 per cent) of total health sector expenditure in 2012. Despite the significant changes in provisions and the system, out-of-pocket payments are the principal source of financing for healthcare (at almost half of total financing in 2012).[6] Moreover, private health insurance was negligible in Nepal in 2012.

Healthcare is a basic necessity of life, as important as food, shelter, and clothing. However, the current practice of estimating poverty incidences in Nepal, similar to other countries, does not capture the basic healthcare costs. By failing to account for out-of-pocket payments on healthcare (OOPPH) in the poverty estimation, the data may provide a misleading picture of poverty dynamics, and ignoring healthcare costs altogether can result in misclassifying which households or individuals are in the greatest need. The OOPPH causes hardship to people if there is an absence of adequate financial protection mechanisms, such as health insurance. Van Doorslaer et al (2006) argue that OOPPH are impoverishing when they push households into poverty or further into poverty. The assessment of impoverishment resulting from OOPPH describes the difference between the pre-payment poverty headcount before

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[6] World Health Organisation 2015.

OOPPH and post-payment poverty headcount after OOPPH. [7] OOPPH may lead to poverty, but Wagstaff (2008) states that healthcare is a basic need and this poverty is not captured by the standard methods of poverty measurement as it is difficult to capture the uncertain nature of healthcare needs through a constant poverty line.

Deaton & Zaidi (2002) emphasise that poor health causes poverty through several pathways, including impaired labour participation, thereby disrupting people's income-generating capabilities. The proposed method of many studies to measure the impoverishment impact of OOPPH does not provide sufficient information to policy-makers. For example, low-income countries have various poverty alleviation programmes and how healthcare payments interact with these programmes to change the poverty levels might be interesting and important for policy-makers. The current literature on measuring the impoverishing impact provides information on whether the OOPPH pushes the household below the poverty line or not. However, Adhikari et al (2007) argue that the OOPPH may actually be a source of the poverty spiral for a household. The OOPPH affects the household economy through at least two channels: a) it increases incidences of poverty because non-poor households are pushed below the poverty line; and b) it increases the intensity of poverty because poor households are pushed further below the poverty line. In other words, households can move from poor to non-poor due to the introduction of anti-poverty programmes, but the OOPPH can pull the households back below the poverty line where they remain poor. The OOPPH not only pushes the non-poor to poor and the poor to further poor, but also affects the movement in and out of poverty. The method of estimating the impoverishing effects of OOPPH indicates the importance of healthcare financing while designing poverty alleviation programmes. An extensive search of the literature

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[7]   Wagstaff and Van Doorslaer 2003.

confirms that none of the studies estimate the impoverishing impact of OOPPH in the case of poverty dynamics. Such a measurement requires panel data, something that is rarely available in the national representative data. Therefore, this paper creates synthetic panel data from two cross-sectional data sources using the method suggested by Dang and Lanjouw (2013).[8]

Over the last two decades the dynamics of poverty have been the subject of extensive empirical research, particularly by Addison, Hulme & Kanbur (2009). These works have improved our understanding of poverty by quantifying its persistence, identifying the factors more likely to determine an individual's ability to escape poverty, and the events likely to trigger poverty over a life cycle. While these measurements suffer from a lack of well-designed panel data in the context of developing countries, Dang and Lanjouw developed a methodology to create a synthetic panel to study the poverty dynamics at the household level that requires a minimum of two years of cross-section survey rounds. The authors demonstrated that the methodology provides a better performance than the true panel data in terms of asymptotic properties and the robustness of estimates guaranteed that certain assumptions are fulfilled. In this study, we have applied the same method of studying poverty dynamics related to gross and net OOP payments for healthcare by utilising the Nepal Living Standard Survey (NLSS) for 2003/04 and 2010/11. The intent of this study is to further contribute to understanding how OOPPH affects transitory and chronic poverty.

Without knowing the dynamics of poverty (what percentage remain in poverty, what percentage move out of poverty, and what percentage fall into poverty during any given period of time), it may not be realistic to target poverty reduction. Instead, the paper aims at making a complementary contribution to measuring poverty

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[8]   Dang, H-A., P, Lanjouw, J, Luoto, & D. McKenzie 2014.

dynamics in Nepal inspired by the most recent literature relating to poverty.

This paper contributes to the current literature on poverty by discussing the impoverishing impact of OOPPH by utilising the most recently developed methods of poverty dynamics. The impoverishment impact of OOPPH is measured in terms of poverty incidences. The paper estimates poverty dynamics by utilising a synthetic panel dataset that was constructed from cross-sectional data: NLSS for 2003/04 and for 2010/011. Moreover, the paper estimates poverty dynamics after deducting the OOPPH from individual consumption, and the measure of the impoverishing impact resulting from OOPPH quantifies the difference between two poverty dynamics: without adjustment for OOPPH and adjusting for OOPPH.

Methods and Materials

Conceptual Framework of Poverty Dynamics

Poverty is not a state of static reality, but a dynamic reality that varies across different population groups, defined either by their place of residence or by their socio-economic and demographic conditions. Analysis of single cross-sectional household data provides a static nature of poverty analysis. Static analyses have extremely limited explanatory power concerning the persistence of poverty, as the fluctuations of poverty trends do not accurate represent the dynamics of poverty. In fact, comparative static methods are applied while analysing the trends of poverty, as mentioned above, and they do capture the economic mobility of households and focus on inter-temporal changes in poverty in a household.

Nepal's economic structure has changed dramatically over last three decades, and is among the most dynamic current economies. The consumption capabilities of households change over time, and measuring poverty dynamics is a widely accepted method to understand the processes that are central to the persistence and reduction of poverty. A dynamic analysis may help explain the variations between permanent and transient poverty that are important from a policy point of view. However, this paper uses a new approach to distinguish between permanent and transient poverty. This is important for both descriptive and policy purposes. It aims at estimating the poverty dynamics by creating hybrid (or synthetic panel) data from the cross-sectional data: Nepal Living Standards Surveys (NLSS II) 2003/04 and (NLSS III) 2010/11.

Chronic poverty concerns the duration of poverty or long-term poverty. Vulnerability to poverty varies across time as well as across different groups of the people. While some groups might continuously be below the given level of a threshold or poverty line, others might only experience poverty in short but repeated episodes. Some of these groups may never experience poverty.

There are at least three main patterns of poverty (Figure 7): always poor or chronically poor, fluctuating poor or transitory poor, and never poor. Poverty dynamics captures all these patterns and examines the aggregate changes in the prevalence as well as changes for particular groups and regions. The conceptual framework shows the dynamics of poverty over a long period of time (Figure 7). However, the analysis of poverty dynamics captures only two periods: 2003/04 and 2010/11.

**Table 1: Utilisation of Secondary Data by Objectives and Indicators**

SN	Measures	Indicators	Methods
1	Out-of-Pocket (OOP) payments for healthcare	Health expenditure including consultation cost, medicine cost (medicine cost was not available in NLSS I)	Derived from NLSS I, II & III questionnaires
2	HH Consumption data	Food and non- food consumption and home production for consumption	Derived from NLSS I, II & III questionnaires
3	Impoverishment impact (incidence and intensity)	Before and netting out the OPP and medicine, cost from consumptions	Derived from NLSS I, II & III questionnaires and using national poverty line income respective years

Note: All NLSS are nationally representative with the sampling unit at the household level and who have choice of providers being either of the public or private sector. All NLSSs also include detail of healthcare costs namely medicine cost and total cost with consumption categories being food consumption, non-food consumption and home production. However, the sample sizes differ; it is respectively 3388, 4008 and 5988 for NLSS I, II and II respectively.

In Figure 7, the linear horizontal line P represents the poverty line. The fluctuating curve T within the poverty line indicates the movement in and out of poverty over the designated period of time, and this group is the transient poor. Curve C, that is always below the poverty line, is the usual or chronic poor, and the fluctuating curve N, that is always above the poverty line indicates the group

of people who never experience poverty. Therefore, the total population can be classified into four groups: chronic poor, non-poor to poor, poor to non-poor, and non-poor to non-poor, and the OOPPH affects the incidences of all four categories. According to this characterisation: a) the OOPPH pushes non-poor to poor, meaning that the group of people who never experience poverty may fall below the poverty line; b) the OOPPH may increase chronic poverty or increase the possibility of remaining poor, hence, poor to poor; c) the OOPPH reduces the capacity of the people who have the potential capacity to move from poor to non-poor; and d) the OOPPH can accelerate the movement from non-poor to poor. These scenarios are indicative of scale of the impoverishing effect of the OOPPH.

Figure 7: Conceptual Framework for Poverty Dynamics
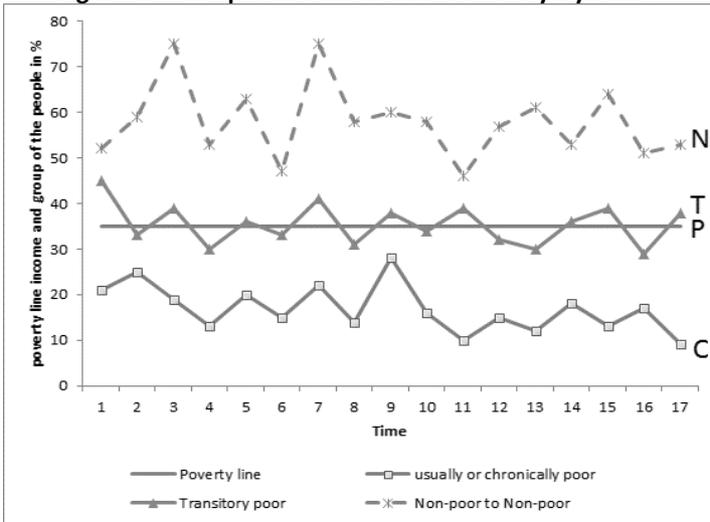
Source: Adhikari, 2016

Methodology for Constructing Synthetic Panels
The dynamic analysis of an economic unit entails the identification of the same economic unit through time. It requires longitudinal

data that tracks individuals or households over time. Hybrid data (synthetic panels) are used in the absence of longitudinal data to analyse poverty dynamics. Recently, pseudo-panel approaches have become popular to create hybrid or synthetic panel data using repeated cross-sectional surveys.[9] Synthetic panels based on cohorts have been widely used to track income and consumption outcomes over time.[10] The methodology of this paper largely relies on recently developed procedures and methods of constructing a hybrid dataset from cross-sectional surveys,[11] and a number of studies which validate the method have generally yielded encouraging findings.[12] It is assumed that y_{it} round t household capita consumption (where t = 1, 2) of household i and Z_k is the poverty line (where k = 1, 2). Let X_{it} is a vector of household characteristics observed in survey round $t(t = 1, 2)$ that are also observed in the other survey round for household $i, i = 1, \ldots, N$. These household characteristics include time-invariant variables, such as household head's ethnicity, education, and gender of the household heads, which remain the same across survey rounds.

The paper seeks to estimate the fraction of the poor population in the first round of the survey who escaped poverty $P(y_{i1} \leq z_1 \ and \ y_{i2} \geq z_2)$ or remain poor $P(y_{i1} \leq z_1 \ and \ y_{i2} \leq z_2)$ in the second round of the survey, and the fraction of non-poor population in the first round of the survey who became poor $P(y_{i1} \geq z_1 \ and \ y_{i2} \leq z_2)$ or remained non-poor $P(y_{i1} \geq z_1 \ and \ y_{i2} \geq z_2)$ in the second round of the survey. $z_1 \ and \ z_2$ are poverty lines for NLSS II and III respectively. Both surveys, NLSS II and NLSS III, adopted random sampling procedures to select the households.
We can estimate the relationship between consumption and time invariant characteristics in each round:

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9   Cruces et al 2014.
10 See Deaton and Paxson 1994; Banks et al 2001; Pencavel 2007; Dang et al 2014; Dang and Lanjouw 2013.
11 See Dang et al 2014; Dang and Lanjouw 2013.
12 See Dang et al 2014; Dang and Lanjouw 2013; Cruces et al 2014.

$$y_{it} = \beta_1' x_{it} + \varepsilon_{it} \; t = 1, 2. \qquad \text{Eq. 2}$$

ε_{it} is an error term.

Using observations from the NLSS III round, we can predict consumption in the NLSS II round by means of the same observed vector of time-invariant or retrospective characteristics and the NLSS II round OLS estimates of parameters. As suggested by Dang and Lanjouw (2013), the mobility of into and out of poverty in context of synthetic panels can be defined as follows.

a) Probability of being poor in 2003/04 remaining poor in 2010/11.

$$P(y_{i1} \leq z_1 \; and \; y_{i2} \leq z_2) \qquad \text{Eq. 3}$$
$$= \phi \left(\frac{z_1 - \beta_1' x_{i1}}{\sigma_{\varepsilon_1}}, \frac{z_2 - \beta_1' x_{i2}}{\sigma_{\varepsilon_2}}, \rho \right)$$

b) Probability of being poor in 2003/04 becoming non-poor in 2010/11.

$$P(y_{i1} \leq z_1 \; and \; y_{i2} \geq z_2) \qquad \text{Eq.4}$$
$$= \phi \left(\frac{z_1 - \beta_1' x_{i1}}{\sigma_{\varepsilon_1}}, -\frac{z_2 - \beta_1' x_{i2}}{\sigma_{\varepsilon_2}}, -\rho \right)$$

c) Probability of being non-poor in 2003/04 becoming poor in 2010/11.

$$P(y_{i1} \geq z_1 \; and \; y_{i2} \leq z_2) \qquad \text{Eq. 5}$$
$$= \phi \left(-\frac{z_1 - \beta_1' x_{i1}}{\sigma_{\varepsilon_1}}, \frac{z_2 - \beta_1' x_{i2}}{\sigma_{\varepsilon_2}}, -\rho \right)$$

d) Probability of being non-poor in 2003/04 becoming non-poor in 2010/11.

$$P(y_{i1} \geq z_1 \; and \; y_{i2} \geq z_2) \qquad \text{Eq. 6}$$
$$= \phi \left(-\frac{z_1 - \beta_1' x_{i1}}{\sigma_{\varepsilon_1}}, -\frac{z_2 - \beta_1' x_{i2}}{\sigma_{\varepsilon_2}}, \rho \right)$$

We need to repeat the procedure R times and take average of above equations in order to estimate movements in and out of poverty because there is a randomly drawn distribution of estimated errors.

Sampling errors were calculated using the bootstrap method and bootstrap standard errors were calculated with 1000 replications. Dang and Lanjouw (2013) proposed a method of creating a synthetic panel from repeated cross-section surveys to arrive at the estimate of poverty dynamics over a period of time. We have attempted to measure the dynamics of poverty with gross and net of the OOPPH at the household level. The difference between the gross and net of the OOPPH poverty incidences gives an estimate of the poverty impact of OOPPH.

Data Sources and Poverty Lines

For the analysis, the paper used two cross-sectional rounds of the household surveys: NLSS II in 2003/04 and NLSS III in 2010/11. Both were implemented by the Central Bureau of Statistics (CBS), with support from the World Bank. Both were nationally representative with the sampling unit at the household level. NLSS II enumerated 3912 households from 326 Primary Sampling Units (PSUs) of the country, and NLSS III enumerated 5988 households from 500 PSUs. The surveys followed the Living Standards Measurement Survey methodology developed and promoted by the World Bank. Both surveys provide details of consumption-related information, and as suggested by the literature, the OOPPH includes the costs of consultations, diagnosis and medicine that were collected from the survey data from both the NLSS II and NLSS III. Official poverty lines are used for both surveys, while estimating the poverty dynamics (Tables 2 and 3). NPR 7,696 and 19,261 are the average poverty lines for the NLSS II and NLSS III, respectively. The average poverty lines (z_1 ; z_2) are used while measuring poverty dynamics for the national level.

Table 2: Poverty Lines for 2003/04 (in NPR)

Analytical Domain	Food	Non-food	Total
Kathmandu	6,722.0	4,334.8	11,056.8
Other urban	4,919.2	2,981.9	7,901.1
Rural Western Hill	5,613.0	3,288.5	8,901.5
Rural Eastern Hill	5,311.2	2,758.5	8,069.7
Rural Western Tarai	4,308.4	3,110.0	7,418.4
Rural Eastern Tarai	4,323.2	1,755.6	6,078.8
Nepal	**4,966.4**	**2,729.4**	**7,695.8**

Source: World Bank 2006

Table 3: Poverty Lines for 2010/11 (in NPR)

Analytical Domain	Food	Non-food	Overall
Mountains	13,295	6,564	19,859
Kathmandu Urban	14,610	26,323	40,933
Urban Hill	11,805	7,772	19,577
Urban Tarai	11,743	9,390	21,133
Rural Hills Eastern	12,297	4,254	16,551
Rural Hills Central	12,240	6,448	18,688
Rural Hills Western	12,537	5,891	18,428
Rural Hills Mid and Far Western	11,772	4,583	16,355
Rural Tarai Eastern	11,333	5,524	16,857
Rural Tarai Central	11,257	6,283	17,540
Rural Tarai Western	10,600	5,398	15,998
Rural Tarai Mid and Far Western	10,998	6,321	17,319
Nepal	**11,929**	**7,332**	**19,261**

Source: CBS 2011

Estimation of Poverty Dynamics

The results of poverty dynamics between the periods of 2003/04 and 2010/011 for Nepal exhibit that almost 21 per cent of the population remain in an impoverished condition, and 58 per cent of the population are in the non-poor to non-poor category over both periods. Transition from a poor state to a non-poor state (14.4 per cent) is higher than non-poor to poor (6.4 per cent) during both periods. This indicates that more people escaped from poverty in 2010/11, and the movements into and out of poverty affects almost

20 per cent of the population (sum of poor to non-poor and non-poor to poor).

Table 4: Overall Poverty Dynamics for 2003/04 and 2010/11

SN	Categories	Poor / Non-poor in %	Standard Error
1	Poor to Poor	20.9	0.009
2	Poor to Non-Poor	14.4	0.014
3	Non-poor to Poor	06.4	0.009
4	Non-poor to Non-poor	58.2	0.014

Source: Authors

Poverty Mobility for Population Sub-groups

The result displayed in Table 5 show that the percentage of non-poor to non-poor is lowest for the mountain region (53 per cent). Almost a fifth of the population fall into the chronic poverty category in all the ecological belts. The percentage of non-poor to poor (13 per cent) for the mountains is higher than the percentage of poor to non-poor (10.7 per cent), which indicates that there is a higher probability of poverty increasing in this belt. Chronic (or permanent) poverty for the Tarai and the Eastern region is higher than in other belts or development regions. The results indicate that almost 60 per cent of the people are in the non-poor to non-poor category. On average, almost 20 per cent of the people are in the poor to poor category (chronically poor), and the remaining 20 per cent are transitory poor. This suggests that almost 40 per cent of the people are vulnerable to poverty. This average percentage can hide regional disparities though. In the Far-Western region, more than 27 per cent are classified as the chronic poor (Table 5). Fourteen per cent of the people moved from the non-poor to the poor category between 2003/04 and 2010/11. Chronic poverty is concentrated among Dalit, disadvantaged non-Dalit Tarai castes, and disadvantaged Janajatis**.** Almost 11 per cent of Dalits moved from the non-poor to poor category whereas only 9 per cent move from the poor to non-poor.

**Table 5: Overall Poverty Dynamics for Population Sub-groups**

SN	Population Sub-groups	Poor to poor	Poor to Non-poor	Non-poor to Poor	Non-poor to Non-poor
	Ecological Belts in % (Standard Error)				
1	**Mountain**	23.3 (0.014)	10.7 (0.016)	13.0 (0.015)	53.0 (0.018)
2	**Hill**	18.8 (0.008)	16.1 (0.015)	04.8 (0.008)	60.4 (0.015)
3	**Tarai**	23.4 (0.011)	12.9 (0.014)	07.6 (0.010)	56.1 (0.015)
	Development Regions (Standard Error)				
1	**Eastern**	24.9 (0.011)	12.5 (0.015)	07.1 (0.011)	55.5 (0.016)
2	**Central**	16.2 (0.008)	19.0 (0.015)	03.1 (0.008)	61.7 (0.015)
3	**Western**	19.6 (0.011)	14.4 (0.016)	05.5 (0.010)	60.5 (0.016)
4	**Mid-western**	26.0 (0.012)	09.9 (0.015)	11.7 (0.013)	52.4 (0.016)
5	**Far-western**	27.4 (0.014)	06.1 (0.015)	14.0 (0.014)	52.5 (0.016)
	Place of Residence in % (Standard Error)				
1	**Urban**	12.9 (0.007)	22.3 (0.015)	01.6 (0.006)	63.2 (0.014)
2	**Rural**	26.5 (0.014)	09.5 (1.014)	09.7 (0.012)	54.3 (0.015)
	Caste (Standard Error)				
1	**Dalits**	27.6 (0.012)	09.1 (0.015)	10.9 (0.013)	52.5 (0.015)
2	**Disadvantaged Janajatis**	26.8 (0.012)	09.6 (0.014)	09.9 (0.012)	53.7 (0.015)
3	**Disadvantaged Non-Dalit Tarai Castes**	27.0 (0.013)	11.5 (0.015)	07.6 (0.012)	53.9 (0.016)
4	**Religious Minorities**	22.8 (0.014)	10.9 (0.018)	10.4 (0.015)	55.9 (0.018)
5	**Relatively Advantaged Janajatis**	12.7 (0.007)	21.2 (0.016)	01.8 (0.006)	64.2 (0.016)
6	**Upper Caste Groups**	17.5 (0.009)	17.3 (0.015)	04.4 (0.008)	60.7 (0.015)

Source: Authors

Sensitivity Analysis

Levels of poverty are estimated using the official poverty line as mentioned in Tables 2 and 3. The poverty line may be arbitrary for the place of residence or geographical region as the poverty line is obviously just a matter of judgement. However, to measure global poverty, various poverty lines; for example, USD 1/day (at 1985 PPPs); USD 1.08/day (at 1993 PPPs); USD 1.25/day (at 2005 PPPs) and USD 1.90/day (at 2011 PPPs)[13] are commonly practised. A range of poverty lines derived from the official poverty lines may allow the comparison between incidences of poverty with incidences of global poverty. A range of values relating to poverty lines are used while estimating levels of poverty for four different categories.

Figure 8: Sensitivity of Dynamics of Overall Poverty
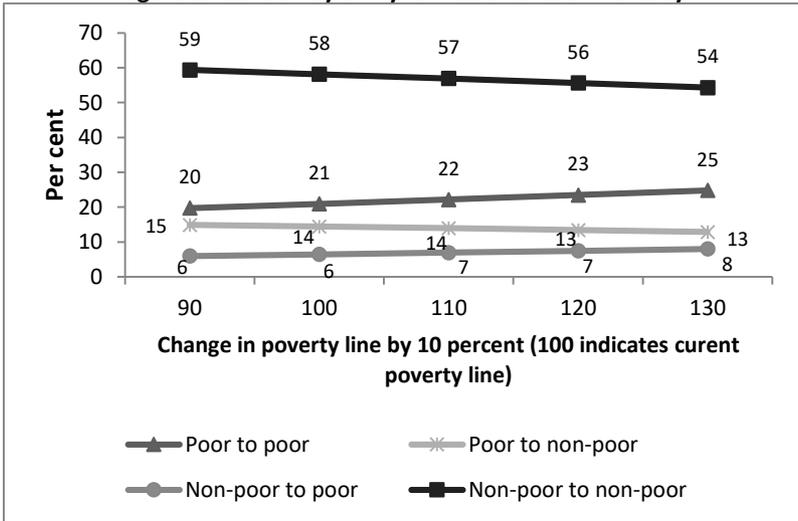
Source: Adhikari, 2016

An index of 100 indicates the existing official poverty line. The official poverty lines for both periods are decreased by 10 per cent

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13   Ferreira 2015.

and increased by 10 per cent three times to make a range of poverty lines. The results show that levels of chronic poverty increases as poverty lines increase. The levels of transitory poverty (sum of poor to non-poor and non-poor to poor) are almost constant as poverty lines increase. However, levels of poor to non-poor decrease and non-poor to poor increase as poverty lines increase.

Impact of OOPPH on National Poverty

The results of the poverty dynamics between the periods of 2003/04 and 2010/011 for Nepal are exhibited in Table 4. After netting out the OOPPH in individual consumption, incidences of poverty are different compared to gross poverty incidences (Table 6). The first and second columns of Table 6 are taken from Table 4, and this indicates that OOPPH have an impact on poverty incidences.

Table 6: Impoverishment Impact of OOPPH (2004 and 2011)

	Gross		Net OOPPH		Impact of OOPPH* In %
	Incidence of Poverty in %	Standard Error	Incidence of Poverty in %	Standard Error	
Poor to Poor	20.9	0.009	22.2	0.009	1.3
Poor to non-Poor	14.4	0.014	13.6	0.014	-0.8
Non-poor to Poor	6.4	0.009	07.1	0.009	0.7
Non-poor to Non-poor	58.2	0.014	57.1	0.014	-1.1

* Difference between gross and net incidences of poverty
Source: Authors

There are two ways OOPPH impacts the results while estimating poverty dynamics: it increases chronic poverty and increases the vulnerability of poverty. Being poor in both 2003/04 and 2010/011 (poor to poor), incidences of chronic poverty is increased by more than 1 per cent and the movement of poor to non-poor is reduced by 0.8 per cent due to the OOPPH, indicating that OOPPH pulls individuals back who have moved above or below the poverty line. The movement of non-poor to poor is increased by 0.7 per cent, also indicating that the OOPPH accelerates the falling rate from non-poor to poor. The probability of being in the category non-poor to non-poor in both 2003/04 and 2010/011 is reduced by 1.1 per cent as a result of the OOPPH. The last column in Table 6 demonstrates the impact of the OOPPH on poverty incidences. The positive

numbers indicate that incidences of poverty are increased due to OOPPH, and the negative numbers indicate that the capacity of households to become non-poor is reduced, indicating that overall incidences of poverty are increased.

Poverty Mobility for Population Sub-Groups

Tables 7 and 8 compare the status of and impact on the movement of poverty. The chronic (or permanent) poverty in the Tarai and the Eastern region is found higher than in other belts or development regions. On average, almost 20 per cent of the people are in the poor to poor category or chronically poor, and the remaining 20 per cent are transitory poor. It suggests that more than 40 per cent of the population from this part of the country are vulnerable to poverty. Table 7 reveals the incidences of poverty after netting out OOPPH in individual consumption data. If we compare the incidences presented in Tables 7 and 8, it shows the impact of OOPPH. Similarly, the OOPPH increases the incidences of poverty or increases the vulnerability to poverty. At the same time, it reduces the capacity of being non-poor in the given time period.

The Central and Western development regions have a higher impact of OOPPH on increasing chronic poverty compared to other regions. The Tarai faces a higher impact of OOPPH compared to the mountain and hill belts. However, more poor live in the mountains compared to hills and the Tarai. The highest poverty incidences are found in the Mid-western region while in the Western region, chronic poverty increases by 1.4 percentage points due to the OOPPH (Table 8). Chronic poverty is concentrated among Dalits, disadvantaged non-Dalit Tarai castes, and disadvantaged Janajatis. Almost 11 per cent of Dalits moved from non-poor to the poor category whereas only 9 per cent moved from poor to non-poor. OOPPH has increased vulnerability among the Dalits and disadvantaged non-Dalit Tarai castes.

**Table 7: Poverty Dynamics for Population Sub-groups after
Netting OOPPH**

	Incidences (in %)			
	Poor to poor	Poor to Non-poor	Non-poor to Poor	Non-poor to Non-poor
Belt				
Mountain	24.3 (0.014)	10.1 (0.016)	13.8 (0.016)	51.9 (0.017)
Hill	20.0 (0.01)	15.3 (0.015)	5.3 (0.009)	59.4 (0.015)
Tarai	24.7 (0.011)	12.0 (0.014)	8.4 (0.014)	54.8 (0.015)
Caste/Ethnicity				
1. Dalit	27.8 (0.013)	8.9 (0.015)	11.2 (0.013)	52.1 (0.015)
2. Disadvantaged Janajatis	27.2 (0.012)	9.3 (0.015)	10.3 (0.012)	53.2 (0.015)
3. Disadvantaged Non-Dalit Tarai Castes	27.4 (0.13)	11.2 (0.015)	8.0 (0.013)	53.4 (0.016)
4. Religious Minorities	23.1 (0.015)	10.6 (0.018)	10.7 (0.015)	55.5 (0.018)
5. Relatively Advantaged Janajatis	13.3 (0.008)	20.7 (0.017)	2.0 (0.006)	63.9 (0.016)
6. Upper Caste Groups	18.0 (0.009)	17.0 (0.015)	4.6 (0.009)	60.4 (0.015)
Development Region				
Eastern	26.0 (0.012)	11.6 (0.015)	7.9 (0.012)	54.4 (0.016)
Central	17.7 (0.01)	17.9 (0.015)	3.7 (0.009)	60.7 (0.015)
Western	21.0 (0.012)	13.6 (0.06)	6.3 (0.011)	59.1 (0.016)
Mid-western	26.9 (0.012)	9.5 (0.015)	12.3 (0.014)	51.3 (0.015)
Far-western	27.9 (0.014)	5.9 (0.015)	14.5 (0.015)	51.6 (0.016)
Place of Residence				
Urban	13.5 (0.008)	21.8 (0.015)	1.8 (0.006)	62.9 (0.014)
Rural	26.8 (0.012)	9.3 (0.014)	10.0 (0.012)	53.9 (0.015)

Source: Authors

Table 8: Impact of OOPPH on Poverty Dynamics for Population Sub-groups

	Poor to poor	Poor to Non-poor	Non-poor to Poor	Non-poor to Non-poor
Belt				
Mountain	1.0	-0.6	0.8	-1.1
Hill	1.2	-0.8	0.5	-1.0
Tarai	1.3	-0.9	0.8	-1.3
Caste/Ethnicity				
1. Dalits	0.2	-0.2	0.3	-0.4
2. Disadvantaged Janajatis	0.4	-0.3	0.4	-0.5
3. Disadvantaged Non-Dalit Tarai Castes	0.4	-0.3	0.4	-0.5
4. Religious Minorities	0.3	-0.3	0.3	-0.4
5. Relatively Advantaged Janajatis	0.6	-0.5	0.2	-0.3
6. Upper Caste Groups	0.5	-0.3	0.2	-0.3
Development Region				
Eastern	1.1	-0.9	0.8	-1.1
Central	1.5	-1.1	0.6	-1.0
Western	1.4	-0.8	0.8	-1.4
Mid-western	0.9	-0.4	0.6	-1.1
Far-western	0.5	-0.2	0.5	-0.9
Place of Residence				
Urban	0.6	-0.5	0.2	-0.3
Rural	0.3	-0.2	0.3	-0.4

Source: Authors

Discussion and Concluding Remarks

The starting point for poverty reduction in Nepal is to provide up-to date data on how to accurately measure poverty. A large corpus of cross-sectional poverty studies is found in the literature related to measuring poverty, but an analysis of the trends of poverty from cross-sectional data may be insufficient in designing appropriate anti-poverty policies. Poverty is not a static phenomenon, and a dynamic analysis of poverty highlights poverty duration and movements into and out of poverty, and the duration and movement of poverty are also further determined by healthcare payments. Panel data is central to obtaining a better understanding of poverty dynamics. Due to the absence of actual panel data for Nepal, this paper applied a recently developed statistical method by Dang et al (2014) and Dang and Lanjouw (2013) to construct synthetic panel data using two rounds of cross-sections in 2003/04 and 2010/11 to measure poverty dynamics. Under reasonably standard assumptions, the time-invariant household characteristics in the two cross-sections can function as the panel connectors employed to construct synthetic panel households. In recent years, measuring poverty dynamics has become a widely accepted practice because it can cover the processes central to the persistence and reduction of poverty. Dynamic analysis may help develop a better understanding between permanent and transient poverty that is important from a policy point of view.[14]

The results indicate that almost 40 per cent of the population are vulnerable to poverty in Nepal. This percentage is increased by more than 1 per cent due to the OOPPH. Among these, almost 21 per cent are in chronic poverty, and chronic poverty is concentrated on Dalits and some ethnic groups as there has been hardly any decline in poverty for Dalit households. The OOPPH has increased the vulnerability of the already vulnerable Dalits, disadvantaged non-Dalit Tarai castes. The Central and Western development

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[14]   Ward 2016.

regions experienced a higher impact of OOPPH increasing chronic poverty compared to other regions. The Tarai belt also has more impact of OOPPH compared to the mountains and hills. OOPPH clearly increases the incidences of poverty or increases the vulnerability to poverty. Simultaneously, it can reduce the capacity of remaining non-poor over the designated time period. However, the impact of OOPPH on chronic poverty depends on consultation of healthcare services and the chronic poor who did not consult healthcare services are not covered in this analysis.

Poverty in Nepal is compounded by the general uncertainty regarding sustainable livelihoods, which threatens an even wider section of the population than might be categorised as the poor. Poverty is an extremely complex phenomenon, which manifests itself in a range of overlapping and interlinked phenomena, such as economic, political and social deprivations. The benefits of development are not widely or evenly spread across the various sections of society. Many sections of the population are left behind and some are not impacted by the benefits of development. Various reasons, including social structure, access to services, planning processes and government mechanisms, and geographical location among others are responsible for the uneven development in the country. Consequently, chronic poverty in Nepal is unexpectedly high.

Chronic poverty is usually understood as related to the structural characteristics of the households and the environment because they experience deprivation over many years, often over their entire lives. In this case, efforts should be made to design policies to directly address structural problems. This requires long-term and costly interventions, such as the development of basic infrastructure, redistribution of assets, increasing economic, social and political inclusion, and increasing rates of capital accumulation, to mention but a few. Transient poverty is usually understood as the result of temporary misfortune that reverses during more secure and stable periods. In this case, policies such as increasing credit

facilities, increasing access to services, remittances, and social safety net programmes that can stabilise short-term income fluctuations may be more appropriate. Differentiating between whether poverty is largely transient or permanent has serious implications when assessing the overall progress toward development goals. The current reduction of poverty in Nepal is generally attributed to the driver of out-migration and is reflected in a sharp growth in remittances.

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