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Abstract

This paper introduces a variety of concepts and methods to examine living standards improvements in Nepal in a dynamic perspective. Using data from three rounds of Nepal Living Standards Surveys conducted in the past two decades, together with data from a nationally representative survey that was implemented in 2014 specifically to collect information on social and economic mobility, the paper presents novel statistics on the extent of inter- and intra-generational mobility in Nepal. The findings suggest that there has been appreciable upward mobility in education; that is, Nepalis today are increasingly more likely to be better educated than their parents. However, inter-generational mobility of occupations has been much more muted, with 47 percent of Nepal today remaining in the same occupation as their parents. Upward mobility is higher for younger cohorts and for individuals who move from their rural areas of birth to an urban area. There are also significant differences in mobility by social groups, with Dalits and Terai caste groups having lower upward mobility odds. Examining mobility within generations using synthetic panel techniques, the paper finds that: (a) for every two people who escape poverty, one slides back, suggesting significant churning around the poverty line; (b) a large fraction of those who have escaped poverty remain vulnerable to falling back, with an overall vulnerable population of 45 percent; and (c) the share of the middle class—defined as those with sufficiently low likelihood of falling back into poverty—has increased steadily over the past two decades, reaching 22 percent in 2010–11. However, triangulating subjective well-being data from Gallup, it appears that a majority of even those who constitute the middle class are fundamentally insecure about their economic futures. The prevalence of a large vulnerable population and a nascent, growing but struggling middle class represents a key challenge to consolidating recent gains in moving people out of poverty.

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Mobility and Pathways to the Middle Class in Nepal

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"Our hardship is like time, it never stops."

– A Nepali woman in Makawanpur, Nepal, in a conversation with "Stories of Nepal"

1. Introduction

In this paper, we explore some aspects of economic and social mobility in Nepal. The data required for this analysis come from a variety of national surveys conducted in the past two decades as well as from a nationally representative survey that was implemented in 2014 to specifically collect information on social and economic mobility as it is perceived in Nepal.

Nepal has undergone some dramatic political, social and economic changes in the past couple of decades. In a single generation, the country has gone from being a unitary, Hindu state ruled by an absolute monarch to a secular republic that has adopted a federal structure of governance. More than 14,000 Nepalis lost their lives between 1996 and 2006 in a violent Maoist conflict that took the country to the brink of a civil war that has fundamentally transformed the common Nepali psyche. This experience has not only altered the relationship between the state and its citizens but continues to have a profound influence on an evolving social contract.

Despite these changes, there is an enduring perception of "structural inequalities," some of which are deeply encoded in the legacy of the country's social structure (e.g., the caste system) and some are driven by what has been widely acknowledged to be a spatially imbalanced development experience. A discussion of mobility becomes pertinent because in many ways mobility is the fundamental characteristic of any development process that can neutralize these deep inequalities. From an intergenerational perspective, a society in which children can aspire to achieve and indeed can achieve levels of education, jobs, and living standards that are materially different from the levels enjoyed by their parents is a society that will automatically begin to redress some of these inequalities. Mobility is not just important from the point of view of equity, it also has efficiency benefits. If talent is distributed more equally in society than the opportunities to exercise these talents, then a mobile society will be better able to mobilize and utilize these talents by allowing people from all segments of society to contribute to the growth process. A mobile society in which individuals from all walks of life, including those with historical disadvantages, can succeed or fail based on nothing else but their effort and hard work, will also have higher levels of motivation and effort and this will have implications for growth.

The rest of the paper proceeds as follows. Section 2 presents the results of our analysis on intra-generational mobility. Section 3 presents the results on inter-generational mobility. Section 4 presents and discusses our findings on perceptions of mobility. The last section concludes.

2. Mobility across Generations

Economists and sociologists have primarily conceptualized intergenerational mobility along the lines of "origin independence". A mobile society is one in which the children of lawyers or doctors and those of

farmers or construction workers have similar (educational, occupational and income) prospects—one where a parent's income, occupation, education, or status does not fully or substantially predetermine the son's (or daughter's). The origin-independence axiom, originally formulated by Shorrocks (1978) requires that the measure of mobility rise when the correlation coefficient between of the vector of outcomes for the father and the vector of outcomes for the son (or daughter) goes down. Or to be precise, if y_0 denotes the vector of incomes of all fathers in society and y_1 the vector of incomes of all sons, the mobility measure could be written as $1 - \rho_{12}$ where ρ_{12} signifies the correlation between father and son's income vectors. Thus a society in which father's position in society perfectly predicts the position his children might be able to attain is the mark of an immobile society. It is easy to see that this idea is intimately linked to the concept of equality of opportunity.

Measuring the extent of mobility along these lines however is quite challenging. This is partly because data required for this kind of analysis are hardly available in most countries, not least Nepal. Even in the most advanced economies with fairly sophisticated data, for example the United States, we are only recently beginning to see some work emerging in this area. Chetty et al (2010) have analyzed tax and administrative records of about 40 million individuals and their parents in an ambitious multi-year undertaking to come up with measures of intergenerational mobility for the United States. Similar information is not available in most developing countries.

A close second best is to study and analyze intergenerational mobility along the lines of educational attainments and occupational status of grown adults and their fathers. This is the approach that has been taken in several prominent regional studies of intergenerational mobility conducted by the World Bank (e.g., Ferreira, 2013; World Bank, 2015) and it is the approach we will follow here as well.[1] While not entirely adequate, we believe that this analysis is very informative, particularly for the case of Nepal where overall educational attainments started out from a very low base a generation ago and occupational status was very strongly correlated with one's position in the Hindu caste hierarchy. So the idea of origin independence in the space of occupations would translate into the question of the extent to which children of farmers or children of particular caste/ethnic groups (e.g., Dalits) have the prospect of ending up in occupational categories that are different from their fathers and conversely whether children of higher caste individuals traditionally mandated to be in occupations that were non-manual in nature end up in other occupations.

Formulating mobility along the lines of occupation also naturally combines the concepts of economic and social mobility. Ability to obtain and work in an occupation or a job that befits one's acquired human capital is clearly an important first step towards strengthening one's economic position. But jobs in any social context, and particularly in the context of Nepal, also come as markers of self-identity, social status and prestige. As the debate on exclusion in Nepal highlights adequately, the marginalized groups – be it socially or economically – routinely bear the double burden of material deprivation of being in low productivity employment as well the associated indignity of their manual jobs. Social mobility for them would mean their children having a fair shot at not having to end up in similar occupations.

[1] This approach is closer to the class and occupational group lens through which sociologists tend to study mobility. Some believe occupational status to be the primary marker of social standing, life chances as well as material comfort and a defining characteristic of advantage and privilege in society (Giddens 2009).

In the data set we use to analyze intergenerational mobility (i.e., Perceptions of Poverty, Prosperity and Economic Mobility in Nepal) we have about 8,000 unique father-offspring pairs with information on completed education level. Limiting our attention to respondents over 30 years of age to filter out individuals who may not have completed education, we end up with a little over 5,000 observations. Father's educational attainment is presented in rows while the son/daughter's education level is presented in columns. The data show an overwhelming improvement in educational outcomes among the generation of "children" in comparison to the earlier generation in the sample. Overall illiteracy is a third of its level among fathers, primary school completion has more than doubled and the completion of SLC, Intermediate and some university level education has increased four-fold. This is consistent with the rapid expansion of education in Nepal in the last three decades (Table 1).

Table 1: Intergenerational Mobility in Educational Attainment

	Son/daughter's educational attainment							
Father's education	Illiterate	Basic Literacy	Primary	Secondary	SLC Passed	Intermediate	University + Technical	*N*
Illiterate	35%	22%	17%	16%	6%	2%	1%	2,777
Basic Literacy	6%	21%	13%	24%	17%	12%	7%	1,273
Primary	10%	11%	26%	29%	16%	5%	3%	325
Secondary	8%	8%	14%	28%	19%	13%	10%	586
SLC Passed	6%	3%	6%	22%	27%	19%	17%	149
Intermediate	2%	0%	2%	13%	11%	31%	39%	89
University + Technical	0%	5%	2%	2%	24%	27%	41%	59
N	1,136	970	815	1,069	619	385	264	5,258

Note: Rows add up to 100%.
Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal. 2014.

In addition to average increases, there have been appreciable improvements within father-son pairs as well. For example, 22 percent of all sons born to illiterate fathers have attained basic literacy, 17 percent have attained primary level education, 16 percent secondary, and about 9 percent have gone beyond the secondary level. Similar patterns can be observed for various other levels of father's education level. In general, there is a greater "mass" above the diagonal than below in this symmetrical transition matrix, suggesting that children have generally done better than their fathers on education. This is not to say that there has not been any downward mobility though; there are non-zero values below the diagonal as well. For example, about 5 percent of children born to parents who had university level education or higher remained at basic literacy status. But these numbers are generally small.

Table 2: Intergenerational Mobility in Occupations

	Son/Daughter's Occupation				
Father's occupation	Farmers (self empl. and wage)	Off farm wage (low skill)	Off farm wage (medium/high skill)	Off farm self-employment	*N*
Farmers (self empl. and wage)	48%	20%	4%	27%	2,761
Off farm wage (low skill)	26%	29%	6%	38%	591
Off farm self-employment	16%	17%	6%	62%	518
Off farm wage (medium/high skill)	10%	16%	28%	47%	122
N	1,590	839	223	1,340	3,992

Note: Rows add up to 100%.
Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014.

Moving on to occupation, we categorize occupations into four main categories: (a) farming that includes wage work or self-employment in agriculture; (b) off-farm wage work that is of low skill content (such as in construction, porterage, helpers in hotels and restaurants, etc.); (c) off farm wage work that is medium to high skill and comes closer in the context of Nepal to white collared, salaried employment, and; (d) off-farm self-employment which can be anything from a small mom-and-pop all-purpose grocery store in rural areas to proprietorship of small and medium enterprises or anything bigger than that. The survey allows the matching of about 4,000 father-son pairs for whom information on these occupations is recorded. This information is presented in Table 2 and as before, the occupations of fathers are reported along rows while those of off-springs, along columns.

Looking at just the overall occupational composition, it is clear to see that there has been a dramatic shift away from farm and farming related occupations in Nepal. Whereas about 69 percent of fathers in the earlier generation were in some form of agricultural employment, only about 40 percent of sons/daughters ended up in this category. This is consistent with the pattern of structural transformation observed in Nepal over the last quarter century with a gradual decline in agriculture's share of overall GDP as well as employment. Consequently, employment shares of low skilled off farm wage work, and off farm self-employment increased from 15 percent to 21 percent and 13 percent to 33 percent respectively. Regular or salaried employment roughly doubled from about 3 percent of the total in the father's generation to 5.6 percent for children's.

Within the same father-son pair as well, the results in Table 2 show substantial occupational reshuffling. About 48 percent of those whose fathers were farmers, have remained farmers, others have moved on to other occupations – 20 percent in low skilled jobs, 27 percent in some form of self-employment and 4 percent in white collar jobs. The highest occupational "persistence" as given by the size of the diagonal elements in each of occupational categories appears to be in off-farm self-employment: 62 percent of those whose fathers were in self-employment outside of agriculture remain in that same occupation. One caveat is in order here. Given the manner in which the question about occupations was asked in the survey, for the respondents we have information on their occupation in the year preceding the survey while for their fathers the information we have is on what they did for the majority of their life. Depending on age and the stage of their life cycle each of the respondent is in, the mobility figures implied by the numbers reported here may be underestimates because it is well known from other settings and also from Nepal that individuals are more likely to start out in the occupation of their parents or in jobs with generally lower economic and social returns and gradually branch out and move on as they get more experienced.

Again, it is important to recall here that in a perfectly mobile society, children would be equally likely to end up in any of the occupations irrespective of where their parents started out. Conversely, in a society with perfect "dependence" on father's position, children would simply take up the father's occupation and that would show up with all of the mass in the diagonals. One way to get a summary measure of how much mobility there exists in society is to ask the question of how far the occupational transition matrix is from the hypothetical transition matrix that would characterize a society with zero mobility, i.e., with all the mass in the diagonals. This statistic is called the *Altham statistic* and has been used by economists to study, among other things, the occupational mobility in the US and UK (Long and Ferrie, 2013). This statistic is agnostic about whether or not the movement is for the better or for the worse, it simply captures how much movement there is. As such, it captures the notion of "origin independence" fairly closely.

We take a simpler approach. Instead of calculating Altham statistics, we define a notion of "doing better than the father" for education and occupation and examine the characteristics of upward intergenerational mobility. One of the reasons for doing this is to exploit the data a little bit and get more than just an aggregate statistic for mobility. Any deeper exploration into the characteristics of mobility would require us to generate similar matrices for subgroups of the population, which, given the relatively modest sample size, would lead to a rapid loss of precision in the estimates. Instead, by considering the son to have done better than his father if his attained education level and occupational standing is of a higher category than his father's, we generate a dichotomous variable that can be analyzed using regression techniques.

This is fairly straightforward for education as attainment levels can be ranked. For example, ten years of education is unambiguously better than only eight years of education. But ranking occupations to determine whether the offspring has done better than the father is not so straightforward and additional assumptions are necessary, particularly on how off-farm self-employment should treated. White collar jobs are always more desirable than blue collar jobs and blue collar wage jobs outside of agriculture are almost always likely to be more desirable than wage jobs in agriculture, and possibly also agricultural self-employment. But comparing high skilled jobs with self-employment off the farm is tricky. Here we make a strong assume that all self-employment outside agriculture is less preferable to all forms of white collared employment. This assumption may not be far from reality given the fact that most of self-employment outside of agriculture is in small and informal entrepreneurial activity. So the assumed hierarchy for occupations, in increasing order of occupations is, any employment in agriculture, wage employment in low skilled jobs outside the farm, self-employment outside the farm and medium to high skilled wage jobs off farm.

By this definition, about 62 percent Nepalis (above the age of 30) experienced upward mobility in education while about 29.8 percent stayed at the levels of their fathers. There is less mobility in occupation than in education: 47 percent of the overall population remains in the same occupation as their father. But about 43.6 percent of the population realized upward mobility. For both education and occupation, there also appears to be some downward mobility. (See Table 3.)

Table 3: Upward and Downward Mobility in Education and Occupation, relative to fathers

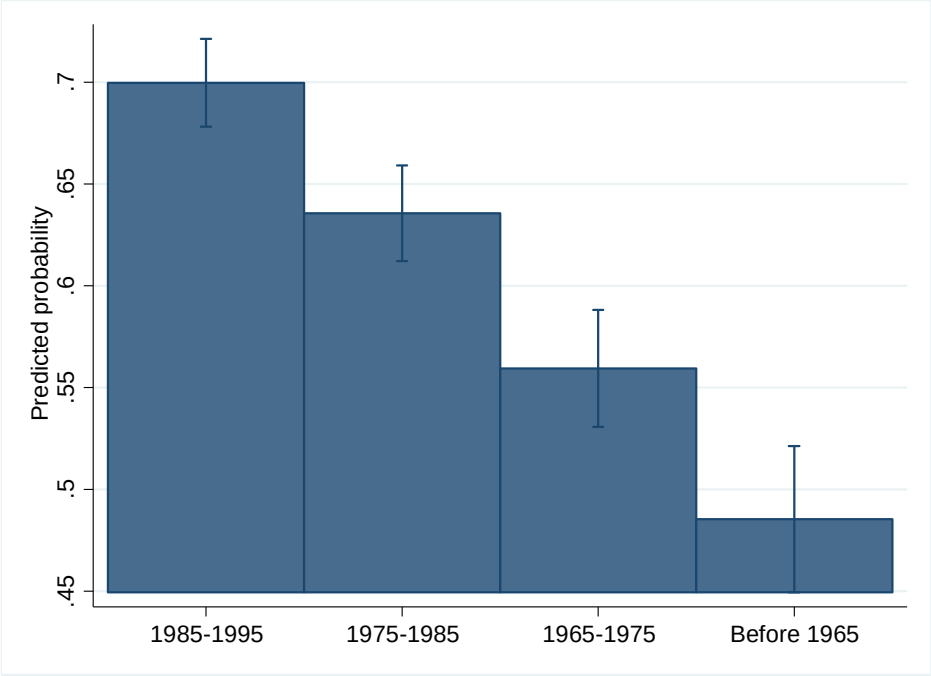
	Education (% of population > 30 yrs.)	Occupation (% of population)
Up	61.9	43.6
Same	29.8	46.8
Down	8.3	9.6

Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014.

Prospects for upward mobility have been increasing Nepal for both education and occupation. In Figure 1 we show the likelihood of doing better than one's father by individuals grouped with 10-year age cohorts. The sample sizes for some age groups are small and thus the estimates are fairly noisy but point estimates suggest that while the likelihood of being better educated than one's father was below 50 percent for those born before 1965, the number is closer to 70 percent for the cohort born between 1985 and 1995. The pattern is similar for occupation as well, except there is a discontinuous jump (roughly 10 percentage points) in predicted probability of upward mobility for the 1975-1985 birth-cohort in comparison to the earlier cohorts. One possible explanation for this is the fact that in contrast to the earlier cohorts, this group of children would have been in school around the time Nepal's economy started liberalizing (1990-1994) and thus may have been in a favorable position to seize the opportunities created by the consequences of this liberalization. In any case, younger cohorts have been more upwardly mobile than the cohorts born before 1975 who appear to have a low steady state transition probability of around 33-34 percent of doing better than their father.

Figure 1: Upward Mobility by Age Cohorts

(a) Better educated than father



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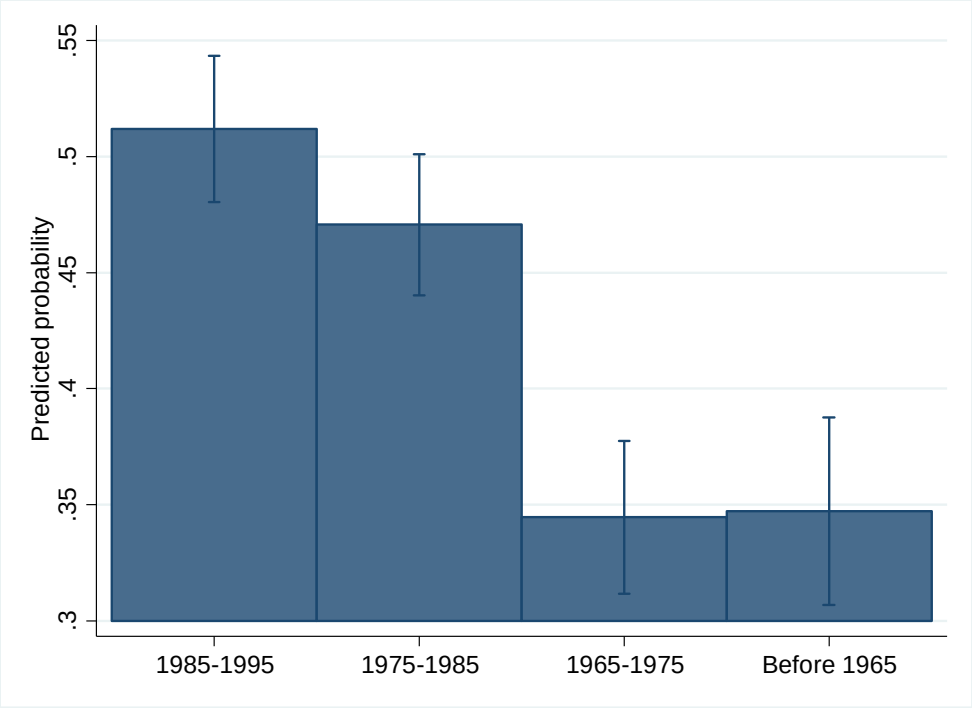
(b) Better occupational status than father

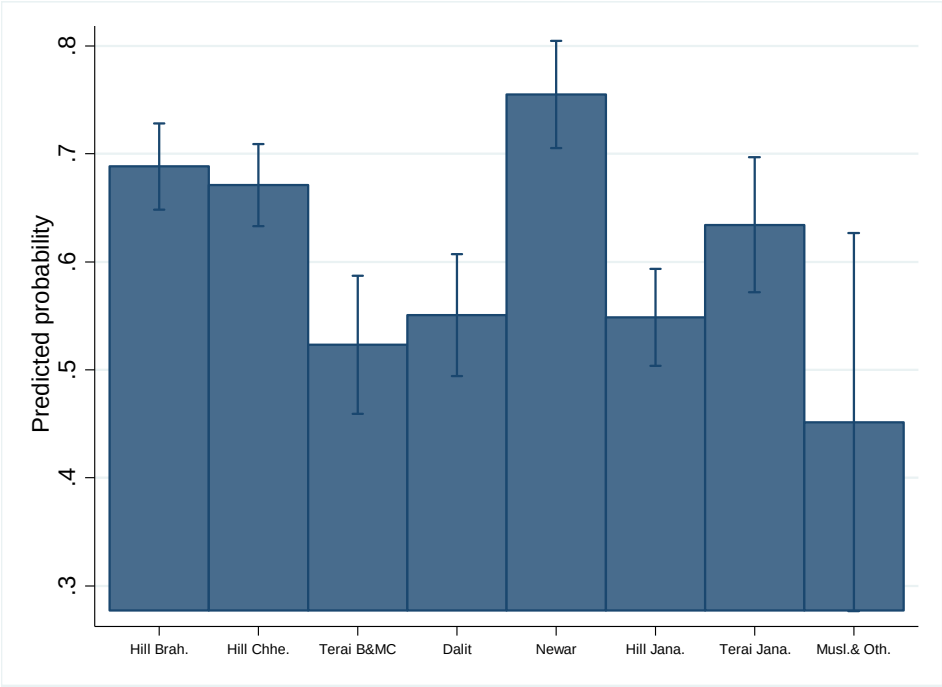


Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014.

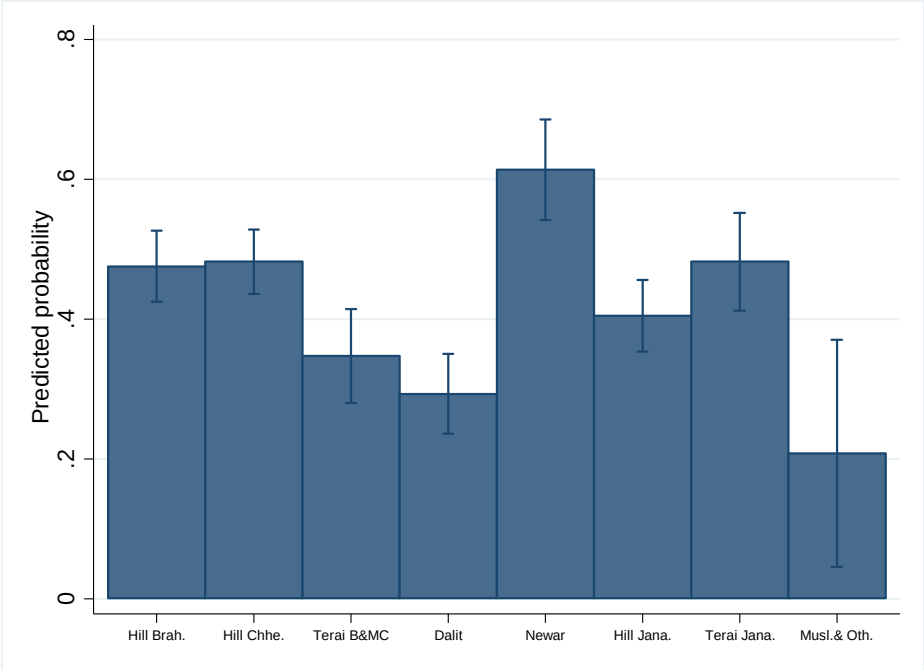
Another dimension along which the examination of intergenerational mobility is interesting in Nepal is the caste/ethnicity status of individuals. The probability of doing better than one's father conditional on one's caste/ethnicity status shows considerable heterogeneity for both education and occupation. Newars, followed closely by hill Brhamins and Chhetris have the best odds of surpassing their father's education and occupation levels. On the other hand, Nepalis in Muslim and other minority caste categories followed by Terai Brahmin Middle Caste, and Dalit categories have the lowest odds of upward mobility for education as well as occupation. Again, low sample size for some groups, such as Muslims and Others, means that the standard error around the point estimates are fairly large so the results have to be interpreted with caution. For example, even though the point estimates for Dalits and the Terai Brahmins and Middle Castes show slight differences, the 95 percent confidence intervals around these estimates have considerable overlaps, suggesting that it is hard to draw any conclusions distinguishing the two groups.

Figure 2: Upward Mobility by Ethnicity

(a) Better educated than father



(b) Better occupational status than father



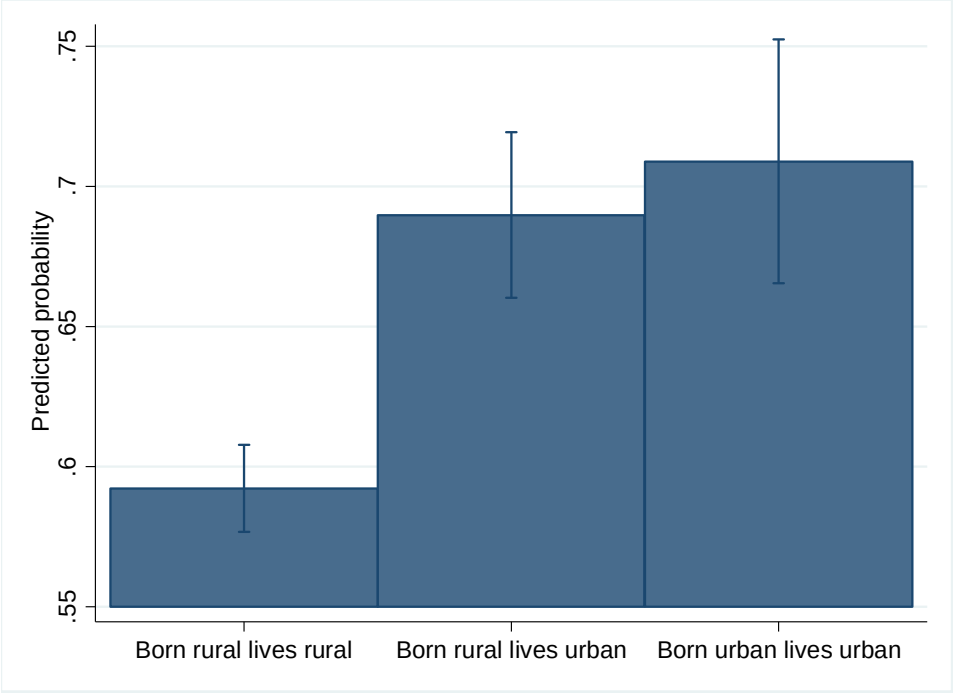
Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014

Notes: Ethnicity categories are hill Brahmin, hill Chhettri, Terai Brahmin and Middle Castes, Dalit, Newar, Hill Janajati, Terai Janajati, Muslim and Others.

Intergenerational mobility in Nepal is likely to be closely associated with the urban vs. rural location of the household. In particular, given large historic gaps in opportunities between urban and rural areas, one could ask the question of whether prospects of mobility are similar in urban and rural areas. We categorize households into three groups: those born in rural areas and living in rural areas, those born in rural areas but living in urban areas and those born and found to be living in urban areas. In Figure 3 we look at prospects of upward mobility for individuals in these three categories. There is a clear and statistically significant difference between odds of upward mobility in education between those who are born and remain in rural areas and those who are found in urban areas (either born or migrated there). The difference in the probability of doing better than one's father between the two groups is close to 10 percent. This suggests that physical mobility between rural and urban areas is a critical part of intergenerational mobility in education. The association between rural-urban migration and upward mobility in occupation is even more pronounced: odds of jumping to a better occupation than one's father jump by 28 percentage points (from 38 percent to 66 percent) for individuals who are born in rural areas but migrate to urban areas.

Figure 3: Upward Mobility by Urban/Rural Migration Status

(a) Better educated than father



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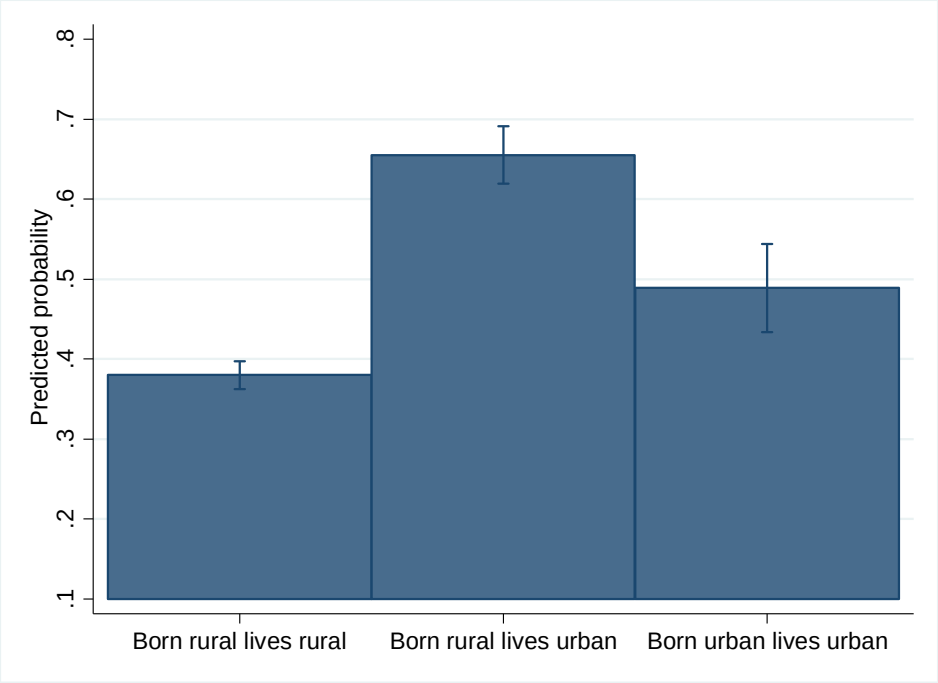
(b) Better occupational status than father



Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014

3. Mobility within Generations

While the idea of lack of correlation between parental income, education or occupation and the outcomes of their children is the fundamental benchmark of a society with high intergenerational mobility, it is unclear whether the same principle would carry over in the analysis of mobility within a generation. A society where a person's income or living standards 10 years ago, for example, had no bearing on their income today would be a society with a significantly large amount of inter-temporal variation in these outcomes. The lack of serial correlation would imply a lot of random churning in living standards and would not necessarily be desirable.

So how can mobility within generations be measured and analyzed? One possibility is to consider directional income/living standards movement for the same individual or household over a lifetime. A mobile society would be one in which poorer and socially marginalized households can climb up the economic ladder and attain higher living standards. This would require the income of this group to grow faster than the income growth realized by the average households. So in a way the key statistic to measure intra-generational mobility then is simply the growth rate of income of the household between two points in time. But a pre-condition to being able to measure this is the existence of nationally representative data that allow us to observe the same household at two points in time. Unfortunately for Nepal, the panel data that have been collected with the three rounds of the living standards survey have suffered from a high degree of attrition between rounds and are thus not ideal for this analysis. Instead, we use what is referred to as the synthetic panel methodology (Dang and Lanjouw, 2013).

Box 1: The Intuition behind Synthetic Panels

Analysis of economic mobility over time requires panel data. However, such data are not typically available in many settings. In Nepal, even though the NLSS surveys contained panel components, they suffer from heavy attrition and the resulting population is not representative for the population in any of the rounds. The synthetic panel methodology was introduced to address this key data limitation. Several efforts to validate the results of this methodology against actual panel data have been conducted and the general consensus that has emerged is that synthetic panels provide a promising way forward.

We describe the key elements of how the method works using the example of two LSMS rounds in Nepal, let's say the 2003/04 and 2010/11 rounds. The essential idea is to use an imputation methodology to predict the consumption of households interviewed in 2003/04 in 2010/11. This prediction is done by first estimating a consumption model for 2010/11. This entails a regression of household per capita consumption on a set of observable household characteristics such as household size, demographic composition, education or asset holdings, etc. The predicted 2010/11 consumption (of households interviewed in 2003/04) is based on two components. The first component is obtained by applying the estimated coefficients on observable characteristics of households interviewed in 2003/04. Implicitly, the question that is being asked is, what would the consumption of the 2003/04 households be if the "returns to their characteristics" were as observed in 2010/11.

But of course, in addition to the deterministic component, there is also an idiosyncratic element to household consumption, e.g., shocks experienced by the households or other unobservable characteristics such as entrepreneurship, industry etc. In order to account for that, a second component has to be included in the predicted consumption. This component is estimated based on the correlation coefficient of the estimated error term obtained from the consumption model for the two years. If a point estimate of this error term is constructed, it can be used to derive point estimates for the mobility measure. If not, an upper or lower bound of the mobility estimates is obtained by making an upper or lower bound assumption on this correlation. The predicted consumption in 2010/11 of each household appearing in 2003/04 is the sum of these components.

For this application in Nepal, we use the so-called "bounds" method and the reported mobility measures are lower bound estimates. A more formal description of this methodology is provided in Annex 2.

Source: Based on Dang and Lanjouw (2013); Dang et al. (2014).

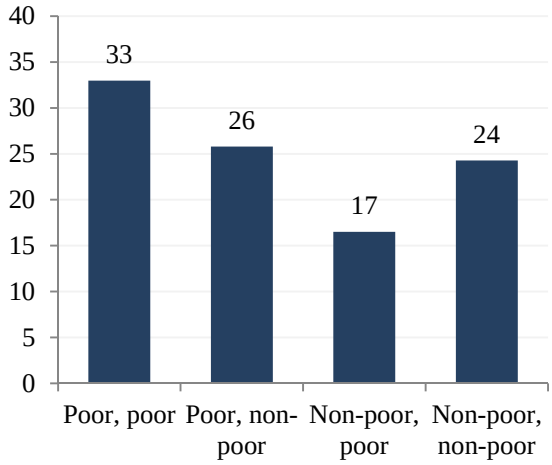
3.1. Poverty Transitions

Using this methodology, we are able to carry out a dynamic analysis of poverty in Nepal in a way that has not been done before. The current understanding of poverty is static and it is not always fully appreciated that the poverty rates that are reported are net rates. They obscure two crucial and contrasting phenomena of people falling into poverty and people escaping poverty. People who fall into poverty and who are never able to escape poverty are distinct and the policy response necessary to address the needs of these two disparate groups is also often likely to be different. For those who remain trapped in poverty, the chronic poor, enhancing mobility may require focusing on expanding access to economic opportunities. This includes opportunities to build assets (human capital) in childhood and opportunities to command a return on these assets through a fair access to the marketplace for jobs in adulthood. For those vulnerable to falling

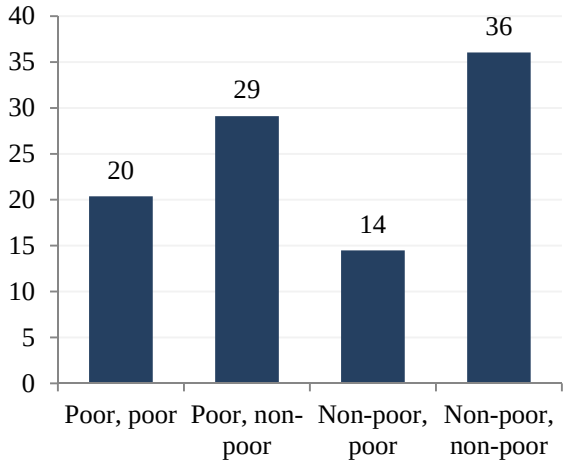
back into poverty on the other hand, what may be required is strengthening the coverage, reach and if needed also the generosity of social protection and safety net systems.

Figure 4: Episodes of movements in and out of poverty (% of population)

(a) Episode between 1995/96-2003/04



(b) Episode between 2003/04-2010/11



Source: World Bank staff calculations using data from three rounds of NLSS data for 1995/96, 2003/04 and 2010/11. The methodology used is called the synthetic panel methodology and is described in Annex 2.

What is the relative size of these groups in Nepal? We answer this question for two poverty reduction episodes between 1995/96 and 2003/04 using data from three rounds of the NLSS data. Recall that the headcount poverty rate using the comparable 2010/11 poverty line declined by 14 and 19 percentage points respectively during these two episodes. From what is presented in Figure 4, what we see is that if 26 percent of the population escaped poverty between 1995/1996 and 2010/11, 17 percent actually fell into poverty during the process. Likewise, between 2003/04 and 2011, 29 percent moved out of poverty while 14 percent fell back in. This essentially implies that that for every 2 Nepalis that got out of poverty in 2010/11, one slid back.

The figure also shows that there is a sizeable persistence of poverty status over the years. In both episodes, roughly three out of five Nepalese who were found to be poor in the latter period were actually already poor in the beginning period. There are different ways of thinking about chronic poverty, but if we consider households to be chronically poor if they are found to be poor in two consecutive survey rounds separated roughly by seven years in the case of Nepal, then we may conclude that roughly 60 percent of those that are found poor for any given year actually suffer from chronic poverty.

This definition is admittedly very simplistic. Among others, it does not take into account, for example, the duration or chronicity of poverty. For instance, a household that is poor in the first period, escapes poverty immediately the subsequent year and remains out of poverty only to fall right back in exactly the year of the follow-up survey would be identified as chronically poor. Conversely, another household that may have toiled for a majority of the intervening years in poverty, escaping only in the year of the follow-up survey may be characterized at non-chronic poor. There may be several other desirable characteristics we may want our measure of chronic poverty to pick up on, but all of them are likely to place heavy demands on data. The spirit of this analysis and the presentation of these numbers is to begin to ask the question about

concretizing the definition of chronic poverty and to use the synthetic panel methodology to present some numbers to stimulate discussion and debate around it. Chronic poverty in Nepal is currently understood in terms of associational characteristics of the underlying population. For example, blanket statements characterizing the entire population of people living in Karnali or belonging to particular social groups such as Terai Dalits as being in chronic poverty may either go entirely uncontested or even if there is any contestation, there may be very little by way of analytics to qualify that statement. The objective is to pique the interest of policy makers not just on the issue of chronic poverty, but also on the kind of data required to measure it in a more holistic manner.

3.2. The Vulnerable and Middle Class

This concept of poverty transitions, in particular the notion of the risk of falling into poverty, can be taken a little bit further to define a more general definition of vulnerability. Like chronic poverty, vulnerability is also widely acknowledged as a critical dimension of welfare in Nepal. But defining a broader class of vulnerabilities or the size of the Nepali population facing these vulnerabilities has been difficult. Heuristic constructs such as the size of the "population clustered just above the poverty" line have been used to define and gain analytical traction on the vulnerable group. For policy formulation and targeting purposes, social and demographic characteristics of the population (e.g., children, elderly, widowed) have been the preferred markers of vulnerability.

As the recent earthquake has amply shown, there is a high degree of vulnerability to natural disasters in Nepal. These vulnerabilities are heightened if one considers the increased frequency with which these disasters are likely to occur due to climate change. Beyond catastrophic shocks such as floods, droughts, landslides, forest fire etc. that can lead to direct loss of lives and severely affect livelihoods, a large proportion of Nepalis also face sharp variation in income simply as a result of variation in monsoon rainfall. Now if credit markets were to work well and if households were able to insure against these shocks, one would expect consumption and living standards to not be affected by much. But as shown recently by Tiwari et al. (2017), households in rural Nepal in particular, are far from being shielded from such risks. In fact, by their estimates, the level of exposure is such that a monsoon rainfall that is 10 percent below the historical norm can lead to a 0.12 standard deviation decline in the height-for-age for children.

Using the three rounds of the living standards data and applying the vulnerability of falling into poverty method developed by Lopez-Calva and Juarez-Ortiz (2011), we define a "vulnerability line" as the level of consumption below which a particular household has larger than 10 percent probability of falling back into poverty. In other words, all households that are above the poverty line but below this vulnerability line are categorized as vulnerable. Why do we do this instead of anchoring the definition of vulnerability along a more absolute concept, such as say, a multiple of the poverty line as it is sometimes done? We do it in order to align ourselves to Sen's (1983) statement that "poverty is absolute in the realm of capabilities but relative in the realm of *functionings*". Extending that notion to vulnerability, this approach takes an absolute stance on what it means to be vulnerable (when a household's probability of falling into poverty is larger than 10%) but a "relative" position on how much income or consumption is required to achieve that capability.

An additional benefit of the methodology we use is that it allows us to get at the notion of the middle class almost as an immediate byproduct. The vulnerability line thought of as described above by definition, forms the "lower threshold" for the middle class population. That is, if, as a household, your income or living

standards is such that you are not vulnerable to falling into poverty, then you probably belong to the middle class. The question that arises is on what is the "upper threshold" of this middle class. Or in other words, what is the level of consumption that distinguishes the middle class from the top strata, the upper class, or the elite?

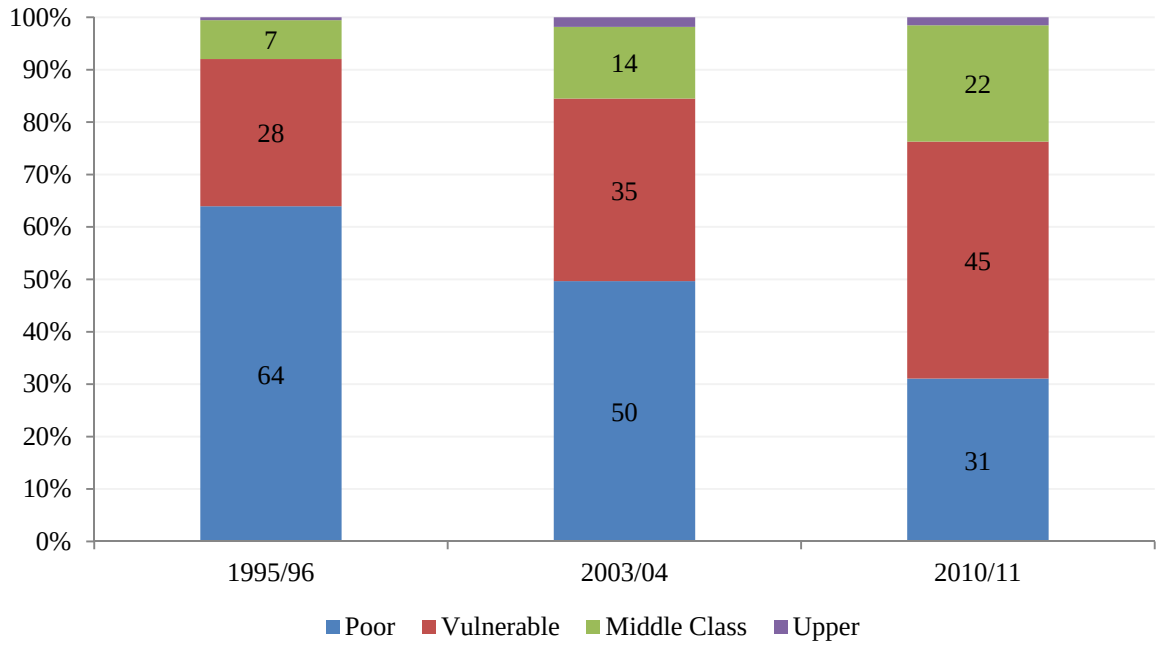
Here the literature offers a number of suggestions. Based on their analysis of household consumption data from 13 developing countries including India and Pakistan, Banerjee and Duflo (2008) propose from $2 to $4 per person per day as lower and upper thresholds respectively for the middle class. A global study of the middle class conducted by the Asian Development Bank defined the middle class in Asia (including Nepal) as those with consumption between $2 and $20 per person per day.[1] In our case, the lower threshold is determined by the vulnerability line which translates to roughly $3 per person per day in 2014 in 2011 PPP terms. For the upper threshold, we inspect the consumption distribution and pick a value that comes to about $8 per person per day in 2014. Even though this choice is somewhat arbitrary, it is between the global upper thresholds of $4 and $20 per person per day. Besides, given how thin the consumption distribution is at that level, the effect of the choice has minimal impact on the size of the middle class. In other words, the size of the middle class is much more sensitive to the choice of the lower threshold than the upper threshold.

With the definition of the vulnerable and the middle class clarified, we can now examine the relative sizes, trends and the various characteristics of these groups in Nepal. The results presented in Figure 5 show that as the proportion of the poor has declined in Nepal, there has been a corresponding growth in the size of the vulnerable population from 28 percent in 1995/96 to 45 percent in 2010/11. During the same period, there has also been quite a remarkable growth in the size of the middle class population in Nepal with the proportion increasing from 7 percent in 1995/96 to 22 percent in 2010/12.

Some familiar patterns appear when we analyze the characteristics associated with being vulnerable or belonging to the middle class. Close to half of the urban population is in the middle class while half of the rural areas is in the vulnerable category. Middle class prevalence is the highest in the Central Development region while the Mid and Far Western Regions have the highest poverty and vulnerability. Vulnerability in the *terai* is higher than in the hills and the mountains and since the *terai* is also more populous, the number of vulnerable is also higher there. Chances of being in the middle class are highest in the hills and lowest in the mountains but the absolute size of the middle class is, again, larger in the *terai* owing to its higher population. (See Figure 6.)

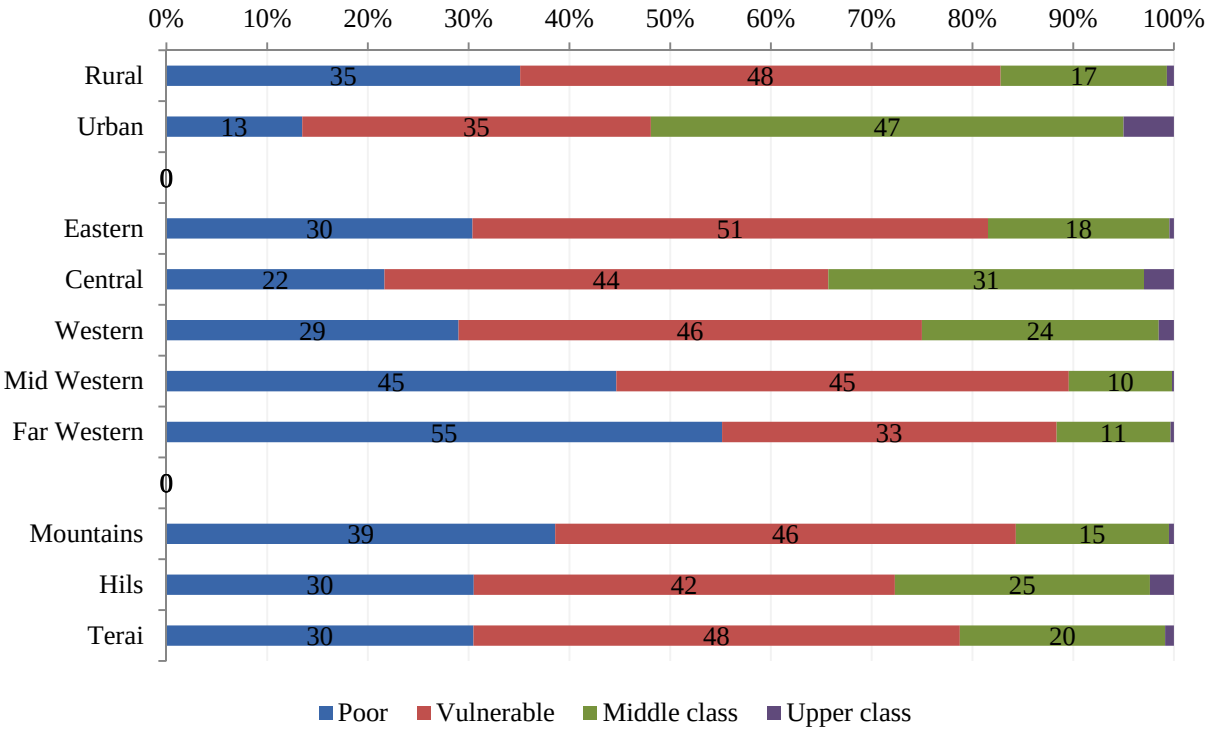
Figure 5: The Poor, Vulnerable and the Middle Class in Nepal

[1] A number of other efforts have been made to define the middle class globally. Birdsall (2010) and Birdsall et al. (2011) proposed a relative concept of the middle class defined as those between 75% and 125% of any society's median income. The notion that the definition of the middle class should be differentiated between developing countries and other, wealthier nations has also been noted quite generally. Ravallion (2010) for example proposed consumption level between $2 and $13 as middle class for developing countries while the "Western middle class" line is anybody above the US poverty line. But a lot of these approaches end up lumping the poor and the vulnerable into the middle class category.



Source: World Bank staff estimates based on data from three rounds of NLSS data for 1995/96, 2003/04 and 2010/11
Notes: The consumption aggregate used in this analysis is the 30-day recall version which is not the version used for official poverty estimates for 2010/11.

Figure 6: Geographic Characteristics of the Poor, Vulnerable and the Middle Class, 2011

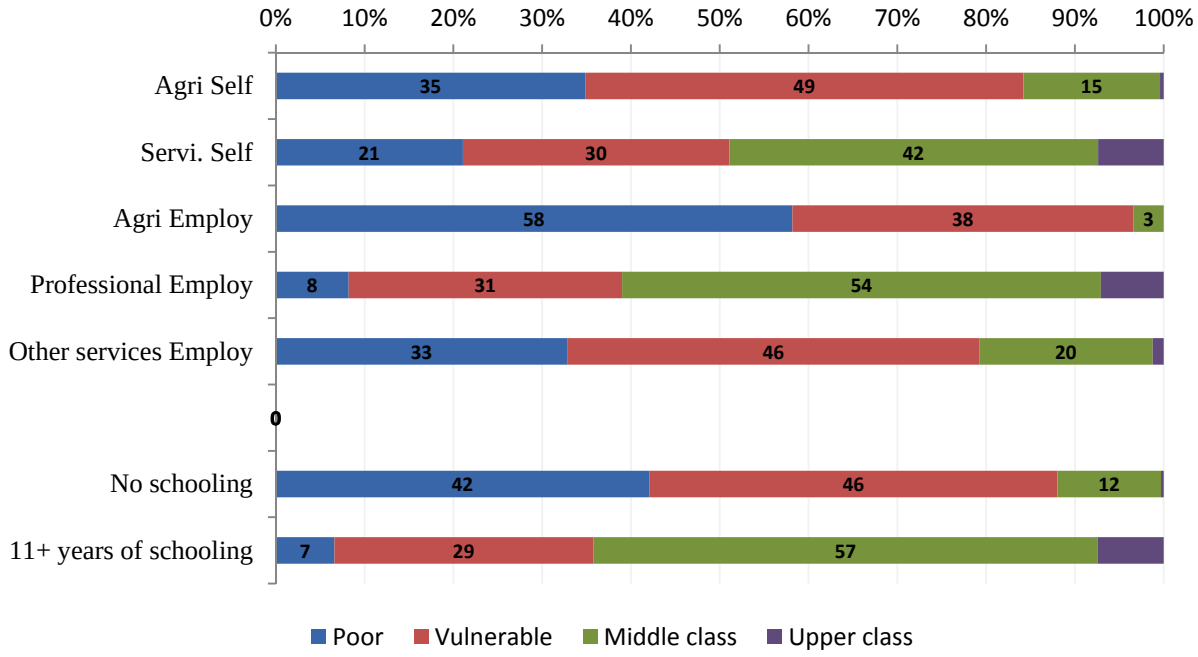


Source: World Bank staff estimates based on data from three rounds of NLSS data for 1995/96, 2003/04 and 2010/11

Looking at education and employment characteristics, it is clear that the likelihood of being in the middle class is significantly higher for households headed by those with more than 11 years of education.

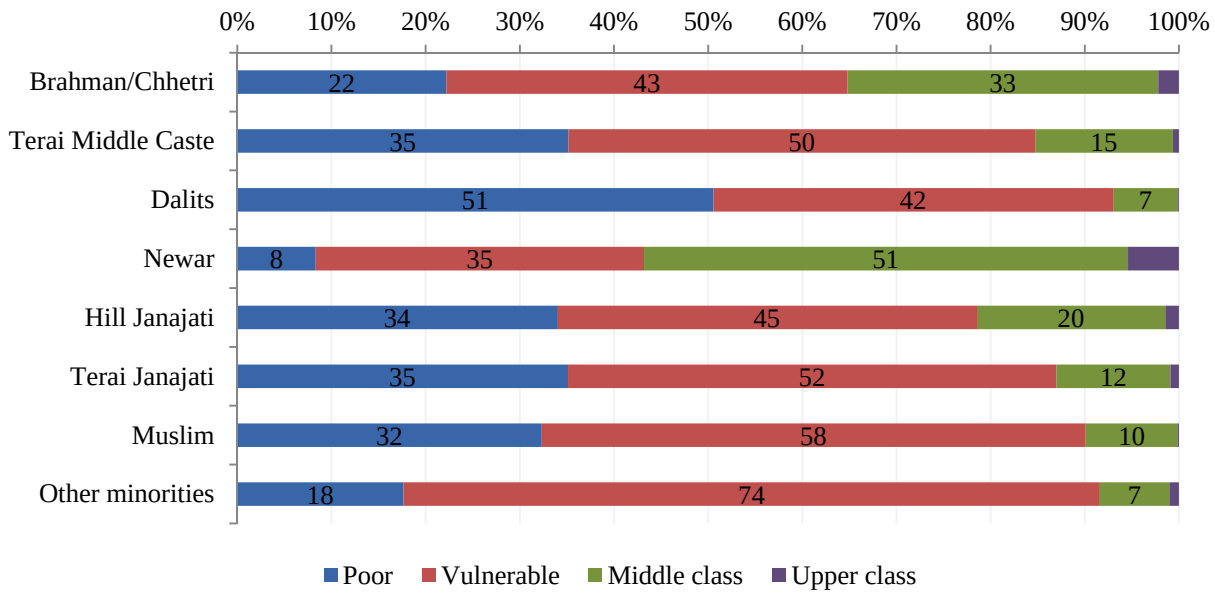
Households with uneducated heads are significantly more likely to be poor or vulnerable. Middle class households appear to be generally further away from agricultural employment and the likelihood of being in the middle class is highest among Nepalis who are in salaried professional employment or in other forms of self-employed services. Vulnerability on the other hand is highest among those self-employed in agriculture and service sector employment, most likely in blue collar occupations. (See Figure 7.) Overall, poverty and vulnerability are highest among households deriving their livelihoods from wage employment in agriculture. Among the various caste/ethnic groups, middle class prevalence is highest among Newars, followed by Brahmin/Chhetris and Hill Janajati groups. Dalits have the lowest middle class prevalence. Vulnerability on the other hand is highest for Muslims and other minorities, Terai Janajatis and Terai Middle Castes and lowest among Newars. (See Figure 8.)

Figure 7: Distribution of the Poor, Vulnerable and the Middle Class in 2011 by Education and Occupation of the Household Head



Source: World Bank staff estimates based on data from three rounds of NLSS data for 1995/96, 2003/04 and 2010/11

Figure 8: Distribution of the Poor, Vulnerable and the Middle Class in 2011 by Household Head Caste and Ethnicity



Source: World Bank staff estimates based on data from three rounds of NLSS data for 1995/96, 2003/04 and 2010/11

4. Perceptions of Mobility

In the preceding sections, we introduced, defined, described and characterized various notions of economic and social mobility in Nepal. A question that we attempt to answer next is the extent to which our findings square with perceptions about mobility. Do Nepalis feel and experience this mobility? Do they feel that they have necessarily done better than their parents? Do they expect their children to do better than their parents? Even within their lifetimes, do they expect to do better than their current economic and social position? We can answer some of these questions using data collected specifically for the purpose in Nepal and data from other global data sources such as the Gallup World Survey.

4.1. Conceptual Background

How inequality is perceived can often be very different and disconnected from the actual level of inequality in society. Perceptions naturally have a strong correspondence with every individual's actual experience with inequality, and are likely to be influenced and shaped not just by the extent of the magnitude of inequality but also by beliefs about the underlying processes that generate the observed inequality. For example, inequality generated by growth processes that are dynamic, broad based and rooted firmly in meritocratic principles of rewarding effort, talent and superior life choices (e.g., studying hard and getting higher education) are likely not to be too objectionable to most. Some may even say such inequalities are necessary to create the right incentives for enterprise, industry, innovation and risk taking. But inequality generated by special privileges (or the lack thereof) associated with circumstances determined by and large by the lottery of birth (one's gender, ethnicity, race, parental wealth, etc.) is likely to be regarded very differently. For the same level of inequality, inequality perception may be entirely different in two societies where these two opposite "inequality generating processes" operate.

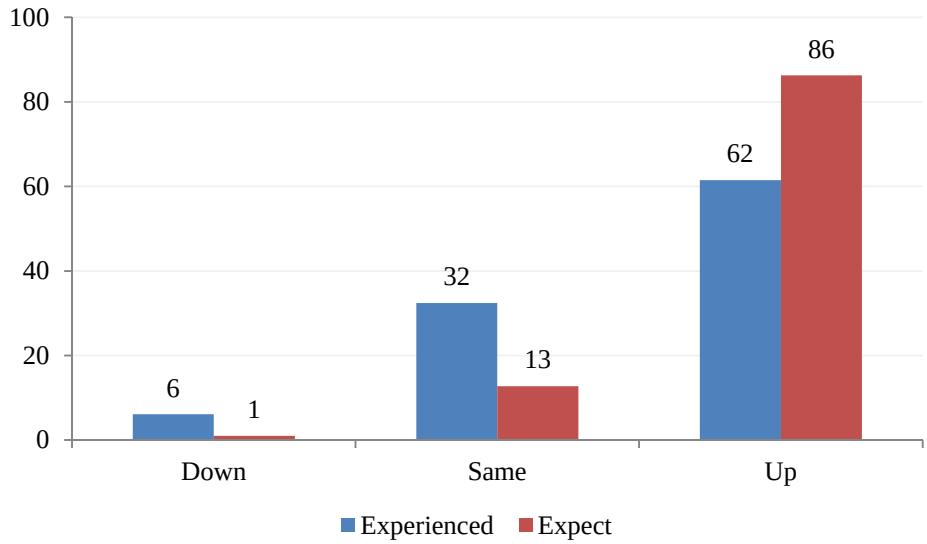
Core beliefs about ideas of justice and fairness are important as well. If individuals subscribe to value systems that are rooted strongly in egalitarian principles, their aversion to inequality (for any given level of inequality) may be higher than others and that may drive perceptions. These beliefs can be inculcated early in life with parents teaching their children to believe in a just world that rewards effort, educational investment and perseverance as opposed to thuggery and deceit to induce the right incentives (Benabou and Tirole, 2006). Or they can be manipulated through other inducements such as political indoctrination as shown by the differences in preferences for redistribution between East and West Germany despite having the same political and economic system prior to the separation (Alesina and Fuchs, 2007).

Perceptions about inequality are likely to be formed in a distinctly dynamic manner. As societies evolve, creating opportunities for some and not for others, they allow some to prosper while keeping others in penury and destitution. An individual's own experience with this mobility may also determine how he/she perceives inequality. For example, an individual who is able to "ride the wave" and realize rank improvements in his own household income, despite a widening income distribution, may perceive inequality to be lower than somebody else in a different society with lower inequality but with limited prospects for upward mobility. As growth takes off inequality begins to rise, and in these early stages the tolerance for inequality, even among the poor, is fairly high. This is because in the growing inequality they see an opportunity for a better life for themselves and for their children. However, if the process of growth is such that it cannot deliver rising incomes for those in the bottom of the income distribution or in the extreme case, if the attendant rise in inequality ends up stifling prospects for economic betterment at the bottom of the distribution, then this will also be associated with disenchantment with the overall process.

4.2. Analysis of Perceptions of Mobility

Now, using data from the survey carried out in 2014, we examine mobility experienced by households based on their self-assessed position in the "economic ladder" relative to where they were five years ago. If the respondent placed the household at a higher rung relative to where they considered themselves to be five years ago, we interpret that rank improvement as upward mobility. Similarly, if the household is placed at a lower rung of the ladder than where it was five years ago, we regard that as downward mobility. The household is deemed to have experienced no mobility if the rank is reported unchanged. The survey also asked about expected position in the same ladder five years from the time of interview and we use responses to that question relative to the current position to define expected upward, downward or no mobility. The results are presented in Figure 9 and show that 62 percent of Nepalis have experienced upward mobility, 6 percent have experienced downward mobility and 32 percent remained unchanged. Considering expected mobility, an overwhelming 86 percent of Nepalis expected to do better in the future with only a small fraction, 1 percent, expecting to do worse.

Figure 9: The Proportion of Nepalis Moving Up, Down or remaining the Same in the Economic Ladder



Source: World Bank staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014

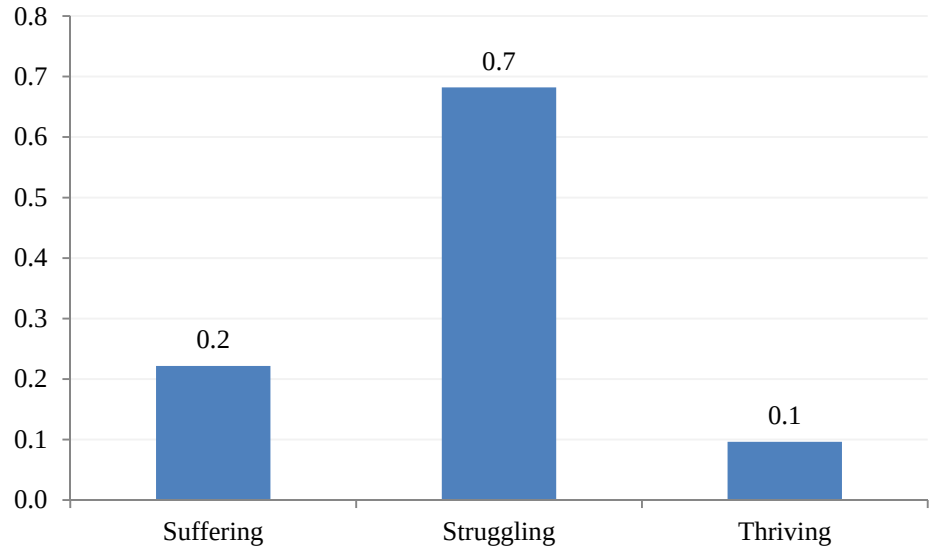
Households in urban areas, in the Western Development region, in the hills, with heads employed in semi-skilled, non-agriculture sector, in the top 40 percent of the wealth distribution and with both domestic and overseas migrants have the highest odds of perceiving upward mobility. In contrast, households in rural areas, in the Far Western Region, in the mountains and the Terai, and the bottom two quintiles are likely to have higher odds of lower mobility. Expected upward mobility, on the other hand, is highest in Mid-Western region, mountains and lowest in the Terai and among semi-skilled workers in non-agricultural sectors. The fact that this latter group has experienced the highest upward mobility among all other occupation categories and yet is also the group that has the lowest expectation of upward economic mobility underscores an important aspect of the nature of structural transformation that has underpinned Nepal's living standards improvement. The growth in labor income that has driven the improvements in living standards at the bottom of the distribution have come from expansion of opportunities as well as the rise in low productivity service sectors in rural as well as urban areas. But given the high degree of informality as well as the low prospects for productivity growth in these sectors, there is a dimmer outlook for continued improvements in living standards into the future. This is the population that constitutes Nepal's growing vulnerable class.

This point is supported by evidence from other sources of data. Gallup World Survey, for example, also asks respondents similar questions about their perceived position in an 11-step Cantril ladder denoting various parts of the economic distribution within each country. Respondents are asked about current position as well as positions five years before the survey and expected position five years hence. Based on responses to these three questions, Gallup defines households as thriving, struggling or suffering. Thriving households have strong current life situation and have positive views about the next 5 years. Struggling households have wellbeing that is moderate but inconsistent while suffering households have well-being that is at high risk, they report poor ratings of their current life and also poor outlook for the future. Based on cross-country analysis of these categories, Gallup has found thriving respondents to have fewer health problems, less worry and stress, sadness and anger and more happiness, enjoyment, interest and respect. Struggling households on the other hand report higher daily stress, and worry about money than thriving

respondents. Suffering households on the other hand are likely to be lacking in basic food and shelter and report to be under physical pain, stress, worry and sadness. They carry more than double the disease burden as "thriving" respondents within each country.

Using data from Gallup for Nepal, we find that 90 percent of Nepalis fall in the suffering or struggling categories. In contrast, only 10 percent of the population actually falls in the thriving category (Figure 10). Juxtaposing this with the earlier result on the size of the middle class, it appears that even though there is a nascent middle class building up in Nepal, roughly half of this group is fundamentally insecure about the prospects of realizing continued improvements in its living standards.

Figure 10: The Proportion of Nepalis Struggling, Suffering and Thriving



Source: World Bank staff estimates based on data from Gallup World Survey. The numbers presented are country averages for the 2007-2014 period.

In the qualitative survey carried out for this analysis, respondents were asked about what they saw as key characteristics of the middle class in Nepal. In both in-depth interviews and focus group discussions, an overwhelming majority of respondents/participants associated being in the middle class with being engaged in relatively secure professions such as government jobs, teaching, medical and engineering professions, and other forms of private sector salaried employment. This association was reinforced by widespread recognition among respondents that economic prospects of those in this group hinge more critically on professional skills and labor as opposed to things like inherited capital and other forms of financial assets. This view is consistent with what has been noted in the literature on middle class. The primary driver of Nepal's recent growth in living standards has been either workers' remittances or increased employment and wages in low to semi-skilled professions largely in informal service sectors. As a result, it appears that even though a majority of Nepalese today may not be in poverty directly, they are still struggling to attain the level of economic security required to be comfortably ensconced in the middle class.

5. Conclusions

In this paper, we introduce a variety of concepts and methods to look at living standards improvement in Nepal in a dynamic perspective. Economic and social mobility is a fundamental equalizer and structural inequalities will typically decrease in societies where individuals from all segments of the population can participate in the growth process. From an intergenerational perspective, a society in which children can aspire to achieve and indeed can achieve levels of education, jobs, and living standards that are materially different from the levels enjoyed by their parents is a society that will automatically begin to redress some of these inequalities. Mobility is not just important from the point of view of equity, it also has efficiency benefits. If talent is distributed more equally in society than the opportunities to exercise these talents, then a mobile society will be better able to mobilize and utilize these talents by allowing people from all segments of society to contribute to the growth process. A mobile society in which individuals from all walks of life, including those with historical disadvantages, can succeed or fail based on nothing else but their effort and hard work, will also have higher levels of motivation and effort and this will have implications for growth.

Our analysis shows that there has been significant upward mobility in educational attainments as a majority of Nepalis today are better educated than their fathers. Intergenerational mobility, on average, has been less spectacular with about 43 percent of Nepalis expecting to be in better occupations than their fathers while 47 percent is likely to remain in the same occupation as their father. Expected upward mobility is uniformly larger for younger cohorts consistent with the expansion of mass education in the last three decades. Upward occupational mobility too has an age gradient with a discontinuous jump of about 10 percent for cohorts that are likely to have been in their formative years (in school) around the time the Nepali economy liberalized creating newer opportunities in the labor market. Looking across different social groups, Newars, followed closely by hill Brhamins and Chhettris have the best odds of surpassing their father's education and occupation levels. On the other hand, Nepalis in Muslim and other minority caste categories followed by Terai Brahmin Middle Caste, and Dalit categories have the lowest odds of doing so. Finally, the odds of upward mobility are significantly better for households who have managed to also be mobile spatially. That is, individuals born in rural Nepal but currently living in urban areas have significantly better odds of doing better than their fathers than individuals who were born in rural areas and continued to stay in rural areas.

We also introduced and used synthetic panel methodology to show the extent of directional income movement within a generation. In particular, we used this technique to unpack net poverty movements and disentangle the proportion of Nepali population falling into and out of poverty. Our results show that for every two Nepalis moving out of poverty in the last couple of poverty reduction episodes, there is one Nepali falling back into poverty. Alongside these movements in and out of poverty, our results also suggest a sizeable persistence in poverty status: based on data from the three rounds of NLSS, we conclude that 60 percent of those that are found to be poor in any given year actually suffer from chronic poverty.

Generalizing, the notion of the risk of falling into poverty, we propose a distinctly economic definition of vulnerability that we argue is an improvement over heuristic definitions such as the level of clustering above

the poverty line or other absolute lines such as 2 times the poverty line. Households are considered vulnerable if they are non-poor but have more than 10 percent likelihood of falling into poverty. We also define middle class households as those with a relatively low likelihood of falling into poverty (less than 10%). Using these definitions, we find the size of the vulnerable and middle class population to be 45 percent and 22 percent respectively. An analysis of trends suggests that the growth in the size of the vulnerable as well as the middle class population has been increasing steadily over the years in Nepal.

Perceptions data as well as results from qualitative surveys generally suggest that Nepali households have experienced robust upward economic mobility along the economic ladder in recent years, but this mobility stands on fragile grounds. Based on data from Gallup and definitions of welfare that take into account realized mobility together with expected mobility, a significantly larger fraction of Nepalis is found to be either suffering or struggling as opposed to thriving. This implies that while Nepal has had a tremendous success in lifting people out of poverty, a majority of Nepalis is either directly at risk of falling back into poverty (more than 10% probability) or even if not directly vulnerable in this sense, they constitute what some have called the "struggling middle class".

From the point of view of policy, the conclusions in this paper point to three key areas of priority. First, the unevenness in the mobility experience across people of different caste/ethnic groups and urban/rural location together with the high incidence of chronic poverty reinforces the call for policies that help equalize opportunities across space and across social groups. The point that not all Nepalis have benefitted in the same manner comes out quite strong. Second, the high degree of vulnerability and transitions around the poverty line with roughly one Nepali falling back into poverty for every two that escape suggests the need to strengthen social protection systems, particularly those that insure households against a variety of income shocks. A particular area of emphasis here should be on designing systems that are able to target and deliver assistance based on broader, income based notions of vulnerability through vehicles such as means tested conditional cash transfers. The recent earthquake that Nepal suffered was a violent and high profile example of a natural disaster wiping out the livelihoods of a large number of Nepalis. As important as it is for the government to respond to this specific emergency, this should also serve as a galvanizing opportunity to design systems that can respond in a more systematic and agile manner to smaller but more frequent and numerous shocks many Nepalis routinely grapple with.

Finally, while policies to directly address chronic poverty, lack of opportunities and vulnerability remain important priorities in Nepal, there is also a critical need to consider policies that facilitate transition into the middle class. The growth of the middle class is widely regarded as the bedrock for the development of stable and prosperous societies. The middle class group is typically associated with high entrepreneurial activity, high investment in human capital, and progressive political and economic value systems. (See Ferreira et al., 2011; Easterly, 2001.) The middle class group often also acts as a neutralizing force between the extractive tendencies of the elites and the revolutionary tendencies of the poor. As such, societies with a large and diverse middle class are often stable societies. The middle class is a source of demand for consumer goods and services and can provide much needed succor for the development of domestic industries not just in manufacturing but also in high value services such as tourism and banking. It can also be a robust voice in the demand for good governance and the provision of quality services which will indirectly also benefit the poorest. Unlike the strugglers, a secure middle class can afford a longer planning horizon and is thus more willing to trade off private costs in the short run for reforms that will yield better public and collective goods such as quality schools, health care, roads and the environment.

Building prosperity for a majority of Nepalis will entail not just safeguarding and cementing the gains already made, but also boosting productivity of the economy in a manner that will help them realize higher income levels. Work related migration, primarily to overseas destinations, has been a critical driver of mobility experienced by Nepalis over their lifetimes and across generations. But taking it to the next level and building a robust middle class will require the creation of good jobs in a large enough scale for those that remain in Nepal.

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Annex 1: Correlates of Upward Mobility (by age, ethnicity and urban-rural status), OLS

VARIABLES *Reference: Born After 1995*	(1) Better educated than father	(2) Better occupation than father
Born 1985-1995	-0.02	0.18***
	(0.01)	(0.01)
Born 1975-1985	-0.08***	0.21***
	(0.02)	(0.01)
Born 1965-1975	-0.16***	0.15***
	(0.02)	(0.01)
Born before 1965	-0.23***	0.15***
	(0.02)	(0.02)
Constant	0.72***	0.09***
	(0.01)	(0.01)
VARIABLES *Reference: Hill Brahmins*		
Hill Chhettri	-0.02	-0.02
	(0.02)	(0.02)
Terai Brahmin & Middle Caste	-0.16***	-0.07***
	(0.03)	(0.03)
Dalit	-0.09***	-0.10***
	(0.03)	(0.02)
Newar	0.07**	0.01
	(0.03)	(0.03)
Hill Janajati	-0.09***	-0.03
	(0.03)	(0.02)
Terai Janajati	-0.05*	-0.05*
	(0.03)	(0.03)
Muslim and Others	-0.17**	-0.13**
	(0.07)	(0.06)
Constant	0.70***	0.25***
	(0.02)	(0.02)
VARIABLES *Reference: Born rural, lives rural*		
Born rural, lives urban	0.08***	0.14***
	(0.01)	(0.01)
Born urban, lives urban	0.05***	0.05***
	(0.02)	(0.02)
Constant	0.63***	0.19***
	(0.01)	(0.01)

Notes: Standard errors in parentheses. * Significant at ten per cent; ** significant at five per cent; *** significant at one per cent.
Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014.

Annex 2: The synthetic panel methodology and its application to Nepal

A proper study of economic mobility that is being proposed has fairly demanding data requirements. At the minimum, it is necessary to be able to observe the same household in at least two time periods and the richer the amount of information available on the household, the richer the analysis that can be done. These "panel data sets" as they are called are fairly hard to come by in many developing countries. In the case of Nepal, the three rounds of NLSS that have been completed have an integrated panel component, i.e., a subset of the sampled households have been tracked over time, but due to sample attrition, it has been found that the surviving households are no longer representative of the nation as a whole.

As the name suggests, the proposed methodology overcomes these shortcomings and builds on an imputation based methodology to construct a "synthetic panel" that makes it seem like the same households were observed in two time periods. The approach relies fundamentally on time-invariant individual and household characteristics. Specifically, it entails predicting consumption of households surveyed in time *t* for period *t-k* using the estimated "returns" to these time-invariant characteristics in period *t-k*. The comparison of "predicted" consumption in *t-k* with the actual consumption in period *t* forms the basis of the analysis of mobility, particularly movement in and out of poverty.

To write more formally, consider two rounds of cross sectional surveys (denoted as rounds 1 and 2) and let y_1 and $y_2$be the corresponding consumption for the two rounds (these are consumption for household *i*, but we suppress those subscripts). For a given poverty line, say, *z*, we are interested in estimating (a) the fraction of poor households in the first round who escaped poverty ($\Pr(y_2 > z | y_1 < z)$) or remained in poverty in the second round, ($\Pr(y_2 < z | y_1 < z)$); (b) the fraction of non-poor households in the first round who became poor ($\Pr(y_2 < z \mid y_1 > z)$) or the fraction of non-poor households that remained non-poor ($\Pr(y_2 > z \mid y_1 > z)$). However, this cannot be done in a straightforward manner because of the fact that we do not observe the same household in the two periods.

Instead we apply the synthetic panel methodology in the following steps:

STEP 1: Estimate the relationship between consumption and time invariant characteristics in each round and obtain estimates for $\widehat{\beta_i}$ and $\widehat{\varepsilon_i}$ for *i = 1, 2.*

$$y_1 = \beta_1 x_1 + \varepsilon_1 \qquad (1)$$

$$y_2 = \beta_2 x_2 + \varepsilon_2 \qquad (2)$$

STEP 2: Use the estimates of $\widehat{\beta_1}$ and the error term to predict period 1 consumption for households surveyed in period 2. Since we do not a priori know the empirical distribution of the correlation between ε_1 and ε_2 we consider two extreme cases and use the two scenarios to define the upper and lower bounds of mobility. In one case, we assume there is zero correlation between the error terms. In this case, the income prediction for the first round is done by randomly drawing with replacement from the empirical distribution of the first-round estimated residuals for each household *i* in the second round. Thus, the period 1 predicted household consumption for each household surveyed in period 2 can be written as:

$$\hat{y}_1^2 = \widehat{\beta_1} x_1^2 + \widehat{\varepsilon_1^2} \qquad (3)$$

Using the predicted consumption from equation (3), we can obtain estimates of movements in and out of poverty. For example, the fraction of poor households in the first round that escaped poverty in the second round is given by:

$$\Pr(y_2^2 > z \mid \widehat{y_1^2} < z) \qquad (4)$$

Two things are important to note here. Since we are drawing from the empirical distribution of estimated errors, we need to repeat this procedure *R* number of times and take the average of equation (4) to get the measure of mobility. Second, we assume zero correlation between the error terms in (1) and (2) the measure of mobility obtained by this procedure is the upper bound, or maximum mobility. We can make an assumption on the other extreme – that the correlations of the idiosyncratic shocks are perfect and positive – and add more "persistence" and "stickiness" to the vector of consumption. This would give us the lower bound estimate of mobility. In this case, instead of what is written in (3) we would estimate the period 1 predicted consumption for each household surveyed in period 2 as:

$$\hat{y}_1^2 = \widehat{\beta_1} x_1^2 + \widehat{\varepsilon_2^2} \qquad (3)$$

where $\widehat{\varepsilon_2^2}$ is the predicted residuals from (2) above. In this case, we would not be drawing from an empirical distribution but using actual predicted residuals for every household; thus we would not have to perform *R*-replications.

Annex 3: Economic and Spatial Characteristics of Perceived and Expected Mobility

VARIABLES	Experienced Upward Mobility	Expect Upward Mobility	Experienced Downward Mobility	Expect Downward Mobility
A. URBAN/RURAL				
Reference Category: Rural				
Urban	0.03***	-0.02**	-0.02***	-0.00
	(0.01)	(0.01)	(0.01)	(0.00)
Constant	0.60***	0.87***	0.07***	0.01***
	(0.01)	(0.00)	(0.00)	(0.00)
B. REGION				
Reference Category: Eastern Region				
Central	-0.04***	-0.04***	0.01	0.01**
	(0.01)	(0.01)	(0.01)	(0.00)
Western	0.13***	-0.05***	0.01*	0.02***
	(0.02)	(0.01)	(0.01)	(0.00)
Mid-Western	-0.04*	0.04***	0.02*	0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Far- Western	-0.23***	-0.03**	0.04***	0.01**
	(0.02)	(0.02)	(0.01)	(0.00)
Constant	0.63***	0.89***	0.05***	0.00**
	(0.01)	(0.01)	(0.01)	(0.00)
C. BELT				
Reference Category: Mountains				
Hills	0.14***	-0.01	-0.05***	0.01***
	(0.03)	(0.02)	(0.02)	(0.00)
Terai	0.12***	-0.03*	-0.02	0.01***
	(0.03)	(0.02)	(0.02)	(0.00)
Constant	0.49***	0.89***	0.09***	-0.00
	(0.03)	(0.02)	(0.02)	(0.00)
D. OCCUPATION OF THE HOUSEHOLD HEAD				
Reference Category: Wage Labor in Agriculture				
Non Agri Wage Work (Unskilled)	0.14***	0.02	0.01	-0.00
	(0.03)	(0.02)	(0.01)	(0.01)
Non Agri Wage Work (Sem skilled)	0.18***	-0.04*	0.01	-0.00
	(0.03)	(0.02)	(0.01)	(0.01)
Non Agri Wage Work (High skilled)	0.16***	-0.02	0.00	-0.01
	(0.03)	(0.02)	(0.02)	(0.01)
Self-Employed Non-Agricluture	0.19***	-0.02	-0.00	-0.00
	(0.03)	(0.02)	(0.01)	(0.01)
Self-Employed Agricluture	0.13***	-0.02	0.01	0.00
	(0.03)	(0.02)	(0.01)	(0.01)

Constant	0.46***	0.88***	0.06***	0.01**
	(0.03)	(0.02)	(0.01)	(0.01)
E. WEALTH INDEX				
Reference Category: Bottom 20%				
Second Quintile	0.08***	-0.00	-0.01	0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Third Quintile	0.11***	-0.01	-0.00	0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Fourth Quintile	0.16***	-0.01	-0.02**	-0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Fifth Quintile	0.15***	-0.03**	-0.04***	-0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Constant	0.51***	0.87***	0.08***	0.01***
	(0.01)	(0.01)	(0.01)	(0.00)

Notes: Standard errors in parentheses. * Significant at ten per cent; ** significant at five per cent; *** significant at one per cent.
Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014.

Annex 4: Social and Demographic Characteristics of Perceived and Expected Mobility

VARIABLES	Experienced Upward Mobility	Expect Upward Mobility	Experienced Downward Mobility	Expect Downward Mobility
A. HOUSEHOLD HEAD LITERACY/EDUCATION				
Reference Category: Illiterate				
Basic Literacy	0.11***	0.05***	-0.02**	-0.01
	(0.02)	(0.01)	(0.01)	(0.00)
Primary	0.06***	0.03*	-0.01	0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Secondary	0.11***	0.04***	-0.01	-0.00
	(0.02)	(0.01)	(0.01)	(0.00)
SLC	0.08***	0.04***	-0.02**	-0.01
	(0.02)	(0.02)	(0.01)	(0.00)
Post-Secondary	0.10***	0.05***	-0.01	-0.01**
	(0.02)	(0.02)	(0.01)	(0.00)
Tertiary	0.10***	0.04**	-0.03**	-0.01**
	(0.03)	(0.02)	(0.01)	(0.00)
Constant	0.53***	0.83***	0.07***	0.01***
	(0.01)	(0.01)	(0.01)	(0.00)
B. CASTE/ ETHNICITY				
Reference Category: Hill Brahmin				
Hill Chhettri	-0.08***	0.02	0.03**	-0.00
	(0.02)	(0.02)	(0.01)	(0.00)
Terai Brahmin	0.07	-0.05	0.05	-0.01***
	(0.10)	(0.09)	(0.06)	(0.00)
Terai Middle Caste	-0.04	-0.03	0.05***	-0.00
	(0.03)	(0.02)	(0.02)	(0.01)
Hill Dalit	-0.04	0.01	0.01	-0.00
	(0.03)	(0.02)	(0.01)	(0.01)
Terai Dalit	-0.05	-0.03	0.02	-0.00
	(0.05)	(0.04)	(0.03)	(0.01)
Newar	-0.02	-0.06**	-0.01	-0.01*
	(0.03)	(0.02)	(0.01)	(0.00)
Hill Janajati	-0.03	0.03	-0.01	-0.00
	(0.03)	(0.02)	(0.01)	(0.01)
Terai Janajati	0.01	0.03	0.02	-0.00
	(0.03)	(0.02)	(0.02)	(0.01)
Muslim	0.02	-0.01	-0.05***	0.03
	(0.09)	(0.07)	(0.01)	(0.04)
Other	-0.24**	-0.09	0.18**	0.03
	(0.11)	(0.09)	(0.09)	(0.04)
Constant	0.65***	0.86***	0.05***	0.01***
	(0.02)	(0.01)	(0.01)	(0.00)

C. DOMESTIC OR OVERSEAS MIGRANT IN HOUSEHOLD				
Reference Category: No Migrant				
Has domestic migrant	0.03**	-0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.00)
Has foreign migrant	0.05***	-0.02	-0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.00)
Constant	0.59***	0.87***	0.06***	0.01***
	(0.01)	(0.00)	(0.00)	(0.00)
D. HOUSEHOLD DEMOGRAPHIC CHARACTERISTICS				
Household size	-0.01**	-0.00	0.00	0.00**
	(0.01)	(0.00)	(0.00)	(0.00)
No. of children (0-6)	-0.01	0.01	-0.01	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)
No. of elderly (65+)	-0.03***	-0.01	0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.00)
No. of adults (15-65)	0.02***	0.01**	-0.00	-0.00
	(0.01)	(0.00)	(0.00)	(0.00)

Notes: Standard errors in parentheses. * Significant at ten per cent; ** significant at five per cent; *** significant at one per cent.
Source: World Bank Staff estimates based on data from Perceptions of Poverty, Prosperity and Economic Mobility in Nepal, 2014.