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Rural Poverty Dynamics in Pakistan: Evidence from Three Waves of the Panel Survey

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1. INTRODUCTION

Poverty analysis in developing countries including Pakistan has in general focused on poverty trends based on cross-sectional datasets, with very little attention being paid to dynamics—of transitory or chronic poverty. Transitory poor are those who move out or fall into poverty between two or more points of time whereas the chronic poor remain in the poverty trap for a significant period of their lives. The static measures of households' standard of living do not necessarily provide a good insight into their likely stability over time. For instance, a high mobility into or out of poverty may suggest that a higher proportion of a population experiences poverty over time than what the cross-sectional data might show.[1] It also implies that a much smaller proportion of the population experiences chronic poverty contrary to the results of cross-sectional datasets in a particular year [Hossain and Bayes (2010)]. Thus, the analysis of poverty dynamics is important to uncover the true nature of wellbeing of population. Both the micro and macro level socio-demographic and economic factors are likely to affect poverty movements and intergenerational poverty transmission [Krishna (2011)].

A close look at the data on poverty levels and trends in Pakistan for the last five decades leads to two broad conclusions: first, poverty reduction has not been sustainable but has fluctuated remarkably; and second, a large proportion of the population has been found around the poverty line, and any micro and/or macro shock (positive or negative) is likely to have pushed them into poverty or to have pulled them out of it. But these poverty dynamics are generally not addressed in poverty reduction strategies of the country. The reason is that although the existing poverty literature in Pakistan is prolific in descriptive studies based on the cross-sectional household surveys such as the Household Integrated Economic Survey (HIES), studies on poverty dynamics, which need longitudinal datasets, are scant.

The few available studies on poverty dynamics in Pakistan have generally been based on two rounds of a panel household survey.[2] Their contribution to knowledge is

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[1]See for example, Adelman, *et al*. (1985), Gaiha and Deolalikar (1993) for India; Jalan and Ravallion (2001) for China; Sen (2003) and Hossain and Bayes (2010) for Bangladesh; Kurosaki (2006), Arif and Bilquees (2007), Lohano (2009) and Arif, *et al*. (2011) for Pakistan.

[2]See, for example, Kurosaki (2006), Arif and Bilquees (2007), Lohano (2009) and Arif, *et al*. (2011).

substantial, but data on more rounds (waves) uncover the dynamics more effectively. For example, the incidence of chronic poverty has generally been higher in two-round surveys than in surveys which had more than two rounds, suggesting that there could be only a small proportion of population that remains in the state of poverty for extended period of time. Effective and right policies, based on the philosophy of inclusiveness, can bring them out of poverty, which could be a big socio-economic achievement for a developing country like Pakistan.

The major objective of this study is to analyse the dynamics of rural poverty in Pakistan using the three waves of a panel household survey carried out by the Pakistan Institute of Development Economics (PIDE) in 2001, 2004 and 2010. This analysis of poverty dynamics is important from both the micro and macro perspectives. From micro-perspective, demographic dynamics and change in household assets may have an impact on the poverty movements. Similarly, the macroeconomic situation, which fluctuated remarkably during 2001 to 2010—moderate growth during the first six years of 2000s and sluggish growth with double-digit inflation particularly the high food inflation since 2007—is likely to have affected a household's well-being. The earthquake in 2005 and floods in 2010 may also have lasting impact on the living standard of population.

The rest of the paper is organised as follows. A brief review of the literature on dynamics of poverty has been presented in Section 2, followed by a discussion on the data source, analytical framework and sample characteristics in Section 3. Cross-sectional poverty estimates have been discussed in Section 4 while the dynamics of rural poverty and its determinants are examined in Sections 5 and 6 respectively. Conclusions are given in the final section.

2. A BRIEF LITERATURE REVIEW

The findings of poverty dynamics studies carried out in different parts of the world during the last four decades are summarised in Appendix Table 1. The 'never-poor' category shown in the last column of this table shows the percentage of households (or population) that did not experience any episode of poverty during the different waves of the respective surveys. In contrast, the 'always-poor' category in the table represents the chronic poverty, proportion of households (or population) that remained poor in all rounds of the respective surveys. Although it is not possible from the data presented in Table 1 to find out a direct association between the number of waves and the proportion of households in the 'never-poor' category or in 'always-poor' category, the data do show that as the number of waves increases, the proportion of chronic poor (always-poor) as well as 'never-poor' in general declines with a corresponding increase in the transitory poverty (poor for some time).

The literature has identified several factors associated with the dynamics of poverty. The changing socio-demographic and economic characteristics of the household have been considered as the key drivers of chronic and transient poverty. The demographic characteristics such as larger household size and/or dependency ratio are associated with chronic poverty as they put an extra burden on a household's assets and resource base [Jayaraman and Findeis (2005); Sewanyana (2009)]. Changes in household size and age structures (young, adult and elderly) are also linked with the movements into and out of poverty because of their distinct economic consequences [Bloom, *et al.*

(2002)]. Additional children not only raise the likelihood of a household to fall into poverty but it also lead to intergenerational transmission of poverty due to reduction in school attendance of children with a regressive impact on poorer households [Orbeta (2005)]. Households headed by females are more likely to be chronically poor [John and Andrew (2003)]; majority of these women are serially dispossessed (divorced or widowed), therefore, may promote intergenerational poverty [Corta and Magongo (2011)]. The male-oriented customary inheritance system also disadvantages the female [Miller, *et al.* (2011)].

A number of studies have shown that the increase in human capital reduces the likelihood of being chronic poor or transient poor. Such evidence from literature has been found in the milieu of the education of household head [Wlodzimierz (1999); Arif, *et al*. (2011)] as well as the education of children, which helps to overcome the persistent poverty [Davis (2011)]. Regarding health, the inadequate dietary intake triggers off a chain reaction, leading to the loss of body weight and harming physical growth of children [Hossain and Bayes (2010)]. The households that have a permanent disabled person are relatively more likely to face persistent poverty [Krishna (2011)].

Both the chronic and transient poverty are also closely associated with the tangible and less-tangible composition of assets of the households [Davis (2011)]. It can be viewed in terms of land ownership [Jalan and Ravallion (2000); Arif, *et al*. (2011)], livestock ownership [Davis (2011)], possession of liquid assets [Wlodzimierz (1999)], remittances [Arif, *et al*. (2011)] and access to water, sanitation, electricity and ability to effectively invest in land [Cooper (2010)]. Mobility in land ownership is highly linked with transient poverty [Hossain and Bayes (2010)]; the size of inherited land from parents is a significant predictor to remain non-poor [Davis (2011)]. Location also plays a vital role to create opportunities for households. The households living in remote areas with less infrastructure and other basic facilities are more likely to be chronic and transient poor [Deshingkar (2010); Arif, *et al.* (2011)]. Asset-less households are more likely to fall into poverty if the economy is not doing well and/or the distribution of assets is highly unequal [Hossain and Bayes (2010)]. In Pakistan, the land distribution is more skewed than income distribution [Hirashima (2009)] as about 63 percent of the rural households are landless while only 2 percent of the rural households owned 50 acres or more, accounting for 30 percent of the total land [World Bank (2007)].

Households face a variety of risks and shocks i.e. macroeconomic shocks, inflation, natural disasters, health hazards personal insecurity, and socially compulsive expenses such as dowry. The customary and ceremonial expenses on marriages and funerals may sometime push the households into a long-term poverty [Krishna (2011)]. Using a six wave dataset from rural China, Jalan, and Ravallion (2001) found a significant fall in household consumption following a shock; higher the severity of the shock, more time would be needed to recover from it. In agricultural regions, loss of land, floods and lack of irrigation system also push households into poverty [Sen (2003)]. Based on the life history analysis in rural Bangladesh, Davis (2011) found that a variety of shocks at various life stages of people determine the pattern of transient and intergenerational transmission of poverty.

3. DATA SOURCE, ANALYTICAL FRAMEWORK AND SAMPLE CHARACTERISTICS

In a longitudinal or panel survey, same households (individuals as well) are interviewed during its different rounds or waves. This study has used three waves of a panel dataset; the first round, named as the 'Pakistan Rural Household Survey' (PRHS) was carried out in 2001 in rural areas of 16 districts, selected from all four provinces of the country: Attock, Faisalabad, Hafizabad, Vehari, Muzaffargarh and Bahawalpur in Punjab; Badin, MirpurKhas, Nawabshah and Larkana in Sindh; Dir, Mardan and Lakki Marwat in Khyber Pakhtunkhwa (KP); and Loralai, Khuzdar and Gwader in Balochistan. The second round of the PRHS was carried out in 2004; but it was restricted to 10 districts of Punjab and Sindh. Because of security concerns the panel districts in KP and Balochistan were not made part of the round two. The third round, which was conducted in 2010, covered all the above-mentioned 16 panel districts. An urban sample was also added in the third round, and it was re-named as the 'Pakistan Panel Household Survey' (PPHS). The sample of the panel survey may have over representation of the poor regions. For example, in Punjab the sample includes six districts, of which three are located in Southern Punjab, the poorest region of the province. In the Sindh sample, the more urbanised districts, where poverty is likely to be low such as Karachi and Hyderabad, are not included in the sample.

In rounds Two and Three of the panel survey, split households were also interviewed. A split household is a new household where at least one member of an original panel household has moved and is living permanently. This movement of a member from a panel household to a new household could be due to his/her decision to live separately with his/her family or due to marriage of a female member. The households split within a sampled village were interviewed; in other words, the movement of a panel household or its members out of the sampled village was not followed because of high costs involved in this type of follow-up. The size of sample for each round is shown in Table 1. The total size varies from 2721 households in 2001 to 4142 households in 2010.

Table 1

Households Covered during the Three Waves of the Panel Survey

		PRHS 2004			PPHS 2010				
	PRHS 2001	Panel house-holds	Split house-holds	Total	Panel house-holds	Split house-holds	Total Rural house-holds	Urban house-holds	Total Sample
Pakistan	2721	1614	293	1907	2198	602	2800	1342	4142
Punjab	1071	933	146	1079	893	328	1221	657	1878
Sindh	808	681	147	828	663	189	852	359	1211
KP	447	–	–	–	377	58	435	166	601
Balochistan	395	–	–	–	265	27	292	160	452

Four features of the three rounds of the panel data are noteworthy. First, urban households, which have been included for the first time in the sample in the third round held in 2010, are not panel households, hence they are excluded from the present analysis. The urban sample, however, has been used for the cross-sectional poverty

estimation. Second, split households are not strictly panel households, particularly those where a female has moved due to her marriage. Thus the matching of split households with the original panel households is not straightforward. So the split households are also not included in the analysis. Third, only rural sampled households in Punjab and Sindh are covered in all three rounds, so the analysis of the three-wave data is restricted to these two provinces. Fourth, for the analysis of all rural areas covering four provinces, panel data are available for the 2001 and 2010 rounds.

In the panel survey, a major concern is the sample attrition. Table 2 presents the attrition rate for different rounds. Between 2001 and 2010, the rate was around 20 percent while the rate during 2004-2010 was as high as 25 percent. The attrition rate in Balochistan is higher than the rate in other provinces (Table 2). The reasons for high attrition rates during 2004-2010 include temporary absence of a panel household, out-migration to a new locality and the decision of a household not to be part of the panel survey.

A legitimate concern in panel dataset involves the level of sample attrition and the degree to which attrition is non-random. A skewed exit from the panel household might generate a non-representative sample that would lead to the biased estimates. For the three waves of the panel dataset, the analysis of the sample attrition was found to be random as it did not show significant differences between the attritors and non-attritors for a set of interested indicators, particularly consumption and poverty (Appendix Tables 2 and 3). Thus, the attrition in the panel data is not a pervasive problem for obtaining consistent estimates.

This study has used all three rounds of the panel survey to include cross-sectional as well as a longitudinal dataset. In the cross-sectional analysis, all the sampled households are included whereas in poverty dynamic analysis, only panel households have been included. In the dynamics analysis, as noted earlier, the split households are excluded, although ideally for comparison these household should be merged with those households from which they were separated. But the merging of a new household with the household from which a woman has moved out after her marriage is not straightforward.

Table 2

Sample Attrition Rates Panel Households—Rural

	2001-2004	2001-2010	2004-2010
Pakistan	14.1	19.6	24.9
Punjab	12.9	17.1	23.8
Sindh	15.7	18.3	26.2
KP	–	16.1	–
Balochistan	–	33.2	–

The study has used the official poverty line for 2001 and 2004, which was inflated for 2010.[3] The used poverty lines are: Rs 723.4 per adult per month for 2001; Rs 878.64 for 2004; and Rs 1671.89 for 2010. All the three waves of the panel dataset have detailed

[3]The Planning Commission of Pakistan measured official poverty line by using the Pakistan Integrated Household Survey (PIHS) 1998-99 dataset, based on 2,350 calories per adult equivalent per day.

consumption modules covering all aspects of consumption including food and non-food items. Household is the unit of analysis; however, the data have been weighted by the household size for poverty estimation.

To distinguish chronic poor from transitory poor, this study has used two approaches: 'spell' and 'component'. In the spell approach, 'the chronic poor are identified based on the number or length of spells of poverty they experience—so that all poor households are classified as either chronic poor or transient poor' [McKay and Lawson (2002)]. The 'components' approach distinguishes the permanent component of a household's income or consumption from its transitory variations. Under this approach, 'households are identified as being chronically poor if their average consumption level falls below the poverty line, and transient poor if their average consumption level exceeds the poverty line but their consumption falls below it in at least one period' [Mckay and Lawson (2002)]. The estimates of chronic poverty, based on the spell and component approaches, are likely to differ because these two approaches are quite distinct from each other.

Under the 'spell approach', a two-step analysis is carried out. In the first step, change in poverty status is examined for two rounds; 2001 and 2004; 2004 and 2010; and 2001 and 2010. The four categories of change in the poverty status between any two periods are: never-poor, poor in two periods, moved out of poverty, and moved into poverty. In the second step, all the three waves of the panel dataset are used to explore poverty dynamics and two types of categories have been established. The first type comprises of four categories; poor in all three periods (chronic poor), poor in two periods, poor in one period and never poor. The second type consists of five categories: poor in all three periods, moved out of poverty, fell into poverty, moved in and out of poverty and never-poor. [4] Similarly, under the 'component approach', for the two-wave panel datasets, a household is defined as 'transitory poor' if its real average per adult equivalent consumption exceeds the poverty line but the consumption of any one period falls below the poverty line. For three-wave panel dataset, 'transitory poor' have two categories; two-period poor if the real average per adult equivalent consumption exceeds the poverty line but it falls below the poverty line for two periods. A household is defined as one-period poor if its real average per adult equivalent consumption level exceeds the poverty line but it falls below the poverty line for one period. Thus four categories have been recorded: poor in all three periods (chronic), poor in two periods, poor in one period and never-poor.

The determinants of poverty are examined to study poverty dynamics through the multivariate analyses. The following three equations have been estimated:

$$PD_{01\text{-}10\,i} = \alpha_i + \alpha_1 I_i + \alpha_2 Hd_i + \alpha_3 Rg_i + \mu_{2i} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

$$PD_{04\text{-}10\,i} = \alpha_i + \alpha_1 I_i + \alpha_2 Hd_i + \alpha_3 shock_i + \alpha_4 Rg_i + \mu_{3i} \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

$$PDs_{01\text{-}04\text{-}10\,i} = \alpha_i + \alpha_1 I_i + \alpha_2 Hd_i + \alpha_3 Rg_i + \mu_{4i} \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

$$PDc_{01\text{-}04\text{-}10\,i} = \alpha_i + \alpha_1 I_i + \alpha_2 Hd_i + \alpha_3 Rg_i + \mu_{4i} \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

[4]Moved out of poverty are those who were poor in the first two rounds and non-poor in the third round, or poor in the first round and non-poor in the next two rounds. Same method has been followed for falling into poverty with reverse direction.

In Equations 1 and 2, the dependent variables $PD_{01\text{-}10i}$ and $PD_{04\text{-}10i}$ represent the change in poverty status between two rounds (2001 and 2010; 2004 and 2010) within the above-mentioned categories.[5] Equation 3 includes all the three waves of the panel (2001, 2004 and 2010), where the dependent variable PDs has five outcomes; poor in three periods (chronic poor), fell into poverty, moved out of poverty, moved in and out of poverty and never-poor. In the first 3 equations, the dependent variable poverty dynamics has been measured by spell approach, while in Equation 4, it is based on the component approach, with three outcomes; poor in three rounds (chronic poor), transitory poor (poor in 1 or 2 rounds) and never-poor. On the right hand side of Equations 1–4, individual, household and community characteristics have been included. Vector I_i measures the characteristics of the head of household (gender, age, education), vector Hd_i measures the household characteristics (household size, dependency ratio, household structure, agriculture and livestock ownership) and Rg_i measures the province of residence. In Equation 2, the shock variable has also been added to examine the impact of natural, inflationary and business shocks on poverty and poverty dynamics. Equations 1 to 3 analyse the poverty dynamics where the dependent variable has more than two outcomes; therefore, the multinomial logistic regression has been applied.

The data on some selected socio-economic variables, as reported in the three waves of the panel survey, are presented in Table 3. According to the PPHS-2010 (3rd wave), the average household size was 7.6 members; 7.8 in rural areas and 7.1 in urban areas. Between 2001 and 2010, the average household size in rural areas declined marginally. Although the overall proportion of female headed households is low (4.8 percent), it doubled between 2004 and 2010 in both the cross-sectional and panel households. It could be attributed to male out-migration or death of male head of household, transferring the headship to his widow. The mean age of the head of household has marginally increased over time. More than 80 percent of the rural households are headed by illiterates or persons having up to primary level education (Table 3). Only 4 percent of rural households are headed by persons having more than 10 years of education.

Data on land ownership show a decline in the medium-level landholdings (3-10 acres), with an increase in small landholdings (≤ 3 acres) among the panel households. The distribution of inherited land may be the major contributing factor in this decline in land ownership. More than two-thirds of the sampled households own livestock; a modest decrease in the ownership of large animals has also been observed while in the case of small animals, the ownership increased between 2001 and 2004 but declined to the 2001 level in 2010. The ownership of housing is universal, and there is a marked change from *kaccha* (mud) houses to *pacca* (cemented) houses. However, the mean number of persons per room remained around 4 with no considerable change over time (Table 3). There is no major difference between rural and urban areas in average of persons per room.

[5]The 2001-2004 period has not been included in the analysis since it has already been examined by Arif, *et al*. (2011). Their findings are shown in Appendix Table 4.

Table 3

Socio-economic Characteristics of the Sampled Households in 2001, 2004 and 2010

	A Cross-sectional Analysis					Panel Households (Rural Punjab/Sindh only)		
	2001	2004	2010			2001	2004	2010
Characteristics	Rural	Rural	Rural	Urban	Overall			
Average household size	8.0	7.7	7.8	7.0	7.6	7.9	7.9	8.1
Female headed households (%)	2.5	2.2	4.1	4.3	4.2	2.4	2.3	4.8
Mean age of head (years)	47.2	47.5	48.5	46.8	48.0	47.2	48.6	51.3
Educational Attainment of the Head of Household (%)								
0-5 year	80.0	83.0	76.0	61.0	71.0	80.7	80.3	78.0
6-10 year	16.0	13.0	18.0	25.0	20.0	15.5	15.2	17.0
11 and above year	4.0	4.0	6.0	15.0	9.0	3.8	4.5	5.0
All	100	100	100	100	100	100	100	100
Land Ownership (%) by Category								
Landless households	49.1	57.5	56.6	91.2	67.4	48.1	48.8	48.2
Small landholder (up to 3 acres)	22.7	17.9	19.1	3.0	14.1	20.4	21.3	24.2
Medium landholder (> 3 to 10)	17.4	15.1	14.0	3.3	10.7	19.0	18.5	15.8
Large landholder (> 10 acres)	10.8	9.6	10.3	2.5	7.8	12.5	11.4	11.9
All	100	100	100	100	100	100	100	100
Housing unit ownership (%)	94.4	–	94.3	83.1	90.8	97.2	–	95.4
Livestock ownership (%)	72.2	73.6	67.1	16.1	51.2	73.9	75.6	72.6
Large animal ownership (%)	59.2	59.5	55.6	10.9	41.6	40.2	61.8	61.7
Small animal ownership (%)	42.9	50.4	43.6	9.7	33.0	65.7	51.8	49.1
House Structure (%) by Category								
Kaccha	61.8	–	47.1	16.8	37.6	57.2	–	48.1
Mix	21.5	–	27.6	22.1	25.9	27.0	–	21.7
Pacca	16.7	–	25.3	61.1	36.5	15.8	–	30.3
All	100	100	100	100	100	100	100	100
Number of persons per room	3.9	–	4.0	3.7	3.9	4.4	–	4.3

Source: Authors' estimation from the micro-data of PRHS-2001, PRHS-2004 and PPHS-2010.

4. POVERTY TRENDS: A CROSS-SECTIONAL ANALYSIS

Table 4 presents data on the cross-sectional incidence of poverty for all the three rounds. It also shows the incidence of poverty separately for Punjab and Sindh provinces, where all rounds of the survey were carried out. Overall poverty in 2010 is estimated at 20.7 percent; 22.4 percent in rural areas and 16.6 percent in urban areas. [6] Poverty estimates for rural Punjab and Sindh show that poverty decreased from 31.3 percent in 2001 to 24.1 percent in 2004; but it increased to 27 percent in 2010. When we take into account the data for all provinces, which is available for 2001 and 2010, Table 4 shows the decline in poverty by 5 percentage points from 27.5 percent in 2001 to 22.4 percent in 2010. The key message from the cross-sectional analysis is that, as in the past, poverty during the last one decade has also fluctuated. However, when the poverty in 2010 is compared with that in 2001, a modest overall decline is recorded. It suggests that the benefits of economic growth during the first half of the last decade in terms of poverty reduction largely disappeared during the second half.

[6]One can expect high poverty rates from PPHS dataset as compared to the rates based on the Pakistan Socio-economic Living Standard Measurement (PSLM) dataset because about half of the sampled PPHS districts are drawn from the poor regions of Sindh and south Punjab, with no representation from major cities except Faisalabad. Moreover, the PSLM dataset is not representative at district level, thus the poverty comparison between PPHS and PSLM based on these 16 districts cannot be justified. However, for the whole 2010-11 PSLM sample, the Country MDG Report 2013 has shown the incidence of poverty at 12.4 percent which is considerably lower than the estimates based on the 2010 PPHS.

Table 4

Incidence of Poverty: A Cross-sectional Analysis of the Three Waves of the Panel Survey (2001, 2004 and 2010)

Survey Year	All Provinces	Punjab and Sindh
2001 – Rural only	27.5	31.3
2004 – Rural only	–	24.1
2010- Rural	22.4	27.0
2010-Urban	16.6	–
2010-All	20.7	–

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.

Table 5 shows poverty trends in rural Punjab and Sindh for the panel households only. In panel A of the Table, split households are excluded but the original households from which these households have separated are included. In panel B, the latter have also been excluded, leaving only pure panel households without any split. This type of classification is likely to capture the effect of demographic change (splitting) on the well-being of households.[7] Trends are same; poverty which was 29.5 percent in 2001 declined to 23.6 percent in 2004, but it increased to 26.6 percent in 2010 (panel A in Table 5). However, the fluctuation is more pronounced when poverty estimates are based on pure panel households (Panel B). Poverty in rural Punjab and Sindh declined sharply from 29.5 percent in 2001 to 21.8 percent in 2004, and then it jumped to 28 percent in 2010. The change (or decline) in poverty levels between 2001 and 2010 is marginal, at only 1.5 percentage points.

Table 5

Incidence of Rural Poverty in Punjab and Sindh: A Cross-sectional Analysis of the Panel Households Covered in 2001, 2004 and 2010.

Panel A	2001	2004	2010
Punjab and Sindh	29.5	23.6	26.6
Punjab	20.2	18.4	20.9
Sindh	40.2	29.2	32.6
Southern Punjab	26.2	23.4	34.1
North/central Punjab	14.6	13.8	8.2
(N)	1395	1395	1395
Panel B			
Punjab and Sindh	29.5	21.8	28.0
Punjab	17.6	16.9	20.6
Sindh	42.6	27.0	35.4
Southern Punjab	25.0	22.5	35.1
North/central Punjab	11.7	12.4	8.3
(N)	1092	1092	1092

Source: Authors' estimation from the micro-data sets of PRHS-2001, PRHS-2004, and PPHS-2010.

Note: In panel A, same households covered in three waves are included. But, split households are excluded except the original households from which one or more households are split. In panel B, all split households including the original households are excluded.

[7]However, in this study only the differences in the incidence of poverty between different types of households are examined. Its thorough investigation is left for the subsequent analysis.

The other key message from panel B of Table 5 is that the behaviour of Punjab and Sindh about change in poverty status is not similar, and even within Punjab, the situation in Southern Punjab is markedly different from the other parts of Punjab (North/Central). In North/Central Punjab region, poverty remained almost at the same level between 2001 and 2004 and declined considerably between 2004 and 2010 (Table 5 panels A and B) while in Southern Punjab and Sindh it first declined between 2001 and 2004 and then increased between 2004 and 2010. In Southern Punjab, the increase in poverty between 2004 and 2010 is much larger than the decline between 2001 and 2004, thus showing a net increase in poverty between 2001 and 2010 period. Although it is difficult to explain these regional differences in poverty levels, a number of studies have shown poor and soft physical infrastructure [Arif, *et al*. (2011)], less diversified resources with highly unequal distribution of land [Malik (2005)], poor market integration, low urbanisation and low industrialisation and fewer remittances in Southern Punjab and Sindh as compared to the North/Central Punjab as the key differentiating factors.

5. RURAL POVERTY DYNAMICS

As noted earlier, only two-wave data (2001 and 2010) are available for all provinces, whereas the three-wave data are available for Punjab and Sindh provinces. The analysis of rural poverty dynamics is carried out in three steps. In the first step, the movements into or out of poverty are examined by the number of waves, using both the spell and component approaches. In the second step, a bivariate analysis for poverty dynamics has been carried out by looking at different socio-demographic characteristics using the spell approach. Multivariate analyses have been carried out in the third step. This section covers the analysis based on the first two steps, while the next section covers the third step, the multivariate analysis. Table 6 shows results on rural poverty dynamics based on two-wave data for three periods; 2001-04; 2004-10; and 2001-10. Both the 2001-04 and 2004-10 waves contain data for Punjab and Sindh only while the 2001-2010 rounds have information for all four provinces. Under spell approach, four movements of poverty dynamics, while under component approach, three movements of poverty dynamics are shown in Table 6. Results based on all three waves of the panel data are presented in Table 7 and discussed later in this section.

Table 6

Rural Poverty Dynamics Using Two-wave Dataset

Poverty Dynamics	2001-04 (Punjab and Sindh only)	2004-10 (Punjab and Sindh only)	2001-10 (all Provinces)
Spell Approach			
Poor in two Waves	9.7	8.6	9.1
Moved out of Poverty	18.2	13.1	15.9
Fell into Poverty	13.7	18.0	13.3
Never Poor	58.4	60.3	61.8
All	100.0	100.0	100
Component Approach			
Chronic Poor	18.0	16.2	16.5
Transitory Poor	24.7	23.5	21.7
Never Poor	58.4	60.3	61.8
All	100.0	100.0	100
(N)	(1422)	(1395)	(2146)

Source: Authors' estimation from the micro-data of PRHS-2001, PRHS-2004 and PPHS-2010.

Table 7

Poverty Dynamics by Region (Rural only) Using Three Waves (2001, 2004 and 2010)

Change in Poverty Status	Total Sample (Sindh and Punjab)	Punjab			Sindh
		Total	Central – North (excluding South)	South	
Spell Approach					
3 Period Poor (Chronic)	4.0	3.7	1.1	6.5	4.3
2 Period Poor	16.6	10.3	6.2	14.7	23.1
1 Period Poor	30.9	24.0	17.4	30.8	38.1
Never Poor	48.5	62.0	75.4	48.1	34.4
All	100.0	100.0	100.0	100.0	100.0
Component Approach					
3 Period Poor (Chronic)	15.1	10.8	5.0	16.8	19.5
2 Period Poor	6.8	4.4	2.4	6.4	9.3
1 Period Poor	29.7	22.9	17.2	28.7	36.8
Never Poor	48.5	62.0	75.4	48.1	34.4
All	100.0	100.0	100.0	100.0	100.0
N	(1395)	(792)	(417)	(375)	(603)

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.

Table 6 shows that both the spell and component approaches yield same results on never poor category; however, significant differences are found in the magnitude of chronic and transitory poverty. There are less chronic poor and more transitory poor under the spell approach than under the component approach, suggesting that the choice of definition can influence the dynamics of poverty. Under spell approach, for example, around 9 percent of the sampled population remained poor in two rounds or waves, whereas approximately 60 percent of the population was in the `never-poor' category, those who have not experienced poverty during the two given rounds. The remaining 30 percent of population have either moved out of poverty or fallen into poverty. The movement out of poverty out-numbered the movement into poverty in 2001-2004 and 2001-2010 periods. During 2004-2010, however, more people fell into poverty than those who escaped poverty. It appears from the movement of households into or out of poverty that the 2004-2010 period witnessed a net increase in poverty while it decreased during the other two periods, 2001-2004 and 2001-2010. Under the component approach, 16 to18 percent of the sampled households are chronic poor in two rounds of panel, while 22 to 25 percent of the households are transitory poor who either moved out or fell into poverty whereas the remaining 60 percent of the population was in the 'never-poor' category (Table 6). It appears that the spells approach has identified more movement into and out of poverty than the component approach, which focuses on a household inter-temporal average permanent income, rather than on year to year variations. The findings of this study are similar to Gaiha and Deolalikar (1993) who found that in rural South India 'only one third of those defined as innately poor that is as having permanent income levels below the poverty line are poor in each of the nine rounds of data available'.

To observe the clustering around poverty line, poverty line was inflated as well as deflated by 10 percent, and the results under the component approach are given in Appendix Table 5. The impact of these changes in the poverty line is more profound on both 'chronic poverty' and 'non-poor' categories than on the 'transitory' poverty. An increase in the poverty line, for example, reduces the likelihood of remaining in the non-poor state while it increases the probability of chronic poverty.

Poverty estimates based on the three waves of data are presented in Table 7, which shows the dynamics different from the two wave data. Again, there are less chronic poor and more transitory poor under the spell approach than under the component approach. The component approach shows higher proportion of the chronic poor. The most important information from the results of two approaches of poverty dynamics is that during the first decade of this millennium, more than half of the rural population (51 percent) in two largest provinces, Punjab and Sindh, were in a state of poverty at least at one point in time. Within this poor group, the major share goes to those who were poor in round one (31 percent), although considerable proportion is found to be poor in two-rounds under the spell approach. Chronic poor, those who remained poor in all three waves are only 4 percent under spell approach, but 15 percent under the component approach.

Table 8 shows change in poverty status through five categories describing poverty dynamics as outlined in methodology section: moved out of poverty, fell into poverty, moved in and out of poverty, chronic poor and never poor. The results under the spell approach show that there is no major difference in moving out of poverty or falling into poverty. However, a substantial proportion, around 15 percent of the households changed their poverty status more than once during three rounds of the panel survey. Moving into or out of poverty is higher in Sindh and Southern Punjab than in central-north Punjab, reflecting more vulnerability in the former region.

Table 8

Poverty Dynamics by Region (Rural only) Using Three Waves (2001, 2004 and 2010)—Spell Approach

Change in Poverty Status	Total Sample (Sindh and Punjab)	Punjab			Sindh
		Total	Central – North (excluding South)	South	
Chronic Poverty	4.0	3.7	1.1	6.5	4.3
Moved Out of Poverty	17.0	10.6	10.3	11.0	23.5
Fell into Poverty	15.8	13.9	5.8	22.3	17.7
Moved Out and Fell into Poverty	14.8	9.8	7.5	12.1	20.0
Never Poor	48.5	62.0	75.4	48.1	34.4
All	100.0	100.0	100.0	100.0	100.0
N	(1395)	(792)	(417)	(375)	(603)

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.

It appears from the poverty status change statistics in Table 6 to 8 that chronic poverty is very low in north-central Punjab under both the spell and component approaches. Movement into and out of poverty under the spell approach is also relatively small in this region as three-quarters of the population is found to be in the 'never-poor' category. The findings of the component approach show a small proportion (2.4 percent) in the category of two-period poor. However, the situation in both Southern Punjab and Sindh is quite different and alarming especially in rural Sindh where about two-thirds of the population has been below the poverty line for one or more periods and only one-third are in the 'never-poor' category. It suggests that rural poverty is more persistent in Sindh and Southern Punjab than in North/Central Punjab. Four broad conclusions can be drawn from the three-wave data.

- First, when a longer period is considered, say last 10 years, the proportion of population who ever lived below the poverty line during this period is much larger (51 percent) than we usually get from the cross-sectional survey datasets.
- Second, moving into and out of poverty is a common phenomenon in rural Pakistan. This movement directly depresses the desired status of `never-poor'.
- Third, while the spell approach indicates that a small proportion of population has been in the state of poverty for 10 years, the component approach indicates higher incidence of chronic poverty.
- Fourth, rural poverty appears to be more persistent in Sindh and Southern Punjab, particularly in Sindh, than in North/Central Punjab.

Who are the chronic or transitory poor (moved into or out of poverty)? Demographic and other characteristics of the household stratified by the number of times households remained in poverty are presented in Table 9. The persistence of poverty in terms of higher incidence of chronic poverty, lower chances of staying in never-poor status and moving into or out of poverty is relatively more common among households headed by less educated persons, and having no ownership of land and livestock, suggesting the structural nature of rural poverty in Pakistan. Like in other parts of the world and consistent with earlier studies, family size and dependency ratios are linked to poverty dynamics. Larger family size and high dependency ratios are associated positively with chronic poverty and negatively with the desired state of 'never-poor'.

Table 9

Poverty Dynamics by Selected Characteristics, Based on 3-waves Data (Spell Approach)

Characteristics in 2001	3-period Poor	2-period Poor	1-period Poor	Never Poor	All
Sex of the Head					
Male	3.7	16.8	21.1	48.4	100
Female	7.0	13.4	12.8	66.8	100
Family Size					
1-4	0.7	13.9	22.7	62.7	100
5-7	3.0	11.2	27.7	58.1	100
8-9	4.9	15.8	30.1	49.3	100
10+	4.3	21.9	34.9	38.9	100
Dependency Ratio					
Low	0.8	10.1	22.9	66.2	100
Medium	4.3	16.2	34.5	45.0	100
High	5.5	22.1	33.5	38.9	100
Education of the Head					
0 to 5	4.0	19.4	31.4	45.2	100
6-10	3.3	5.8	26.9	64.0	100
Above 10	0.0	3.7	32.6	63.5	100
Remittances					
No	3.8	17.0	30.5	48.6	100
Yes	0.0	5.0	41.6	53.4	100
Livestock					
No	5.3	21.2	32.4	4.11	100
Yes	3.3	15.5	30.2	51.0	100
Land Ownership					
No Land	5.1	24.1	34.2	36.6	100
Some Land	2.8	11.0	28.1	58.1	100

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.

Movement into and out of poverty is also more common among large households with high dependency ratio than among small households (Table 9). Regarding the gender of the head of household, on the one hand, more female headed households are chronically poor than the male headed households; but, on the other hand, the proportion of female headed households who did not experience poverty in the last 10 years (never-poor) is much larger (67 percent) than the corresponding proportion of male headed households (48 percent). It is thus difficult to jump to the conclusion that female headed households are worse off than the male headed households. The findings suggest that there may be different characteristics and dynamics of better-off and worse-off female-headed households; in other words, a binary which leads to rather different outcomes. For example, could it be that the worse-off tend to be those where the husband has deserted or died, whereas the better-off tend to be those where the husband is working overseas.

6. DETERMINANTS OF RURAL POVERTY DYNAMICS

Determinants of rural poverty dynamics are examined separately for two-wave and three-wave data; however, the multinomial logit technique has been applied to study both types of dynamics, in view of more than two categories of the dependent variable. As reported earlier, the change in poverty status based on two-wave panel dataset has been recorded in four categories: poor in two periods, moved out of poverty, moved into poverty and never-poor. In the analysis of three waves, poverty dynamics have three categories: poor in three periods (chronic), poor in one or two periods, and never-poor. The never-poor category is used as the reference category. For the two-wave data, the multivariate analysis is carried out separately for 2001-2010 and 2004-2010 periods.[8]

Following the poverty dynamics literature in multinomial logit models, correlates of a base year, which include four sets of independent variables are regressed on the poverty dynamics. The first set includes the characteristics of head of households (age, age^2, sex and education). Demographic and health factors are part of the second set, while economic status of households i.e., land and livestock ownership, structure of the housing unit and room availability are used as the third set of independent variables. Regional and provincial dummies are used as the fourth set. All these correlates are not available for all three rounds, so there is a minor variation in independent variables across the models. Difference in some selected independent variables between two periods has also been used in different models i.e. household size, dependency ratio, education of the head of household, and ownership of land and livestock. Based on the PPHS 2010 dataset, the shock variable has also been incorporated into the 2004-2010 analysis as the shock variable covers the last five years.

6.1. An Analysis of Two-wave Data

Four multinomial logit models have been estimated using the two-wave data and results are presented in Tables 10-11. In model 1, which covers the 2001-2010 period, gender of the head of household has not shown a significant association with poverty dynamics. Age of the head, however, is negatively associated with movement into poverty, It suggests that an increase in the age of head of household first empowers

[8]For the 2001-04 period, see Appendix Table 4.

Table 10

Multinomial Logit Model: Effects of 2001 Socio-economic Characteristics on Rural Poverty Dynamics (2001-10)

	Model-1			Model-2		
Correlates (2001)	Chronic Poor/Non-poor	Moved out / Non-poor	Moved into/ Non-poor	Chronic Poor/ Non-poor	Moved out/ Non-poor	Moved into/ Non-poor
Sex of the head (male=1)	–0.95	–0.694	0.499	–1.199**	–0.813**	0.222
Age of the Head	–0.03	0.031	–0.044**	–0.007	0.036	–0.032
Age^2 of Head	0.00	0.000	0.000**	0.000	0.000	0.000
Education of the Head	–0.08*	–0.038**	–0.049*	–0.094*	–0.040**	–0.084*
Household size	0.14*	0.139*	0.037**	0.218*	0.123*	0.119*
Dependency Ratio	0.24*	0.084	0.133**	0.560*	0.171	0.370*
Household with one member abroad (yes=1)	–2.69	–0.246	–0.670	–2.823	–0.203	–1.224
House Structure (PACCA=1)	–0.94*	–0.443*	–0.451*	–0.880*	–0.454*	–0.467*
Electricity Connection (yes=1)	–0.56*	0.096	0.161	–0.401**	0.162	0.122
Toilet facility (yes=1)	–0.62**	–0.778*	–0.202	–0.628**	–0.766*	–0.158
Animals (Nos)	–0.04*	–0.118*	0.002	–0.156*	–0.120*	–0.067*
Land Holdings (acres)	–0.12*	–0.034*	–0.029*	–0.119*	–0.036*	–0.041*
Number of rooms per person	–2.11*	–2.295*	0.137	–3.607*	–2.402*	0.099
Presence of disable person (yes=1)	0.21	0.057	–0.404	0.222	0.047	–0.491
South Punjab/North Punjab	1.55*	0.139	1.469*	1.391*	0.218	1.501*
Sindh/North Punjab	1.94*	0.744*	1.397*	1.466*	0.814*	1.140*
KP/North Punjab	–1.06**	–1.147*	–0.649**	–1.424*	–1.064*	–0.853*
Baluchistan/North Punjab	1.52*	0.993*	0.865*	1.586*	1.101*	0.780*
Constant	–1.81	–1.477**	–2.112*	–2.113**	–1.436	–2.602*
Difference in Household Size	–	–	–	0.131*	–0.031	0.139*
Difference in Dependency Ratio	–	–	–	0.373*	0.094	0.290*
Difference in Education of Head	–	–	–	0.021	–0.013	–0.074*
Difference in Land Holdings	–	–	–	–0.016	–0.006	–0.030*
Difference in Animals	–	–	–	–0.141*	0.000	–0.085*
LR chi-2		678.13 (54)			825.30 (69)	
Log likelihood		–1827.00			–1706.83	
Pseudo R^2		0.1565			0.1947	
N		2,124			2,080	

Source: Authors' estimation from the micro-data of PRHS 2001and PPHS 2010.

*denote significant at 5 percent, **denote significant at 10 percent.

households through his/her economic activities not to fall into poverty but in old age this empowerment weakens and raises the probability of households to fall into poverty. Education of the head of household has a significant and negative association with all three poverty states, suggesting, on the one hand, that households headed by literate persons are less likely than illiterates to be in chronic poverty or falling into poverty. On the other hand, they are also less likely to escape poverty. It is not easy to explain this phenomenon since education is considered as an important factor to help individuals and households to move out of poverty. However, it does indicate that education is not a sufficient factor to make a transition from being poor to being non-poor.

Table 11

Multinomial Logit Model: Effects of 2004 Socio-economic Characteristics on 2010 (Rural only)

	Model-3			Model-4		
Correlates (2001)	Chronic Poor/Non-poor	Moved out / Non-poor	Fell into/ Non-poor	Chronic Poor/ Non-poor	Moved out/ Non-poor	Fell into/ Non-poor
Sex of the head (male=1)	–16.328*	–0.707	–1.014	–16.339*	–0.700	–0.511
Age of the Head	0.010	–0.005	–0.042	0.021	0.005	–0.048
Age^2 of Head	0.000	0.000	0.000	0.000	0.000	0.000
Education of the Head	–0.055	–0.063*	–0.045**	–0.072**	–0.077*	–0.073*
Household size	0.200*	0.150*	0.124*	0.266*	0.126*	0.204*
Dependency Ratio	0.310**	0.227**	0.204**	0.460*	0.307**	0.264**
Household with one member abroad(yes=1)	–30.879	–0.621	–0.008	–31.823	–0.506	0.012
Animals (Nos)	–0.152*	–0.051*	–0.019	–0.232*	–0.045**	–0.128*
Loan Obtained Last Year	–0.106	–0.378**	0.269	–0.155	–0.370**	0.281
Land Holdings (acres)	–0.076*	–0.008	–0.061*	–0.082*	–0.014	–0.101*
Unexpected shock (no shock as ref.)						
Natural shock	–0.046	0.491	0.785**	0.022	0.473	0.691**
Inflation shock	0.344**	0.397	0.425	0.269**	0.315	0.463**
Business and others shock	1.311	0.155	0.579	1.240	0.201	0.560
South Punjab/North Punjab	1.324*	0.487	1.640*	1.281*	0.479	1.320*
Sindh/North Punjab	1.526*	–1.067*	1.989*	1.159*	1.055*	1.410*
Constant	–21.097	–2.852*	–2.096**	–21.456	–2.884*	–2.484**
Difference in Household Size	–	–	–	0.122*	–0.055**	0.231*
Difference in Dependency Ratio	–	–	–	0.198	0.081	0.067
Difference in Education of Head of Household	–	–	–	0.001	–0.020	–0.053
Difference in Land Holdings	–	–	–	–0.040	–0.020	–0.108*
Difference in Animals	–	–	–	–0.098*	0.001	–0.164*
LR chi–2		253.68 (45)			353.44 (60)	
Log likelihood		–853.273			–783.07	
Pseudo R^2		0.1294			0.1841	
N		997			978	

Source: Authors' estimation from the micro-data of PRHS-2001, PRHS-2004 and PPHS-2010.
*denote significant at 5 percent, **denote significant at 10 percent.

Two household-level demographic variables, family size and dependency ratio have a positive and statistically significant association with the chronic poverty and the probability of falling into poverty. Regarding the movement out of poverty, dependency ratio is insignificant, but the household size has a positive and significant sign, suggesting that it helps households to make transition out of poverty. It seems that household size helps this transition probably when the dependency ratio is low with the addition of an adult working member. So the target could be the lowering of dependency ratio primarily through a decline in fertility, which is still high in Pakistan, particularly in its rural areas.

The household-level economic variables including the ownership of land and livestock, housing structure *(pacca)* and availability of room have a significant and negative association with both chronic poverty and falling into poverty. But these variables also have a significant and negative association with the movement out of poverty. Apparently this association is also difficult to explain. The possible explanation

could be that households with a better economic position in terms of land, livestock and housing are less likely to be in poverty for long duration or fall into poverty than staying in the non-poor status. In other words, they were relatively more likely to be in the non-poor status between the two given rounds (2001-10).

Regional dummies have some interesting features. During the 2001–2010, holding other things constant, the people of Southern Punjab were more likely than their counterparts in North/Central Punjab to be in the state of chronic poverty or falling into poverty. The dummy variables representing Sindh and Balochistan provinces show results similar to those of Southern Punjab except that they also have a significant and positive association with making a transition out of poverty. The KP population is less likely than North/Central Punjab to be in chronic poverty or making a transition into or out of poverty (Table 10). It supports the bivariate analysis, which has shown larger poverty movement in Southern Punjab and Sindh than in North/central Punjab. It further shows the vulnerable situation in Balochistan as well.

In model 2, differences in the values of five correlates (household size, dependency ratio, education, landholding and animals) between the 2001 and 2010 are added in the multinomial logit model. There is no major change in results when compared to model 1 except that the sex of the head of household which was insignificant in Model 1 turned out to be significant in model 2. The reverse is the case for the age (age^2) of the head of households. Male headed households are less likely than households headed by females to be in chronic poverty or to move out of poverty. However, all the new variables—difference in two periods—have shown a significant and expected relationship with poverty dynamics. The difference in household size for example has a positive relationship with chronic poverty or falling into poverty. Its relationship with moving out of poverty is not significant. The same is the case for the dependency ratio. Difference in both the landholding and education has a negative and significant association with moving into poverty. The difference in livestock ownership has also shown a negative association with chronic poverty as well as falling into poverty (Table 10). It suggests that not only the initial socio-demographic conditions of households but also a change in these conditions overtime has correlation with the poverty dynamics. Thus, the message is that a positive change in socio-demographic and economic conditions of households can lead to positive outcomes in terms of improving the well-being of households. Our findings are to some extent consistent with Davis (2011) who shows that the tangible assets i.e. land, livestock are the important protective assets as compared to the less tangible assets i.e. education and social networks. The present analysis, however, shows the importance of both types of assets for poverty reduction.

The multinomial logit results for the rural poverty dynamics for 2004–2010 are presented in Table 11. It is worth repeating that the 2004 round of the PRHS covered Punjab and Sindh provinces, so the models 3 and 4 are limited to rural areas of these two provinces. But the findings of these models are not different from the results of models 1 and 2, with a couple of exceptions. The sex of the head of household which was insignificant earlier turned out to be significant; the male headed households are less likely than female headed households to be chronically poor.

The new variable 'loan obtained last year' had a negatively significant association with moving out of poverty. Thus, the borrowing did not help escape poverty between the 2004 and 2010 period. However, these could have been "desperation borrowings", oriented to survival rather than escaping from poverty. Natural shocks increase the likelihood of moving into poverty while the inflation is positivity associated with chronic poverty. The results are consistent with other studies.[9] Business shock, however, has not shown a significant impact on poverty movements. Finally, as expected, households in south Punjab and Sindh are more likely than households in north-central Punjab to be chronic poor or moved into poverty (Table 11).

6.2. Analysis of Three Waves Data

Table 12 presents the multinomial logit results based on three-wave panel data, where the dependent variable has five categories; chronic poor (poor in 3-periods), moved out of poverty, fell into poverty, moved in and out of poverty, and never-poor. The latter is used as the reference category. Results reported in Table 12 are based on the spell approach while the results based on component approach are given in Table 13. In both the approaches, the correlates are from the 2001 round of PRHS, and the difference in selected variables between 2001-2010 have also been included in the analyses.

First consider the findings of the spell approach presented in Table 12. The findings are more consistent with economic rationale than the analysis based on the two-wave data. For example, education of the head of households has significant and negative relationship with chronic poverty or being fallen into poverty (Model 5) and even moving in and out of poverty (model 6) as compared to those who are never poor. So, in the long run, say a decade, education is a very strong factor to keep households in the desired status of never-poor. Household size and dependency ratios have positive association with the chronic poverty as well as with falling into poverty or change in poverty status by more than once in three waves. All economic variables such as ownership of land and livestock, structure of housing units *(pacca)* and availability of rooms have significant and negative association with the chronic poverty, falling into poverty and being poor in one or two periods. In terms of regions, both rural Sindh and Southern Punjab are more likely than North/Central Punjab to be in the state of chronic poverty and various types of transitory poverty.

The addition of five variables showing difference between 2001 and 2010 period does not affect the overall results (model 6). These variables also have significant association with the poverty dynamics; an increase in household size or dependency ratio worsens the household well-being while a positive change in soft assets and physical assets (land and livestock) improves it.

Finally, the correlates of the change in poverty status using the component approach based on all three waves of the panel datasets are presented in Table 13. Two models have been estimated, and three categories of change in poverty status have been included in these models: chronic poor, transitory poor and non-poor. The difference between models 7 and 8 is that change in 5 selected explanatory variables (household size, dependency ratio, education of the head of household, landholding and animals) is included in the later while other variables are same in both models. These two models are

[9]Jalan and Ravallion (2001), Sen, (2003), Davis (2011), Lawrence (2011).

Table 12

Multinomial Logit Model: Effects of 2001-02 Socio-economic Characteristics on Change in Poverty Status between 2001-02 and 2010-11-Spell Approach (Rural Area of Punjab and Sindh only) (Based on the Three Waves of PPHS)

	Model-5				Model-6			
Correlates (2001-02)	Chronic Poor / Non-poor	Moved out / Non-poor	Fell in/ Non-poor	Moved in and out/ Non-poor	Chronic Poor / Non-poor	Moved out / Non-poor	Fell in/ Non-poor	Moved in and out/ Non-poor
Sex of the head (male=1)	–1.019	–1.025**	0.883	–0.181	–0.992	–1.149*	0.750	–0.318
Age of the Head of Households	–0.009	0.002	–0.065*	–0.045	–0.007	0.012	–0.064*	–0.026
Age^2 of Head of Household	0.000	0.000	0.001*	0.000	0.000	0.000	0.001*	0.000
Education of the Head of	–0.122*	–0.042**	–0.062*	–0.034	–0.157*	–0.041	–0.097*	–0.050**
Household size	0.228*	0.202*	0.092*	0.138*	0.339*	0.174*	0.196*	0.178*
Dependency Ratio	0.268	0.130	0.144	0.134	0.536*	0.279**	0.349*	0.327*
Household with one member abroad	–10.880	0.707	–0.448	0.640	–11.045	0.876	–0.627	0.859
House Structure (PACCA=1)	–0.903*	–0.349**	–0.146	–0.459*	–0.804**	–0.350**	–0.088	–0.426**
Electricity Connection (yes=1)	0.197	–0.226	–0.022	–0.211	–0.099	–0.099	–0.109	–0.252
Animals (Nos)	–0.196*	–0.171*	–0.047*	–0.019	–0.325*	–0.155*	–0.124*	–0.079*
Land Holdings (acres)	–0.109*	–0.059*	–0.066*	–0.035*	–0.111**	–0.065*	–0.085*	–0.025*
Number of rooms per person	–1.735	–2.299*	0.104	–1.460*	–1.916	–2.632*	–0.205	–2.392*
Presence of disability (yes=1)	–0.623	–0.177	0.689**	–0.064	–0.642	–0.119	–0.632	–0.037
South Punjab/North Punjab	1.432*	0.087	1.482*	0.379	1.371*	0.181	1.486*	0.320
Sindh/North Punjab	1.401*	1.013*	1.664*	1.025*	0.890	1.076*	1.304*	0.785*
Constant	–2.709	–0.643	–2.140**	–0.733	–3.134	–0.754	–2.563**	0.072
Difference in Household Size	–	–	–	–	0.171*	–0.036	0.176*	0.244*
Difference in Dependency Ratio	–	–	–	–	0.318**	0.157	0.287*	–0.032*
Difference in Education of Head	–	–	–	–	0.007	–0.012	–0.085*	–0.010
Difference in Land Holdings	–	–	–	–	–0.063	–0.005	–0.076*	–0.080
Difference in Animals	–	–	–	–	–0.174*	0.021	–0.103*	–0.961*
Pseudo R^2	0.1315				0.1706			
N	1382				1349			

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.

Note: The split households covered in 2004 and 2010 are included for the estimation of poverty.

*denote significant at 5 percent, **denote significant at 10 percent.

Table 13

Multinomial Logit Model: Effects of 2001-02 Socio-economic Characteristics on Change in Poverty Status -Component Approach (Rural Area of Punjab and Sindh only) (Based on the Three Waves of PPHS)

	Model-a		Model-b	
Correlates (2001)	Transit Poor/ Chronically Poor	Non-poor/ Chronically Poor	Transit Poor/ Chronically Poor	Non-poor/ Chronically Poor
Sex of the head (male=1)	0.823	0.916	0.942	1.281**
Age of the Head of Households	0.028	0.060**	0.032	0.052
Age^2 of Head of Household	0.000	–0.001*	0.000	–0.001*
Education of the Head of Household	0.054**	0.095*	0.034	0.095*
Household Size	–0.041	–0.190*	–0.089*	–0.266*
Dependency Ratio	–0.153	–0.260*	–0.337*	–0.620
Household with one member abroad	–0.254	–0.582	0.352	–0.179
House Structure (PACCA=1)	0.348	0.648*	0.347	0.607*
Electricity Connection (yes=1)	0.143	0.206	0.321	0.382**
Animals (Nos)	0.006	0.073*	0.063**	0.158*
Land Holdings (acres)	0.058*	0.102*	0.054*	0.093*
Number of rooms per person	0.435	1.148**	1.441	2.626*
Presence of disability (yes=1)	0.172	0.434	0.119	0.338
South Punjab/North Punjab	–0.441	–1.043*	–0.438	–1.103*
Sindh/North Punjab	–0.394	–1.556*	–0.293	–1.323*
Constant	–0.111	0.430	–0.221	0.442
Difference in Household Size	–	–	–0.048**	–0.106*
Difference in Dependency Ratio	–	–	–0.180*	–0.392*
Difference in Education of Head of Household	–	–	–0.075**	–0.018
Difference in Land Holdings	–	–	0.022	0.039**
Difference in Animals	–	–	0.055*	0.094*
LR chi-2	381.57 (30)		443.85 (40)	
Pseudo R^2	0.1395		0.1700	
N	1,409		1,349	

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.
Note: The split households covered in 2004 and 2010 are included for the estimation of poverty.
*denote significant at 5 percent, **denote significant at 10 percent.

different from the earlier models (1-6) in the use of reference category; the non-poor category was earlier used as the reference category while in models 7 and 8 'chronic poverty' is used as the reference category. However, results presented in Appendix Table 6 are similar to models 1-6 in which non-poor category serves as the reference category.

However, despite this change in the reference category as well the use of component approach; the overall findings are similar to earlier models based on the spell approach. Age has a positive association with the probability of being non-poor than being chronic poor while age^2 has a significant and negative sign. Education increased the probability of staying in non-poor state or making a transition out of chronic poverty. As expected, two demographic variables, household size and dependency ratio are negatively associated with the probability of being non-poor. All economic variables land, housing, animals and number of rooms per person have a positive association with the probability of being in non-poor state than being in chronic poverty. Residence in Sindh and South Punjab reduced the likelihood of being in non-poor status.

There is no major change in the results of model 8 where 5 variables showing change overtime have been included. An increase in household size and dependency ratio reduce the likelihood of being in non-poor category while an increase in landholding has a significant and positive effect on the probability of being non-poor. In short, although the incidence of chronic poverty under the component approach is different and higher than the incidence estimated under the spell approach, the correlates of chronic poverty under two approaches are similar. Human capital, household assets, demographic pressure, living conditions and region of residence are the most important factors that influence poverty movements.

Moreover, it appears from the investigation of rural poverty dynamics through the two- and three-wave data that the latter gives more consistent explanation of the change in poverty status over time than the former. It is particularly difficult to find out from a two-wave data analysis the factors that contribute to a transition out of poverty. Another important message from the analysis of poverty dynamics is that not only the initial socio-demographic conditions of the household are crucial in explaining the dynamics; a change in the demographic, economic and human capital related factors plays a key role in changing the well-being status of households.

7. CONCLUSIONS

This study has used the three rounds of the panel datasets, conducted in 2001, 2004 and 2010 to examine the poverty dynamics in rural Pakistan. These rounds have also been used for cross-sectional analysis to examine the trends in rural poverty. The poverty has been estimated by using the official poverty line. Based on the spell and component approaches, chronic and transitory poverty are estimated separately for the two and three waves of the panel data. For the two waves, the panel households were grouped into four categories under the spell approach, and were grouped into three categories under the component approach. In three-wave data analysis, two types of categories were formed under the spell approach. The first type comprises of four categories: chronic poor, poor in one or two periods, and never-poor, while the second type comprises of five categories: poor in all three periods, moved out of poverty, fell into poverty, moved in and out of poverty and never-poor. Under the component approach, four categories have been recorded: poor in all three periods (chronic), poor in two periods, poor in one period and never-poor.

According to the spell approach based on the two wave panel, around 9 percent of the households remained poor in two periods. It declined to only 4 percent when three-wave data is taken into account. Poverty movements based on the three waves of panel dataset show that more than half of the rural population in Punjab and Sindh remained in poverty for at least one period. Under the component approach, 16 to18 percent of the sampled households were chronically poor in two rounds of the panel while 22 to 25 percent of the sampled households were transitory poor who either moved out or fell into poverty. The spell and component approaches indicate differences in the incidences of chronic and transitory poor. The later has shown a higher incidence of chronic poverty, in fact, 4 times higher than the spell approach.

However, in a multivariate analysis, the findings are similar under both approaches. Demographic variables, household size and dependency ratio have a

significant positive association with chronic poverty as well as falling into poverty. Economic variables such as the ownership of land and livestock, housing structure *(pacca)* and availability of room have a significant and negative association with chronic poverty. Both inflationary and natural shocks are likely to keep households either in chronic poverty or push them into the state of poverty. As expected, a change in both the demographic and economic factors at the household level affects the poverty dynamics; the demographic burden increases the probability of falling into poverty while a positive change in economic status improves the households' well-being.

Policy interventions for the chronically poor may not be same as for the transitory poor (moving into or out of poverty). The former may need financial assistance in the short term to smooth their consumption such as the Benazir Income Support Program or the distribution of *zakat;* but such programs may not be sufficient to escape poverty. The latter may be targeted through interventions in the labour market to increase their employability and productivity. It can be done through a multi-sectoral approach that aims to: improve human capital as well as the employability of working age population; create assets for the poor, provide microfinance ; lower the dependency ratio by reducing fertility; and minimise the risks associated with shocks (inflation, flood, drought etc.). The village-level infrastructure and rural-urban linkages have also been effective in influencing poverty dynamics in other developing countries. The North Punjab region of Pakistan is a successful case, where better human capital, strong rural-urban linkages and access to international labour market have played a role in controlling rural poverty. It is recommended that the poor rural areas of the country should be targeted for some specific interventions, based on a multi-sectoral approach: improving human capital, creation of assets, addressing the demographic concerns, and developing both the village-level infrastructure and rural-urban linkages.

Appendices

Appendix Table 1

Number of Waves and Dynamics of Poverty in Different Parts of the World

Country	Time Frame	Number of Waves	Source	Welfare Measure	% of Households		
					Always Poor	Sometime Poor	Never Poor
Chile (Eight Rural Communities)	1968-1986	2	Scott, 2000	Income per capita	54.1	31.5	14.4
Pakistan (IFPRI)	1988-2005	2	Lohano, 2009	Income per capita	41.3	43.1	15.6
South Africa	1993-1998	2	Carter, 1999	Expenditures per capita	22.7	31.5	45.8
Ethiopia	1994-1995	2	Dercon and Krishnan, 2000	Expenditures per capita	24.8	30.1	45.1
Pakistan (PSES)	1998-2000	2	Arif and Faiz, 2007	Expenditure per capita	22.4	28.8	48.8
Pakistan (PRHS)	2001-2004	2	Arif et al., 2011	Expenditure per capita	11.3	32.2	56.5
Uganda	1992-1999	2	Ssewanyana, 2009	expenditure per adult	18.4	44.5	37.1
Ethiopia	1994-95, 1997	3	Abbi, and Andrew, 2003	expenditure per adult	21.5	16.8 (2-periods) 19.4 (1-period)	51.1
India (NCAER)	1968-1971	3	Gaiha, 1989	Income per capita	33.3	36.7	30
India (NCAER)	1970/71-1981/82	3	Bhide and Mehta, 2006	Real per capita expenditure	21.3	17.3	61.3
Indonesia	1993,1997, 2000	3	Widyanti, *et al.* 2009	per capita household expenditure	4.2	30.1	65.7
Zimbabwe	1992-1996	4	Hoddinott, *et al*. 1998	Income per capita	10.6	59.6	29.8
Uganda	1992-1996	4	John and Andrew, 2003	Expenditure per capita	12.8	57.3	30
Pakistan (IFPRI)	1986-1991	5	McCulloch and Baluch, 1999	Income per adult equivalent	3	55.3	41.7
China (Rural)	1985 -1990	6	Jalan and Ravallion, 1999	Expenditure per capita	6.2	47.8	46

Appendix Table 2

Household Expenditure: OLS Regression Model 2001-2010

Variables	Full Sample	Always in (Non-attrition)
Age	0.00719*	0.00851*
Age^2	–2.89e-05	–3.89e-05
Literacy	0.191***	0.183***
Family Size	–0.385***	–0.405***
Land Ownership	0.217***	0.216***
Livestock	0.128***	0.126***
Own House	–0.0312	–0.0378
Constant	7.064***	7.085***
Observations	2,237	1,829

Source: Authors' estimation from the micro-data of the Panel Survey.

***P<0.01; ** P<0.05, * P<0.10.

Appendix Table 3

Correlates of Poverty: Logistic Regression Model 2001-2010

Variables	Full Sample	Always in (Non-attrition)
Age	–0.0122	–0.0235
Age^2	5.31e–05	0.000139
Literacy	–0.553***	–0.528***
Family Size	1.156***	1.290***
Land Ownership	–0.680***	–0.687***
Livestock	–0.501***	–0.528***
Own House	0.145	0.114
Constant	–1.740***	–1.687***
Observations	2,237	1,829

Source: Authors' estimation from the micro-data of the Panel Survey.

*** P<0.01; **P<0.05; * P<0.1.

Appendix Table 4

Multinomial Logit Model: Effects of 2001 Socio-economic Characteristics on Change in Poverty Status between 2001 and 2004 (Rural Area of Punjab and Sindh Only) (PRHS)

	Model a			Model b		
Correlates (2001-02)	Chronic Poor/ Non-poor	Moved out of Poverty/ Non-poor	Fell into Poverty/ Non-poor	Chronic Poor/ Non-poor	Moved out of Poverty/ Non-poor	Moved into Poverty/ Non-poor
South Punjab/North Punjab	0.136	0.317	0.129	0.102	0.331	0.096
Sindh/North Punjab	1.183*	1.281*	0.620*	1.105*	1.317*	0.471**
Household Size	0.269*	0.198*	0.173*	0.342*	0.187*	0.214*
Female Headed Households	0.535	–0.567	–0.354	0.635	–0.528	–0.239
Age of the Head	0.054	–0.024	0.021	0.042	–0.019	0.024
Age^2 of Head	–0.001	0.000	0.000	0.000	0.000	–0.000
Dependency Ratio	0.384*	0.234*	0.091	0.484*	0.313*	0.176
Literacy of the Head	–0.483*	–0.449*	–0.265	–0.489*	–0.422*	–0.324
Health Expenditure (per capita)	–0.001*	–0.001*	0.000	–0.001*	–0.001*	0.00007
Farm Households	–0.259	0.436	0.248	–0.274	0.452	0.161
Housing Unit Ownership	–0.356	0.284	–0.006	–0.197	0.264	0.084
House Structure (PACCA=1)	–0.667*	–0.232	–0.236	–0.767*	–0.205	–0.344
Credit	–0.231	–0.061	0.247	–0.289*	–0.074	0.245
Total Large Animals	–0.308*	–0.212*	–0.133*	–0.396*	–0.208*	–0.149*
Total Small Animals	–0.067**	0.001	0.053*	–0.050	–0.006	0.065*
Land Holdings	–0.094*	–0.048*	–0.015*	–0.104*	–0.047*	–0.167*
Electricity Connection	–0.564*	0.014	–0.616*	–0.681*	0.007	–0.717*
Agriculture Employed	–0.220	–0.461*	–0.264	–0.225	–0.469*	–0.261
Construction Sector Employed	0.196	0.529	0.909*	0.200	0.516	0.841*
Difference in Household Size	–	–	–	0.114*	–0.018	0.115*
Difference in Dependency Ratio	–	–	–	0.408*	0.189	0.375*
Difference in Education of Head	–	–	–	–0.004	0.014	–0.028
Difference in Large Animals	–	–	–	–0.105*	0.008	–0.026
Difference in Land Holdings	–	–	–	–0.061*	–0.024**	–0.602
Constant	–3.341*	–2.260*	–2.913*	–3.599*	–2.400*	–3.195*

Source: Arif, *et al*. (2011).

* significance at 5 percent, ** significance at 10 percent.

Appendix Table 5

Rural Poverty Dynamics with Arbitrary Cut-offs Using Two-waves Data — Component Approach

Poverty Dynamics	2001-04 (Punjab and Sindh only)	2004-10 (Punjab and Sindh only)	2001-10 (all Provinces)
Poverty line Inflated by 10 %			
Chronic Poverty	25.0	23.1	22.5
Transitory Poor	24.6	24.0	23.3
Non-Poor	50.5	53.0	54.2
All	100.0	100.0	100
Poverty line Deflated by 10 %			
Chronic Poverty	12.0	10.0	11.3
Transitory Poor	20.7	21.7	18.1
Non-Poor	67.3	68.3	70.6
All	100.0	100.0	100
(N)	(1422)	(1395)	(2146)

Source: Authors' estimation from the micro-data of PRHS-2001, PRHS-2004 and PPHS-2010.

Appendix Table 6

Multinomial Logit Model: Effects of 2001-02 Socio-economic Characteristics on Change in Poverty Status—Component Approach (Rural Area of Punjab and Sindh only) (Based on the Three Waves of PPHS)

	Model-7		Model- 8	
Correlates (2001)	Chronic Poor/ Non-poor	Transitory Poor/Non- poor	Chronic Poor/ Non- poor	Transitory Poor/Non- poor
Sex of the head (male=1)	–0.916	–0.093	–1.281***	–0.340
Age of the Head of Households	–0.060***	–0.032	–0.052	–0.020
Age^2 of Head of Household	0.001**	0.000	0.001	0.000
Education of the Head of Household	–0.095*	–0.040**	–0.095*	–0.061*
Household size	0.190*	0.149*	0.266*	0.177*
Dependency Ratio	0.260**	0.107	0.620*	0.282**
Household with one member abroad	0.582	0.327	0.179	0.530
House Structure (PACCA=1)	–0.648*	–0.301**	–0.607**	–0.260***
Electricity Connection (yes=1)	–0.206	–0.063	–0.382***	–0.061
Animals (Nos)	–0.073*	–0.067*	–0.158*	–0.096*
Land Holdings (acres)	–0.102*	–0.044*	–0.093*	–0.039*
Number of rooms per person	–1.148***	–0.713***	–2.626*	–1.185**
Presence of disability (yes=1)	–0.434	–0.263	–0.338	–0.219
South Punjab/North Punjab	1.043*	0.602*	1.103*	0.664*
Sindh/North Punjab	1.556*	1.163*	1.323*	1.031*
Constant	–0.430	–0.541	–0.442	–0.663
Difference in Household Size	–	–	0.106*	0.058*
Difference in Dependency Ratio	–	–	0.392*	0.212**
Difference in Education of Head of Household	–	–	0.018	–0.058**
Difference in Land Holdings	–	–	–0.039***	–0.016
Difference in Animals	–	–	–0.094*	–0.039*
LR chi-2	381.57 (30)		443.85 (40)	
Pseudo R^2	0.1395		0.1700	
N	1,409		1,349	

Source: Authors' estimation from the micro-data of PRHS 2001, PRHS 2004 and PPHS 2010.

Note: The split households covered in 2004 and 2010 are included for the estimation of poverty.

*denote significant at 5 percent, **denote significant at 10 percent

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