The Persistence and Transition of Rural Poverty in Pakistan: 1998-2004

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ABSTRACT

This study has used two rounds of the two panel data sets to examine the poverty dynamics in rural Pakistan (Sindh and Punjab). The Pakistan Socio-Economic Survey (PSES) covers two periods, 1998 and 2000, while the Pakistan Rural Household Survey (PRHS) covers the 2001 and 2004 period. More than one-fifth of the households were chronically poor in the PSES rounds, and 11 percent in the PRHS rounds. Further, both chronic and transitory poverty are higher in Sindh and southern Punjab than in central and northern Punjab. Illiteracy, household size, dependency ratio, lack of livestock, landlessness, lack of ownership of dwellings, and health expenditure are the factors responsible for aggravating long-term poverty. The higher incidence of transitory poverty in rural Sindh and southern Punjab indicates the impact of large investments made in the public sector to raise the living standards there to the level of the better-off regions.

JEL classification: I3, I32

Keywords: Poverty, Chronic Poverty, Household Panel Datasets, Rural Pakistan

1. INTRODUCTION

With changes in socio-economic circumstances, the poor today may or may not be poor tomorrow, and some of the non-poor today may end up being poor tomorrow and many stuck in poverty over longer periods [Baulch and Masset (2003)]. In Asia, the movements of poverty are much greater than net changes in poverty ratios [Adams and Janes (1995); Sen (2003); Kurosaki (2006); Arif and Bilquees (2007)]. Pakistan has not witnessed a secular decline in poverty for a long period; poverty has rather fluctuated overtime. The overall changes in poverty levels in Pakistan since the 1990s are largely due to poverty changes in Sindh province, particularly in its rural areas and to some extent in Balochistan[1] [Cheema (2005); World Bank (2007)]. In the other two provinces, Punjab and Khyber Pakhtunkhwa (KPK), the fluctuation in poverty levels has been relatively low. The intra-country dynamics of poverty in Pakistan have hardly been examined; even the studies that have assessed the poverty dynamics using the longitudinal data have not examined the inter-province variations in poverty movements [Arif and Bilquees (2007)].

Remoteness, certain types of endowments in respect of natural resources, political disadvantage together with weak integration can all contribute to the creation of intra-country spatial poverty traps [CPRC (2009)]. At the micro level, the studies support the dictum that increasing human capital decreases the probability of being chronically poor [Rodgers and Rodgers (1993); Mehta, Kapur, and Shah (2001)]. The literature also shows similar results for transient poverty [McCulloch and Baulch (2000)], specifically regarding the role the education of the head of the household plays [Jalan and Ravallion (1998)]. On the demographic side, an increase in household size puts extra burden on a household's assets and resource base. In Uganda, for example, the chronically poor household had a mean size of six persons compared to four for non-poor and five for the transitory poor [John and McKay (2003)]. An increase in dependency ratios also can increase the probability of being chronically poor. Moreover, chronic poverty is closely associated with unemployment, sources of household's income and assets including land and, livestock ownership and possession of liquid assets [Wlodzimierz (1999); Bhide and Mehta (2006)].

There is a growing interest in Pakistan in understanding the dynamics of poverty because the policy interventions required to eradicate long-term or chronic poverty are primarily different from those needed for tackling the transitory nature of poverty. This interest has resulted in the generation of

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[1]There are four provinces in Pakistan: Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, and Gilgit Baltistan has also been given the status of a province.

longitudinal (or panel) data sets which are required for this type of analysis. This study has used two panel data sets: first, a panel survey named the Pakistan Socio-Economic Survey (PSES) was carried out in 1998-99 covering both rural and urban areas. Its round-II was completed two years later in 2000-01 when the same households were tracked and interviewed. Secondly, the first round of the Pakistan Rural Household Survey (PRHS) was carried out in 2001 and the same households were re-interviewed in 2004.[2] Meanwhile during these very years the Federal Bureau of Statistics (FBS), an official agency for data collection, also generated nationally representative surveys: for example, in 1998-99 and 2000-01, the Pakistan Integrated Household Survey (PIHS) was carried out while in 2004-05 the Pakistan Socio-economic Living Standard Measurement Survey (PSLM) was carried out. These cross-sectional household surveys have provided a very useful source to understand the overall changes in poverty levels in Pakistan. However, the information they provide is insufficient to examine the persistence and transition of poverty and factors associated with them. The panel data sets are a reliable source to examine the poverty dynamics. The major objectives of this paper are:

(1) to examine rural poverty trends across the provinces to put the study in the proper context;

(2) to analyse the poverty dynamics in rural areas of two large provinces of the country—Punjab and Sindh;

(3) to explore the correlates of rural poverty; and

(4) to estimate the association between the initial socio-economic conditions of the panel households and poverty transition, moving into or out of poverty.

The rest of the study is organised as follows. A discussion on data sources and methodology is given in Section 2, followed by an analysis of rural poverty trends in Sections 3 and 4. Poverty dynamics and their determinants are given in Sections 5 and 6, followed by policy considerations in the final section.

2. DATA SOURCES AND METHODOLOGY

The dynamics of poverty can best be analysed from panel information which is good for looking into inter-temporal variations [Andrew and David (2002)]. As noted earlier, two panel data sets have been used in this study: PRHS and PSES. The Round-I of the PRHS, which was conducted in 2001 in rural areas of all four provinces of the country, covered 2,740 households while its Round-II which was carried out in 2004 covered 1,893 households only in

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Sindh and Punjab, the two largest provinces of the country.[3] Because of security reasons, households in Khyber Pakhtunkhwa and Balochistan were not included in Round-II. The panel households for which data are available for both rounds of the PRHS are 1609 (929 in Punjab and 680 in Sindh). The Round-I of PSES was fielded in 1998-99 covering 3,564 households in rural as well as urban areas. The Round-II of PSES was completed in 2000-01. Since the PRHS panel is limited to rural areas of Punjab and Sindh provinces, a sub-sample of PSES covering rural areas of Sindh and Punjab has been selected for this study (Table 1). Although the two panel data sets are not strictly comparable, they do provide information on movements into and out of poverty for four periods; 1998-99 to 2000-01 (PSES rounds) and 2001 to 2004 (PRHS rounds). It is worth noting that between 1998-99 and 2000-01, the overall incidence of poverty increased while a decline was witnessed during 2001-2004.

Table 1

Samples of the PSES and the PRHS and Attrition Rates

PSES Panel/Attrition	All Sample	Rural Areas	Urban Areas	Province			
				Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
PSES-I (the 1998-99 Sample Households)	3564	2268	1296	1952	848	508	256
PSES-II (2000-01 Sample-Panel Households)	2774	1789	985	1650	604	338	182
Attrition Rate between 1998-99 and 2000-01 Rounds (%)	22.2	21.1	24	15.5	28.8	33.4	29.1
PRHS-I (2001)	2740	2740	–	1077	816	45	395
PRHS-II (2004)	1609	1609	–	929	680	0	0
Attrition (%)	41.3	41.3	–	13.7	16.7	100	100

A legitimate concern in any household panel data involves the extent of sample attrition and the degree to which attrition is non-random. Exiting the panel might be correlated with individual and/or household characteristics in a way that biases the demographic estimates or behavioural relationships. Similarly, the failure to follow movers might yield a panel sample that is seriously deficient for many descriptive and analytical purposes. The attrition rates for the two panels are also reported in Table 1, which shows a very high overall attrition rate of more than 40 percent for the PRHS panel, while for the PSES it is 22 percent. The large attrition rate in PRHS is due to non-coverage of two provinces, KPK and Balochistan, during its Round-II because of security concerns. In Punjab and Sindh, however, where the Round-II of the PRHS was

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[3]According the 1998 Census, Punjab has a share of 56 percent followed by the Sindh with 23 percent in the total 146.5 million population of Pakistan.

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extended, the attrition rates are 13.7 and 16.7 percent respectively. For the PSES panel, in a comprehensive analysis of the sample attrition, Arif and Bilquees (2006) could not find significant differences between the set of coefficients for attritors versus non-attritors for indicators of interest, particularly consumption and poverty; the coefficient estimates of standard background variables were not affected by the sample attrition. They concluded that, like many other panel data sets in developed and developing countries, attrition of more than 20 percent sample of the PSES was not a pervasive problem for obtaining consistent estimates. Although, this type of analysis needs to be replicated for the PRHS panel, because of the relatively small attrition rates of less than 20 percent for Punjab and Sindh provinces, its estimates are likely to be consistent.

This study has used the official poverty line. The Planning Commission of Pakistan measured official poverty line by using the data from the Pakistan Integrated Household Survey (PIHS) 1998-99, which is cross-sectional in nature, based on 2350 calories per adult equivalent per day. The official poverty line is based on the consumption module of the PIHS. Both the PRHS and PSES also have detailed consumption modules covering all aspects of consumption including food and non-food items. However, the consumption module of PIHS is slightly different from the PRHS and PSES modules in total number of food items included in the consumption modules.

In both the panel data sets (PRHS and PSES), the regional price differentials have been adjusted by Paasche's price index and then the poverty lines are derived from the PRHS and PSES data sets in five steps:

- In step I, since the focus of this study are rural areas of Punjab and Sindh, the inflation adjusted official poverty line for 2000-01 period which was Rs 723.4 per adult per month was applied on the PIHS data to find the poverty headcount rate for rural Punjab and Sindh only. It is counted at 38.5 percent.
- In step II, a monthly per equivalent adult consumption of Rs 792.1 was derived by calculating the population percentile threshold value that generates the same poverty headcount rate of 38.5 percent using the PRHS-I (2001) data (for rural Punjab and Sindh only).
- In step III, an inter-temporal inflation rate of 15.2 percent between PRHS-I (2001) and PRHS-II (2004) was estimated by weighting monthly CPIs (consumer price indices) by the number of observations for each corresponding month for PRHS-I and PRHS-II data. The poverty line for 2004 period was derived as Rs 912.3 per adult per month by multiplying the PRHS-I poverty line (Rs 792.1) by the above inflation rate (15.2 percent).
- In step IV, the same procedure was adopted for the PSES panel and the poverty line for 2000-01 period was deflated for the 1998-99 period.
- In the final step, the derived poverty lines were applied to the monthly

per adult equivalent expenditure data from PRHS and PSES to classify an individual as either poor or non-poor.

Two waves of the PRHS have also been used as cross-sectional data sets to examine the correlates of poverty for the 2001 and 2004 period separately.

The following equation has been estimated by using logistic regression;

$$P_i = a_i + a_1 I_i + a_2 Hd_i + a_3 Rg_i + \mu_{1i} \qquad \dots \qquad \dots \qquad \dots \qquad (1)$$

Where P_t is the probability that the household is poor or non-poor, I_i represent individual characteristics of the head of household, Hd_i is the vector representing the household characteristics and Rg_i captures the regional variations.

For poverty dynamics, this study has followed the methodology of Gaiha (1989), Mehta, *et al*. (2001), Armida and Yusuf (2003), John and McKay (2003), Arif and Bilquees (2007). The dynamics of poverty or the change in the poverty status between the two rounds has been measured by four mutually exclusive categories: (i) poor in both rounds, (ii) poor in round-I and non-poor in round-II, (iii) non-poor in round-I and poor in round-II, and (iv) non-poor in both rounds. The first category is considered as 'chronic poverty', while the second and third categories are named respectively as 'moved out of poverty' and 'fell into poverty' between the two rounds.[4] The last category is considered as the 'never poor' or 'non-poor in two periods'. The combination of second and third categories is known as the 'transitory poor'. The 'transitory poor' or 'transitory poverty' refers in this paper to these two categories.

Since the dependent variable, that is the change in poverty status between two rounds as noted above, has four outcomes, the multinomial logistic regression has been applied to estimate the determinants of poverty dynamics (the details of multinomial logistic regression has been given in Appendix A). The following two models have been estimated: model 2 estimates the determinants on the basis of PSES data set, while model 3 estimates on the basis of PRHS data set

$$PD_{psi} = a_{psi} + a_1 I_{psi} + a_2 Hd_{psi} + a_3 Rg_{psi} + \mu_{1i} \qquad \dots \qquad \dots \qquad (2)$$

$$PD_{pri} = a_{pri} + a_1 I_{pri} + a_2 Hd_{pri} + a_3 Rg_{pri} + \mu_{2i} \qquad \dots \qquad \dots \qquad (3)$$

In both the models, the dependent variable PD_i represents the change in poverty status between the two rounds of these panel data sets which are: chronically poor; moved-out of poverty; fell into poverty; and remaining non-poor in both rounds. The last category, 'non-poor in two rounds', is the reference category. In the right hand side of these equations, this study has included household, individual and community characteristics; vector I_i measures the individual characteristics (gender, age, education), vector Hd_i

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[4]According to the Government of Pakistan, the chronic poverty is based on cross sectional data and has been defined as person who consumes less than 50 percent of the poverty line

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measures the household characteristics i.e. household size, dependency ratio, household structure, agriculture and livestock ownership and Rg_i measures the province of the residence. Determinants of poverty dynamics have been estimated by taking the regressors from the initial period of the two panels (for PSES, they have been measured on the basis of 1998-99 and for the PRHS panel, they have been measured on the basis of 2001). The choice of base year for poverty dynamic analysis is consistent with the existing literature [Wlodzimierz (1999); Mehta, *et al*. (2001); Armida and Yusuf (2003); Bhide and Mehta (2006)].

In a more recent work by Lawson (n.d.) and Bhide and Mehta (n.d.) the difference in selected variables between the two waves of a panel is included in the regression analysis to examine the determinants of poverty dynamics. Following this type of work and using the PRHS two waves data, the analysis has been extended by incorporating the difference in selected variables in model 4 where ?As_i is a vector of the difference variables i.e., the difference in household size, dependency ratio, educational level of the head of household, large animals and landholdings.

$$PD_{pri} = a_{pri} + a_1 I_{pri} + a_2 Hd_{pri} + a_3 Rg_{pri} + a_4 ?As_{pri} + \mu_{3i} \qquad \ldots \qquad (4)$$

In the analysis, the Punjab sample from both the PSES and PRHS panels has been divided into 'southern Punjab' and 'central Punjab and northern Punjab'. This division has particularly been made to examine the poverty situation and dynamics in 'southern Punjab' as compared to other areas of Punjab as well as Sindh. The literature has census about the relatively high levels of poverty in southern Punjab. In the PRHS equation, dependency ratio, the ownership of livestock, appearing as the number of small and large animals, and per capita health expenditure were also included. The health expenditures have been included to see their correlation with the poverty dynamics. In the PSES equation, two dummies for domestic and foreign remittances have also been included because remittances have great potential in alleviation of poverty directly through increasing income of the household [Gupta, *et al*. (2009) and Fuente (2010)].

Finally, most of the explanatory variables or correlates of poverty are themselves affected by poverty. For example, while acquisitions of such assets as housing and ownership of land and livestock have been used as determinants of poverty, they themselves could be influenced by poverty. A vicious cycle may thus exist between poverty and acquisition of assets. In the presence of two-way causation, the econometric results of this study can be biased. However, this study is primarily concerned with the change in poverty status of the sampled households between two periods. The independent variables used in the multinomial logit models of this study help explain how the socio-economic conditions at the time of round-I keep people poor or escape poverty. The dynamics of poverty have commonly been examined in terms of their

maintainers and drivers; the former makes the poverty persistent and traps people in poverty while the latter causes individuals and households to fall and slide into poverty [CRPC (2005)]. Maintainers and drivers cannot always be precisely distinguished from each other.

3. POVERTY TRENDS IN PAKISTAN: AN OVERVIEW

The overall poverty trends in Pakistan since the early 1990s have been discussed in detail in many recent reports and studies based on the cross-sectional nationally representative data sets produced by the FBS. Figure 1 presents poverty trends for the 1992-93–2005-06 period based on the consistent official poverty line. The picture which emerges is that between 1992-93 and 1993-94, when economic growth was modest, overall poverty increased only by 0.32 percentage point. During this period, urban poverty declined considerably while rural poverty witnessed an increase of more than 2 percentage points (Figure 1). The rise in rural poverty in the early 1990s has largely been attributed to the negative agriculture growth in 1992-93 [Malik (2005)]. Between 1996-97 and 2000-01, when GDP grew by only 3.3 percent per annum on average, overall poverty increased sharply, by 8.7 percentage points. Although the increase in poverty was witnessed in both rural and urban areas, it was sharp (9 percentage points) in the former.
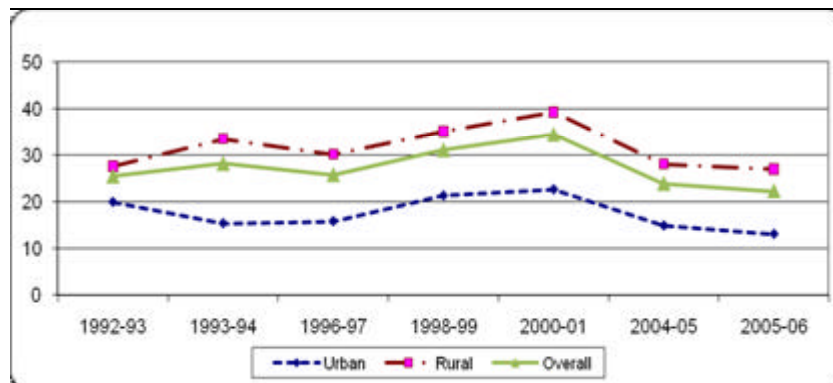
Source: *Economic Survey of Pakistan* (various issues) and Cheema (2005).

Fig. 1. Poverty Trends in Pakistan

The link between poverty and economic growth is very complex in nature and it is witnessed that economic growth has not always translated into poverty reduction. Periods of low growth rate (the 1950s and 1970s and the 1990s) have alternated with periods of high growth (the 1960s, 1980s and 2001-06). Though the incidence of poverty has tended to decline most when the economic growth rate was high (e.g. in the 1980s and more recently) and increase when the

growth rate was low (in the 1990s), it has also declined when (in the 1970s) the growth rate was low and increased when (in the 1960s) the growth rate was high [Haq, *et al.* (2007)]. However, it appears that high economic growth during the 2001-06 period reversed the rising poverty trends experienced in the 1990s (Figure 1). During the 2001-06 period, poverty declined by more than 10 percentage points. The net reduction in overall poverty between 1996-97 and 2004-05 period is only 1.9 percentage points, and even less than 1 percentage point in urban areas. If a longer period is taken into account, say 1992-93 and 2005-06, poverty declined only in urban areas while rural poverty remained at the same level, around 28 percent (Figure 1).

Province-level estimates of poverty based on the official methodology are available for the 1992-93–2001-02 period [Cheema (2005)], and are presented in Table 2 which shows the highest levels of poverty for KPK for all years except 2000-01. However, the cyclical view of poverty was more pronounced in Sindh than in other provinces. Rural Sindh has shown a considerable reduction in poverty between 1992-93 and 1996-97; after this period poverty level more than doubled from 19 percent in 1996-97 to 45 percent in 2001-02. Poverty also fluctuated in Balochistan, but at a lower scale. World Bank (2007) also provides

Table 2

Trends in Rural Poverty across Provinces

Source/Year	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
Cheema (2005)					
1992-93	27.6	25.4	28.6	34.9	26.2
1993-94	33.5	33.0	30.2	38.2	36.8
1996-97	30.2	27.9	19.2	42.4	41.6
1998-99	35.1	34.6	34.0	43.7	21.3
2000-01	39.3	36.9	45.1	43.6	37.5
World Bank (2007)					
1998-99	33.8	32.2	34.5	43.3	21.6
2000-01	39.1	33.8	48.3	44.4	39.3
2004-05	34.0	33.4	28.9	41.9	35.8

Note: These estimates are based on cross-sectional nationally representative household surveys carried out by the Federal Bureau of Statistics (FBS). For the year 1992-93 and 1993-94, it was the Household Integrated Economic Survey (HIES) while the Pakistan Integrated Household Survey (PIHS) was used for 1996-97, 1998-99 and 2000-01. For the 2004-05 period, it was Pakistan Socio-Economic Living Standard Measurement Survey (PSLM). However, despite different names, the expenditure module included in these surveys was similar with slight difference in term of number of food items in the modules. So the poverty estimates are based on consistent data.

province-wise poverty estimates based on different methodology.[5] Table 2 shows that while rural poverty declined in all provinces between 2000-01 and 2004-05, the decline was very sharp in rural Sindh: more than 20 percentage points. This marked decline in poverty in rural Sindh in a short period reversed the ranking across provinces; Sindh was the poorest region in 2000-01, and turned out to be the least poor province in 2004-05. Based on these trends, it is commonly argued that the national level decline in poverty between the 2000-01 and 2004-05 period is primarily due to substantial decline in Sindh province. The World Bank attributes the highest volatility in headcount ratio for Sindh to the severe drought in 2000-01 and exceptionally high agriculture growth in 2004-05 [World Bank (2007)].

4. CROSS-SECTION ANALYSIS OF POVERTY IN RURAL PUNJAB AND SINDH

Poverty trends based on the panel data sets as shown in Table 3, largely corroborate the poverty trends as discussed above from the cross-sectional nationally representative data produced by the FBS; poverty increased between 1998-99 and 2000-01 period according to the PSES data sets while it declined during the 2001-04 period in all regions according to the PRHS data sets. As in the case of large survey data by the FBS, the PSES and PRHS also show relatively high fluctuations in poverty levels in rural Sindh in comparison to Punjab.[6] However, despite this similarity, one dimension is noteworthy; in Punjab rural poverty also fluctuated between the 2001 and 2004 period and it is largely due to changes observed in 'southern Punjab'. During this period, according to the PRHS, poverty in 'central and north' Punjab remained low, less than 20 percent (last column of Table 3), and the decline in poverty in these

Table 3

Incidence of Rural Poverty the Punjab and Sindh:
Evidence from the Panel Data Sets

Source/Year	Punjab and Sindh	Punjab only	Sindh only	South Punjab	Central and North Punjab
PSES Panel Data Set					
1998-99	26.1	28.2	18.6	35.5	23.2
2000-01	38.3	39.5	34.1	50.0	32.4
PRHS Panel Data Sets					
2001	38.6	28.3	50.7	37.9	19.3
2004	26.2	21.5	31.3	28.7	14.6

Source: Computed from the PSES 1998-99 and 2000-01 and PRHS 2001 and 2004.

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[5]The Planning Commission estimates based on Consumer Price Index to express the 2000-01 poverty line in 2004-05 prices, following the same methodology used in poverty est imates for earlier years. World Bank estimates use inflation rates calculated from price information collected as part of the PSLM survey. Differences in definitions of poverty lines in the base year and data cleaning protocols also contribute to differences in the estimates.

[6]These findings are also supported by the result for PRHS-1 and PRHS-2 based on logistic estimates.

regions was also small compared to Sindh and 'southern Punjab'. It thus appears that volatility in the latter (southern Punjab) is also very high.

Estimates of poverty for different groups and categories of the sampled households are presented in Table 4 for the two periods of the PRHS (2001 and 2004). Two demographic variables, household size and dependency ratio are closely associated with the incidence of poverty for all periods covered in the two panels. Poverty among the small families is lower than among the large families. Similarly, households with high dependency ratios are more likely than households with low dependency to be poor. The education level of the head of household has a negative association with the incidence of poverty.

The other noteworthy information gathered from the sampled households is that poverty incidence is considerably higher among the landless households than among the land-owners. Within the land owner category, the poverty incidence gradually declines with an increase in the size of land ownership. Even small land owners seem to be better off than the landless rural households. Since the poverty is high among the landless households and almost half of the rural households are in this category, rural poverty concentrates either in these households or in households with small land ownership.

In terms of land ownership and poverty differences across the regions, the PRHS shows important information. While poverty incidence among households owning more than 10 acres of land in Punjab is very small (less than 10 percent), in Sindh it is very high (more than 20 percent in both rounds of the PRHS). It suggests that the size of landholding has different meanings in terms of the well-being of households across the regions. Different rural regions may vary in terms of tenurial systems, soil fertility, and access to water for irrigation. In addition to these agriculture related factors, the farm households in Sindh may vary from households in Punjab in terms of access to sources of non-farm income. There is strong evidence that these sources, mostly access to foreign remittances, are considerably higher in 'central and northern' Punjab than in other regions of the country [Malik (2005); Amjad, *et al.* (2008)]. The livestock ownership also has a negative association with the incidence of poverty (Table 4). While the majority of households (more than 80 percent) own livestock, according to the PRHS panel, their size or value may matter more for poverty and vulnerability. Poverty estimates against ownership of large animals is also shown in Table 4; the higher the number, the lower the incidence of poverty.

Correlates of rural poverty, based on equation 1, where the dependent variable is the probability of being poor or non-poor are presented in Table 5. The two rounds of the data of the PRHS (2001 and 2004) are used as cross-sectional in this estimation. The operational definition of the independent variables used in the model is also given in Table 5. The findings strongly support the bivariate analysis and show that the rural population in Sindh is more likely to be poor in both periods (2001 and 2004) than their counterparts in north and central Punjab. The south Punjab dummy did not turn out to be

Table 4

Table 4

Poverty Profile: Incidence of Poverty by Socio-economic and Demographic Characteristics, PRHS-I (2001) and (2004) – Rural Only

Characteristics	PRHS-I (2001)					PRHS (2004)				
	Punjab and Sindh only	Punjab only	Sindh only	Southern Punjab Only	Central and North Punjab	Punjab and Sindh only	Punjab only	Sindh only	Southern Punjab only	Central and North Punjab
All Sample	38.59	28.29	50.67	37.89	19.33	26.19	21.48	31.33	28.66	14.63
Male	38.85	28.57	50.58	37.65	19.67	26.35	21.66	31.32	28.81	14.62
Female	23.67	19.40	100	77.27	13.33	15.67	15.28	100	17.02	14.79
Household Distribution (%) by Family Size										
< 5	19.33	11.75	29.54	16.61	8.67	12.34	10.63	15.38	12.74	8.65
5-7	28.69	18.69	45.09	24.25	14.26	20.21	16.56	26.07	24.40	10.82
8-9	42.93	32.98	57.79	45.03	19.12	25.67	19.36	34.95	21.38	17.29
10+	47.89	39.85	54.08	49.51	29.76	33.60	32.68	34.17	43.34	19.80
Dependency Ratio (%) by Category										
Low	23.57	17.09	34.42	19.26	15.94	18.05	15.16	22.11	19.98	11.92
Medium	37.64	27.80	47.58	35.98	19.46	29.08	23.91	34.08	32.70	14.81
High	49.79	38.07	62.02	48.70	23.67	30.46	25.73	35.07	31.58	18.39
Landless Households (%)	51.23	38.49	62.62	51.06	26.87	28.93	27.93	29.85	34.76	21.62
Land Owning Households (%)	27.58	21.37	36.80	28.83	14.21	23.52	16.14	33.59	22.05	11.10
Land Ownership (%) by Category										
= 2 Acres	36.48	31.06	56.63	34.05	25.89	27.23	24.25	35.17	27.53	18.50
2.1 – 5 Acres	31.88	25.47	44.02	31.46	18.15	22.94	13.60	43.14	23.53	4.28
5.1 - 10 Acres	28.42	11.77	48.65	18.33	8.51	24.66	16.04	33.88	14.57	16.60
> 10 Acres	14.37	4.63	20.64	6.73	3.92	19	4.34	27.96	0.00	5.81
Livestock (Large Animal Only)										
No Animal	54.37	47.06	63.66	56.95	29.38	35.01	31.64	38.1	41.38	20.58
1/ 2 Animal	40.63	28.96	54.23	34.43	20.83	26.27	22.43	30.35	26.81	16.81
3/ 4 Animal	35.56	24.64	46.79	29.8	20.23	23.88	19.1	30.02	30.92	8.77
5 and above Animal	18.55	10.38	28.42	2.47	12.77	18.03	11.9	25.34	10.65	12.56
Educational Level (Only Head of the Household)										
Illiterate	42.15	30.59	57.68	40.38	21.04	27.58	23.70	31.65	31.22	16.07
Primary (1-5)	41.02	35.77	44.47	42.62	25.96	29.57	24.29	33.43	30.37	16.84
Less than Matric (6-8)	22.42	16.48	36.55	19.03	15.08	21.30	18.16	30.80	18.15	18.16
Matric (9-10)	27.58	20.14	43.20	31.82	12.99	12.02	8.84	20.80	19.59	2.92
Higher than Matric (11+)	25.89	2.19	43.61	6.25	0.00	17.45	10.49	23.53	11.88	9.64

Source: Computed from the PRHS, 2001 and 2004.

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Table 5

Logistic Model of Being Poor: Effects of the 2001 Socio-economic
Characteristics on the Change in Poverty Status between 2001 and 2004
(Rural area of Punjab and Sindh Only) (PRHS)

Correlates	PRHS-I (2001)		PRHS-I (2004)	
	Coefficient	Std. Error	Coefficient	Std. Error
South Punjab/North Punjab	0.349	0.214	0.157	0.357
Sindh/North Punjab	1.199*	0.197	0.587*	0.303
Household Size (Numbers)	0.176*	0.019	0.210*	0.027
Female Headed Households (Female =1)	−0.166	0.596	−0.685	1.300
Age of the Head (Years)	−0.002	0.026	−0.024	0.047
Age^2 of Head	0.000	0.000	0.000	0.000
Dependency Ratio	0.268*	0.083	0.000	0.135
Literacy of the Head (Literate=1)	−0.433*	0.145	−0.392**	0.225
Farm Households (=1)	−0.243	0.243	−0.396	0.274
Housing Unit Ownership (=1)	0.065	0.427	−0.010	1.095
House Structure (Pacca=1)	−0.369**	0.215	−0.624**	0.331
Credit (had access=1)	−0.165	0.167	−0.542*	0.238
Total Large Animals (Numbers)	−0.209	0.031	−0.177*	0.062
Total Small Animals (Numbers)	−0.039*	0.019	−0.003	0.030
Land Holdings (Acres)	−0.060*	0.009	−0.026*	0.009
Electricity Connection (Yes=1)	−0.038*	0.147	−0.487*	0.246
Agriculture Employed (Yes=1)	0.211	0.190	0.182	0.351
Construction Sector Employed (Yes=1)	0.130	0.349	–	–
Constant	−1.916*	0.827	−1.347	1.641

statistically significant. The two demographic variables, household size and dependency ratio, have a positive and significant association with the probability of being poor, although the latter is not statistically significant for the 2004 period. All other variables that turned out to be statistically significant in the model have a negative association with the probability of being poor, including literacy, access to credit, ownership of land and dwelling, housing structure and access to electricity. This cross-sectional analysis of the data shows the importance of age structure of the population (dependency ratio), human capital, physical assets and access to electricity for the household's well being.

5. PERSISTENCE AND TRANSITION OF POVERTY
IN RURAL PUNJAB AND SINDH

Poverty dynamics are examined through change in poverty status of same households between two periods of the two panels. It is worth repeating here that overall poverty during the two rounds of PSES increased while it declined during the two rounds of PRHS. Changes in poverty status as computed from these two panels are reported in Table 6, which shows several important dimensions. As expected, the proportion of households that fell into poverty was larger than those which escaped poverty between the 1998-99 and 2000-01

Table 6

Poverty Dynamics by Region (Rural Only)

| | | Punjab | | | |
Change in Poverty Status	Total Sample (Sindh and Punjab)	Total	Central – North (Excluding South)	South	Sindh
PRHS (2001-2004)					
Chronic Poor	11.3	8.3	5.3	11.9	15.3
Moved Out of Poverty	21.2	14.8	11.2	19.1	30.1
Fell into Poverty	11.0	9.6	8.3	11.2	12.8
Never Poor	56.5	67.3	75.2	57.8	41.7
All	100.0	100.0	100.0	100.0	100.0
N	(1606)	(928)	(509)	(419)	(678)
PSES (1998-99-2000-01)					
Chronic Poor	21.3	23.6	17.6	31.4	14.1
Moved Out of Poverty	10.2	10.5	9.5	11.9	9.2
Fell into Poverty	23.3	21.9	19.3	25.3	27.6
Never Poor	45.2	44.0	53.6	31.3	49.0
All	100.0	100.0	100.	100.0	100.0

period, resulting in increase in overall rural poverty. The change in opposite direction was witnessed during the two periods of PRHS panel—2001 and 2004 when more people moved out of poverty than those who fell into poverty, resulting in a decline in overall rural poverty. Despite a decline in overall poverty, the chronic poverty remains an issue (Table 6). For example, in the PSES panel 21 percent of the households are chronically poor in rural Sindh and Punjab since they remained below the poverty line in 1998-99 and 2000-01. In the PRHS panel, 11 percent of households are counted as chronically poor, indicating that despite poverty reduction during the 2000-2004 period they have not benefited from the economic growth and have remained poor.

The two panel data sets used in this study, PRHS and PSES, have only two rounds or waves. More rounds over longer period of time may reduce the chronicity of poverty by giving the poor more time (or opportunities) to escape poverty. A review of some panel studies as presented in Table 7 shows that the chronicity of poverty does vary with the number of rounds (or waves) of the panel data sets. The studies with two or three waves of the panel studies have generally shown higher incidence of chronic poverty as compared to studies based on four or more waves of panel. Two studies carried out in Indonesia and Ethiopia are an exception (Table 7). In the former, Armida and Yusuf (2003) have shown lower incidences of chronic poverty, only 7.8 percent based on two waves of the panel data set, while in the case of latter, Bigsten and Shimeles (2008) have reported a high incidence of chronicity, based on the five waves of the panel data (Table 7). This difference can be attributed to the overall economic situation of a country as the economy of Indonesia is far better than the economy of Ethiopia.

Table 7

Poverty Dynamics by the Numbers of the Panel Data Sets

Country	Time Frame and Number of Waves	% of Households			Source
		Always Poor	Sometime Poor	Never Poor	
Pakistan (Rural KPK)	1996-1999 (2 waves)	63.2	43.7 - 58.3	–	Kurosaki (2006)
Ethiopia (Specific Rural Locations)	1994-1995 (2 waves)	24.8	30.1	45.1	Dercon and Krishnan (2000)
Pakistan (PSES)	1998-2000 (2 waves)	22.4	28.8	48.8	Arif and Bilquees (2007)
South Africa (KwaZulu Natal)	1993-1998 (2 waves)	22.7	31.5	45.8	Carter (1999)
Indonesia (IFLS Survey)	1993, 1997 (2 waves)	7.8	19	73.2	Armida and Yusuf (2003)
Uganda (UNHS)	1992-99 (2 waves)	18.9	39.9	41.2	Lawson, *et al.* (2003)
Ethiopia (Urban Specific)	1994-95, 1997 (3 waves)	21.5	16.8 (2 periods) 19.4 (one period)	51.1	Abbi and Mckay (2003)
India (NCAER)	1970/71-1981/82 (3 waves)	21.34	17.33	61.33	Bhide and Mehta (2006)
Uganda	1992-1996 (4 waves)	12.79	57.27	30	John, *et al.* (2003)
Ethopia	1994-2004 (5 waves)	26	52.6	21.4	Bigsten and Shimeles (2008)
China (Rural)	1985 -1990 (6 waves)	6.2	47.8	46	Jalan and Ravallion (1999)

Table 6 shows a marked difference among regions in terms of chronicity of poverty; compared to only 5 percent in 'central and north' Punjab the PRHS panel shows as 15 percent and 12 percent the chronically poor respectively in Sindh and 'southern Punjab' regions. In the PSES panel, chronic poverty is higher in 'southern Punjab' than in other regions shown in Table 6. Thus two panel data sets clearly demonstrate the higher incidence of chronic poverty or persistence of poverty in Sindh and 'southern Punjab' (Table 6).

Table 6 also presents statistics on the movement into and out of poverty which is found higher in Sindh and southern Punjab as compared to 'central and north' Punjab. In Sindh, 30 percent of the PRHS panel households are able to escape poverty between 2001 and 2004. About one-fifth of the households in 'southern Punjab' have also moved out of poverty during this period. The corresponding percentage for the 'central and north' Punjab is only 19.

Overall, almost half of the households remained in the 'non-poor' category in two panels (Table 6). The PRHS panel shows a marked difference in this category between Sindh and 'central and northern' Punjab. As compared to only 42 percent in the former, three-quarters of households in the latter were in the 'always non-poor' category. This seems to be the major difference between the regions; the relatively better-off region of 'central and northern' Punjab has managed to retain a large proportion of households in the 'non-poor' category for a long period. Other regions lagged behind in this important dimension. Finally, there is no marked difference

among regions according to the PRHS panel in proportion of households falling into poverty, although relatively more people did so in Sindh and 'southern Punjab'. Despite a sharp decline in overall poverty, approximately a tenth of households in all regions fell into poverty between 2001 and 2004 (Table 6). By combining this percentage with chronic poverty, the proportion of households that have not benefited from the high economic growth is alarmingly high.

The message from this simple analysis of poverty dynamics is that both Sindh and 'southern Punjab' are the home of chronic as well as transitory poor. In other words, the serious issue which deserves the attention of policy makers as well as the civil society is the low retention rate of rural households in these regions in the desired status of 'remaining non-poor' in two periods. Similarly, during the high growth periods when poverty declined sharply, the fresh movement into poverty is a challenge to make growth more pro-poor.

6. FACTORS AFFECTING POVERTY MOVEMENTS: A MULTINOMIAL LOGIT ANALYSIS

This section examines the socio-economic correlates of the change in poverty status of the same households between the two waves of both the PSES and PRHS by using multinomial logit models. Results of the multinomial logit models are presented in Tables 8 (PSES, 1998–2001) and 9 (for PRHS, 2001-2004) [7] while the definition of the independent variables with their mean values

Table 8

Multinomial Logit Model: Effects of the 1998-99 Socio-economic Characteristics on the Change in Poverty Status between 1998-99 and 2000-01 (Rural Area of Punjab and Sindh Only)

| | Model 2 | | |
Correlates (1998-99)	Chronic Poor/ Non-poor	Moved out / Non-poor	Moved into / Non-poor
Sindh/ North Punjab	–0.887*	–0.457**	0.025
South Punjab/ North Punjab	0.188*	0.325	0.570*
Household size	0.396*	0.270*	0.226*
Female Headed Households	–0.629**	0.144	–0.717*
Age of the Head of Households	–0.001	0.074	–0.014
Age Square of Head of Household	0.000	–0.001**	0.000
Literacy of the Head of Household	–1.239*	–0.574*	–0.741*
Head of Household Employed	–0.527**	–0.279	–0.495*
Farm Households	–0.263	–0.052	–0.032
Housing Unit Ownership	0.081	0.450	–0.192
Electricity Connection	–1.161*	–0.883*	–0.623*
Land Ownership	–1.228*	–0.730*	–0.398*
Remittances (Domestic)	–0.396	–0.343	0.123
Remittances Overseas	–0.1522*	–0.719	–0.067
Loan Obtained Last Year	0.057	0.219	0.055
Constant	–1.445	–4.028*	–0.513

Source: Computed from the two rounds of PSES.
*Significance at 5 percent.   ** Significance at 10 percent.

[7]Cross section estimates for PRHS-1 and PRHS-2 are reported in Appendix Table 3.

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and standard deviation are reported in Appendix Tables 1 (PRHS) and 2 (PSES). There are substantial differences in mobility (poverty movement) between the regions. For the 1998-2001 panel period (Table 8), when overall poverty increased in the country, rural population of Sindh was less likely than their counterparts in 'north and central' Punjab regions to make upward mobility (moved out of poverty). During the same period, the population of rural south Punjab region was more likely than the population of rural 'north and central' Punjab regions to make downward mobility (moved into poverty). The chronicity of poverty, however, was stronger in 'north and south' Punjab regions than in Sindh.

For the 2001-04 panel period, when overall poverty declined in the country, rural Sindh population witnessed more mobility than the 'north and central' Punjab regions (Table 9). The southern Punjab region did not turn out to be statistically significant. The regional differences in poverty movement in rural areas can be attributed to local conditions, access to land, and opportunities in findings jobs. For example, the rural population in 'north and central' Punjab region has more access to jobs available in the cities, armed forces, and overseas than the population in rural Sindh and southern Punjab [Amjad, *et al.* (2008)].

Beyond the region level, the analysis shows that the households that were poor in the first round of the two panels with larger number of members tended to remain poor in the second round relative to those with fewer members. The significant and positive association of household size with both movement out of poverty and falling into poverty shows volatility of large families. They are more likely either to stay longer in poverty or to be vulnerable to poverty than being 'always non-poor'. Families with smaller size are more likely to stay in 'always non-poor' status. Thus, even if rural poor households choose larger size for additional earning potential, it may not always help them escape poverty. The significance of dependency ratio in the PRHS model (Table 9) reinforces it and shows that an increase in the proportion of children and elderly population also increases the probability of being chronically poor or being transitory poor.

The importance of association between poverty dynamics and two demographic variables, family size and dependency ratio, needs to be understood in the context of on-going demographic transition in Pakistan. Changes in age distribution due to fertility decline are usually examined through changes in the "dependency ratio". Pakistan has moved out of the phase of rising child dependency because of the decline in fertility since the early 1990s [Arif and Chaudhry (2008); Nayab (2008)]. The negative association of small family size and low dependency ratio with the chronic or transitory poverty suggests that efforts may be accelerated to achieve the population growth targets in order to reduce further the dependency ratio, which would help in making transition from being poor to non-poor. According to a recent work of Akhtar (2008), low dependency ratio contributes to increasing household savings.

Table 9

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

Correlates (2001-02)	Model 3			Model 4		
	Chronic Poor/ Non-poor	Moved out/ Non-poor	Moved into/ Non-poor	Chronic Poor/ Non-poor	Moved out/ Non-poor	Moved into/ 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 Ownership (Yes=1)	−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: Computed from the two round of PRHS.
 *Significance at 5 percent. ** Significance at 10 percent.

Literacy of the head of the household has a significant and negative association with both chronic and transitory poverty in both models (PRHS and PSES), suggesting that non-poor households are more likely to be headed by literate persons.[8] Human capital improves the quality of labour as an asset and is the key element in contexts where access to material assets is highly constrained [CPRC (2005)]. Education is, therefore, the critical path out of poverty.

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[8]The literacy mean that the head of the household can at least read and write. The concept also includes all persons with formal education.

With respect to employment, an interesting finding of the PRHS panel is that rural households headed by a person working in the construction sector are more likely to fall into poverty than those working in other sectors of employment (Table 9). The issue of rural wages seems to be relevant here. Irfan (2009) has recently shown a decline in real wages overtime in rural areas. The findings of Malik (2005) are also similar. The government of Pakistan has fixed the minimum wage, but its implementation in rural areas is generally difficult.

Health has commonly been related to change in poverty status [Hussain (2003)]. It is considered as one of the important factors in understanding poverty movements. In the PRHS model, per capita health expenditures per month are included to see their association with poverty dynamics. The per capita expenditures have shown a negative and significant association with chronic poverty as well as the movement out of poverty (Table 9). It suggests that large health expenditures are an obstacle for making transition from being poor to being non-poor. It is an important finding of this study. It is probably the first time that empirical evidence shows that health expenditures have an association with poverty movements.

To examine the relationship between access to assets and change in poverty status, dummy variables for two variables are included in the models: ownership of dwelling unit and land. As expected, land ownership is negatively associated with both chronic and transitory poverty, showing that land-owners are more likely to be in the 'always non-poor' category.

In the PRHS equation, the numbers of small and large animals owned by the sampled households are also included. The large animals are negatively correlated with chronic poverty as well as moving out of poverty. It shows that poor households owning large animals in 2001 are less likely to be poor in 2004. The small animals also have negative association with the chronic poverty but have positive association with 'falling into poverty category'. It appears that like land, the owners of large animals are more likely to be in the 'always non-poor' category. A similar relationship is found between the better-quality houses (structure) and poverty dynamics (Table 9). Thus, assets in rural Pakistan are the prime source for a household to be in the category of 'always non-poor'. They protect households from any negative shock.

It is worth noting that the proportion of pure livestock households in rural areas is not very high; rather it is common among the farm households to have livestock animals. The 2000 Agriculture Census classifies rural households under three broad categories: agricultural households that operate land as owner-cultivators or tenants; livestock owners; and non-agricultural households. The share of non-agricultural households in total rural households is 45 percent, while agricultural households and livestock owners constitute 37 percent and 18 percent respectively. There is a variation in the share of pure livestock households in total rural households across the four provinces; it is highest, 22 percent, in Sindh (Table 10). In terms of employment, the non-agriculture sector

Table 10

Distribution of Rural Households by Activity Status and Province

Province	Agricultural Households	Livestock Holders	Non-agriculture Households	All Households
Pakistan	36.7	18.3	45.0	100
Punjab	36.5	18.0	45.5	100
Sindh	25.0	22.4	52.6	100
KPK	55.0	12.0	33.0	100
Balochistan	45.8	19.1	35.1	100

Source: Computed from the 2000 Agriculture Census.

seems to be an important source for members of agricultural as well as livestock-owner households. About a quarter of the employed members of agricultural households are employed in the non-agriculture sector, and more than 40 percent of the members of livestock-owner households are employed in this sector. In this complexity, it is hard to see the exact relationship between livestock ownership and poverty.

In Pakistan, access to credit is considered a key factor in assisting the poor. But data in hand are not sufficient to examine its association with poverty dynamics. In the PSES model (Table 8) the 'loan obtained last year' was included and it did not turn out to be significant. The dummy variable of "loan obtained last year" is an intersection of credit *access* and credit *need*. Credit access will help alleviate poverty and vulnerability, while the credit need is higher among the poor and the vulnerable. In models, these two forces are canceling each other so that the beneficiary effect of credit access did not show through the variable "loan obtained last year".

Table 9 also shows the results of Equation (4) analysing the impact of the difference of selected variables between the two waves of PRHS panel (the difference in household size, dependency ratio, educational level of the head of household, large animals and landholdings) on the change in poverty status. The estimates show that change in household size and dependency ratio is significantly associated with poverty movements. A positive change in both variables either pushes the non-poor into poor category or keeps them to be always poor. A positive change in household assets i.e. land and livestock ownership, is negatively linked with chronic poverty. Thus, positive change in assets holding is likely to change the status of a household from poor to non-poor. An interesting part of model 4 is the negative and statistically significant association of obtained credit with the likelihood of chronic poverty. It suggests that an access to credit facility might help to alleviate the persistent poverty of this marginalised group.

7. CONCLUSIONS AND POLICY CONSIDERATIONS

This study has used two rounds of the two panel data sets, PSES and PRHS, to examine the poverty dynamics in rural Pakistan. The former covers two periods, 1998-99 and 2000-01 while the latter covers 2001 and 2004 period. The analysis was limited to rural areas of Punjab and Sindh. For this study rural Punjab was further divided into 'southern Punjab' and 'central and northern' Punjab. The panel households were grouped into four categories: chronically poor, moved out of poverty, fell into poverty and 'always non-poor'.

The net movement into poverty was witnessed between 1998-99 and 2000-01 period while during the PRHS rounds in 2001 and 2004 poverty declined sharply. These poverty trends corroborate the findings of the nationally representative surveys carried out during the same periods by the FBS.

The present analysis shows that overall more than one-fifth of the households were chronically poor in the PSES rounds. Despite an overall sharp decline in poverty between the 2001 and 2004 period, the PRHS panel has shown the chronically poor as 11 percent. Another 10 percent fell into poverty during this period. Both chronic and transitory poverty are higher in Sindh and 'southern Punjab' as compared to 'central and northern' Punjab. There is a need to acknowledge that poverty dynamics are not the same as poverty trends; rather it suggests that poverty reduction policies may be designed on the basis of both poverty trends and poverty dynamics.

Household size increases the risk of remaining in chronic poverty or being transitory poor. High dependency ratio is also associated with long-term poverty. These demographic factors may be viewed for the policy purpose in the context of on-going demographic transition, which refers to the change from a situation of high fertility and high mortality to one of low fertility and low mortality. This transition brings about sizeable changes in the age distribution of the population; the proportion of children declines, that of the elderly cohort increases modestly and, most importantly, that of adults of working-age increases sharply. Thus, the demographic transition presents the economy with a "demographic gift" in the form of a surge in the relative size of the working-age population. There is convincing evidence that Pakistan has entered in the demographic bonus phase; fertility decline since the late 1980s has led to declining trends in child dependency and rise in working age population. This is the right time for Pakistan to pursue the small family norm in the country, particularly in rural areas. It will lead to low dependency ratio, more household savings and reduction in poverty.

Both health and education have a close association with poverty dynamics. These two sectors on the one hand may be linked with the demographic dividend. Unless efforts are made to improve both the health status

of the poor and vulnerable and their educational level, it seems difficult for Pakistan to take the advantage of one-time opportunity and reap the demographic dividend. On the other hand, the health expenditure, as shown by this study, can play a major role in perpetuating poverty. The government of Pakistan has recently introduced a transfer income scheme (Benazir Income Support Programme) to benefit the poor. As part of this scheme, health insurance for the poor may be introduced. In view of the increasing share of landlessness in rural Pakistan, rural wages which have fallen in real terms may also be monitored and regularised.

The proportion of households which depend on livestock only for their livelihood is small in Pakistan. Ownership of both land and livestock works together to mitigate poverty and vulnerability in the country. They are the major sources to keep better-off households in the desired 'non-poor' category. Access to land is on the decline in two ways; through decline in landholding overtime and through a decline in sharecropping. Small land-owners prefer self-cultivation as well. In addition to providing incentives for small farmers and implementation of the tenancy laws to help the sharecroppers, there is a need to work out the strategy for more and better access to livestock for the poor, particularly among the landless households.

Appendices

APPENDIX A

The response variable captures the status of household either chronic poor or transient poor, then;

$$\pi_{ij} = Pr(Y_i = j) \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad (1)$$

denotes the probability that the ith response falls in the jth category. For example pi1 is the probability that ith household is 'chronic poor'. By assuming that the response categories are mutually exclusive, let $?_i$ denote the number of cases in the ith group and Y_{ij} denote the number of responses from the ith group that fall in the jth category, with observed value y_{ij}, then $\eta_i = \sum_{j=1}^{J} y_{ij}$ with parameters $\pi_i = (\pi_{i1}, \pi_{i2}, \dots \pi_{iJ})$. The probability distribution of the counts Y_{ij} given the total $?_i$ is given by the multinomial distribution.

$$Pr(Y_{i1} = y_{i1}, \dots Y_{iJ} = y_{iJ}) = \binom{ni}{y_{i1}, \dots Y_{iJ}} \pi_{i1}^{y_{i1}} \dots \pi_{iJ}^{yiJ} \qquad \qquad \dots \quad (2)$$

The most appropriate way to relate p_{ij} to covariates is through a set of $J - 1$ baseline category logits. Taking J as the baseline category, the model is;

$$\eta_{ij} = \log\left(\frac{\pi_{ij}}{\pi_{iJ}}\right) = \alpha_j + X_i'\beta_j$$

$\qquad\qquad\qquad$ …$\qquad$…$\qquad$…$\qquad$…$\qquad$(3)

Where a_j is a constant and β_j is a vector of regression coefficients, for $j = 1, 2…J$-1. This model is similar to a logistic regression model, except that the probability distribution of the response is multinomial instead of binomial and we have J-1 equations instead of one. To calculate p_i from β, the back-transformation is;

$$\pi_{ij} = \frac{exp(X_i'\beta_j)}{1 + \Sigma_j^J exp(X_i'\beta_j)}$$

$\qquad\qquad\qquad$ …$\qquad$…$\qquad$…$\qquad$…$\qquad$(4)

And the base line category is

$$\pi_{ij*} = \frac{1}{1 + \Sigma_j^J \exp(X_i'\beta_j)}$$

$\qquad\qquad\qquad$ …$\qquad$…$\qquad$…$\qquad$…$\qquad$…$\qquad$(5)

The unknown parameters β_j are typically estimated by maximum likelihood. Since in our study, the outcome has four levels, the multinomial logistic regression procedure produces three logits simultaneously. Let logit 1 refer to the logistic regression comparing the households who are chronic poor to those who are non-poor. The logit 2 refers to the logistic regression comparing the households who are falling into poverty to those who are non-poor and logit 3 compares the households who are falling out of poverty to those who are non-poor. If a variable is significant in either logit, it is retained in the multinomial logistic regression. The three logits are as follows:

$$\text{Logit }1 = \log\left[\frac{pr(chronic|X)}{pr(nonpoor|X)}\right] = \beta_{10} + \beta_{11}X_{1i} + \beta_{12}X_{2i} + ... + \beta_{1p}X_{pi}$$

$$\text{Logit2} = \log\left[\frac{pr(fallingin|X)}{pr(nonpoor|X)}\right] = \beta_{20} + \beta_{21}X_{1i} + \beta_{22}X_{2i} + ... + \beta_{2p}X_{pi}$$

$$\text{Logit 3} = \log\left[\frac{pr(fallingout|X)}{pr(nonpoor|X)}\right] = \beta_{30} + \beta_{31}X_{1i} + \beta_{32}X_{2i} + ... + \beta_{3p}X_{pi}$$

Where p is the number of predictors and i indicates the individual.

Appendix Table 1

Appendix Table 2

Appendix Table 1

Summary Statistics of Panel (PRHS 2001-02)

Characteristics	Punjab				Sindh				Punjab and Sindh			
	Mean	S D	Min	Max	Mean	S D	Min	Max	Mean	S D	Min	Max
Household Size (Nos)	8.8	3.81	2	26	11.18	6.18	2	42	9.92	5.21	2	42
Female Headed Households (Female =1)	0.03	0.17	0	1	0	0.05	0	1	0.02	0.13	0	1
Age of the Head of Households (Years)	50.63	15.18	14	99	47.76	13.77	16	84	49.28	14.6	14	99
Age^2 of Head of Household (Years)^2	2793.62	1607.44	196	9801	2470.32	1373.12	256	7056	2641.28	1509.67	196	9801
Dependency Ratio (%)	1.04	0.86	0	7	1.1	0.76	0	4.5	1.07	0.82	0	7
Literacy of the Head of Household (Literate =1)	0.41	0.49	0	1	0.49	0.5	0	1	0.45	0.5	0	1
Health Expenditure (Per Capita, Rupees)	228.52	820.05	0	13850	92.34	587.43	0	13300	164.35	722.81	0	13850
Housing Unit Ownership (Own=1)	0.96	0.19	0	1	0.99	0.09	0	1	0.98	0.15	0	1
Farm Household (Yes= 1)	0.75	0.43	0	1	0.92	0.27	0	1	0.83	0.37	0	1
House Structure (Pacca= 1)	0.18	0.39	0	1	0.13	0.34	0	1	0.16	0.36	0	1
Credit (Yes=1)	0.73	0.45	0	1	0.85	0.36	0	1	0.78	0.41	0	1
Total Large Animals (Nos)	3.18	3.5	0	22	3.29	3.29	0	19	3.23	3.4	0	22
Total Small Animals (Nos)	1.9	2.74	0	20	2.32	4.99	0	50	2.1	3.97	0	50
Land Holdings Acres (Nos)	5.05	10.55	0	91.25	9.2	19.02	0	172	7.01	15.28	0	172
Electricity Connectio n (Yes=1)	0.72	0.45	0	1	0.56	0.5	0	1	0.65	0.48	0	1
Agriculture Employed (Yes=1)	0.53	0.5	0	1	0.68	0.47	0	1	0.6	0.49	0	1
Construction Sector Employed (Yes=1	0.07	0.25	0	1	0.01	0.11	0	1	0.04	0.2	0	1
South Punjab (Yes = 1)	0.5	0.5	0	1	0	0	0	0	0.26	0.44	0	1
Sindh (Yes = 1)	0	0	0	0	1	0	1	1	0.47	0.5	0	1

Source: Computed from the PRHS 2001-02.

Appendix Table 2

Summary Statistics of Panel (PSES 1998-99)

Characteristics	Punjab				Sindh				Punjab and Sindh			
	Mean	S.D	Min	Max	Mean	S.D	Min	Max	Mean	S.D	Min	Max
Household Size	6.38	2.93	1	26	6.99	3.91	1	30	6.52	3.18	1	30
Female Headed Households	0.11	0.31	0	1	0.16	0.12	0	1	0.86	0.28	0	1
Age of the Head	49.32	14.67	15	97	44.80	14.20	15	90	48.33	14.70	15	97
Age Square of Head of Household	2648.04	1531.99	225	94.09	2207.42	1390.83	225	8100	2551.29	1512.72	225	9409
Literacy of the Head of Household	0.35	0.48	0	1	0.42	0.49	0	1	0.36	0.48	0	1
Head of Household Employed	0.79	0.41	0	1	0.88	0.32	0	1	0.81	0.39	0	1
Farm Households	0.41	0.49	0	1	0.54	0.50	0	1	0.44	0.50	0	1
Housing Unit Ownership	0.95	0.22	0	1	0.94	0.23	0	1	0.95	0.22	0	1
Electricity Connection	0.88	0.47	0	1	0.58	0.49	0	1	0.66	0.48	0	1
Land Ownership	0.33	0.47	0	1	0.45	0.50	0	1	0.35	0.48	0	1
Remittances (Domestic)	0.11	0.31	0	1	0.003	0.06	0	1	0.09	0.28	0	1
Remittances Overseas	0.05	0.22	0	1	0.01	0.11	0	1	0.043	0.20	0	1
Loan Obtained Last Year	0.22	0.41	0	1	0.21	0.41	0	1	0.22	0.41	0	1

Source: Computed from PSES 1998-99.

REFERENCES

Abbi, M. Kedir, and A. McKay (2003) Chronic Poverty in Urban Ethiopia: Panel Data Evidence. Paper prepared for International Conference on 'Staying Poor: Chronic Poverty and Development Policy'. University of Manchester, UK, 7–9. April.

Adam, R. H. and J. H. Jane (1995) Sources of Income Inequality and Poverty in Rural Pakistan. International Food Policy Research Institute. (Research Report 1020).

Akhtar, Sajjad (2008) Demographic Transition and Household Savings: Evidence form Pakistan. Population Council, Islamabad.

Amjad, R., G. M. Arif, and Mustafa Usman (2008) Does the Labour Market Structure Explain Differences in Poverty in Rural Punjab. *The Lahore Journal of Economic* (special edition September).

Andrew, McKay and David Lawson (2002) Chronic Poverty: A Review of Current Quantitative Evidence. (CPRC Working Paper No. 15).

Arif, G. M. and N. Chaudhry (2008) Demographic Transition and Youth Employment in Pakistan. *The Pakistan Development Review* 47:1, 27–70.

Arif, G. M. and Faiz Bilquees (2007) Chronic and Transitory Poverty in Pakistan: Evidence from a Longitudinal Household Survey. *The Pakistan Development Review* 46:2, 111–128.

Arif, G. M., and Faiz Bilquees (2006) An Analysis of Sample Attrition in the PSES Panel Data. PIDE, Islamabad. (MIMAP Technical Paper Series No. 20).

Armida, Alisjahbana, and Arief A. Yusuf (2003) Poverty Dynamics in Indonesia: Panel Data Evidence. Department of Economics, Padjadjaran University. Indonesia.

Baulch, B. and E. Masset (2003) Do Monetary and Non-monetary Indicators Tell the Same Story about Chronic Poverty? A Study of Vietnam in the 1990s. *World Development* 31:3, 441–454.

Bhide, S. and A. K. Mehta (2006) Correlates of Incidence and Exit from Chronic Poverty in Rural India: Evidence from Panel Data. In A. K. Mehta and A. Shepherd (eds) *Chronic Poverty and Development Policy*. New Delhi: Sage Publication.

Bhide, S. and A. K. Mehta (n.d.) Chronic Poverty in Rural India. An Analysis Using Panel Data: Issues and Findings.

Bigsten, A. and A. Shimeles (2008) Poverty Transition and Persistence in Ethiopia: 1994–2004. *World Development* 36:9, 1559–1584.

Carter, Michael R. and Julian May (1999) One Kind of Freedom: Poverty Dynamics in Post Apartheid South Africa. University of Wisconsin-Madison, December. (Staff Paper No. 427).

Cheema, Ali (2005) A Profile of Poverty in Pakistan, Islamabad: CRPRID (The Centre for Research on Poverty Reduction and Income Distribution).

Chronic Poverty Research Centre (CPRC) (2005) The Chronic Poverty Report 2004-05. Chronic Poverty Research Centre, University of Manchester, UK.

Chronic Poverty Research Centre (CPRC) (2009) The Chronic Poverty Report 2008-09. Chronic Poverty Research Centre, University of Manchester, UK.

Dercan, Stefan, and Pramila Krishnan (2000) Vulnerability, Seasonality and Poverty in Ethiopia. *Journal of Development Studies* 36:6, 82–100.

Fuente, A. D. (2010) Remittances and Vulnerability to Poverty in Rural Mexico. *World Development* 38:6, 828–839.

Gaiha, Raghav (1989) Are the Chronically Poor also the Poorest in India. *Development and Change* 20.

Gaiha, R. and A. B. Deolaiker (1993) Persistent, Expected and Innate Poverty: Estimates for Semi Arid Rural South India. *Cambridge Journal of Economics* 17:4, 409–21.

Haque, Nadeem Ul, G. M. Arif, and Nasir Iqbal (2007) Growth, Poverty and Social Outcomes in Pakistan. A Study Prepared for DFID, Islamabad.

Hoddinott, John, Trudy Owens, and Bill Kinsey (1998) Relief Aid and Development Assistance in Zimbabwe. Report to United States Agency for International Development, Washington, D.C.

Irfan, M. (2009) Pakistan's Wage Structure during 1990-91–2006-07. (PIDE Worker Paper Series No. 2009:54)

Jalan, Jyotsna and Martin Ravallion (1998) Transient poverty in Post-reform Rural China. *Journal of Comparative Economics* 26:2, 338–357.

Jalan, Jyotsna and Martin Ravallion (1999) Do Transient and Chronic Poverty in Rural China Share Common Causes? Paper presented as IDS/IFPRI Workshop on Poverty Dynamics, IDS, April.

John, A. Okidi and Andrew McKay (2003) Poverty Dynamics in Uganda: 1992 to 2000. (CPRC Working Paper No 27).

Kurosaki, T. (2006) The Measurement of Transient Poverty: Theory and Application to Pakistan. *Journal of Economic Inequality* 4, 325–345.

Lawson, D, A. McKay, and J. Okidi (2003) Factors Affecting Poverty Dynamics and Persistence in Uganda. Paper to be presented at Chronic Poverty Research Centre, International Conference, Manchester, April.

Lawson, D. (n.d.) Uganda: The Influence of Health on Chronic Poverty. The University of Nottingham.

Malik, S. J. (2005) Agricultural Growth and Rural Poverty: A Review of the Evidence. Asian Development Bank, Pakistan Resident Mission, Islamabad. (Working Paper No. 2.)

McCulloch, Neil and Bob Baulch (1999) Distinguishing the Chronically From the Transitory Poor—Evidence from Pakistan. Institute of Development Studies, University of Sussex. (Working Paper No. 97).

McCulloch, Neil and Bob Baulch (2000) Simulating the Impact of Policy on Chronic and Transitory Poverty in Rural Pakistan. *Journal of Development Studies* 36:6, 100–130.

Mehta, Aasha Kapur and Amita Shah (2001) Chronic Poverty in India: Overview Study. Chronic Poverty Research Centre. (Working Paper No. 7).

Nayab, D. (2008) Demographic Dividend or Demographic Threat in Pakistan. *The Pakistan Development Review* 47:1.

Pakistan, Government of (2000) *Agriculture Census*. Islamabad: Federal Bureau of Statistics.

Pakistan, Government of (Various Issues) *Pakistan Integrated Household Survey (PIHS)*. Islamabad: Federal Bureau of Statistics.

Pakistan, Government of (Various Issues) *Pakistan Social and Living Standards Measurement (PSLM) Survey*. Islamabad: Federal Bureau of Statistics.

Rodgers, J. R. and J. L. Rodgers (1993) Chronic Poverty in the United States. *Journal of Human Resources* 28:1, 25–54.

Sen, B. (2003) Drivers and Escape and Descent: Changing Household Fortunes in Rural Bangladesh. *World Development* 31:3, 513–534.

Wagh (2009) Effect of Remittances on Poverty and Financial Development in Sub-Saharan Africa. *World Development* 37:1, 104–115.

Wlodzimierz, Okrasa (1999) Who Avoids and Who Escapes from Poverty during the Transition? Evidence from Polish Panel Data, 1993-96. (World Bank Policy Research Working Paper 2218, November).

World Bank (2001) Hungary: Long-Term Poverty, Social Protection, and the Labour Market. Volume 1: Main Report, Poverty Reduction and Economic Management (ECSPE) Europe and Central Asia Region, April.

World Bank (2007) Pakistan Promoting Rural Growth and Poverty Reduction. Sustainable Development Unit, South Asia Region, World Bank.