INEQUALITY, POVERTY AND MOBILITY:

THE EXPERIENCE OF A NORTH INDIAN VILLAGE

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Thesis Abstract

This thesis analyzes data collected from four surveys conducted bewteen 1957 and 1984 in Palanpur, a village located in Moradabad District of Uttar Pradesh, India. It considers the evolution of inequality, poverty and economic mobility in Palanpur. The working of the credit market is also scrutinized.

The influences on the distribution of income and land of agricultural intensification (the "Green Revolution") and off-farm employment are examined. The use of income as an indicator of living standards is evaluated and compared with a more broad measure of prosperity. Various correlates of poverty are assessed and the incidence of poverty among agricultural labour and low caste households is found to be high.

A unified framework for the analysis of inequality, poverty and welfare, following the stochastic dominance approach, is applied to the data. Across a broad range of measures, the 1974/75 survey year shows less poverty, higher welfare and lower inequality. The four survey years may be divided into one pre-Green Revolution and one post-Green revolution pair. On this basis, there is some evidence that living standards have risen between the earlier and later pair of years. Within each pair, however, living standards in the later year tend to be lower. This is partly due to the effect of poor harvests.

Mobility in Palanpur appears high if we look at current incomes, suggesting that poverty in the village may not be long-term. However, among poor agricultural labour households occupational mobility is low. Moreover, the income mobility among these households is largely transitory and hence poverty for this group may be regarded as sustained.

Credit market operations in Palanpur between 1974/75 and 1983/84 are examined. Credit rationing is widespread and in this segmented market there is evidence that poor households are able to smooth consumption only by borrowing at a high (and rising) cost.

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DEDICATION

To My Mother and Father,

Helga Elizabeth Lanjouw

and

Jan Cornelius Lanjouw

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I take full responsibility for any errors of commission or omission.

Note

Chapter 2 of this thesis builds on a paper co-authored by Nicholas Stern and myself entitled 'Agricultural Change and Inequality in Palanpur 1957-84' which is forthcoming in the volume The Economics of Rural Organization edited by K. Hoff and J. Stiglitz, to be published by Oxford University Press for the World Bank. An earlier version of chapter 3 was written by Nicholas Stern and myself and published as 'Poverty in Palanpur' in The World Bank Economic Review, 5(1), 1990. Chapter 5 is partly based on the forthcoming Discussion Paper No. 35 of the Development Economics Research Programme in STICERD, written by Jean Drèze, Nicholas Stern and myself, entitled 'Economic Mobility and Agricultural Labour in Rural India: a Case Study'. Chapter 6 builds on 'The Credit Market in Palanpur', a mimeo written by Jean Drèze, Naresh Sharma and myself in 1991.

Chapter 1: Introduction

This thesis is concerned with dynamic aspects of inequality, poverty and mobility in the north Indian village of Palanpur. Its aim is to document changes in the levels and distribution of living standards in the village and to investigate the processes whereby these changes have occurred.

Data on the village are available for four years covering an interval of roughly a quarter-century between 1957/58 and 1983/84. As a result, it is possible to investigate the impact on living standards in Palanpur exercised by some of the developments which have taken place in the wider Indian context. We enquire into the effect of changing agricultural technologies, the so-called "Green Revolution", on the distribution of income in the village. We ask who have been the major beneficiaries, who have not, and whether there have been changes over time in this respect. In a similar way we examine aspects of the process of inter-sectoral change whereby a number of villagers have been able to move from a livelihood which was highly dependent on agriculture to a more diversified occupational structure including employment in nearby towns. Another feature of the wider Indian economy which has affected Palanpur concerns the evolution of financial markets in rural areas. We examine the credit market in Palanpur and ask how well this market operates as a source of funds for those villagers with particular investment needs or those who wish to smooth their consumption in the face of short-term fluctuations in income. We also pay attention to the success of government programmes designed to expand the availability of credit in the village.

In this study, attention is paid to issues which arise out of an attempt to measure living standards, particularly where these are changing over time. The focus on one village provides a rare opportunity to

evaluate the success of common approaches to the measurement of socio-economic change. This is because the study permits the comparison of results reached on conventional bases with what is known about the village from intensive fieldwork carried out during four separate survey periods, and which has provided detailed quantitative and qualitative information.

1.1. The Palanpur Study

The project to study the Palanpur economy over an extended period of time was originally initiated by Christopher Bliss and Nicholas Stern. Over the agricultural year 1974/75, assisted by two Indian researchers - S.S. Tyagi Jr. from the Indian Agricultural Economics Research Centre (AERC) in Delhi and V.K. Singh from RBS College, Agra - they undertook a year-long study of the village economy which culminated in the publication of a book, *Palanpur: the Economy of an Indian Village*, in 1982. In this book, the focus was principally on agriculture, economic decision-making and markets, but it also explored in some detail a wide range of other issues relating to the village economy. The selection of the village was based on a number of different criteria[1]. Prominent among these was the fact that the village had twice previously been surveyed by researchers from the AERC in Delhi, the first survey taking place in 1957/58 and the second in 1962/63. Results from the first survey were reported in Ansari (1964). Copies of completed schedules and questionnaires used during the earlier two surveys were made available to Bliss and Stern and some comparisons were provided in Bliss and Stern (1982).

In the late 1970s Nicholas Stern decided to prepare for a resurvey of the village, with the intention to explore further questions relating to living standards, and changes over time. He approached Jean Drèze on the issue in 1982 and it was decided to conduct a survey over the 1983/84 agricultural year. This resurvey was directed by Jean Drèze and Nicholas

[1]. These are described in full in Bliss and Stern (1982), and will not all be repeated here.

Stern, in consultation with Christopher Bliss, and conducted by Jean Drèze and Naresh Sharma of the Indian Statistical Institute in Delhi. Stern made frequent visits to the village during the course of the fieldwork, and Bliss also visited the village during this period. The survey covered a period somewhat longer than one entire agricultural year between 1983 and 1984. The researchers in 1983/84, as in 1974/75, were assisted by S.S. Tyagi Jr. of the AERC and his participation greatly contributed to continuity[2]. The project was directed from the University of Warwick Development Economics Research Centre until 1986 when it moved to the London School of Economics. It was funded by the Overseas Development Adminstration (ODA) under ESCOR.

After the 1983/84 survey, the data for all four years were compiled and coded in such a manner so as to create a panel data set[3]. While the level of detail (and accuracy) is not uniform over all four survey years, an extensive "core" of data are available for each year and much of the analysis contained in the thesis is based on this core data set. Where possible the core data are then supplemented with additional information available for specific survey years[4].

1.2. The Village Setting

An excellent and detailed description of Palanpur, its population, institutional setting and its markets, can be found in Bliss and Stern (1982). Additional information, pertaining specifically to the last survey

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[2]. Moreover, the elder brother of S.S. Tyagi Jr. had directed the fieldwork in Palanpur during the 1957/58 survey.

[3]. This lengthy process was directed by Jean Drèze at the University of Warwick and the London School of Economics during the mid-1980s and was funded by the ODA and the Suntory Toyota International Centre for Economics and Related Disciplines (STICERD) at the LSE. A number of collaborators assisted in this programme, including Naresh Sharma, S.S. Tyagi, Luc Leruth, Serge Wibaut, Anindita Mukherjee, and Peter Lanjouw.

[4]. In addition, between the main survey years several short revisits took place which provided useful supplementary information on the village.

year, can be found in a number of recent contributions (see Drèze and Stern (1986, 1989), Drèze (1988), Drèze and Mukherjee (1989) and Drèze and Sharma (1990) and Sharma (forthcoming)). In the brief introduction to the village presented below we have drawn from these sources but this overview will not attempt to go into the same level of detail.

In addition, we will not attempt to provide here a complete account of the village economy and how it has evolved over time. While we do discuss some aspects of the village economy, we will carry out a fairly detailed examination, in chapter 2 of this thesis, of the major forces which have affected the economy of Palanpur over time and therefore do not repeat this discussion here.

In terms of population, population growth, average yields, per capita income levels and growth rates, Palanpur is not far away from all-India averages. This is not to assert however, that Palanpur may be regarded as a "typical" Indian village - a notion of a "typical" or "average" village is a rather doubtful concept. What we are interested in is whether commonly advanced arguments apply to or explain what is observed in Palanpur. If not, we are entitled to ask why that is. Does this raise interesting questions for the arguments? Does what occurs in Palanpur provide insights into what might be fruitfully investigated elsewhere? Palanpur does not have particular features which make it peculiar in crucial respects. For a village study to provide a useful setting in which to examine the working of economic theories or to assess the impact of particular government policies, we would not want it to stand out markedly in any particular way.

1.2.1 Location and Physical Features

Palanpur is situated in Moradabad District in west Uttar Pradesh. It is located along the railway track connecting the city of Moradabad and the town of Chandausi. Both these towns are quite sizeable, the population of Moradabad was already in excess of 200 thousand in 1974/75. Moradabad is

approximately 30 kilometers away and Chandausi is situated at a distance of about 13 kilometers (see Figure 1). Palanpur lies adjacent to the Jargaon railway station on the Moradabad - Chandausi line and is thus quite well positioned vis-a-vis the outside world. This relatively favourable connection with the urban economy has been important in facilitating access to work opportunities outside the village. But it cannot be said that Palanpur is exceptional in this respect, at least for Moradabad district: while only a minority of villages are endowed with a railway station, a significant part of the rural population in the district finds it possible to take up employment in nearby towns and to commute either by public transport or by bicycle. While Palanpur has a railway station, the nearest tar-sealed road is several kilometers away and reaching the nearest town (Chandausi) by bicycle involves a journey of some time. The distance from Delhi of Palanpur is about 190 kilometers, and involves a journey by train of considerable duration. For most villagers in Palanpur, Delhi is a very remote place which does not figure highly in their daily life.

The village itself consists of a cluster of mostly mud houses which are closely packed together. A few of the wealthier villagers have houses which are made of brick, but these are relatively rare. Three broad lanes, wide enough for a bullock cart, run through the village. There are a number of small narrow alleys in the village. The village households are divided in such a way that specific castes tend to congregate together. There is no electricity in the village itself, nor effective drainage in the lanes running through the village.

1.2.2 Land and Agriculture

The village land covers just under 500 acres, including residential and railway land as well as land under the Ari river which forms the village boundary on the northern and eastern side. Most, but not all of this land is owned by Palanpur households; some is owned by landlords in neighbouring villages. Similarly, a few Palanpur households own land in other villages. Nearly all of the village land is being cultivated. There

is very little which is under any forest cover so that possibilities for further extension of agriculture are minimal. The distribution of land owned and cultivated is described in Chapter 2.

Agriculture forms the most significant component of the Palanpur economy. The dominance of this sector declined somewhat in the most recent survey year as links between Palanpur and the outside economy strengthened, but even then it remained of central importance. There are two main seasons in the agricultural year, rabi and kharif. The harvest for most of the crops grown in the rabi season is in April and May, and for the kharif it is in September and October. For the relatively small area cultivated in Palanpur, the number of crops grown is rather large (in 1983/84 around 30 crops were grown in almost 100 combinations). However, most of the gross cultivated area is devoted to four or five main crops. In decreasing order of area in 1983/84, these are wheat, sugarcane, millet (bajra), fodder (jowar) and paddy. Sugarcane is a major cash crop in the region and wheat is the most important food grain. Most crops are grown in either the rabi season or the kharif season but sugar cane is the exception as it requires ten months to reach maturity. The main rabi crop is wheat, while bajra, jowar and paddy are all grown during the kharif season. High yielding wheat seed varieties associated with the "Green Revolution" were introduced in Palanpur over the interval surveyed. The first such seeds were introduced around 1970, i.e. between the 1962/63 and the 1974/75 survey years, and further improved varieties have appeared subsequently.

A second major feature of the agricultural intensification which took place in Palanpur over the 25 years surveyed has been the spread of irrigation. Whereas in 1957/58, irrigation was still very underdeveloped, by 1983/84 more than 96% of land owned was irrigated. Nearly all irrigation is from sources drawing groundwater. There is a small village pond which is occasionally used as a source of irrigation water. In 1974/75, Bliss and Stern (1982) found that the most common source of irrigation was the Persian wheel attached to an open well and powered by

draught animals. By the last survey year, the number of Persian wheels had declined from 26 in 1974/75 to 22, with many of them not in working order. The use of Persian wheels had declined because they were being replaced by diesel pumping sets; there were 22 such pumping sets in 1983/84 compared with only 9 in 1974/75. In addition, in 1983/84 one tubewell running on electricity was in operation and the one tractor in the village was also being used to lift water from borings.

The climate in Palanpur is dry for most of the year, but there are four monsoon months (July-October) during which rains are frequent. These rains are erratic from year to year, and in this respect agriculture during the 1983/84 survey year fared particularly poorly[5]. The monsoon is preceded by a couple of very dry and hot months where temperatures during the day can be well over 40° C. During the winter months in Palanpur temperatures can fall to nearly 0° C, and there are occasional rains as well.

1.2.3 Population and Caste Composition

In 1957/58 there were 100 households in the village, comprising a total population of 528. By 1983/84 the number of households had risen to 143 and the population had risen to 960. According to the 1981 Census, nearly 75% of all villages in India had a population below 1000, and almost 50% had a population below 500. For the state of Uttar Pradesh specifically, the comparable proportions were very similar. Palanpur, while not extremely large, is certainly not among the smaller villages in India.

Palanpur is a multi-caste village, and this feature of the village will be seen to exercise an important influence in many different parts of the analysis. Of the village population in 1983/84, 87% were Hindus with the remaining 13% consisting of Muslims. Bliss and Stern (1982) divide the

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[5]. During that year, pest attacks on a number of fields during both the rabi and kharif seasons constituted an additional factor resulting in particularly poor harvests for 1983/84.

village population into a hierarchical ordering of nine castes and this division will be retained in the thesis. The term "caste" in this sense is used rather loosely as it includes those Hindus without caste and two groups of Muslims.

The top of the social hierarchy in Palanpur is occupied by households of the Thakur caste. In 1983/84 there were 30 such households with a total population of 217 individuals. Thakurs are traditionally of a warrior caste and even though most of them are currently farmers, factory workers in nearby towns, or government employees, there remains a discernable reluctance among many to become involved in manual labour. In 1983/84, the average landholding per Thakur household was 25 bighas (6.4 bighas are equal to 1 acre), and the average cultivated holding was 19 bighas (see Table 1). This compares with 30 and 26 bighas respectively in 1974/75. From Table 1 we can see that while in terms of status Thakurs are ranked highest in the village, they are not ranked highest in terms of land ownership, operation, nor in fact, per capita income.

Ranked just below Thakurs in the social hierarchy are the Muraos. In 1983/84 there were 27 such households with a total population of 217. Muraos are the only caste group in Palanpur whose traditional occupation is cultivation, particularly the growing of vegetables. Compared to other castes, many Muraos appear to take pride in cultivation and they are often very skilled farmers. They have taken greatest advantage of recent technological advances in agriculture. Their land endowment is better than that of all other castes and has actually increased over time. The average landholding of Murao households in 1983/84 was 40 bighas compared with 37 bighas in 1974/75, and in 1983/84 they averaged a cultivated holding of 41 bighas compared with 29 in 1974/75 (table 1). The rising prosperity of Muraos has become a source of rivalry with the Thakurs, who are losing their ability to retain a privileged economic and social position.

Next in the social hierarchy of Palanpur are the Dhimars. The traditional occupation of this caste of 13 households in 1983/84 numbering

74 individuals, was water carrier. Dhimars reportedly owned quite a lot of land long ago, but they had already lost much of this by the earlier survey years. By 1983/84 the average household owned 5 bighas and cultivated 12 bighas of land. This was down from a comparable average of 11 and 19 bighas respectively in 1974/75. In chapter 6 of this thesis we will see that Dhimar households are quite heavily indebted to public lending institutions in Palanpur.

Below the Dhimars in the social hierarchy are households of the Gadaria caste. This caste comprised 12 households in 1983/84 and 83 individuals. The traditional occupation of these households was goatherds although few are still involved in this occupation. In terms of landholding per household in 1983/84, Gadarias were ranked below only Thakur and Murao households with an average holding of 16 bighas, and a cultivated holding of 15 bighas.

The two Muslim "castes"; Dhobis - washermen, and Telis - oil pressers, follow below the Gadaria caste in the social hierarchy. There were only 4 Dhobi households in 1983/84 numbering 27 individuals. Telis were more numerous with 16 households and 92 individuals. On average, households of these two castes owned around 6 bighas of land in 1983/84. Dhobis averaged a cultivated holding of 15 bighas while Telis cultivated 12 bighas on average.

Below the Telis in rank, but far richer in terms of average per capita income, are the Passi households[6]. This caste was traditionally involved in mat-weaving. They recently emigrated to Palanpur from east Uttar Pradesh, and many members of the caste are employed in the railways. Involvement in agriculture of this caste is generally quite low, with on average a land holding of 9 bighas and land operated averaging 7 bighas in 1983/84.

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[6]. Towards the lower end of the social hierarchy as laid out here, the actual ranking of castes becomes less clear-cut. Hence, the significance of the Passis being "ranked" below the two Muslim groups while earning greater incomes, may not be marked.

The Passis are followed by the Jatabs (traditionally leather-workers) in the social ranking. This is the third largest group in the village after the Thakurs and Muraos. In 1983/84 there were 19 Jatab households numbering 118 individuals. Jatabs are similar to Muraos in many ways, except that they own far less land and other resources (in 1983/84 Jatabs owned 11 bighas of land on average, and cultivated 12 bighas). They are heavily involved in various labouring occupations, particularly agricultural labour. Although they are poor, and unable to lease in as much land as they may desire because they lack complementary resources, Jatabs are good cultivators, particularly in growing vegetables.

The ninth group in the social hierarchy comprises the remaining households in the village which do not fit into any of the other castes. Consequently this heterogenous group should not be considered as uniformly below the Jatabs in rank. It included, in 1983/84, three Banji (sweeper) households, two households of the well-educated Kayasth caste, a barber household and one carpenter household. The households in this group differ widely from each other in social standing, education, income, and so on. They have little or no involvement in agriculture.

1.2.4 Markets and Institutions

The market for land in Palanpur centres on rental transactions as opposed to sales. Sales of land occur infrequently and usually as a consequence of distress. The principal contractual arrangement is sharecropping, with 50% of the harvest going to each the landlord and tenant, but with the tenant incurring most production costs (such as seed, labour, use of bullocks and so on). In recent years, with the expansion of fertilizer use and mechanized irrigation, some of these additional variable costs are shared between landlord and tenant. Several features of leasing patterns are of interest. Tenancy arrangements covered in 1983/84 approximately 30% of total operated area, and more importantly leave very few households in the village unaffected. Both tenants and landlords constitute large, fluctuating and heterogeneous groups. While

landlords tend generally to be somewhat better endowed in terms of landholdings, the distribution of both groups along the landownership scale is quite similar. A majority of tenants contract with several landlords, with most leases lasting only one year. The landless have virtually no access to tenancy. See Bliss and Stern (1982), and Drèze and Sharma (1990) for further details on sharecropping in Palanpur.

The labour market in Palanpur operates largely in terms of casual agricultural labour with some non-agricultural wage labour also occurring within the village. As a rule, casual labour is hired on a daily basis. Contracts are usually agreed during the evening preceding the day of employment, with the employer approaching the prospective labourers and asking them whether they are willing to work for him the next day. There are three types of wage-payment system: daily wage, piece rate, and harvest share. Most contracts are based on the daily-wage system. The "going wage" for a day's work is generally the same for all labourers, and it also tends to be somewhat rigid over time despite fluctuations in the level of agricultural activity. As a result, involuntary unemployment is common during periods of slack labour demand. Often, those who have to go without a job during these periods are the less productive labourers. Few women are employed as wage labourers and those that are are almost invariably from the lower castes. Regular employment opportunities outside the village have increased substantially over the survey period, while traditional labour services and occupations are becoming less important. More details on the labour market can be found in Drèze and Mukherjee (1989).

The credit market is the subject of chapter 6 of this thesis. Briefly, it can be divided into four broad segments: (1) interest-free credit from friends and relatives; (2) low interest credit from state institutions (including rural banks and a local Credit Cooperative); (3) commercial credit from urban goldsmiths and pawn-brokers; and (4) high-interest credit from village moneylenders. Nominal interest rates vary widely between these four sources (from zero in the case of friends and

relatives to about 60 per cent per year in the case of village moneylenders), but non-price factors limit arbitrage. For instance, borrowing from a relative can entail a loss of prestige, state institutions are prone to corruption and fraud, and loans from urban goldsmiths can be obtained only against specific collatorals. Generally, better-off households are able to obtain cheaper credit, while the poorest households find it hard to borrow from sources other than village moneylenders.

There is an active market for the services of most (non-animal) assets used for productive purposes in Palanpur. In earlier years, as mentioned above, most irrigation was conducted with the use of a Persian wheel powered by bullocks or buffaloes. By 1983/84, water was mainly drawn from tubewells by diesel pumpsets. Throughout the survey period, irrigation was organized and provided privately. Similarly, the introduction of new technologies and seed varieties was largely the result of private initiative. Although an extension worker has been appointed for Palanpur, there is little evidence of effective assistance and advice being provided.

In Palanpur there is an elected village council, called the *Panchayat*, which was designed to serve as the cornerstone of local self-government. The Panchayat hardly ever meets and in practice most of its duties are performed directly by the headman. In 1983/84, this headman was a Thakur farmer who was regarded by many as corrupt, and strongly disliked by many in the village.

Palanpur has a government primary school. However, this institution does not function in an even remotely satisfactory manner. The school is housed in a one-room building in ruins, with no materials or equipment to speak of. In 1983/84 the school teacher was a Thakur from Palanpur, son of the village headman, but he was only rarely observed to perform his duties. There is also a Secondary High School located in Palanpur. It is privately run and has a slightly better record than the Primary School. However, as this school requires the payment of fees, only few Palanpur households send their children to the school. These households are without

exception of the higher castes. In 1983/84 72% of males and 95% of all females in Palanpur were illiterate. There were four college graduates and two individuals with secondary education. Of the four graduates three were Muraos and one was a Gadaria. On the whole however, the level of education among Thakurs was the highest in the village, with 31% of all Thakurs having gone to school. The Jatabs, Dhimars, Dhobis and Telis were the most poorly educated in the village.

1.3. Socio-Economic Change in Palanpur: Issues

In this thesis one of the issues with which we will be concerned is whether the "quality of life" of Palanpur villagers has improved over the last 25 years. This question is one which is natural to ask and one which is of interest not only to economists but any to concerned observer. However, it raises a number of important methodological issues. There is need for a definition of welfare and its changes over time. In addition, to comment on the welfare of individuals involves numerous distributional judgements. Under certain conditions (e.g. the endorsement of individuals' own preferences), welfare changes are revealed by a comprehensive measure of "real income" which takes into account not only earnings but also health, disutility of labour, the consumption of public goods, etc. (see Sen, 1979). Such a measure of "real income" can differ markedly from the conventional income measure, and an important component of this thesis is concerned to highlight these differences. However, this is not to deny the importance of purchasing power in any assessment of changes in living standards in Palanpur. Because so many villagers are severely constrained by poverty in their endeavors and aspirations, it is easy to understand the great concern for money incomes among villagers. A further point relating to income as a measure of living standard is that as a measure of purchasing power it represents command over commodities and yet ultimately we may be more interested in "capabilities" (see for example, Sen, 1992). The two approaches diverge mainly because the relationship between commodity command and capabilities tends to differ from one individual to

the next. However, the differences need not be very large within a small village, where the individuals share a similar environment and a similar access to public goods. For these reasons, this thesis will pay a considerable amount of attention to changes in the levels, distribution and functional determinants of money incomes in the village.

In the literature on the measurement of living standards, consumption expenditure has frequently been proposed as an alternative indicator of welfare (see for example, Anand and Hariss, 1990). It is argued that such a measure is well placed to shed light on welfare achievements by individuals. Certainly, where individuals are able to "smooth" consumption in the face of fluctuations in income, one might prefer to examine expenditures when evaluating living standards. Such a measure is used in many studies of living standards, particularly in India, and there is no doubt that much interesting analysis could have been conducted for Palanpur with such information. However, the data available for the village do not include details on consumption and expenditures and no work in this direction could be carried out[7].

While the use of income data may not generate the same conclusions regarding living standards in Palanpur as would have been obtained from consumption data, in some situations it might actually be the preferred indicator. As has been pointed out by Atkinson (1989) income can be seen to point to *opportunities* to achieve certain welfare levels, while expenditures reveal *achievements*. The implication of this difference can be easily brought out in an example. A particular individual may be regarded as very badly off on the basis of expenditure data, when in fact his income is quite adequate and his low consumption is not the result of

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[7]. It is possible that the choice of expenditure data as opposed to the collection of income data in most large scale studies of living standards, is motivated by the fact that it is easier to collect (although numerous collection and definition problems are also encountered in this approach). A reliable measure of income (certainly annual income) involves very detailed information and requires extensive cross-checking and verification. Complete information on many income components would not be readily volunteered to strangers. In the Palanpur study it was possible to overcome many of such difficulties.

financial constraints but some other consideration such as fasting on religious grounds, or the conscious choice for an ascetic way of life. In such circumstances it may be argued that the expenditure data become misleading in terms of revealing the standard of living.

Supposing that the use of income restricted to some measure of purchasing power is found to be acceptable, the measurement of income and its change over time in an agrarian economy still presents a number of difficulties. First is the definition of income for farm households simultaneously involved in production, consumption and investment. Second is the need to choose price indices which will allow meaningful comparisons to be made between survey years. A third problem involves the choice of time interval over which the flow of incomes should be calculated. In some respects an interval of a year may seem to be very long because it masks the considerable variation occurring during the year. On the other hand, an annual measure may seem too short because it does not adequately reflect the long-term purchasing power position of individuals. In the Palanpur setting, as in most agricultural settings, these considerations take on additional significance because of the presence of sharp short-run fluctuations in farm incomes due to harvest quality. We will see that "noise" in an income measure, in the sense that income in a particular year deviates randomly from its long-run level, can have serious implications for the investigation of living standards, particularly in the analysis of poverty and economic mobility.

A first step taken in this thesis is an enquiry into the distribution of living standards in the different survey years. Is income inequality rising with the intensification of agriculture and the rise in the number of outside jobs? There is a substantial literature which suggests that the Green Revolution has been associated with increasing income inequality (for a recent survey on this issue see Lipton and Longhurst, 1989). It is argued that large farmers may have advantages in the credit market and are therefore better positioned to acquire the new seed varieties, fertilizers and capital goods that the more intensive cultivation practices require.

In addition, it has been argued that large farmers may be able to reap economies of scale from cultivating intensively on larger plots of land and by utilizing their capital stock more efficiently. Third, large farmers may be quicker to adopt new practices because the risks posed may be less severe as they need not devote their entire landholdings to the new techniques.

A second issue discussed in the literature has been the effect on the distribution of income of inter-sectoral transfer out of agriculture. In a developing country context, this literature can be traced back at least to the contribution of Lewis (1954), and it has provoked much research at various levels of aggregation (see also Kuznets, 1955). In Palanpur there has been a discernable strengthening of links between the village and the outside economy and the impact of this process on income inequality has been marked.

The nature and the extent of poverty in Palanpur is examined and we discuss how well a measure such as income identifies the poor in the village. Questions relating to different notions of poverty must be addressed. For example, what are the differences between absolute poverty and relative poverty? From the perspective of policy, it is of interest to consider the success of various correlates in identifying the poor in the village. If a clear, and easily observed correlate of poverty were found, then this could suggest a possible target group for government poverty alleviation schemes. It will be seen that, because income is a 'noisy' measure, seeking to identify groups particularly vulnerable to poverty may result in systematic biases, such that the poverty of those who are truly poor is understated while the poverty of those who are not poor is overstated.

Much of the analysis of living standards has tended to treat the measurement of income inequality, poverty and welfare as distinct issues which can be examined separately. Such practices are not always satisfactory, because they may obscure the many linkages between these

aspects of living standards. In particular, the choice of summary measures can significantly influence conclusions reached. For example, it is quite possible that for a particular change in the distribution of income, with some specific measures, poverty may be seen to fall with inequality rising, and the reverse may be observed when other measures are used. As another example, it is important to know under what circumstances rising average incomes, accompanied by worsening income inequality, would lead to a rise or a fall in welfare. These questions are difficult to examine using conventional approaches.

A further problem encountered in many of the conventional approaches to the measurement of living standards is the failure to deal systematically with subjective judgements. We have already mentioned that poverty and inequality measures often do not make these judgments explicitly, but even where they do, one would also be interested to know how robust conclusions made on the basis of a particular measure are when other distributional judgements are held. In the measurement of poverty further room for individual discretion lies in the selection of a poverty line below which individuals will be regarded as poor. Once again it is of interest to know whether conclusions as to a rise or fall of poverty between two periods is heavily dependent on the actual income level at which the poverty line is drawn.

There is an approach taken in the literature, and which we examine in the Palanpur context, which does attempt to address many of the difficulties raised in the above two paragraphs. This is the approach pioneered by Atkinson (1970) for the measurement of inequality and welfare, which has been extended in a number of directions in subsequent contributions by himself as well as other researchers. Essentially the approach applies results from the literature on stochastic dominance to rank distributions on the basis of poverty, inequality and welfare. If dominance of one distribution, whether in terms of poverty, inequality or welfare, is observed, then this ranking holds over a wide range of measures. Hence a considerably more robust ordering, incorporating a much

wider range of distributional judgements, may be obtained than would have been possible using one or two individual measures. Because the process of examining for stochastic dominance is so similar whether we are considering poverty, inequality, or welfare, we retain a clear idea of how related these concepts are. Using this approach does not always provide us with a full ranking, however. While this may appear in some respects to be a disadvantage, it does highlight the fact that comparisons of poverty, inequality or welfare cannot be easily divorced from distributional judgements.

A question of great interest which arises in any examination of dynamic aspects of living standards, is the extent of economic mobility which occurs over time. In relation to poverty, it is important to obtain some idea of the degree to which poverty is a sustained or a temporary condition. Once again, we must scrutinize our measure of income in its ability to distinguish between those villagers who are "chronically" poor and those who are not vulnerable in this respect. In some respects the fact that the years surveyed in Palanpur are fairly wide apart makes some of the analysis of income mobility more difficult. However, considerable additional insights can be obtained for the situation in Palanpur by scrutinizing the mobility of *occupations*. It is seen that households with involvement in agricultural labour have not enjoyed much occupational mobility over the quarter century studied. Moreover, households of this group are highly represented among the poor in all four survey years. There is therefore a suggestion that among most households in this group, poverty is a long-term condition.

The operation of the credit market in a village such as Palanpur can influence the living standards of households in several ways. First, this market can act as a conduit through which households wishing to make productive investments may be able to temporarily expand their expenditures over and above their current revenues and savings. These productive investments can affect future incomes of households and in this way living standards may be raised substantially and in a permanent way. Second, the

credit market may affect living standards by providing a buffer whereby households facing a temporary downturn in their fortunes (this can be due to a whole host of reasons including bad health, harvest quality, mistakes, accidents, etc.) are able to avoid having to resort to distress sales of assets, or even more drastically, constrained consumption. With access to loans such households might avoid reinforcement mechanisms which could threaten to make a temporary downturn become a continuous spiral.

An examination of the Palanpur credit market with respect to these two roles may be usefully conducted from five perspectives. First, we ask whether credit has been going to both types of borrowers. As we are concerned to detect evidence of vulnerability among certain groups we will be particularly interested to see whether those who are likely to need credit to tide over temporary shortfalls are restricted in their access to the market. The approach from this perspective involves some assessment of the *purpose* for which credit is required. Ascertaining this purpose can be difficult because of the fungibility of money. From the second perspective, we enquire into the cost of credit and whether this has been changing over time. We will be interested to see whether credit going to different people has different costs attached to it and we must examine why this would be.

The third perspective focuses on repayment performance. An aspect which deserves attention is that the burden of debt may itself become one of the mechanisms threatening to turn a temporary shortfall into longer term immizerization. Related to this issue of repayment is the fourth perspective which focuses on collatoral and inter-linkages with other markets. If access to credit is linked with an ability to offer collatoral of a value equal to or greater than the loan, then there may be cause for concern that those with few assets may be unable to obtain the credit they would like, regardless of whether it is to be used for consumption smoothing or investment. It has been pointed out in the literature that inter-linkages with other markets may develop in those circumstances where informational asymmetries threaten to make credit unavailable for those

unable to offer collatoral (see Bell, 1989, for a survey). However, even where such interlinkages occur it need not be the case that the outcome is particularly desirable. For example, in order to obtain credit, an agricultural labourer may have to accept employment as an attached labourer at a wage below the daily wage rate.

A fifth perspective from which we view the credit market in Palanpur is with respect to the dichotomy between public, or government, provision of credit and private (all other sources) provision. The government of India has been active in trying to displace the village moneylender in rural credit markets. It has argued that these moneylenders charge high and usurious interest rates, and has proposed that government provision of low cost credit is the best way to eliminate these moneylenders from the scene. Questions which must be asked include, what have been the effect of these measures in terms of the two roles that the credit market in Palanpur can play? What proportion of the total private credit market do moneylenders represent? Have village moneylenders actually diminished their scale of operation? Have they been replaced by other private lenders?

1.4. Village Studies Versus Large-Scale Studies

In recent years there has been on-going debate surrounding the way in which to examine socio-economic change in developing countries such as India[8]. One approach, often labelled the "economist's approach", has been to compare results for different years from large-scale surveys of many thousands of households designed to represent particular regions, states or even an entire country. The second approach, more typically associated with anthropologists but certainly not exclusively so, consists of resurveying individual villages or groups of villages. In India the debate became particularly heated during the 1970s and 1980s when it was found

[8]. A recent publication edited by Bardhan (1989) contains a very lucid summary of the debate until the late 1980s, and also contains many useful contributions from both sides of the debate.

that the different approaches yielded different conclusions about trends in living standards in rural areas. Moreover, the divergence in conclusions was not always in the same direction. On the one hand, village re-surveys tended to observe a decline in poverty over time while large-scale studies painted a more gloomy picture. On the other, large-scale evaluations of the working of the Integrated Rural Development Programme (IRDP) in India during the 1980s yielded rather optimistic conclusions while micro-studies tended to be considerably more negative.[9]

This thesis is well placed to contribute to this debate. We have already mentioned above that the changes in living standards which we have documented for Palanpur should not be extrapolated to all villages in rural North India, or even western Uttar Pradesh. However, the findings obtained for Palanpur may be usefully suggestive, and should be tested out elsewhere. It should be stressed that we do not disagree with the advocates of large-scale surveys who stress that generalizations are only possible from such studies. We would argue however, that the micro-study of a village such as Palanpur is better placed to examine "dynamics, processes and relationships" (Bardhan, 1989, pg.6) than large scale studies. Village studies can circumvent many of the problems associated with large-scale studies stemming from the large size and the consequent need to compromise regarding standardized definitions, concepts and categories. In addition, possible "agency" problems which develop between field investigators and the original designers of the surveys may be avoided. Moreover, micro-studies are particularly good at identifying situations which, while still marginal and statistically insignificant, point to substantial changes in the larger dynamic context. Consequently, small scale field studies can very productively feed into the operation of large scale surveys by supplying hypotheses, identifying useful indicators, and highlighting the ambiguity of various definitions.

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[9]. See Drèze (1990) for a comparison of the conclusions reached by the Concurrent Evaluation of the IRDP conducted by the government of India, and what was observed from many village studies, including Palanpur. Note that the IRDP was not introduced in Palanpur until after the last survey year, and as a result it will not be examined in this thesis.

Micro-studies can play another important role in testing several areas of economic theory. For example, it has not been possible to firmly establish whether the ongoing attention of many development theorists to the importance of inter-linkages in rural markets has been warranted, because most large-scale studies are unable to provide any guidance as to the relative importance of such contracts. We would argue that careful and detailed micro-studies can provide the necessary information. These studies typically examine many markets at the same time; more extensive cross-checking and verification of responses can be carried out; and they are more likely to elicit accurate responses on topics which are sensitive. As a result, micro studies can be not only useful but may be essential testing grounds for economic theories.

While the Palanpur survey unambiguously falls under the heading of a micro-study, it is clear that in many respects it differs from the type of survey which anthropologists might carry out. Many cultural anthropologists might reject altogether attempts to measure socio-economic change in a positive manner, and certainly most anthropological studies would place less emphasis on the collection of quantitative as opposed to qualitative data[10]. While we would agree that the collection of quantitative data should not form the entirety of an intensive village study, there can be real benefits to having such data available. Most of these advantages lie in the fact that carefully collected and recorded quantitative information may improve our ability to detect inconsistencies in respondents' replies as well as our understanding of what these inconsistencies mean. The level of detail provided by quantitative micro-data means that if properly used, such data can contribute in a real way to the positive analysis of rural economies.

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[10]. The Palanpur project is by no means the only village study in India which has focused on economic questions and made intensive use of quantitative data. There is a long list of studies in this area and many published works. For just a flavour of this literature, see Bailey (1957), Bardhan (1984), Bardhan and Rudra (1980), Cain (1990), Epstein (1962, 1970), , Gough (1987), Hariss (1983), Platteau and Abraham (1987), Swaminathan (1988), Walker and Ryan (1991).

1.5. Plan of the Thesis

The changing distribution of income and land in Palanpur is the focus of chapter 2. The impact of population growth, intensification of agriculture and the spread of outside jobs is assessed. The determinants of income in the four survey years are examined. Inequality of incomes is decomposed by components as well as by population subgroups in an attempt to understand their contribution to total inequality. The effect of household partition on the distribution of land is examined. It is found that inequality in Palanpur changed substantially between the survey years, but that the direction of change was not uniform over the survey period.

In chapter 3 we examine the meaning and identification of poverty in Palanpur using three indicators of standard of living. The first is a measure of "apparent prosperity" based on the personal assessments of the investigators involved in the fieldwork. The other two are income for each respective survey year and a measure of permanent income obtained by averaging incomes over the four surveys. Income measured in any one year may give a misleading impression of the incidence of poverty. In particular where current income is used to identify groups particularly vulnerable to poverty, systematic biases may emerge. Vulnerability is high among low-caste households and those which are involved in agricultural labour. Categories, however, are not homogeneous.

Chapter 4 examines living standards in Palanpur from a particular methodological perspective. The approach taken is the one of stochastic dominance, which permits (partial) orderings of distributions on the basis of inequality, poverty and welfare. These orderings are robust over a wide range of measures embodying various subjective distributional judgements. We examine the extent to which we can obtain more rankings if we are prepared to permit less divergent distributional judgements than are allowed in the stochastic dominance framework. We find some evidence to support the assertion that living standards have risen over the 26 year period, particularly when we consider the income distribution as a whole.

When we focus more specifically on poverty or inequality, it is more difficult to convincingly argue that the village has seen an improvement between 1983/84 and earlier years.

In chapter 5 we turn to the issue of economic mobility. In particular we examine the mobility of agricultural labour households in Palanpur. This examination yields insights into the working of the economic processes which have affected Palanpur over time. In addition, the interpretation of different measures of economic status, such as income and occupation are explored in a dynamic context. It is found that whilst the diversification of employment opportunities permits routes out of agricultural labour, particularly across generations, agricultural labourers are not generally well placed to take advantage of these opportunities and mobility out of agricultural labour remains low. While there appears to be much variation in relative incomes among agricultural labourers, there is some evidence that this 'income mobility' is more transitory than among other households. The incidence of poverty among agricultural labour households is consistently high. Together these factors suggest that households in this occupation are chronically poor.

Chapter 6 examines the credit market in Palanpur. In particular, the chapter considers the way in which the market has changed between 1974/75 and 1983/84. Changes in levels of indebtedness between the two years are analysed. The changing relative importance of the various segments of the market is described. The evolving role of the public sector in the Palanpur market is considered and contrasted with the private sector. A distinction is made between private sources of credit within the village and those outside. The debt burden of households in Palanpur is examined and related to income levels, land ownership and caste. A formal analysis of the characteristics of borrowers from different segments of the market is presented and we also examine the determinants of debt levels. It is found that while there has been considerable change in the Palanpur credit market it is difficult to point to evidence of the credit market having improved in its ability to protect and enhance the living standards, in

particular of those most vulnerable to poverty.

In Chapter 7, we provide a concluding discussion.

Table 1

COMPARISON OF BASIC INDICATORS FOR 1957/58 AND 1962/63 BY CASTE

Caste	1957/58					1962/63				
	No. of households	No. of individuals	Per Capita Income[a]	Av. land Holding (bighas)	Av. land Cultivated (bighas)	No. of households	No. of individuals	Av. Per Capita Income	Av. land Holding (bighas)	Av. land Cultivated (bighas)
Thakur	17	104	178	53	38	19	125	180	45	48
Murao	21	117	221	48	38	25	133	208	41	39
Dhimar	10	56	91	10	9	9	53	93	11	9
Gadaria	9	42	177	21	23	9	45	202	22	23
Dhobi	2	6	236	30	35	1	2	731	40	40
Teli	8	47	108	11	15	9	57	107	10	17
Passi	11	56	180	10	10	16	70	183	8	6
Jatab	16	71	120	15	15	13	71	105	19	22
Other	6	29	112	5	7	5	29	93	10	9
VILLAGE	100	528	161	27	23	106	585	162	26	26

[a] All income figures are expressed in 1960/61 rupees (see chapter 2).

Table 1 (cont.)

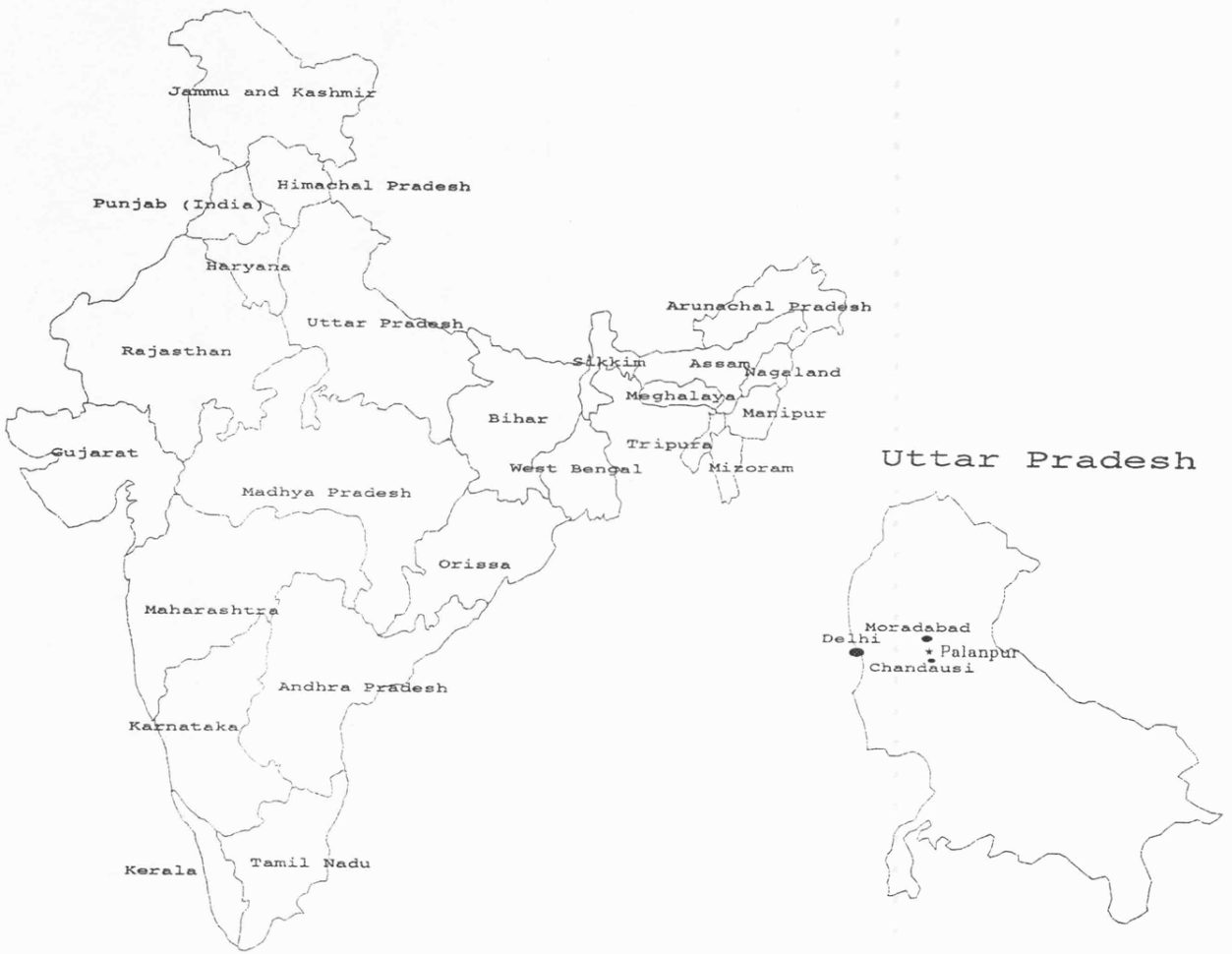
COMPARISON OF BASIC INDICATORS FOR 1974/75 AND 1983/84 BY CASTE

Caste	1974/75					1983/84				
	No. of households	No. of individuals	Per Capita Income[a]	Av. land Holding (bighas)	Av. land Cultivated (bighas)	No. of households	No. of individuals	Av. Per Capita Income	Av. land Holding (bighas)	Av. land Cultivated (bighas)
Thakur	25	174	334	30	26	30	217	212	25	19
Murao	27	178	336	37	29	27	217	240	40	41
Dhimar	8	59	210	11	19	13	74	194	5	12
Gadaria	10	68	237	18	18	12	83	211	16	15
Dhobi	3	22	178	19	18	4	27	175	5	15
Teli	12	71	203	7	18	16	92	149	6	12
Passi	8	61	287	13	13	15	85	240	9	7
Jatab	14	97	189	14	21	19	118	83	11	12
Other	4	27	212	5	1	7	47	179	2	3
VILLAGE	111	757	273	23	22	143	960	194	18	19

[a] All income figures are expressed in 1960/62 rupees (see chapter 2).

Figure 1

India



Chapter 2

Agricultural Changes and Inequality

2.1. Introduction

The economy of Palanpur changed radically between the first survey in 1957/58 and the last one in 1983/84. There were three major forces at work. First, the population grew from a little over 500 to nearly 1000. Second, agriculture intensified greatly with increased irrigation, the use of chemical fertilisers, and the adoption of new varieties of seed, particularly of wheat - the process often known as the "Green Revolution". Third, job opportunities outside the village, mainly in local towns within commuting distance, expanded very substantially, changing from 9 regular outside jobs in 1957 to 54 in 1983 and contributing around one-third of village income in the mid-1980s compared with less than one-tenth in the 1950s. The purpose of this chapter is to examine how the distribution of income and of land has altered under the influence of these demographic, technological and economic changes and to indicate how these processes and outcomes have been related to the operation of village markets and institutions.

We shall be examining the operation of two kinds of theory. The first concerns the more broad brush descriptions of the way in which development processes take place. Two key aspects of standard development stories - technical change, and sectoral transfer as the relative importance of agriculture declines - are involved here. The second concerns the way in which certain markets work, particularly those for land, labour and agricultural inputs. The analysis is based on data from the four household surveys of the village between 1957/58 and 1983/84. Although we are in a position to follow the fortunes of families over time the work described here involves mainly a comparison of the distributions of income at the four data points and is not based primarily on its panel aspects. These

will, however, be invoked from time to time and will play an important role in some of the arguments (see Chapter 5 for a examination of economic mobility which further exploits panel aspects of the data).

Measurement of income and its growth raises a number of difficulties. First, we have the problem of what to include in the definition of income; second, we have to consider the relevant period for income measurement when there are severe fluctuations; and third, we need a price index for comparison across years. Further we have to consider the question of the income unit - individual, family, household, and so on. Finally, potential measurement inaccuracies associated with panel data must be recognised (see Ashenfelter, Deaton and Solon (1986) for a useful review). We do not go into these important issues in detail but will comment. Our notion of income is intended to measure the returns to land, labour and other household assets, but we have not, largely for data reasons, been in a position to capture this perfectly. For example, as moneylending income was not collected in the two earlier surveys and even in later surveys proved difficult to verify, it is not included in our measure[1]. As a rule we have used only simple measures which do not go beyond the data availability for early years. We have subtracted current input costs, including payments for labour hired but not family labour, but were not able to include land appreciation, or capital depreciation. Nevertheless we do think that the income measures remain useful and do not involve omissions which undermine our argument[2].

We note that 1957/58 seems to have been an average year for agriculture, 1962/63 bad, 1974/75 rather good with yields perhaps 15% or so higher than average at that time and 1983/84 a bad year with yields

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[1]. See chapter 3 for a discussion of how this omission leads to a divergence between the ranking of households in income terms compared with their ranking in 'apparent prosperity' terms.

[2]. Our income measure will remain under close scrutiny in subsequent chapters of this thesis. Therefore we will defer discussion of some issues which arise from the calculation and use of this measure to those later chapters.

30-35% or so down on the average at that time. With roughly 80% of income coming from agriculture for the years of the first three surveys (although only 56% in the last one) this consideration is obviously of great importance for assessing the level of incomes.

The price index which we have used is based on the consumer price index for agricultural labourers in Uttar Pradesh (see note to Table 1). As expenditure data were not collected in the Palanpur surveys, it proved impossible to construct our own price index for the village.

An aggregate picture of change in the village is presented in Table 1. The growth in the village population over the 26-year period has averaged 3% per annum, a rate slightly higher but not far from that for India as a whole. Daily wages for hired agricultural labour appear to have risen over the quarter of a century at a rate similar to real income per capita. Real wages for regular outside jobs have risen rather faster than real income per capita. Average wheat yields have approximately tripled.

Bearing agricultural fluctuations in mind, the "normal" income per capita (i.e. averaging fairly crudely over fluctuations) for both the years 1974/75 and 1983/84 would appear to be around Rs 240-250 (at 1960/61 prices). Comparing with 1957/58 we see a growth in income per capita of around 50% over 26 years, or around 1.9% p.a. - again not far away from all-India figures. In 1974/75 the income per capita was close to the average for India.

We shall see that, broadly speaking, the Green Revolution brought with it, at least initially, a reduction in inequality of incomes. (The new agricultural technologies were first introduced between the 1962/63 and 1974/75 surveys.) This is not to say that we have found a dramatic counter-example to the common assertion that the Green Revolution has been strongly biased in favour of rich farmers through their cheaper or privileged credit, lower risk aversion, greater access to information and scarce capital equipment and so on. In fact in Palanpur the Green

Revolution appears to have been scale neutral. Two factors appear to have been involved. First irrigation reduces variability in yield. This equalising effect seems to have been particularly strong in a good year for agriculture (1974/75) where errant practices may be less heavily penalised. Second, the distribution of land cultivated in 1974/75 was more equal than in other years. This was for a combination of reasons. In the earlier two surveys the biggest ownership holdings were generally by Thakur households and four of their major landowning households split between 1962/63 and 1974/75 dividing the land between them. Some members of this caste were prone to drinking and gambling and as a result over the years they lost land. By 1974/75 the Muraos owned more land than the Thakurs and were well-represented amongst the largest landowning households. The biggest landowners in that year were not however, leasing in land and, for this year only, tenancy acted to make the distribution of cultivated holdings more equal than land ownership.

As the Muraos' farming prospered, and some of the larger landholders woke up to the opportunities, while others with very small plots gave up agriculture, this equalising effect of tenancy on the distribution of agricultural holdings faded in the later years (1983/84) and the more effective farmers took on more land. In 1983/84 ten of the fifteen largest cultivators were Muraos and only two were Thakurs. The increasing dispersion in land cultivated was compounded by the more productive taking more land and by the more adverse conditions which led to greater dispersion in yield per acre in 1983/84. Throughout the period, tenancy remained almost exclusively share-cropping (See Sharma and Drèze (1990) for a detailed discussion of tenancy in Palanpur).

The most striking impacts on inequality in the period 1974/75 to 1983/84 were not, however, from agriculture but from outside jobs. Where some lower castes had been employed in outside jobs in earlier years, in 1983/84 the higher castes were more prominently represented and the outside jobs became a source of inequality as significant as agricultural incomes even though outside jobs represented only one-third of total income.

Movements in the inequality of land ownership seem to be much smaller than those in income inequality. On average less than 1% of the village land turns over in any one year whereas one-quarter to one-third of the land would be under tenancy. This fraction appears to have increased over the last 9 years of the study period along with the growth of outside jobs and the greater success of certain groups in agriculture. Inequality in land ownership has grown a little in those 9 years but this has been almost entirely due to the early division of certain households in the sense that a number of sons now live separately from their fathers before the land is divided and thus become landless households. This is an interesting social development and possibly associated in part with the growth of outside jobs. Other movements in land ownership have been connected with distress sales brought about by dissipation, particularly drinking and gambling, and not by agricultural failure. Those who have bought the land tend to be those who have been successful in agriculture. As we have noted they are also taking more land under tenancy.

The remainder of this chapter is essentially devoted to providing the analytical evidence underlying the general picture we have described here. In the next section we examine the inequality of income and of land, in the former case decomposing it into contributions from its main elements, agricultural income and outside job income. Section 3 contains an analysis of the change in agriculture and Section 4 of outside jobs. Section 5 briefly discusses issues in measuring inequality in the presence of income growth and sectoral transfer. Some concluding comments are offered in Section 6.

2.2. Inequality of Income and Land

Inequality in the distribution of income, as measured in the four surveys between 1957 and 1984, did not follow a monotonic path. In Table 2 we see that between 1957/58 and 1962/63 inequality, as represented by a range of summary measures, increased. The Gini coefficient for individually distributed per capita income (see below for a discussion on

the choice of this unit) rose from 0.336 to 0.390, generally taken to be a substantial increase. Looking at the Lorenz curves in Figure 1, we see that the curve representing 1962/63 lies outside that of all other years, implying that a whole range of inequality measures would present the 1962/63 distribution as being the most unequally distributed (see Atkinson, 1970)[3]. Between 1962/63 and 1974/75, inequality as represented by the Gini coefficient fell dramatically from 0.390 to 0.253, and between 1974/75 and 1983/84 it rose again to 0.307. Most of the summary measures of inequality present the 1983/84 distribution as more equal than the 1957/58 distribution. However, in 1983/84 the Atkinson index with an inequality aversion parameter 5 is greater than the corresponding index for 1957/58. This means that as the index becomes very sensitive to inequality among the poor, income in 1983/84 is seen as less equally distributed than 1957/58. This is also reflected in the Lorenz curves in Figure 1, where the 1983/84 curve lies below the 1957/58 curve at the lower end of the income scale, implying that the poor in 1983/84 received a lower share of total income than the poor in 1957/58. However, beyond the bottom 30%, income in 1983/84 appears to be more equally distributed than 1957/58, and beyond the bottom 80%, it crosses the 1974/75 Lorenz curve.

Notice that we have presented figures on the distribution of income in terms of "individually distributed income per capita". This is calculated by dividing household income by the number of individuals and then attributing to each individual in the household this per capita income. Inequality in household income itself is not a particularly useful concept when households vary in size (see Cowell, 1984a)[4]. Experiments

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[3]. The analysis of inequality on the basis of Lorenz curves (or more precisely, stochastic dominance) instead of summary indices is in many respects preferable to the examination of summary statistics. In chapter 4 of this thesis, these advantages are explored in some detail and in that chapter the discussion avoids summary statistics altogether.

[4]. Cowell (1984b) presents an additional argument for using individual incomes which is particularly pertinent to the Palanpur study. He argues that in the presence of family splits household income or household per capita income are not reliable units of observation, and individual per capita incomes (or equivalent incomes which allow for potential economies of scale) are preferred. See below for further discussion of the impact of family splits on the Palanpur economy.

with dividing household income by "equivalent members" to correct for the lower "requirements" of children made little difference to the analysis presented here. In Table 3 we demonstrate the effect on measured inequality of using three different sets of equivalence scales. Whether we examine individual incomes or use the household as the unit of analysis we see that the effect of using different equivalence scales is small regardless of which set of equivalence scales we use or which inequality measure is used. Second, and more importantly, the direction of measured inequality is not monotonic over all inequality measures and set of equivalence scales. For example, if we consider the Atkinson measure for individual incomes with $\varepsilon=2$ inequality rises from 0.319 (using individual per capita incomes) to 0.328 if we use the equivalence scales provided by Paul (1989) and falls from 0.319 to 0.316 if we use the scales proposed by Jaramillo and Pinstrup-Anderson (1986). Given that we have little guidance as to which equivalence scales are preferable and that their use does not seem to alter measured inequality by much, we have chosen to keep things simple by not adjusting for 'equivalent units'[5]. We have not made any additional attempts to examine the extent of within-household inequality, although this clearly merits further research.

The relationship between average incomes and the degree of inequality for the four survey years is explored in Figure 2. Following Shorrocks (1983) we present generalized Lorenz curves for the four distributions. Generalized Lorenz curves are constructed by simply scaling the Lorenz curves for different distributions by their mean. Shorrocks shows that if a generalized curve for a particular distribution lies everywhere above that of another, then one can say that welfare in the former distribution, as represented by a wide class of social welfare functions, is unambiguously higher. It can be seen that although average income in 1983/84 is greater than in 1957/58 and 1962/63, the generalized Lorenz

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[5]. Atkinson (1983) notes that the ethical status of equivalence scales which are based on observed consumer behaviour may be of some controversy. Not everyone will agree that consumption patterns estimated conditionally on family composition can be used to draw conclusions about welfare levels with different compositions.

curve does not lie everywhere above that for 1957/58, and hence we cannot rank 1983/84 higher than 1957/58 in terms of welfare. On the other hand, the curve for 1974/75 clearly lies above that for all three other years.[6]

It is our objective in this chapter to arrive at some understanding of the causes of changes in inequality in Palanpur over the four survey years. Our analysis will focus on the different components of income, principally those derived from cultivation and from jobs outside agriculture. There is also agricultural labour income which is treated separately and may be negative for households which hire in labour. The main source of income outside agriculture is regular jobs outside the village but some small non-agricultural income is earned inside the village and some jobs outside the village are casual. The breakdowns of each decile of total income by three different components for each year are provided in Tables 4(a)-(d). It may be seen that the proportions vary both across the years and by decile. For the village as a whole in 1983/84, outside jobs contributed 34% of total village income, the proportion being as high as 51% for the top decile. For the three earlier surveys agricultural income was the dominant source of income for all households[7].

It is interesting to note that the comparatively low inequality of income observed for the 1974/75 survey year is also mirrored in an average per capita income for the top decile that was just over 6 times greater than for the bottom decile[8]. For the other three survey years the comparable ratio was over 10, and nearly 20 for 1962/63. Although the top decile in 1974/75 did enjoy the highest average per capita income of all

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[6]. Generalized Lorenz dominance is also explored in greater detail in chapter 4.

[7]. It should be noted that agricultural income as we have defined it is not solely the difference between output and costs on land cultivated by the household. It also reflects share-rents received by households on land which they have leased out, and paid by tenants on the land they have leased in.

[8]. Although see Sen (1973) for a criticism of the range as an attractive measure of income inequality.

survey years, the striking observation is that average per capita incomes for the poorest decile in that year were more than twice as high than for any of the other survey years.

The surveys are essentially snap-shots of the village in their respective years, and we must therefore consider the possibility that inequality may to some extent simply reflect variations in harvests due to fluctuations in climate or other stochastic factors which can affect households in different ways. Indeed, as we noted, the harvests in 1957/58 and 1974/75 were generally regarded as being average or above while those in 1962/63 and 1983/84 were less successful. One idea investigated was that these fluctuations might explain a considerable portion of the rise in inequality between the last two survey years. In the last year outside job income had become particularly important. A poor harvest might increase inequality by widening the gap in income between those whose income derives mostly from agriculture and those with outside jobs. In Tables 4(a)-(d) we saw that the proportion of total per capita income from agricultural activities was around 80% in the first three years, but only 56% in 1983/84. We tried to obtain a more accurate measure of permanent income by scaling agricultural revenue up in 1962/63 and 1983/84, and down in 1957/58 and 1974/75 (see Table 5). Because inputs in cultivation are generally applied some time before the harvest and with the expectation that this will correspond perhaps to the preceding or some 'average' of past harvests, it seems reasonable to scale agricultural revenue while leaving costs unchanged. This approach assumes that good or bad harvests do not have any marked effect on output prices, and that the reason for the bad or good harvest does not appear until late in the season (often but not always true). Alternatively, the scaling exercise can be thought to encapsulate the output-price effect. These adjustments have little effect on measured differences in inequality across the years. Note also in Table 5 that by scaling up cultivation incomes in 1983/84 does not reduce inequality as we would have expected but *increases* inequality. Similarly, scaling down cultivation incomes for 1974/75 *reduces* measured inequality. We can see why and begin to understand the reasons for the differences in

inequality by looking more carefully at the components of income.

In Table 6a and 6b we present the Gini coefficients of the four survey years, decomposed by income components. Following Shorrocks (1982) the contribution of components to total income inequality, as measured by the Gini coefficient, can be obtained from the product of a 'pseudo-Gini' coefficient for each component and a weight given by the proportion of the mean of the component to the mean of total income[9]. The 'pseudo-Gini' simply consists of the Gini for the distribution of the income component when individuals are ranked in terms of their total (rather than component) income[10]. If income inequality is decomposed in this way, one can readily see why scaling agricultural income by some factor does not result in a significant change in inequality.

Suppose we consider changes in the income components which multiply each component by a scalar factor and which together are sufficiently small not to change the overall income ranking. Then G_k^*, the pseudo-Gini for component k, is unchanged. Suppose the mean of component k changes from μ_k to μ_k' and the mean of the overall income from μ to μ'. Then

$$G = [\frac{\mu_1}{\mu}] G_1^* + \ldots [\frac{\mu_k}{\mu}] G_k^* + \ldots + [\frac{\mu_n}{\mu}] G_n^* \qquad (1)$$

$$G' = [\frac{\mu_1'}{\mu'}] G_1^* + \ldots [\frac{\mu_k'}{\mu'}] G_k^* + \ldots + [\frac{\mu_n'}{\mu'}] G_n^* \qquad (2)$$

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[9]. Similar techniques for decomposition by factor components have been discussed in Anand (1983), Fei, Ranis and Kuo (1978), and Pyatt, Chen and Fei (1980).

[10]. The 'pseudo-Gini' for a particular component divided by the true Gini for that component can be shown to be equal to the rank correlation coefficient between incomes from the component and total incomes (see note 2 in Table 6b). Hence the lower the 'pseudo-Gini' the more uncorrelated are incomes from that component with total incomes. Note also that the 'pseudo-Gini' can take a value less than one.

and

$$G - G' = \left[\frac{\mu_1}{\mu} - \frac{\mu_1'}{\mu'}\right] G_1^* + \ldots \left[\frac{\mu_k}{\mu} - \frac{\mu_k'}{\mu'}\right] G_k^* + \ldots + \left[\frac{\mu_n}{\mu} - \frac{\mu_n'}{\mu'}\right] G_n^*. \quad (3)$$

In 1974/75, for example, (see Table 6a) we have very different pseudo-Ginis for agricultural income and outside income, yet an increase of five percentage points in the share of outside job income and a corresponding reduction in the share of agricultural income (a fairly large adjustment) would reduce the Gini (if the above assumptions apply) by 0.05 (0.321-0.065) = 0.013, small relative to the difference between the observed Ginis for 1974/75 and 1983/84.

From Table 6a we see that for the first three surveys inequality is largely 'explained' by inequality in agricultural income whereas in 1983/84 only around half can be 'attributed' to agricultural income with the other half coming from outside jobs. The 'pseudo-Ginis' for agricultural income showed a slight tendency to decline over time. For outside income, there was a striking increase in the 'pseudo-Gini' between the 1974/75 and 1983/84 survey year, suggesting that not only did this component become more important in the later year (as seen by the higher relative mean) but the distribution of incomes from this source was along lines quite similar to the distribution of total incomes, unlike in 1974/75 when these incomes were virtually uncorrelated with total incomes (see Table 6b). These considerations led us to look more closely (sections 3 and 4 below) at the causes of inequality in these two components.

In Table 7a we present mean per capita incomes for the different castes in Palanpur. Following Shorrocks (1980) and others (Cowell, 1980 and Bourgignon, 1979) we decompose inequality between castes, using the Theil Index, to assess the extent to which total income inequality is due

to between caste or within caste differences. We see in Table 7b that the bulk of inequality in all four survey years can be attributed to the within caste component. Nonetheless, roughly 25% of inequality as represented by this particular summary statistic is the result of between caste differences in all four years. There appears to have been little change in this respect over the whole survey period[11].

The determinants of household income, as summarized using simple regressions, are set out in Table 8. The important influences appear to be land, the number of adult males, family size and outside jobs. Interestingly, education does not appear to play a major role, although it is possible that our measure, years schooling attained by the most educated household member, does not proxy education well. A large part of the variation is explained by the regressions in Table 8, although, as in some other respects the 1962/63 results are less satisfactory. The influence of land is particularly strong in 1974/75 and of outside jobs in 1983/84. The influence of the caste variables, allowance having been made for other attributes, is not strong although the coefficients for Muraos are generally positive whereas those for the Thakurs are negative. The Thakurs and Muraos are the two richest castes and own most land (respectively 29.4% and 41.3% in 1983/84). We have already mentioned that Muraos are a traditionally cultivating caste and Thakurs traditionally a warrior caste.

One of the problems encountered when looking at the individual survey years and attempting to describe trends by following particular households through the whole period is that in each survey year the composition of the village in terms of households can be different. First, households in the village may split over time. In the earlier years this usually occurred

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[11]. While the between group component here seems low, it should be noted that it is higher than what is frequently observed elsewhere. For example, in an investigation of inequality in Malaysia in 1970, Anand (1983) notes that perceived racial inequalities had prompted an extensive range of government policies favouring Malays vis-a-vis Chinese, Indians and Europeans. Yet he found that less than 10% of individual income inequality could be attributed to the between-race component in his decomposition of the Theil index.

when brothers set up independent households upon the death of their father, and was generally associated with the division of the household's land between them. Later, it became increasingly common for members of the household to separate from their parents while these were still economically active. This then involved being a landless household until the family land was divided, with perhaps the son getting the usufruct of some of his father's land. Second, between 1957/58 and 1983/84 a few households entered the village while some others left. Sometimes a particular household was away for one of the survey years and could not be questioned. Thus it is not always possible to trace each household in one year to its antecedents in all other survey years. In order to examine the development of a given population, a subset of the village households in each year consisting of those which could be traced through all four survey years, was examined. This subset can be thought of as representing the 'permanent population'. Any newcomer or departing household was ignored, but splitting households were retained. Inequality of income within this group appears to mirror the experience of the population as a whole, although in all years inequality is a little lower. In particular, changes between the years seem to be of roughly the same magnitude. It is useful to use this subset of the population when looking at issues which are amenable to panel data analysis[12].

The distribution of land is represented in Figure 3 for the whole population in each year. As before, we attribute an equal proportion of a household's land to each member. The Lorenz curve for 1983/84 can be seen to generally lie outside that for the other years (but becoming indistinguishable from other Lorenz curves at the two ends). However, if we take the 'permanent population' and merge the households which split over the 26 year period, so that we are effectively considering the distribution of land between 'dynasties', we see that much of the difference in the distribution of land between the survey years is eliminated (Figure 4). In particular, while before the distribution of

[12]. See chapter 5 for a more complete discussion of this 'permanent population'.

land in 1983/84 was the most unequal, in Figure 4 the 1983/84 Lorenz curve for 'dynasties' in the 'permanent population' was inside (at least partially) that for the other years. It is clear therefore that the main determinant of the changes in the distribution of land over time has been the phenomenon of household splits. The market for land in Palanpur is not very active, and land sales played a minor role in the changing distribution of land.

In Table 9 we contrast the distribution of land ownership and land operated (or operational holding), focusing now on a household basis since the point of interest is the difference between land owned and land operated, i.e. tenancy. Tenancy is almost exclusively share-cropping throughout this period. The total amounts of land leased in the four years were 1957/58, 209 bighas, 1962/63, 341 bighas, 1974/75, 538 bighas and 1983/84, 736 bighas. This corresponds to an increase from about one quarter of all land cultivated to roughly a third. We have more confidence in this aspect of the data for the last two survey years and we can assert that leasing has shown a significant increase across that period. For 1962/63 the Gini coefficients for the distribution of land owned and land operated were roughly equal although this conceals considerable tenancy (see next section). For 1957/58 and 1983/84 the Ginis for land operated are larger than for land owned but this ranking is reversed for 1974/75. Hence on balance tenancy had an equalising effect on operational holdings in 1974/75 but not in other years. The reversal by 1983/84 of the equalising effect of tenancy is associated with some larger landowners leasing in land in 1983/84 where very few of them did in 1974/75, together with more smaller households leasing out land. As agriculture becomes a more intensive activity it appears to involve greater commitment of time and energy.

2.3. Agricultural Change

It has been suggested by some that the Green Revolution benefits large landowners more than small farmers for a number of reasons (see Lipton and Longhurst, 1989, for a useful survey). Large farmers may have greater

access to the credit market and are therefore more able to acquire the seed varieties, fertilizers and capital goods (largely for irrigation) that the more intensive cultivation practices require. Large farmers may be able to reap economies of scale from cultivating intensively on larger plots of land by utilizing their capital stock more efficiently. Large farmers may be quicker to adopt the new practices because the risks posed may be less severe as they need not devote their entire landholdings to the new techniques. One can try to trace further linkages between the distribution of income and agricultural change through the general equilibrium of the village. For example, Braverman and Stiglitz (1989) suggest that credit-market rationing for small farmers could lead to land sales, forcing these farmers to turn to sharecropping, and leading to a reduction of the initial productivity gains as well as a widening income distribution. In Palanpur things worked out differently with, between 1974/75 and 1983/84, few land sales but with the bigger and better farmers taking on more land under share tenancy.

New farming practices and seeds were introduced in the period between 1962/63 and 1974/75. Average per capita income from agricultural activities in 1957/58 and 1962/63 was roughly constant, but between 1962/63 and 1974/75 it grew by 75% (see Tables 4a-4d). Average real income from cultivation of the poorest 30% (in terms of total income in 1974/75), was 76% greater than that of the poorest 30% in 1962/63. Average real income from cultivation of the richest 30% in 1974/75 was 36% higher. However, average real income from cultivation of the middle 40% was 107% higher in 1974/75 than in 1962/63. The effect of the new farming practices seems to have been spread over the distribution, with the largest rise among those around the median.

Although 1983/84 was a poor year for agriculture, agricultural practices had intensified still further. In 1974/75, for example, Persian wheels made a large contribution to irrigation (there were 22 Persian wheels and 9 diesel pumping sets) whereas in 1983/84 very few Persian wheels were in active use and there were 22 diesel pumping sets.

The impact of the Green Revolution on the distribution of agricultural income can be seen in Table 6b. The Gini for agricultural income fell from 0.509 to 0.372 between 1962/63 and 1974/75, suggesting an initially equalizing influence. However, between 1974/75 and 1983/84 this Gini coefficient rose from 0.372 to 0.487, a considerable increase. Having suggested that agricultural change between 1962/63 and 1974/75 did not exacerbate agricultural income inequality, it is necessary to consider how this might have happened, and why some of the mechanisms suggested above did not apply strongly to Palanpur. Agricultural change in Palanpur over the years between 1957/58 and 1974/75 took various forms. In 1957/58, less than half of the village land was irrigated. Most of it was single-cropped and cultivation consisted largely of sowing and harvesting. By 1974/75 double-cropping was commonplace. The use of Persian wheels and diesel pumping sets was widespread and almost all the village land was irrigated. An active market for the services of existing Persian wheels, tubewells and pumpsets developed alongside the rise in their numbers. High yielding varieties (HYVs) of wheat had been introduced and were widely used. The expansion in irrigation as well as the increased adoption of HYVs in Palanpur was not the result of an integrated programme of public investment and extension services. In fact it appears that the new technologies made their way into the village on a gradual basis with farmers acquiring new capital and seed varieties as and when they could afford these. When new practices had been successfully adopted by some farmers, they would be imitated by others. Although a government Seed Store had been established in Palanpur, providing new seed varieties and fertilizer on credit, it was widely accepted that these were often deteriorated or mixed and of lower quality than what was available on the market. Most seed loans taken out from the Seed Store were for consumption purposes. Pumpsets and Persian wheels were occasionally purchased with loans from banks in the nearby towns of Chandausi and Bilari, but this was by no means the rule and occasionally they were purchased from accumulated savings[13].

[13]. See chapter 6 for further details on the credit market in Palanpur.

We may think of agricultural income as being determined by a combination of three factors. First, land cultivated, second inputs per acre and third an 'unexplained' contribution to output per acre which we may associate with skills, land quality, luck and the like. The dispersion of land cultivated was discussed in section 2 above and we saw that in 1974/75 this was indeed lower than in other years. The relationship between output and land cultivated is explored in Table 10(a). We can see from the regressions of the logarithm of output on the logarithm of land cultivated and that of the logarithm of cultivation costs on the logarithm of land cultivated that for all four years the two regressions suggest proportionality of both output and cultivation costs to the area cultivated.

The proportionality conclusion is confirmed when we look at the small covariance of the logarithm of output per bigha and the logarithm of land cultivated (Table 10(b)). Hence we may investigate the dispersion of output in terms of the dispersion of land cultivated and of output per bigha. From the variances presented in Table 10(b) we see that the more important is that of the logarithm of land cultivated but that the variance of the logarithm of output per bigha also plays an important role, particularly in the last year. This latter variance was low for the two good years (1957/58 and 1974/75) and higher for the bad, it being particularly low in 1974/75 and high in 1983/84. It is possible that in good years a generally more intensive agriculture leads to more equality in yields with errant practices being punished less, but that in bad years it leads to more inequality in yields as better farmers are more able to protect themselves.

Finally, we examined the relationship between the logarithm of output per bigha and the logarithm of cultivation costs per bigha to see how far the latter accounted for the variation in the former (Table 10(c)). We see that the R^2 in the bad years are indeed higher than those in the good years, being as high as 0.42 in 1983/84 and essentially zero for 1957/58, prior to the Green Revolution. It should be emphasized that we

have greater faith in the data for 1974/75 and 1983/84 with respect to the issues discussed here than that for the earlier years. Finally we should note that there is still a sizeable variation in output per bigha after allowing for variation in input costs.

We conclude then that the most important determinant of agricultural output is, not surprisingly, land cultivated. But output per bigha is not related to farm size either before or after the Green Revolution, a result which is quite striking given the arguments at the beginning of this section. Further, whilst variation in output per acre is strongly related to input per acre, particularly post-Green Revolution and in bad years, there is a great deal that is unexplained. This, we take it, corresponds (apart from the usual reasons of problems of modelling and data) to household effects (better and worse farmers) and 'genuine' stochastic factors. This is a topic which merits further research.

2.4. Outside Jobs

The rise in the importance of outside jobs (by which we mean jobs outside agriculture) in Palanpur can be seen both in terms of the rise in the number and variety of occupations that villagers filled and in the increasing proportion of income from outside jobs to total income. In Table 6a and 6b we saw that outside job income made up about 8% of total income in 1957/58 and that this proportion had reached 34% by 1983/84.

The number and types of regular jobs available in the four survey years are displayed in Table 11. There were nine villagers employed outside the village in 1957/58. By 1983/84 this number had risen to 54. The expansion of outside jobs occurred primarily after 1962/63, with increasing employment in occupations (such as the railways) which had already existed in 1957/58, and also with villagers finding new employment opportunities, such as in a bread factory or cloth mill.

In Table 6a we can see that regular outside job income had a differing impact on the distribution of total income in the different years. In 1974/75, for example, the pseudo-Gini for outside job income was 0.065. This meant that income from outside jobs was very equally distributed when villagers were ranked in terms of total per capita incomes. In 1983/84 on the other hand, the pseudo-Gini was 0.444. With the proportion of per capita outside job income to total per capita income reaching 34% in 1983/84, the contribution of outside job income inequality to total income inequality reached 50% by that year.

Outside jobs, particularly the more remunerative ones, went to villagers positioned differently along the income distribution in the four survey years. In the two earlier years, as well as in 1983/84, those who held the well-paying outside jobs were also those who were well off in total income terms. This was not the case in 1974/75 where 16 out of the 37 villagers with a regular outside job came from households in the bottom half of the income distribution, and only six out of the 20 richest households had any member with outside employment.

2.5. Income Inequality and Economic Growth

Before concluding this chapter we digress briefly to examine the relationship between income inequality and the process of economic modernization (for example the inter-sectoral transfer observed over time in Palanpur). It has been suggested, if we take an aggregate economy-wide perspective, that the development process is characterized by increased inequality during the initial stages, that this then peaks at some level of output, and then further growth is accompanied by a decline in income inequality[14]. This process could stem from development along Lewis-type

[14]. The possible existence of such an "inverted U-curve" was originally proposed in a series of papers in the 1950s and 1960s by Kuznets (see for example Kuznets, 1955). While this hypothesis was originally proposed rather tentatively, it has come to be viewed by many as a "stylized fact" which theories of growth should incorporate (see for example Aghion and Bolton, 1991). Others however, have stressed the

lines where a rural economy, with everyone at or near subsistence level, evolves towards a level of advanced industrialization[15]. At first inequality will be quite low as incomes are uniformly distributed at the subsistence level. Over time however, a small urbanized sector will emerge, offering higher incomes and attracting migration from the rural sector. The distribution of income will widen and continue widening as the urban sector itself develops. More and more people will leave the rural sector for the urban sector and its growing incomes. At some point however, the majority of the population will be in the high income sector, and any further economic growth will be accompanied by a reduction in inequality.

When we turn to the path traced out by inequality over time in one community as opposed to the economy as a whole, the model above clearly does not apply directly. However, we have already observed that one of the major changes in the economy of Palanpur has been the rise in the number and variety of outside jobs. These regular jobs generally offer high and stable wages and for this reason are highly prized in the village. In this context we could plausibly present a story analogous to the one above, describing how inequality may move over time in Palanpur. The spread of jobs could lead initially to an increase in inequality, until so many villagers hold outside jobs that any further spread in the number available leads to a decline in inequality. We have seen that the contribution of outside job income to total income inequality has indeed risen sharply between 1974/75 and 1983/84, a period during which the number and variety of jobs increased significantly. However, what deserves to be stressed from the Palanpur example, is that we have observed increasing involvement in the outside economy without much migration (something which standard stories have tended to emphasize). In addition, intersectoral transfer in Palanpur has been characterized in most cases by changes in the range and

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fragile empirical basis for this hypothesis (see Anand and Kanbur, 1984, also Stern, 1989).

[15]. See Lewis (1954).

balance of a household's portfolio of occupations. The process does not appear to have been associated with a discrete occupational shift by households from one sector into another.

A related point, which we will briefly discuss, relates to the success of conventionally used inequality measures in representing changes in the distribution of income in the presence of economic growth as described above. For example, Gary Fields (1987) has recently expressed his dissatisfaction with a number of commonly used inequality measures when the question being addressed is how inequality has changed in the presence of economic growth. He argues that these measures occasionally present a picture of increasing inequality when, under some circumstances, it would in fact we be reasonable to expect them to do the opposite. His argument holds for the case when we have economic growth of the form described above - the enlargement over time of a high income sector - and can be most easily seen in an example. Suppose there are six individuals in a community with their distribution of income represented by the vector y=[1,1,1,1,1,4]. The Gini coefficient for this distribution is 0.278. Suppose that the individual with the income of 4 is the one with an outside job and that the other five individuals are involved in subsistence cultivation. Suppose further that over time, as the economy as a whole grows, another outside job becomes available to the village. One of the cultivators will now be able to earn the high outside job income and the distribution of income in the economy can now be represented by x=[1,1,1,1,4,4]. Fields argues that with the enlargement of this high income sector many observers might expect this to reflect a *decline* in inequality because the elite position enjoyed by the individual with the outside job in the initial period has been eroded. Average income is higher, and the distance between the high income earners and low income earners has not changed. Yet, the Gini coefficient is now 0.333, a clear rise from 0.278. If inequality had been measured using an index from the Atkinson family (except for the case with $\varepsilon=0$), as well as many from the General Entropy family (such as the Theil, or Theil L), then inequality would also be observed to rise. Fields argues that if we do not agree that

inequality has risen in the example above, then how can we be sure that measures such as the Gini coefficient and the Atkinson measure will properly reflect changes in inequality in the presence of economic growth?

What is being observed in this example is the role played by the implicit, and in some cases explicit (e.g. with the Atkinson index), normative judgements embodied in these various measures of inequality. The Gini coefficient has long been criticized because it tends to give a greater weight to transfers in the middle of the income distribution than on either ends of the distribution. The Atkinson measure and the two Theil measures have all been constructed so as to be more sensitive to changes in the bottom end of the distribution. In the situation described by Fields it is perhaps more appropriate to use a measure which focuses on changes in the top of the income distribution. One such measure is the square of the coefficient of variation, and indeed, when we use this measure we see that the whole process of development from a distribution such as y to x to z=[1,4,4,4,4,4] will be marked by a fall in inequality (0.556 to 0.500 to .102). It is noteworthy that in the Palanpur experience the square of the coefficient of variation rose from 0.254 to 0.297 between 1974/75 and 1983/84.

While this example serves principally to reaffirm the need for care when measuring inequality with summary measures, it also interesting in the way it explores the evolution of inequality in the presence of inter-sectoral transfer. This is an area which has been comparatively under researched in the context of rural India as a whole, and one which deserves further attention.

2.6. Concluding Comments

We shall be brief since a summary was provided in the opening section. Inequality in incomes and land holdings decreased across the 'Green Revolution' period to 1974/75. This was partly from the apparently equalising effect of a good agricultural year, together with the splitting

of some large households and the division of their land. Tenancy exerted a further equalising effect as the more committed farmers amongst the larger landowners had not yet begun leasing in. Outside jobs were becoming important but not yet a major source of inequality. Inequality had increased again by 1983/84. This was associated particularly with the continuing growth of outside jobs which had now become more favourably distributed towards the rich as they began to take more work outside the village. Further, the traditional cultivating caste (Muraos), and major landowners, were farming more intensively and leasing in land. This was compounded by the unequalising effect of a poor agricultural year. Landlessness increased with the growing practice of sons living separately from fathers before division of the land.

There was no strong relationship between output per acre and farm size before or after the 'Green Revolution'. This suggests that the bias towards richer farmers which has been suggested by some authors is not the dominant force in explaining inequality in Palanpur. Farmers do vary considerably in their techniques but this appears to be greatly influenced by their commitment to, and their skills in, their activity. The relationship between inequality of incomes and of land cultivated is influenced by the absence of a specific labour market in Palanpur, namely a market for farm managers. In a world of complete and perfect markets, inequality would be determined by endowments (for given factor prices and abstracting away from non-convexities such as those involved in productivity/consumption links) and could be clearly traced back to them. In Palanpur, an explicit market exists for agricultural labour but not for farm management skills. These skills cannot be directly marketed, but divergent abilities can be manifested through the taking of more land under tenancy. Land cultivation thus reflects the distribution of these farming skills, particularly after 1974/75, when the further intensification of farming through technological change, as well as the increased range of alternative sources of income outside the village, led to a clearer realization among the (more) skilled farmers of their comparative advantage.

The picture that emerges then is one where inequality arises from endowments, sector or type of employment, risk/good fortune and different types of behaviour. These factors receive some reinforcement from imperfections in markets (e.g. differential access to, or price for, credit and labour) but from our evidence it would be difficult to argue that the market imperfections, as opposed to the aspects just described, played the major role in determining inequality, and its changes, in Palanpur.

The big changes described in development stories, namely agricultural advancement, the decreasing relative role of agriculture, and population growth, are having major effects on the level and distribution of income in Palanpur. Their interaction and variation over time require careful analysis more generally.

Table 1

Broad Indicators of Economic Change in Palanpur

	1957/58	1962/63	1974/75	1983/84
Population	528	585	757	960
Village real income (Rs)	85,166	94,712	208,024	186,432
Real income/capita (Rs/capita)	161.3	161.9	274.8	194.2
Price index	1.07	0.92	3.78	5.28
Agricultural daily wages, real 1962=100	123	100	123	158
Agricultural daily wages (kg wheat/day)	2.5	2.25	3.1	5.0
Index of real wages for regular outside jobs	n.a.	100	122	193
Wheat yields, actual kgs/bigha	40	40	114	97
Wheat yields, normal kgs/bigha	40-50	50	100	150-160

Notes

1. The price index is taken from the consumer price index (CPI) for agricultural labourers in Uttar Pradesh. See Lal, Economic and Political Weekly, June (Review of Agriculture), 1976, for 1957/58 index. This is taken as the interpolation of 1956/57 and 1958/59. For 1962/63 the index at 92 was estimated by S.S. Tyagi Jr and communicated to us. For 1974/75 see the Bulletin of Food Statistics (1976) estimating the average between July 1974 and June 1975. The 1983/84 estimate is obtained from the mean CPI for agricultural labourers between November 1983 and October 1984 in the Bulletin of Food Statistics (1985).
2. "Normal" yields correspond to the perceived normal yield for Palanpur in the respective year.

Table 2

Inequality of Individual Incomes

		1957/58	1962/63	1974/75	1983/84
Gini		0.336	0.390	0.253	0.307
Coefficient of variation		0.649	0.871	0.504	0.545
Atkinson	=1	0.178	0.251	0.105	n.a.
	=2	0.338	0.485	0.206	0.319
	=5	0.647	0.821	0.483	0.739
No. of observations		528	585	757	960
(No. of households)		(100)	(106)	(111)	(143)

Note Individual income is household income divided by household size. The Atkinson measure with $\varepsilon=1$ cannot be computed for 1983/84 because one household recorded a negative income in that year.

Table 3

Impact of Different Equivalent Scales and Income Unit Weighting on Inequality

Inequality Measure	Unadjusted Household Income Inequality	Equivalent Household Income Inequality		
		ICRISAT	Pinstrup-Anderson	Paul
Gini coefficient	0.466	0.467	0.471	0.477
Atkinson Class				
ε=2	0.591	0.573	0.594	0.635
ε=5	0.910	0.886	0.906	0.926
General Entropy				
c=2	0.520	0.519	0.530	0.533

Inequality Measure	Unadjusted Individual Income Inequality	Equivalent Individual Income Inequality		
		ICRISAT	Pinstrup-Anderson	Paul
Gini coefficient	0.307	0.305	0.305	0.305
Atkinson Class				
ε=2	0.319	0.312	0.316	0.328
ε=5	0.739	0.719	0.729	0.758
General Entropy				
c=2	0.149	0.146	0.145	0.146

Notes:

1. This simulation is carried out using income data for 1983/84 only.

2. The equivalence scales used by the ICRISAT studies were provided in a private communication from staff at ICRISAT in Hyderabad, Andhra Pradesh, the Pinstrup-Anderson and Jaramillo equivalence scale is taken from Jaramillo and Pinstrup-Anderson (1986), and the Paul scales are taken from Paul (1989).

3. Higher values of ε in the Atkinson class imply greater inequality aversion.

4. A General Entropy parameter of c=2 is ordinally equivalent to the coefficient of variation. As c becomes smaller, the inequality measure becomes increasingly sensitive to income differences at the bottom of the distribution.

Table 4(A)

Anatomy of Income Distribution: Components of Income by Decile

1957/58

	g=1	g=2	g=3	g=4	g=5	g=6	g=7	g=8	g=9	g=10	village average (%)
pcrinc	41.70	72.59	87.23	110.74	133.51	158.20	183.41	227.04	292.86	446.73	161.32 (100)
pcraginc	23.30	32.89	65.78	89.08	80.41	136.72	134.80	212.62	236.59	363.50	126.63 (79)
pcroutinc	0.00	8.48	9.54	0.00	20.49	16.55	6.47	15.67	30.59	36.85	13.09 (8)
pcraglab	6.74	23.96	9.58	13.38	26.53	4.98	35.51	0.00	11.01	12.82	14.21 (9)
HH size	5.5	6.7	4.7	5.1	5.4	6.1	5.2	7.3	3.3	3.5	5.3
Adm.	1.1	1.5	1.6	1.5	1.5	2.1	2.2	2.6	1.4	1.4	1.7
education	1.0	0.4	0.6	1.0	1.6	2.6	1.8	2.9	1.0	0.6	1.4
jobs	0.0	0.2	0.1	0.0	0.2	0.1	0.1	0.2	0.1	0.2	0.1
pc land	1.75	1.57	2.55	4.63	2.94	5.93	4.40	7.93	12.03	13.26	5.20
pc cult.	2.04	1.52	4.23	3.51	3.65	4.26	4.58	6.38	6.45	10.43	4.41

Notes:

1. pcrinc=per capita real income
   pcraginc=per capita real agricultural income
   pcroutinc=per capita real regular outside job income
   pcraglab=per capita real casual wage labour income
   jobs=proportion of households with at least one job
   pc cult=per capita land cultivated.
   HH size= household size
   Adm=number of adult males in household
   education=years of shooling of most educated member of household
   pc land=per capita land holdings

2. Individuals are ranked into deciles on the basis of their per capita real income. g=1 corresponds to the bottom 10% in terms of real per capita income.

3. Entries in the table are the average of the variable in the row for the decile in the column.

Table 4(B)

Anatomy of Income Distribution: Components of Income by Decile

1962/63

	g=1	g=2	g=3	g=4	g=5	g=6	g=7	g=8	g=9	g=10	village average (%)
pcrinc	27.89	62.82	86.13	104.44	129.00	156.96	191.13	236.64	309.88	535.40	161.93 (100)
pcraginc	38.74	50.94	73.15	80.11	93.35	121.62	117.64	188.87	206.32	517.75	130.04 (80)
pcroutinc	0.00	0.00	0.00	16.04	14.28	13.91	72.06	39.97	59.12	0.00	19.98 (12)
pcraglab	6.65	6.13	15.84	9.62	9.69	17.17	0.00	0.00	8.23	0.00	7.91 (5)
HH size	6.1	5.3	6.4	5.5	5.4	6.8	6.1	6.2	3.3	3.9	5.5
Adm.	1.7	1.2	2.0	1.5	1.8	2.1	1.7	2.4	1.2	1.7	1.7
education	0.8	2.7	1.8	2.2	2.0	3.8	2.1	3.1	0.4	2.3	2.1
jobs	0.0	0.0	0.0	0.2	0.3	0.1	0.5	0.2	0.5	0.0	0.2
pc land	4.85	3.17	3.27	3.30	2.80	4.59	3.02	6.27	5.45	13.38	4.65
pc cult.	4.76	4.03	3.50	3.43	3.29	4.56	3.21	5.82	5.09	13.21	4.76

Notes:

1. pcrinc=per capita real income
   pcraginc=per capita real agricultural income
   pcroutinc=per capita real regular outside job income
   pcraglab=per capita real casual wage labour income
   jobs=proportion of households with at least one job
   pc cult=per capita land cultivated.
   HH size= household size
   Adm=number of adult males in household
   education=years of shooling of most educated member of household
   pc land=per capita land holdings

2. Individuals are ranked into deciles on the basis of their per capita real income. g=1 corresponds to the bottom 10% in terms of real per capita income.

3. Entries in the table are the average of the variable in the row for the decile in the column.

Table 4(C)

Anatomy of Income Distribution: Components of Income by Decile

1974/75

	g=1	g=2	g=3	g=4	g=5	g=6	g=7	g=8	g=9	g=10	village average (%)
pcrinc	98.58	153.89	193.87	222.27	242.11	267.86	296.95	328.15	412.89	616.25	274.77 (100)
pcraginc	48.58	114.30	123.23	188.44	153.00	217.30	293.80	261.17	371.19	605.44	227.40 (83)
pcroutinc	26.44	30.22	37.36	22.03	90.94	55.91	10.19	46.51	46.88	37.67	41.48 (15)
pcraglab	21.11	7.28	20.41	11.80	-1.83	-5.35	-7.05	3.39	-5.18	-26.86	2.32 (1)
HH size	5.9	7.4	6.7	7.5	7.5	8.2	6.0	7.5	6.1	5.5	6.8
Adm.	1.8	1.9	2.2	2.2	2.1	2.0	1.7	2.5	1.7	1.9	2.0
education	0.3	0.5	0.5	0.8	0.8	1.0	0.8	0.5	1.2	1.1	0.8
jobs	0.4	0.4	0.2	0.2	0.7	0.5	0.1	0.5	0.3	0.3	0.4
pc land	1.05	1.58	1.93	3.04	2.00	3.39	3.80	3.25	5.51	8.95	3.30
pc cult.	1.20	2.11	2.29	2.73	2.29	3.00	4.55	3.80	4.10	7.29	3.22

Notes:

1. pcrinc=per capita real income
   pcraginc=per capita real agricultural income
   pcroutinc=per capita real regular outside job income
   pcraglab=per capita real casual wage labour income

   jobs=proportion of households with at least one job
   pc cult=per capita land cultivated.

   HH size= household size
   Adm=number of adult males in household
   education=variable taking a value of 0 if no household member is literate, if maximum schooling in household is to primary level, and 2 if education is greater than primary level.
   pc land=per capita land holdings

2. Individuals are ranked into deciles on the basis of their per capita real income. g=1 corresponds to the bottom 10% in terms of real per capita income.

3. Entries in the table are the average of the variable in the row for the decile in the column.

Table 4(D)

Anatomy of Income Distribution: Components of Income by Decile

1983/84

	g=1	g=2	g=3	g=4	g=5	g=6	g=7	g=8	g=9	g=10	village average (%)
pcrinc	35.86	77.17	101.86	130.10	151.66	186.49	213.36	253.34	308.64	394.84	194.17 (100)
pcraginc	20.75	40.60	58.26	80.30	85.29	99.232	126.51	148.06	205.40	178.19	109.65 (80)
pcroutinc	2.37	17.91	18.81	23.52	38.24	57.51	76.12	95.39	86.51	202.55	65.61 (12)
pcraglab	12.52	12.85	15.01	12.90	10.24	5.90	1.03	5.00	0.21	4.59	7.58 (5)
HH size	5.3	5.7	4.9	7.4	7.6	6.0	7.7	7.6	7.8	7.3	6.7
Adm.	1.3	1.3	1.5	2.0	2.7	1.4	2.5	2.2	2.3	2.8	2.0
education	3.4	2.1	3.9	3.6	4.7	6.2	4.6	4.9	6.2	6.2	4.5
jobs	0.1	0.5	0.3	0.3	0.4	0.4	0.7	0.6	0.6	0.7	0.5
pc land	2.14	1.15	2.77	3.10	2.37	3.30	3.32	3.09	2.92	2.59	2.70
pc cult.	2.61	1.72	2.09	2.72	1.92	2.27	3.53	3.57	3.19	3.46	2.76

Notes:

1. pcrinc=per capita real income
   pcraginc=per capita real agricultural income
   pcroutinc=per capita real regular outside job income
   pcraglab=per capita real casual wage labour income
   jobs=proportion of households with at least one job
   pc cult=per capita land cultivated.
   HH size= household size
   Adm=number of adult males in household
   education=years of shooling of most educated member of household
   pc land=per capita land holdings

2. Individuals are ranked into deciles on the basis of their per capita real income. g=1 corresponds to the bottom 10% in terms of real per capita income.

3. Entries in the table are the average of the variable in the row for the decile in the column.

Table 5

Impact on Inequality of Scaling Cultivation Income Up or Down

I. Scaling Cultivation Up to Adjust for Bad Harvests (1962/63 and 1983/84)

Inequality Measure	Unadjusted Individual Income Inequality	Scaling Factors 10%	15%	20%	25%	30%
1962/63						
Gini coefficient	0.390	0.387	0.385	0.384	0.384	0.383
Atkinson Class						
ε=2	0.485	0.460	0.452	0.445	0.440	0.436
ε=5	0.821	0.788	0.776	0.765	0.757	0.750
General Entropy						
c=2	0.379	0.381	0.383	0.385	0.388	0.391
1983/84						
Gini coefficient	0.307	0.307	0.308	0.309	0.310	0.311
Atkinson Class						
ε=2	0.319	0.321	0.322	0.324	0.326	0.328
ε=5	0.739	0.747	0.750	0.754	0.758	0.762
General Entropy						
c=2	0.149	0.149	0.150	0.150	0.151	0.152

II. Scaling Cultivation Down to Adjust for Good Harvests (1957/58 and 1974/75)

Inequality Measure	Unadjusted Individual Income Inequality	Scaling Factors 10%	15%	20%	25%	30%
1957/58						
Gini coefficient	0.336	0.337	0.337	0.338	0.340	0.342
Atkinson Class						
ε=2	0.338	0.335	0.334	0.335	0.336	0.339
ε=5	0.647	0.627	0.619	0.611	0.605	0.601
General Entropy						
c=2	0.210	0.210	0.210	0.212	0.213	0.216
1974/75						
Gini coefficient	0.253	0.247	0.244	0.241	0.239	0.238
Atkinson Class						
ε=2	0.206	0.198	0.194	0.190	0.187	0.184
ε=5	0.483	0.476	0.473	0.471	0.471	0.471
General Entropy						
c=2	0.127	0.120	0.117	0.114	0.110	0.108

Notes

1. Higher values of ε in the Atkinson class imply more inequality aversion.
2. A General Entropy parameter of c=2 is ordinally equivalent to the coefficient of variation.

Table 6: Decomposition of Gini Coefficients by Components of Income

Table 6a

	Gini	Agricultural income	Outside income	Other Income Sources
1957/58	528 obs. 0.336	0.308 (92%) μ_k/μ=0.79 G_k^*=0.390	0.028 (8%) μ_k/μ=0.081 G_k^*=0.350	0.002 (1%) μ_k/μ=0.134 G_k^*=0.012
1962/63	585 obs. 0.390	0.315 (81%) μ_k/μ=0.80 G_k^*=0.394	0.050 (13%) μ_k/μ=0.123 G_k^*=0.410	0.023 (6%) μ_k/μ=0.073 G_k^*= 0.318
1974/75	757 obs. 0.253	0.265 (105%) μ_k/μ=0.83 G_k^*=0.321	0.010 (4%) μ_k/μ=0.151 G_k^*=0.065	-0.022 (-9%) μ_k/μ=0.021 G_k^*=-1.052
1983/84	960 obs. 0.307	0.164 (53%) μ_k/μ=0.56 G_k^*=0.293	0.152 (49%) μ_k/μ=0.340 G_k^*=0.446	-0.009 (-3%) μ_k/μ=0.097 G_k^*=-0.095

Notes

1. Gini coefficient $G = \Sigma(\mu_k/\mu)G_k^*$, where μ_k/μ is the share of component k in total income.
2. When $G=2/n^2\mu \Sigma_i[r_y-(n+1)/2]Y_i$, for n households indexed i, where r_y is the income ranking of total incomes, then the pseudo-Gini, G_k^*, is obtained in the same way except with Y_{ki}, the kth component of income replacing total income Y_i.
3. The true Gini coefficient for component k is equal to neither $(\mu_k/\mu)G_k^*$, nor G_k^* - see notes to Table 3b.
4. The percentage contribution of inequality in component k to total inequality is $[(\mu_k/\mu)G_k^*]/G$.

Table 6b

	Gini	Agricultural income			Outside income			Other Income Sources		
		μ_k/μ	G_k^*/G_k	G_k	μ_k/μ	G_k^*/G_k	G_k	μ_k/μ	G_k^*/G_k	G_k
1957/58	0.336	0.79	0.842	0.463	0.08	0.390	0.897	0.13	0.013	0.962
1962/63	0.390	0.80	0.774	0.509	0.12	0.470	0.872	0.07	0.159	2.000
1974/75	0.253	0.83	0.863	0.372	0.15	0.088	0.739	0.02	-0.452	2.328
1983/84	0.307	0.56	0.602	0.487	0.34	0.645	0.691	0.10	-0.107	0.889

Notes:

1. The Gini coefficient can also be decomposed as $G=\Sigma(\mu_k/\mu)(G_k^*/G_k)G_k$.
2. It can be readily shown that G_k^*/G_k is equal to $R=Cov(Y_k,r_y)/Cov(Y_k,r_k)$, where r_k is income ranking of the kth component.

Table 7a

Caste and Incomes in Palanpur

Per Capita Real Income (Rupees)

Caste	No.	1957/58	1962/63	1974/75	1983/84
Thakur	1	186.34 (17)	174.27 (19)	354.76 (25)	199.83 (30)
Murao	2	253.94 (21)	222.62 (25)	364.91 (27)	230.82 (27)
Dhimar	3	114.93 (10)	96.72 (9)	202.38 (8)	180.56 (13)
Gadaria	4	187.88 (9)	209.31 (9)	242.10 (10)	202.08 (12)
Dhobi	5	235.51 (2)	730.98 (1)	154.47 (3)	159.35 (4)
Teli	6	107.56 (8)	104.33 (9)	203.59 (12)	147.12 (16)
Passi	7	174.57 (11)	281.58 (16)	275.15 (8)	217.67 (14)
Jatab	8	149.39 (16)	110.70 (13)	195.04 (14)	84.64 (19)
Others	9	128.73 (6)	101.84 (5)	255.79 (4)	183.89 (8)

Note

1. Figures in brackets correspond to number of households in each caste.
2. Per capita income figures correspond to average household per capita incomes.

TABLE 7b
Inequality between Castes

	Theil Index T(Y)	Within Component	Between
1957/58	0.1858	0.1438 (77%)	0.0419 (23%)
1962/63	0.2742	0.2201 (80%)	0.0541 (20%)
1974/75	0.1106	0.0825 (75%)	0.0281 (25%)
1983/84	0.1510	0.1126 (75%)	0.0384 (25%)

Note: There are nine caste groupings in Palanpur. Ranked from highest in social ranking to lowest they are: Thakur (217); Murao (217); Dhimar (74); Gadaria (83); Dhobi (27); Teli (92); Passi (79); Jatab (118); and a composite group of various others (53). The numbers in brackets refer to the number of individuals in each caste in 1983/84. Land owned in bighas in 1983/84 was Thakur, 758, Murao, 1053, Dhimar, 65, Gadaria, 195, Dhobi, 21, Teli, 101, Passi, 141, Jatab, 217, and other,17. In Palanpur there are 6.4 bighas per acre.

TABLE 8

Income Regressions

Model: The dependent variable is current nominal income for the year in question

Income = β_1Land + β_2Adm + β_3Fam + β_4Bullocks + β_5He-Buffalo + β_6Animals + β_7Educ + β_8dThakur + β_9dMurao + β_{10}Jobs + stochastic term

	1957/58	1962/63	1974/75	1983/84
No. of observations	100	106	111	143
constant	-15.4 (-0.14)	6.8 (0.05)	-1909.7 (-2.74)	-3216.6 (-5.60)
β_1	10.1 (5.75)	13.7 (4.85)	86.7 (5.01)	23.9 (1.13)
β_2	123.4 (2.31)	65.6 (1.58)	564.8 (1.78)	1756.3 (6.27)
β_3	57.2 (2.25)	15.2 (0.34)	610.8 (4.51)	881.6 (7.04)
β_4	52.7 (0.91)	37.7 (0.54)	622.1 (2.58)	-173.9 (0.44)
β_5	101.7 (1.32)	-8.8 (-0.10)	264.3 (0.64)	-945.6 (-2.62)
β_6	44.8 (1.92)	47.8 (1.72)	411.4 (2.6)	203.4 (1.79)
β_7	-26.3 (-1.09)	30.7 (1.32)	518.7 (1.19)	119.3 (1.72)
β_8	-95.3 (-0.66)	-145.2 (-0.81)	1276.8 (1.67)	-385.1 (-0.47)
β_9	224.8 (1.81)	22.5 (0.14)	709.9 (0.89)	1593.2 (1.71)
β_{10}	617.6 (4.11)	521.9 (2.81)	1310.9 (2.22)	3042.1 (6.03)
R^2	0.683	0.498	0.720	0.800

Note

1. t-statistics are given in brackets.

2. Land = land owned in bighas; Adm = number of adult males; Fam = number of family members; Bullocks = number of bullocks; He-buffalo = number of he-buffalos; Animals = number of other animals; Educ = years of schooling of most educated household member; dThakur = dummy for Thakurs; dMurao = dummy for Muraos; Jobs = number of outside jobs.

Table 9

Size Distribution of Land Holdings

Land holding size (bighas)	No. ownership holdings				No. operational holdings			
	1957	1962	1974	1983	1957	1962	1974	1983
>100	4	3	0	0	6	3	0	2
75-100	4	4	3	6	5	4	1	3
50-75	6	6	12	5	8	9	8	4
40-50	6	7	4	4	6	6	4	8
30-40	12	14	5	11	8	14	16	22
20-30	21	24	31	24	16	27	35	18
15-20	4	4	10	12	5	9	8	9
10-15	11	14	15	12	9	5	6	9
5-10	17	14	9	23	9	8	9	9
2.5-5	0	0	8	12	0	1	4	7
0.1-2.5	1	1	4	7	1	0	2	6
0	14	15	10	27	27	20	18	46
No. of obs	100	106	111	143	100	106	111	143
Average	27	26	22	18	27	26	22	19
Gini	0.54	0.50	0.49	0.57	0.61	0.49	0.44	0.60

Notes

1. 6.4 bighas = 1 acre; 2.5 acres = 1 hectare

2. Land holdings are presented for households not individuals.

Table 10
Outputs, Inputs and Farm Size

10(a) Output and Land

Model: Log(output) = Log(land cultivated) + intercept + residual

	1957/58	1962/63	1974/75	1983/84
Land cultivated	0.956	1.070	1.080	0.937
	(21.95)	(11.54)	(27.0)	(13.50)
Intercept	3.220	2.73	5.06	5.207
	(22.54)	(8.75)	(84.33)	(23.78)
R2	0.850	0.615	0.940	0.673

Model: Log(cultivation costs) = Log(land cultivated) + intercept + residual

	1957/58	1962/63	1974/75	1983/84
land cultivated	0.961	1.051	1.15	0.902
	(7.3)	(10.46)	(8.62)	(12.94)
Intercept	0.573	1.393	9.69	4.43
	(1.20)	(4.15)	(3.84)	(20.26)
R2	0.498	0.567	0.519	0.652

10(b) Variance/Covariance Matrices of Log (output/bigha) and Log (land cultivated)

	Log (output/bigha)	Log (land cultivated)
1957/58		
Log (output/bigha)	0.1812	-0.0902
Log (land cultivated)	-0.0902	0.8147
1962/63		
Log (output/bigha)	0.3333	0.0367
Log (land cultivated)	0.0367	0.4610
1974/75		
Log (output/bigha)	0.0826	0.0638
Log (land cultivated)	0.0638	0.5297
1983/84		
Log (output/bigha)	0.4652	-0.0695
Log (land cultivated)	-0.0695	1.0998

10(c) Output and Costs

Model: Log(output/bigha) = Log(cultivation costs/bigha) + intercept + residual

	1957/58	1962/63	1974/75	1983/84
cultivation costs	0.069	0.585	0.143	0.663
	(0.99)	(7.27)	(3.64)	(8.18)
Intercept	2.95	2.08	5.07	2.258
	(47.71)	(15.46)	(56.91)	(6.60)
R2	0.00	0.385	0.153	0.428

Notes

1. Cultivation costs in 1957/58, 1962/63 and 1983/84 included irrigation costs, costs of seeds, costs of fertilizer and costs of fodder, while in 1974/75 the only cultivation costs available were fertilizer costs.
2. Figures in brackets denote t-statistics.
3. Output is in rupees and land cultivated in bighas.

Table 11

Regular Jobs Outside Agriculture, 1957-1984

	1957/58	1962/63	1974/75	1983/84
Regular job involving good education or skills				
teacher	0	0	3	2
mechanic	1	1	0	0
electrician	0	0	1	0
insurance salesman	0	0	0	1
tax collector	0	0	0	1
cook	0	0	0	1
skilled work in bread factory	0	0	0	1
clerk in factory	0	0	1	0
Regular job involving limited training or skills				
chowkidar (watchman)	2	0	1	5
permanent railway employee	3	5	6	10
non-permanent railway work	1	0	3	6
permanent servant	1	0	0	0
cloth mill or spinning factory	0	1	11	14
cane centre	0	0	2	0
bread factory	0	0	0	7
security guard or policeman	0	0	0	2
coal depot in Moradabad	0	0	0	1
work in chakki	0	0	0	1
selling bricks in Moradabad	0	0	0	1
unspecified regular job	1	3	9	0
	9	10	37	54

Note

This list does not include occupations that are seasonal, casual/semi-regular, or which are carried out on the basis of traditional arrangements.

FIGURE 1

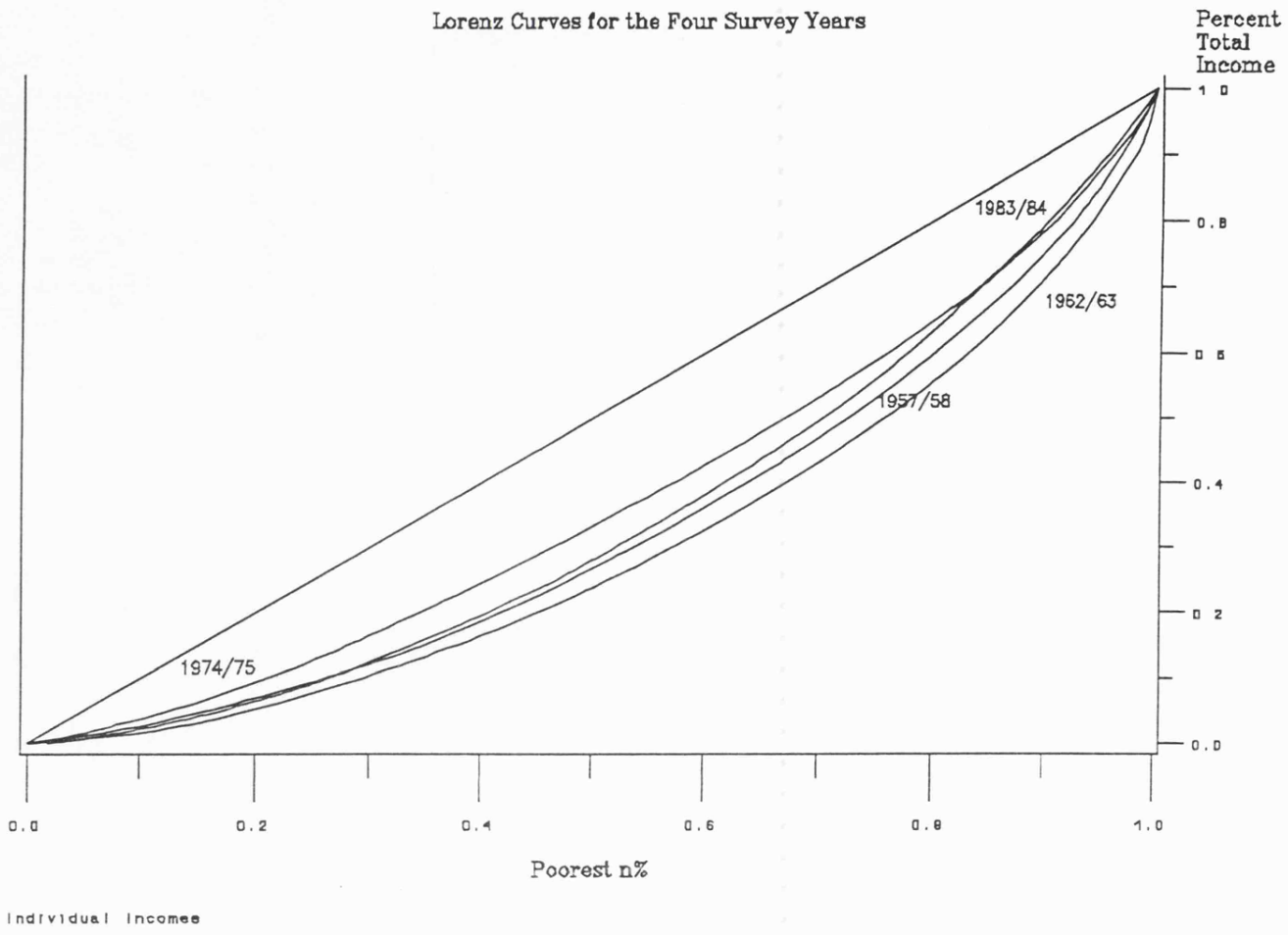
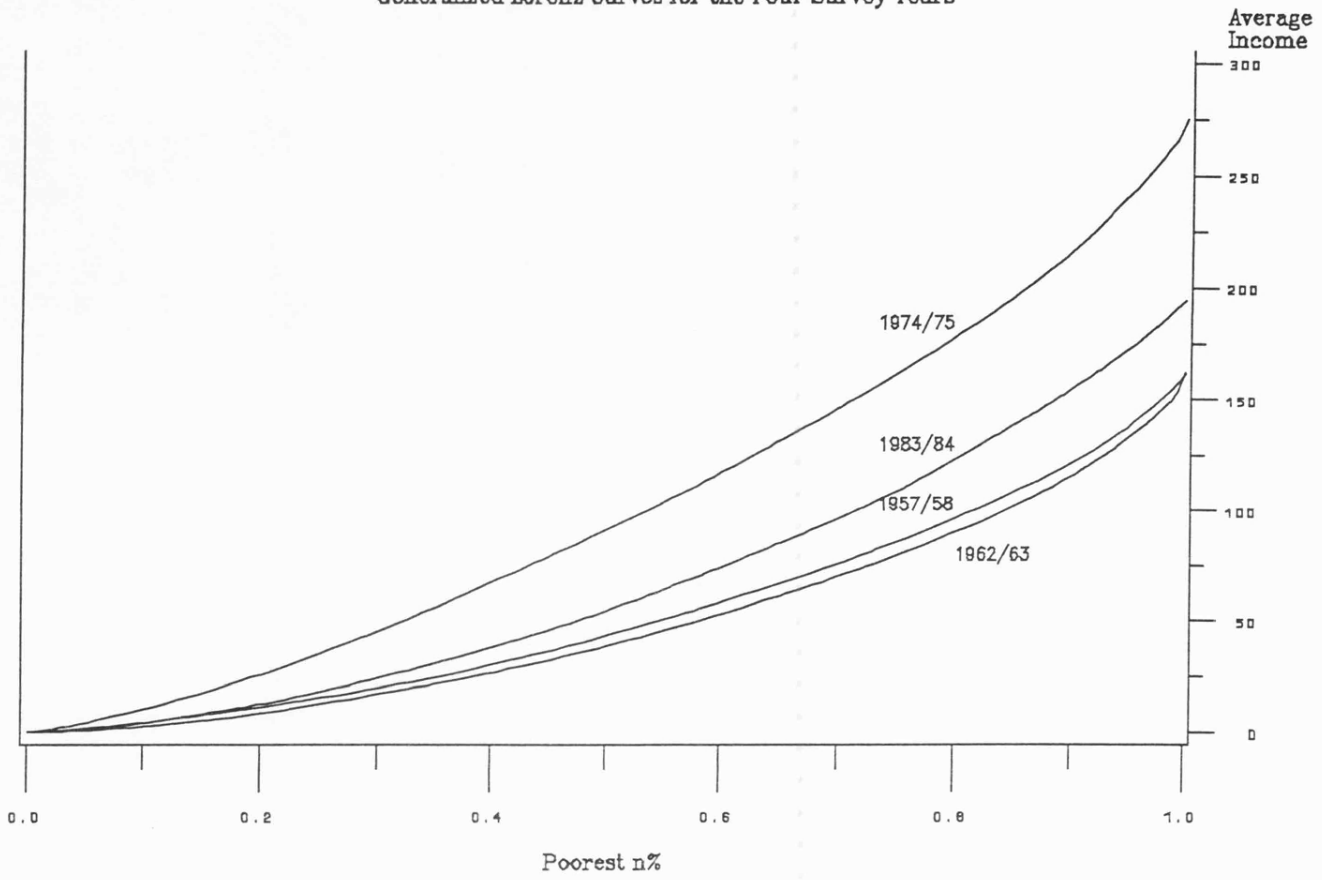

Lorenz Curves for the Four Survey Years
Percent Total Income
1.0
0.8
0.6
0.4
0.2
0.0
1983/84
1962/63
1957/58
1974/75
0.0
0.2
0.4
0.6
0.8
1.0
Poorest n%
Individual Incomes

FIGURE 2

Generalized Lorenz Curves for the Four Survey Years



Individual Incomes

FIGURE 3

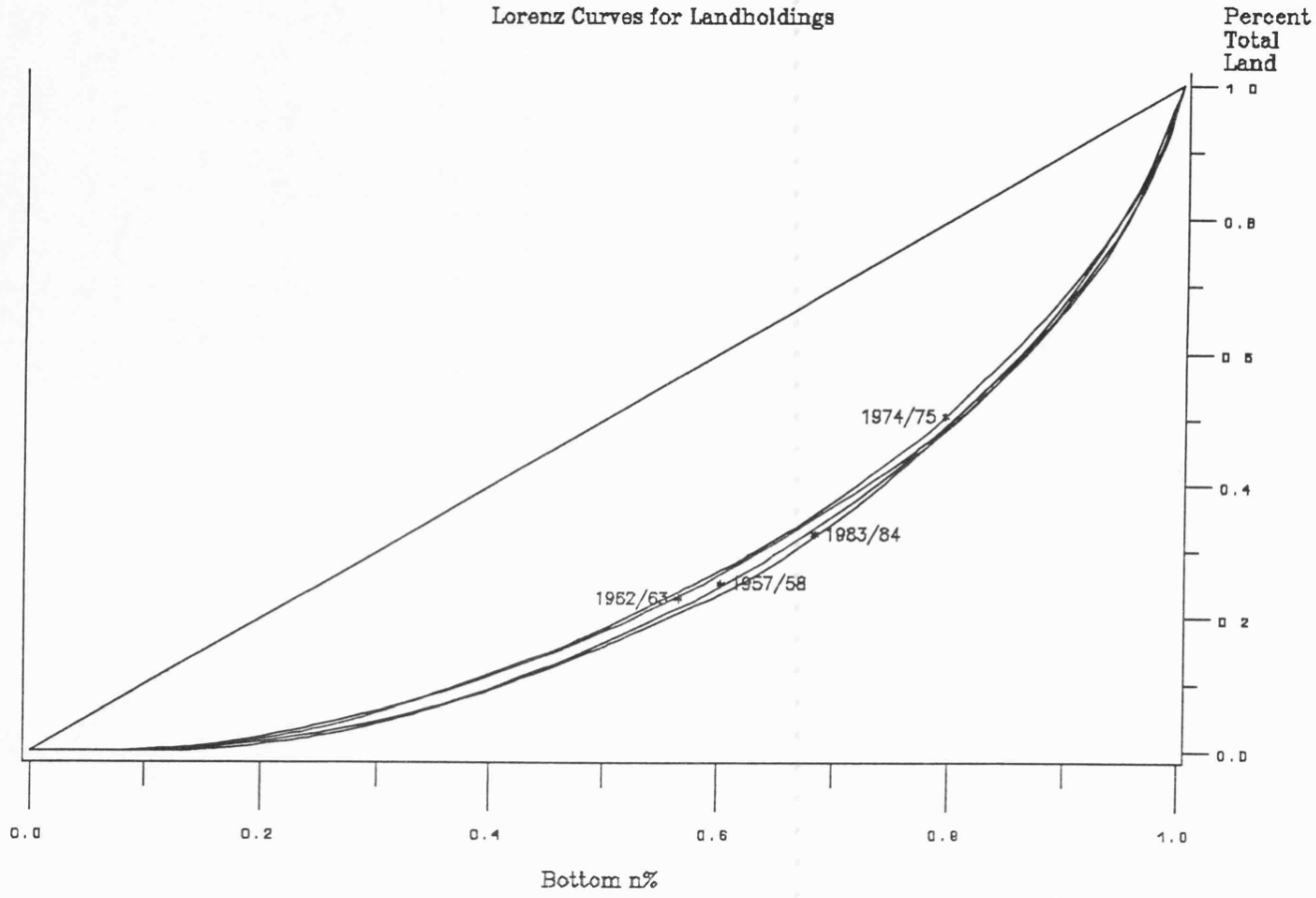
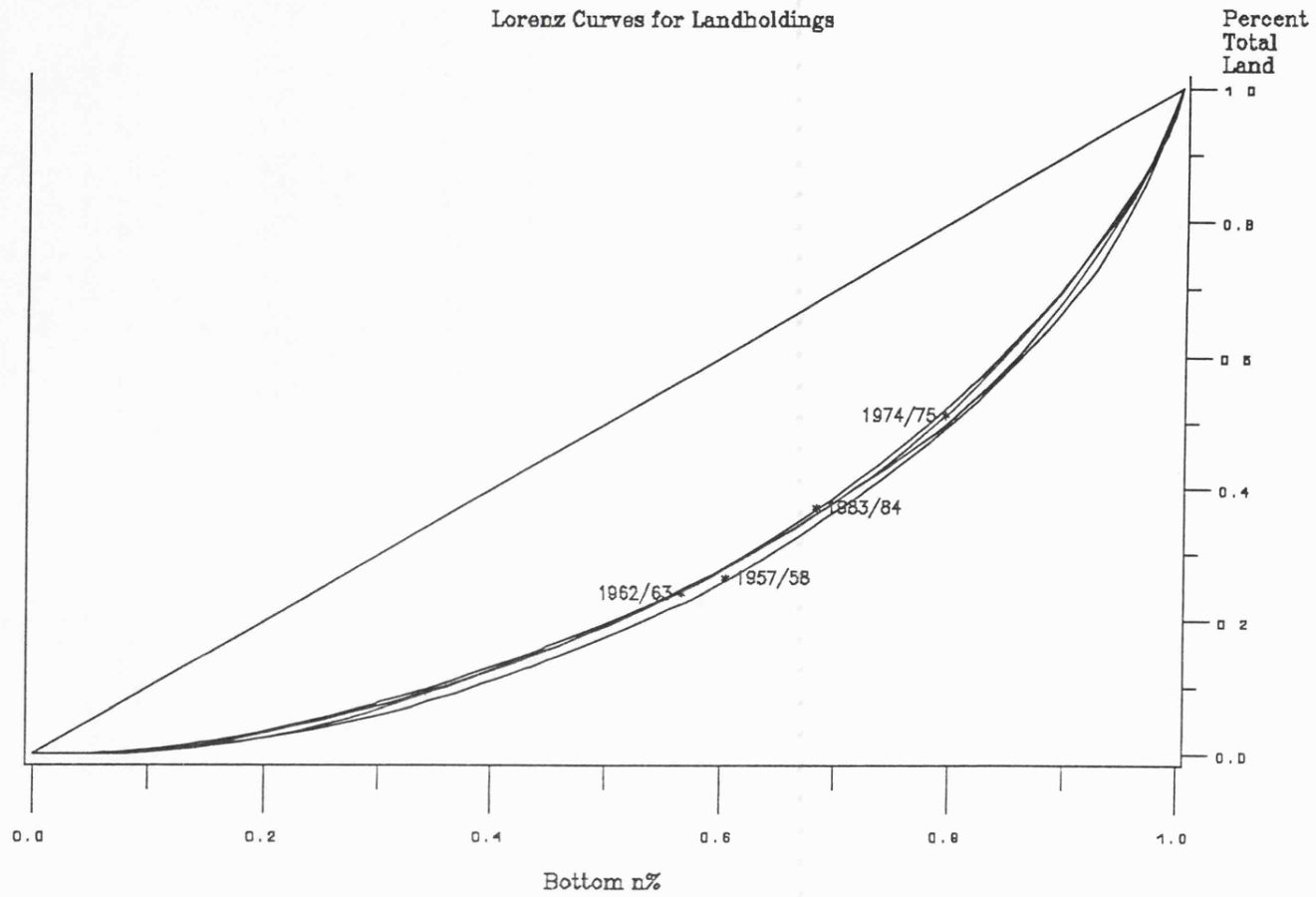

Lorenz Curves for Landholdings
Percent
Total
Land
1.0
0.8
0.6
0.4
0.2
0.0
1974/75
1983/84
1957/58
1952/53
0.0
0.2
0.4
0.6
0.8
1.0
Bottom n%
Individual landholdings

FIGURE 4


Lorenz Curves for Landholdings
Percent
Total
Land
1.0
0.8
0.6
0.4
0.2
0.0
1974/75
1983/84
1962/63
1957/58
0.0
0.2
0.4
0.6
0.8
1.0
Bottom n%
Individual landholdings

Chapter 3: Poverty in Palanpur

3.1 Introduction

In this chapter, we examine the definition, identification and determinants of poverty in Palanpur. The information which has been acquired over the four survey years, as well as during numerous shorter visits since 1974/75, permits a detailed evaluation of commonly proposed correlates of poverty. Such correlates can be of importance to the design of policy. We shall pay particular attention to understanding to what extent, and why such correlates may or may not be appropriate.

In order to explore such questions we require a welfare indicator which can at least provide an ordinal ranking of households. In a recent contribution to the literature, Anand and Harris (1990) provide an illustration of how conclusions reached regarding the extent of poverty can vary with the particular choice of welfare indicator, drawing on evidence from Sri Landkan household budget survey data for 1981/82. They describe how the bottom 10 per cent of individuals in the urban sector of Sri Lanka have a monthly per capita food expenditure of Rs 116 (in 1981 rupees) when individuals are ranked by per capita income; Rs 95 when per capita total expenditure is used as the ranking variable; Rs 88 when per capita food expenditure is used; and Rs 171 when food share in total expenditure is used. Needless to say, such widely differing predictions of the food consumption of the lowest 10 per cent (if we were to assume that they were the target group for food strategies) would clearly affect our assessement of the magnitude of the problem of hunger, and poverty. In this chapter we will be discussing in particular the success of per capita income as the ranking variable.

The close study of one village provides details on living standards which are not available by other means. Examples include whether the lifestyle of a villager looks very different from that which might be

implied by measured income, whether there are any particular circumstances concerning the health of members of the household or problems with its animals, equipment or fields which might influence standard of living, whether employment outside agriculture is likely to persist, whether tenancy exists, and so on. Such questions can be crucial to the sensible definition, measurement and accurate interpretation of income, or more broadly standard of living, and thus also of poverty.

The chapter is organised as follows. In the remainder of this section we consider briefly the problems of measuring standard of living in a village like Palanpur. In Section 2 we examine the relationship between poverty and household characteristics in 1983/84 incorporating different definitions of income and poverty. A more formal analysis of the determinants and correlates of poverty is presented in Section 3. In Section 4 we consider the incidence of poverty in earlier survey years and follow this with, in section 5, a discussion of some longitudinal considerations. Section 6 is devoted to concluding remarks.

3.1.1. Measuring Standard of Living

An important initial consideration involves which measures of standard of living one would, in principle, like to use and second whether or not these are likely to be workable in practice. A natural first concept to be considered is income[1]. The difficulties with defining income, which can be substantial in developed countries (see Atkinson, 1989, Ch. 1), are much more troublesome in developing countries. First we have the problem of the period. Yearly income in agricultural communities is a natural concept given the seasonal cycles in agriculture. But the year is in some respects too long, because seasonal hardship can be severe, and it is in some respects too short, because there are considerable year-by-year

[1]. Anand and Harris (1990) argue that regardless of whether one wishes to attach a utility connotation to it or not, long-run average income is a reasonable indicator of standard of living in that it determines an individuals long-run command over resources and the consumption level that can be sustained.

fluctuations, so that income in one year may not reflect the long-term standard of living. Related to the problem of period is the problem of inputs. Like other activities, agriculture involves inputs which go in in one period and outputs which come out in another. How are the inputs to be debited against outputs? In some cases inputs will obviously be associated with outputs in a particular season but, in the case of investment in water resources, for example, the inputs are much more long-term. Similarly we have inputs which are used both for production and consumption purposes. For example, bicycles and carts can be used to go to town for shopping simultaneously for consumption or productive inputs. A third problem is the family unit. Household sizes in a village can quite easily range from 1 to 30 and vary considerably in composition. Does one use equivalence scales? Are there important consumption goods which are public within the household? Different treatments of income can lead, as we shall see, to very different results.

Besides income, there are a number of other dimensions one would like to measure. In some respects expenditure or expenditure on food may more reliably measure living standards than income[2]. Such data were not collected in Palanpur however. Land is an important indicator of wealth and earning power, as are other assets. Health and nutrition are crucial aspects of the standard of living often not well captured by income measures (see, e.g., Drèze and Sen, 1990).

The empirical work reported here concentrates on two particular measures of standard of living. The first, the 'apparent prosperity' index for 1983/84, is based on the observations and assessments of Jean Drèze and Naresh Sharma who lived in Palanpur throughout the agricultural year

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[2]. In the conceptual framework proposed by Sen, income and consumption data can be used to examine the entitlements and achievements of individuals, respectively (see for example, Sen, 1992). Atkinson (1989) emphasizes that analyses based on income may reach different conclusions from those based on expenditure because of factors such as borrowing and saving as well as the existence of various market imperfections. One way of distinguishing between these indicators is that expenditures may be taken to represent the *choices* which have been made, while incomes are argued to better reflect *opportunities* faced.

1983/84 (see next section). The second is a measure of current per capita income, intended to measure the returns to land, labour and other household assets. Largely for data reasons, it has not been possible to construct an income measure able to capture these factors perfectly. The income measure used here does not go beyond the data availability for early years. We have subtracted current input costs from gross revenue, including payments for labour hired but not family labour. It should be noted that the income measure used here is sensitive to the quality of agricultural year. This is particularly so for the first three survey years where more than 80% of income came from agriculture (see Chapter 2).

One further measure of income for Palanpur is examined. We construct a 'permanent' income measure which involves taking averages across all four years of the survey (or in some cases, across the last two survey years). The income measures used in this chapter are constructed first for the household but are then translated into income per capita for the household. This is taken as the main income-based indicator. As was seen in Chapter 2 experiments with the use of equivalence scales did not lead to dramatically different results in the analysis of income distribution.

3.2. Poverty and Household Characteristics

This section investigates the characteristics of poor households in Palanpur. There are different ways of defining and measuring "poverty", even if we restrict ourselves to the conventional view of poverty as a lack of commodity command. In this chapter we shall be concerned with rankings by living standards and income. We will look at the characteristics of those households ranked lowest so that the notion of poverty is, in this sense, a relative one. In what follows, unless otherwise stated, we shall use the term 'poor' to describe those households (59 in 1983/84) which are located among the poorest 4 deciles of the population in terms of the particular measure of standard of living we are using. This chapter does not follow conventional practice of estimating the incidence of "absolute" poverty by calculating the number of households located below a specific

poverty line defined in income terms. More detailed discussion of such an approach is provided in Chapter 4 and also Chapter 5. Note, however, if we take a widely used poverty line for rural India, 40% of Palanpur households would be regarded as having been poor in 1983/84[3].

It will become clear in this paper that the poor in Palanpur are a heterogeneous group and not easily described in any simple or unidimensional way. However, a particular example might contribute to some understanding of the circumstances, and especially the vulnerable state, in which most poor households in Palanpur might find themselves, and thus help understand what it means to be poor in Palanpur. Roshan (household number 613) is an elderly man of the Teli caste who heads a household of four. He has no land, and earns his income working as an agricultural labourer. He lives with his family in a one-room house with mud walls. For one year during the mid-1980s (after the 1983/84 survey) Roshan's fortunes appeared to be improving after he succeeded in obtaining a loan and setting himself up as a oil-seller in Palanpur and nearby villages. However, this success proved short-lived when he was involved in an accident in which 42 litres of oil were spoilt and he was unable to continue his business. At the time of a visit to Palanpur during January and February of 1990, Roshan was in a desparate situation. His wife was ill and needed medication which Roshan was unable to purchase. Because of his age and feeble physical health he was finding it difficult to get work as a casual labourer. His children were young and not contributing to household income, although Roshan's eldest son was nearing the age when he would be able to work as well. Finally, Roshan was heavily indebted after having borrowed money to purchase a rope-making machine and some goats. All but one of the goats had died, and the rope-making machine was not producing rope of sufficient quality to be able to sell in the village. Roshan was at a loss as to how he was going to repay these loans.

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[3]. To calculate this, we selected an all India poverty line for rural areas proposed by Dandekar and Rath (1971), of Rs. 15 per person, per month (at 1960/61 prices). Relative prices between Uttar Pradesh and India as a whole in 1963/64 were used to obtain a poverty line of Rs 11.3 for U.P. in 1960/61 (see the contribution by Bhattacharya and Chatterjee in Bardhan and Srinivasan, 1974).

3.2.1 The Apparent Prosperity Classification

We begin with the 'apparent prosperity' classification of the households of Palanpur according to their apparent level of economic prosperity. The affluence of a household in a small Indian village is, to a some extent, a matter of common knowledge. Similarly, the extent to which a particular household's asset position, or the health and nutritional status of its members, bears on the household's prosperity is also widely understood. The investigators who constructed the classification were involved in intensive fieldwork in Palanpur for more than a year and therefore were able to observe many of the assets owned by households as well as have access to the common knowledge in the village about villagers' affluence.

The classification was carried out in several stages. Initially, all households were divided into seven "fractiles" of increasing prosperity by Jean Drèze. These groups were labelled "Very Poor", "Poor", "Modest", "Secure", "Prosperous", "Rich" and "Very Rich"[4]. The number of households in these respective fractiles turned out to be as follows: 8, 8, 43, 38, 29, 6, and 11. Next, Naresh Sharma (who collaborated with the field work throughout 1983/84) was requested to produce his own independent classification of Palanpur households, aiming at fractiles of the same size as Drèze's. Table 1 presents the combined results of these classifications. In this table, each 3-digit number represents one household, and the position in the table indicates how the household has been classified by both Drèze and Sharma[5]. For instance, household 209 has been put in the "modest" category by Sharma, but in the "prosperous"

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[4]. These labels roughly correspond to the way in which different households would be expected to be described in the village itself. There is no implication that any of the households of Palanpur can be considered as "very rich" in an objective sense. For further details see Drèze (1988).

[5]. Throughout this chapter, the first digit of household indentification numbers indicates the caste of the household. The position of a household in the tentative caste hierarchy is detailed in Table 2 (with, for example, the identification number of Thakurs beginning with the digit 1, Muraos with digit 2 and Jatabs with digit 8).

category by Drèze. Reassuringly, there was a strong degree of agreement between the classifications of Drèze and Sharma, with 137 of the 143 households being put in the same or adjacent categories. This high compatibility confirms the view that relative positions in terms of apparent prosperity are in many cases reasonably clear.

It is not, of course, easy to spell out precisely what the basis of one's impressions about the prosperity of different households is, even when these impressions are quite strong. To a great extent prosperity is associated with "lifestyle": the quality of housing, food and clothing, the possession of durable goods, the consumption of luxuries, etc. There are, however, some difficulties with this observation, which account for many of the discrepancies between the classifications of Drèze and Sharma. Two of these difficulties deserve special mention.

First, one has to bear in mind the distinction between consumption or lifestyle on the one hand and income or commodity command on the other. A good illustration of this difficulty is provided by household 226, classified as "Modest" by Drèze but "Rich" by Sharma. Bhikkay (226) is an old and childless man who lives alone and exclusively from the rent of his land. He owns 25 bighas (about 4 acres) of land and, under the standard terms of share-cropping in Palanpur, this would give him a per-capita income well above the Palanpur average. However, for one reason or other Bhikkay's consumption patterns are those of a poor man: his small mud house is dilapidated and empty, his clothes are tattered and he eats barely enough to survive. This contrast seems to have led Drèze into classifying Bhikkay as "Modest", while Sharma classified him as "rich" in view of his relatively high income. Later it appeared that the motive of Bhikkay's high savings rate was his desire to build a small temple. The classification of such households for which income and lifestyle measures differ widely can be problematic.

Second, there can be important intra-household inequalities of lifestyle. A good example is provided by household 705, consisting of a

widow (Champa), her adolescent son (Raj Kumar), and a small daughter. Raj Kumar works in a steel polish workshop in Moradabad, and his earnings are the main source of household income. Polishing steel is hard work, but under the piece rate system it yields relatively high daily wages (about Rs 20 per day), and Raj Kumar himself leads the relatively privileged life of those who have daily access to a substantial sum of cash. But his mother Champa is comparatively neglected, and leads a severely deprived life. She even engages in wage labour, a symptom of severe deprivation in Palanpur. This household has been classified as "Modest" by Drèze and as "Very Poor" by Sharma.

The final stage of the classification exercise consisted of ranking the households from the seven fractiles into deciles of equal size. This was carried out by Jean Drèze, and mainly involved an effort to integrate the separate scales produced by Drèze and Sharma.

3.2.2. Apparent Prosperity and Current Income

We have noted that current income is often used to measure poverty and to identify a target population for poverty alleviation programmes (see Drèze, 1990a, on income and eligibility conditions of the Integrated Rural Development Programme, IRDP). It is of some interest therefore to compare the position of different households in the scale of 1983/4 per-capita income with their position in the classification discussed in the preceding section. A basis for this comparison is provided in Table 3, which shows the position of each of Palanpur's 143 households both in the apparent prosperity scale (row index) and in the per capita income scale (column index), both scales having been divided into deciles[6]. It is clear that there are substantial differences between the rankings obtained under each method. These reflect partly the inaccuracies inherent in each method of assessment, but also some real differences in the underlying concepts of prosperity and poverty.

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[6]. The number of households in the poorest decile is 17 for each scale and 14 in all other deciles.

One of the most obvious and important contrasts arises from the fact that current income varies widely from year to year. As a result, per-capita income in 1983/84 can be quite a poor indicator both of the longer-run earning opportunities of a household, and of its living standard in that year.

Among the factors that account for the short-run instability of income, the quality of the harvest is one of the most influential. The year 1983/84 was one of poor harvest in Palanpur but good harvest in Uttar Pradesh as a whole (and hence low output prices), resulting in depressed incomes for households which derive a substantial part of their earnings from farming. As can be seen from Table 3, for the majority of households cultivating 10 bighas of land or more, 1983/84 per capita income is somewhat depressed relative to "apparent prosperity". The incomes of Murao farmers are particularly depressed, as cultivation tends to account for a large part of total income for this cultivating caste. For example, of the 24 Murao households cultivating more than 10 bighas, 16 were found to lie below the diagonal in Table 3 indicating that their per-capita income ranking understated their apparent prosperity. In only two out of the 24 cases did per capita income overstate the prosperity of Murao households.

Fluctuations in the quality of the harvest for the village as a whole are compounded by fluctuations for individual farmers related to factors such as pests, management errors or risk-taking behaviour. An extreme example is provided by household 122, which had a negative income in 1983/84. This household owns a large amount of land, excellent draught animals, a variety of consumer durables and a good house. But, for one reason or other, this household experienced a disastrous harvest in 1983/84, resulting in a negative income for that year[7]. There are other important sources of instability of short-run income. These include: (1) fluctuations in prices and wages (with, for example, real agricultural

[7]. Referring forward to the section on averaged incomes, it is interesting to note that this household is ranked quite high in the permanent income scale.

wages being at a temporary peak in 1983/84); (2) temporary illness (household 113); (3) job search (household 715).

As far as inaccuracies of assessment are concerned, we have already commented on a number of difficulties earlier in this paper. Two further problems deserve mention. First, our measure of current income excludes income earned from illegal activities (e.g. stealing coal from passing trains and selling liquor) as well as interest income. This appears to lead to some systematic underestimation of the incomes of richer households. Thus, it is revealing that among the 8 households which are positioned in the richest decile in terms of apparent prosperity but *not* in terms of per-capita income, *all* the non-Murao households (5 in total) are moneylenders[8]. One of them (410) is also notorious for earning large sums of money from illegal activities, especially selling liquor. Other omissions in the measurement of income, such as the imputed rent of houses will also have led to some underestimation of richer households' income.

The second problem relates to the treatment of household size. As can be seen from Table 4, there is a systematic tendency for the scale of apparent prosperity to boost the position of large households (in square brackets), and reduce the position of small ones (in bold type), compared to the scale of current incomes. The reason for this is not obvious, and two non-exclusive possibilities come to mind. First, it could be that perceptions of lifestyle are overinfluenced by total household income as opposed to per-capita income, and biased upward, especially for large households, by intra-household inequalities. A good example of this possibility is provided by household 224. This household is widely regarded as one of the most well-off in the village, and its endowment of land and other assets in 1983/84 was indeed very impressive (it possessed, for instance, the only functioning tubewell in the village, the only

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[8]. The neglect of interest income can also lead to overestimation of the incomes of heavily indebted households. One example is that of household 609, which borrowed a large sum of money just before the survey year to buy a she-buffalo. The operation of the credit market in Palanpur is discussed further in Chapter 6.

tractor and the only flour mill). The head of the household, Bhupal, rarely works himself, smokes cigarettes as opposed to bidis, travels and gives generous feasts at marriages. However, when it is remembered that this exceptionally large household contains no less than 35 members, and that the other 34 members rarely smoke cigarettes or travel, it becomes much harder to make up one's mind where to place it in the prosperity scale.

The other possibility is that the observed bias arises from the failure of per-capita income measures to capture the effects of economies of scale and adult equivalence. There are obvious economies of scale involved, for instance, in the ownership of a number of consumer durables such as handpumps, radios and bicycles. The use of adult equivalence scales would also lead to upward corrections of the incomes of large households, where the proportion of children tends to be higher than average.

It is clear from this discussion that apparent prosperity and current per-capita income both have strengths and weaknesses as indicators of the standard of living. What should be stressed, perhaps, is that defining "poverty" simply in terms of current income leads to rather unsatisfactory and counter-intuitive classifications. Consider, for instance, the set of households falling in the richest three deciles of the apparent prosperity scale in Table 3 or 4. This group contains households which appear quite low in the current income scale. It includes Dumber (410), the liquor dealer, and Gulabo (112), the leading moneylender in the village. It also includes a number of households whose incomes were temporarily depressed by a bad harvest, illness or job search.

The observation that current income has major deficiencies as an indicator of prosperity is hardly surprising, but it has far-reaching policy implications since current income is often taken as the basis for "targetting" government assistance to vulnerable households. Even in the absence of measurement errors, the benefits of such schemes would accrue

to the "transient poor" as well as to the "chronic poor". Further, there are good reasons to believe that the transient poor would, in general, have greater chances of being selected than the chronic poor. This is because the transient poor usually have more influence, are better educated, and can incur the costs of search and bribery more easily, not to mention the fact that government officials themselves often prefer to deal with the less poor among eligible households.[9]

3.2.3. Current Income and Permanent Income

An obvious remedy to the problems for measurement caused by short-run fluctuations in income is to average income over several years. As the data available for Palanpur is in a panel form, we are able to compare the ranking of households in terms of 1983/84 per capita income with their ranking in terms of per capita income averaged over these four years (Table 5)[10].

There is an obvious difficulty in interpreting the contrast between current income and a measure of permanent income based on such a long period of time. For any particular household, current income can deviate from permanent income either because of a long-run change in economic status (caused, say, by the loss of an earning member) or because of a short-run fluctuation (e.g. due to a poor harvest). In spite of this difficulty, some interesting observations do emerge from Table 5.

First, access to employment opportunities outside the village seems to have played a major role in upward income mobility[11]. For instance,

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[9]. For a discussion of income and the eligibility conditions of the IRDP programme see Drèze (1990a).

[10]. Household incomes are averaged over the years for which survey data were collected. Not all households were present in all four survey years, having migrated in after the earlier surveys or being away during one or more survey years. Incomes were made comparable by deflating with the appropriate price index (see Chapter 2).

[11]. Economic mobility in Palanpur, in particular the *immobility* of the poor agricultural labour households, is examined further in Chapter 5.

of the 11 households which were not in the richest decile in the permanent income scale but which moved into the richest decile in the 1983/84 per-capita income scale, 8 had at least one (in four cases, more than one) member employed in the formal sector outside the village - in spinning factories, railways, teaching, etc.[12] As Table 5 shows, regular employment outside the village also accounts for a large part of upward mobility at other levels of income. To some extent, this observation reflects the short-run downward fluctuation in farm incomes in 1983/84. However, much the same conclusion is retained if we compare permanent income with apparent prosperity in 1983/84 instead of current income.

Second, a number of the more dramatic cases of downward mobility are clearly related to the loss of income-earning household members. In some cases (113, 225), the loss is temporary, and due to illness or accident. In other cases (613,711,712,714), the loss is permanent, due to death or permanent disability[13] .

Third, Table 5 throws light on the relationship between caste and poverty. A very high incidence of poverty emerges among Jatabs, not one of whom fails to be included in the poorest 40% by at least one of the two criteria of current or permanent income. Similarly, a high proportion of large Murao farmers among the unambiguously rich households is noticeable. Downward mobility is discernable among Thakur households, with only eight of them below the diagonal (in 5 cases due to access to outside employment). It is not likely that all of this downward mobility can be attributed to the bad harvest, since many Thakur households were comparatively less dependent on cultivation than other households. This fits with the widely held view in Palanpur that the relative economic position of the Thakur caste has deteriorated in the last few decades.

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[12]. Six of these eight households have access to a pacca (permanent) job, involving security of employment and comparatively high monthly salaries.

[13]. On the connection between widowhood and downward mobility in Palanpur, see Drèze (1990b), section 4.

3.2.4. Poverty and Household Characteristics

This section investigates the incidence of poverty among households in relation to economic, demographic, occupational and caste characteristics. Some relevant information is presented in Table 6, where a number of different household groups are considered. The last column of this table indicates the number of households included in each group. The first column indicates the proportion of households which would be included in the poorest 40% of households under the apparent prosperity criterion. The second and third columns denote the proportion of households in the poorest 40% of the population according to the current income and permanent income classifications, respectively. Note that in this exercise permanent income refers to the average of 1974/75 and 1983/84 incomes only, as the household characteristics considered apply to 1983/84 and some are not likely to be long-term.

It is reassuring that different approaches to the assessment of poverty do not give wildly diverging indications of the relative incidence of poverty in particular household groups. For example both the apparent prosperity and the current income criteria suggest that households without land, households with no fit adult male, households headed by widows without a fit adult male, agricultural labour households and households of the Jatab caste are substantially more vulnerable than average, while there is relatively little poverty among joint families, households with access to regular jobs, Thakurs and Muraos. The criterion of permanent income produces similar levels of poverty for most household groups, except those defined in terms of transient demographic characteristics. For example, widow-headed households without a fit adult male in 1983/84 was a highly vulnerable group in that year according to both the apparent prosperity and current income criteria, but less particularly so in terms of permanent income. This is hardly surprising, since most of these widows would have been living with their husbands in the earlier survey year.

We turn now to a brief discussion of the relationship between poverty

incidence and a few specific household characteristics. Depending on the classification used, the risk of poverty among landless households ranges from about 70% above the village average risk (using the apparent prosperity criterion) to roughly the same as the average. The link between poverty and landlessness is therefore not so strong as might have been imagined.

The reason for this is that the landless comprise a highly heterogeneous group, which includes households with widely divergent economic opportunities. In Palanpur we can identify at least three sub-groups of landless households which one would not expect to be particularly poor. First, there are landless households with access to regular employment outside the village. Important examples relate to the two households of the Kayasht caste (906 and 907). This caste is generally renowned for its high educational achievements and has a long tradition of involvement in white-collar jobs. It lives up to its reputation in Palanpur, with an adult literacy rate of 100 percent (compared with 10% of males and 1% of females in the village as a whole) and, in each of the two households, access to a secure and well-paid job outside the village.

Second, there are households from castes traditionally providing particular services not involving the use of land, e.g., carpenters, barbers, potters, sweepers. In Palanpur as in much of the rest of India, some of these traditional occupations have been markedly displaced in and by the urban economy. Others, however, have recently prospered. This applies, for instance, to carpenters, who are in high demand in Palanpur and are benefitting from the current construction boom in the village.

Third, a number of landless households are those of grown-up sons who live separately from their parents and have no legal title to land but have privileged access to their fathers' land. This can take the form of being granted the usufruct of a particular plot from the family holding, or of leasing in on preferential terms. One would not expect such households to be as deprived as households which are completely landless.

Such qualifications serve to remind us that landlessness is not a straightforward indication of vulnerability to poverty in a village such as Palanpur. One could further speculate that the link between landlessness and poverty has become less strong over time, with the diversification of the economy, the expansion of outside employment opportunities, and the greater tendency of grown-up sons to live separately from their parents.

Aside from the landless, households without a fit adult male immediately come to mind as being particularly vulnerable, especially in villages such as Palanpur where female employment and land rights are severely restricted. However, once again this is a heterogeneous group. The means through which some of these households escape poverty in Palanpur include the ownership of milch animals (household 409), access to a secure job (103), and remittances from a male family member living outside the village (503, 907).[14] Table 6 itself indicates that there are sub-groups among the group of households without a fit adult male for which poverty incidence is very high. For instance, the households of widows without a fit adult male are highly vulnerable.

The condition of widows in Palanpur is discussed in detail in Drèze (1990b). Once again this is a heterogeneous group including a number of very deprived households but also Gulabo (112) who is the largest moneylender in Palanpur and is entered in the richest decile of the apparent prosperity classification. The vulnerability of widows in Palanpur is strongly affected by the presence or absence of a grown-up son. Through the practice of patrilocality, a woman in Palanpur normally joins her husband's village immediately after marriage and is generally unable to appeal to her own relations when she becomes widowed. Employment opportunities in Palanpur are very limited for women, given purdah and related practices, so a widow has great difficulty in earning income by

[14]. Note that a male family member who normally resides outside the village is not counted as a member of the "household". Thus, households "without a fit adult male" include some households with an adult male working and residing outside the village.

hiring out her labour. In-laws in Palanpur rarely provide any support to a widow. As a consequence of these factors, usually only a widow with grown-up sons can be confident that she will receive some support.

Indicators of poverty incidence by caste (see the last block of rows of Table 6) broadly confirm the patterns discussed earlier. The incidence of poverty is very high among Jatabs, and relatively low among Thakurs and Muraos. Poverty among Muraos is practically non-existent, though current incomes reveal some poverty in this group mainly due to the bad harvest. The rapidly rising economic prosperity of this caste of hard-working and skilful farmers is recognised in the village as one of the basic socio-economic changes of the last few decades.

Although a considerable amount of change has taken place at the top of the economic and social heirarchy, little progress has been made in Palanpur by the lower castes, especially the Jatabs. Among this group, poverty remains endemic. This is a reflection not only of poor endowments of productive assets, but also of low educational standards and vulnerability to caste-based discrimination resulting in, among other things, little access to any kind of regular employment outside the village.

3.2.5. Systematic Biases Resulting From the Use of Current Income

Before concluding this section it is of interest to comment briefly on an aspect of systematic deviation between the observed poverty incidence for households with different characteristics based on the apparent prosperity criterion as opposed to the current income criterion. We have already discussed the numerous ways in which our current income measure fails to capture the underlying 'true' living standard of Palanpur villagers. One way that we can regard the imperfections found in our income measure is by representing these as an element of 'noise', such that our observed income is equal to 'true' income plus a random noise component. If we make this assumption, it is necessary to ask what are the

implications in terms of our calculations of poverty risk of having a 'noisy' measure of true living standards[15]. To answer this we can make use of a result presented in Ravallion (1988) in which he shows that the presence of noise increases the incidence of poverty for any unimodal distribution if the poverty line lies to the left of the distibution's mode (and vice verca)[16]. This result suggests that if we consider two groups within the population and we find that one group is concentrated to the left of the poverty line and the other group has a greater concentration to the right, then we will overstate the incidence of poverty for the group whose mode lies to the right of the poverty line and understate the incidence for the group whose mode lies to the left of the poverty line.

The intuition of this argument can be easily seen from Figure 1. Suppose that per-capita income in a particular year is the product of a 'normal income' and a random component. Assume for simplicity that both components are log-normally distributed with mean (of the logarithem) zero. Due to the presence of the random component, actual (per capita) incomes (as measured by the logarithem) will have a 'flatter' distribution than normal incomes, with the same mean. As a result, if the poverty line is below that mean, the estimated proportion of households below the poverty line (based on actual incomes) will be *higher* than the proportion corresponding to the distribution of normal incomes. If the poverty line had been drawn to the right of the mean income level, our conclusions would be the reverse; we would be understating the incidence of poverty on the basis of actual income. If we suppose there are two groups in the population, one with its mean income to the right of the poverty line and

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[15]. Note, we are putting aside for the momemt the effect on incomes of non-random shocks, for example, the effect of a drought, which would reduce observed incomes for many villagers in the same way. We assume here that the only deviation of observed income from the 'true' income is the result of shocks specific to particular households and un-correlated with shocks to other households. See also Anand and Harris (1990) for a discussion of the 'noisiness' of current incomes.

[16]. Ravallion's (1988) result is specific to poverty as represented by the headcount measure. If we measure poverty with any measure which is member of the Atkinson class, Ravallion showes that the presence of noise will increase poverty regardless of where the poverty line is relative to the mode of the distribution.

one with its mean below the line, then by examining actual instead of 'normal' income we would overstate the poverty incidence of the group concentrated above the poverty line, and understate the poverty incidence of the group below the line.

To check for evidence that this argument may actually apply in Palanpur, we can refer to Table 6 and compare the poverty incidence which we obtain on the basis of the current income criterion to the poverty incidence obtained in terms of apparent prosperity. We take the poverty incidence on the basis of this latter criterion to be the 'true' poverty incidence. We can argue that joint-family households are generally unlikely to be highly represented among the poor, because of the various scale-economies that such households enjoy in terms of cultivating undivided landholdings, consumption of durables, etc. Indeed, on the basis of apparent prosperity these households have an incidence of poverty of 0.19, considerably below the village average of 0.41. On the basis of current income, however, the incidence of poverty among this group is higher (at 0.22). Because the incomes of this group would be concentrated at a level above the 'true' poverty line, our argument above would suggest that current income is overstating the incidence of poverty among this group[17].

For other groups likely to be concentrated above the poverty line such as Thakurs and Muraos, we also find that current income overstates their incidence of poverty relative to the apparent prosperity criterion. If we examine groups whose incomes would tend to be concentrated below the true poverty line such as the landless, landless without regular job, agricultural labour households, and households without fit adult male, we see that for these groups the poverty incidence obtained on the basis of current income is consistently lower than the 'true' poverty incidence, as

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[17]. Note, because we do not have a cardinalization of the 'true' income represented by the apparent prosperity measure, it is not possible to check whether the mode of a particular group's 'true' income distribution lies to the left or right of the poverty cut off point (here the bottom 40% in terms of 'true' income).

would be expected on the basis of our argument above. In fact, only in one case of households thought to be concentrated below the poverty line, namely households with a widow, is the poverty incidence on the basis of apparent prosperity greater than that obtained on the current income criterion. We have already mentioned that this particular group is very heterogeneous and the mode of its distribution of income may lie to the right of the poverty line. Note also that the assumption of a unimodal distribution of income for any group in Palanpur need not necessarily apply. This point may apply in particular to the first row in Table 6, where, in contrast to our expectations the poverty incidence of households with a regular outside job on the current income criterion is greater than on the apparent prosperity criterion. Given that outside jobs take many forms and involve varying skills, the assumption of a unimodal distribution of outside job income may not be reasonable.

3.3. The Determinants and Correlates of Poverty

The discussion of the preceding section can be extended using simple econometric analysis of the determinants of poverty. The problems of specifying exogenous variables are both important and difficult here. We have selected two types of variables in this category. The first consists of three zero-one variables characterizing the household's asset or labour market position. The first of the three is landlessness. Since this condition arises for many families from their historical position at the time of the Zamindari abolition (in the early 1950s) and since in Palanpur the land market is highly inactive, there is a case for thinking of this variable as exogenous. The second is the presence of a fit adult male - which we may view as arising from birth, marriage, or health. The third is the presence in the household of an outside job. Access to these jobs may depend on factors unrelated to a household's economic position (for example, a relative in urban employment who can approach his own employer on behalf of his relations). We must acknowledge that one can provide arguments why each of these might be endogenous (particularly the last) but

the problems with these variables are rather less strong than with other possible selections. The second group of explanatory or exogenous variables are zero-one variables representing four of the castes in the village.

There are three measures of poverty employed for this part of the analysis. The first is derived from the apparent prosperity index, the second from current income, and the third from income averaged across the four survey years (permanent income). For each of the criteria we call a household poor if it is among the poorest 4 deciles of the corresponding standard of living criterion. Results from probit analysis of the influence of household characteristics on the risk of poverty are presented in Table 7. We first display results without and then with the caste dummies included. Without the caste dummies we find that for the apparent prosperity criterion the important explanatory variables are landlessness and employment in a regular outside job (the effect of landlessness increases the probability of poverty while the opposite occurs with possession of an outside job). Using the estimated parameters in the first part of Table 7 we find that the landless are more than 2 times as likely to be poor as those with land (for average values of other variables)[18]. Similarly, holding the other explanatory variables constant at their means, households without a regular job have a probability of poverty 26 percentage points higher than households with outside jobs.

Turning to the current income criterion, the influence of landlessness becomes insignificant, possibly the consequence of the poor harvest in 1983/84. With the permanent income criterion, once again landlessness and employment in a regular job significantly related to the probability of

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[18]. In this example we can show that if the household is landless and the other variables are at their means the probability of poverty is 70%%, while if the household has land, the probability is 33%. This is calculated using the fact that the mean for the regular job dummy is 0.34 (see Table 6) and the mean for the no fit adult male dummy is 0.13. Putting these means in the estimated equation and a one for the landless dummy gives a z value of 0.514, while a z value of -0.426 is obtained if the landless dummy is set at 0. From standard Normal tables it is possible to obtain the accompanying probabilities.

being included among the poor.

The presence or absence of a fit adult male does not seem to be of independent significance. Where the coefficients on landlessness or on a regular job are significant, the significance generally survives the introduction of variables representing caste. Only in the case of permanent income does the landless dummy loose its significance.

For given values of the three asset/labour market variables, Jatab caste membership had a significant effect (increasing the probability of poverty) regardless of the poverty criterion used (see the second part of Tables 7). For the apparent prosperity criterion the likelihood of poverty among Jatabs, with all other variables held constant at their means, is almost 7 times higher than among non-Jatabs (on the basis of estimated parameters in the second part of Table 6). With the apparent prosperity and current income criteria, membership of the Thakur and Murao castes does not appear to have a significant independent effect on poverty, but with the permanent income criterion both of these caste dummies become significant (decreasing the probability of poverty). The dummy representing Dhimar households is significant and positively related to the probability of poverty for the apparent prosperity and current income criteria, although not for the permanent income criterion. Households of this caste have become highly indebted in Palanpur in recent years (see Chapter 6) and have experienced a decline in earning opportunities. Although they are ranked reasonably high in the social hierarchy their economic position appears to be increasingly precarious.

The correlates of poverty are displayed in the correlation matrix presented in Table 8. Here we focus only on households which are considered poor according to the apparent prosperity criterion. We see that the caste variables are again significant. It is also striking that participation of the household in agricultural labour is strongly correlated with poverty. This should perhaps be recognised as a consequence of poverty and may well be useful for policy purposes as an

indicator. Results from further investigation into the nature of poverty among agricultural labour households can be found in Chapter 5.

3.4. Poverty and the Characteristics of the Poor in Earlier Survey Years.

So far in this chapter the focus of our attention has been on the poverty of Palanpur households during the 1983/84 survey year. The construction of an apparent prosperity measure has allowed us some comparison with income measures in identifying the poor in the village. As this apparent prosperity measure draws, albeit informally, on a very wide range of living standards indicators such as wealth, ownership of durables, health, etc., we have regarded this measure as an appopriate benchmark against which to assess income. Unfortunately, it has not been possible to replicate the creation of an apparent prosperity index for the earlier survey years. To examine the poverty incidence of different household groups in the earlier years we are therefore compelled to make use of the income criterion while acknowledging that this measure is going to be imperfect (and may systematically understate the incidence of poverty for precisely those groups we would expect to be highly represented among the poor). Therefore, while we do present figures on the poverty incidence of groups in earlier survey years, and also repeat the probit analysis on the probability of being among the poor in those years, we will confine our discussion to a few brief remarks and only with respect to current income figures for each year.

In Table 9 we provide figures for the incidence of poverty in terms of the current income criterion for each of the four survey years, and for the same household characteristics that were examined in the previous sections[19]. During no survey year was the poverty incidence of households with regular outside jobs above the village average. Note that in 1974/75 households with outside jobs had only a slightly lower incidence of poverty

[19] Note that for the earlier survey years, it was not possible to ascertain whether a household has a *fit* adult male member or not. We therefore examine the less common characteristic of households without *any* adult male.

than the village average. This echoes the finding in Chapter 2 that income from outside employment in 1974/75 contributed little to total income inequality (i.e. it was distributed rather evenly over the total-income distribution). Consistently high poverty incidence in all four survey years is observed for agricultural labour households, as well as Jatab, Dhimar and Teli households. Thakur and Murao households were consistently less likely than average to be among the poor in all four survey years.

For no household characteristic is there evidence of a clear monotonic trend towards increasing or decreasing poverty incidence. Only for landless agricultural labour households did the incidence of poverty never fall between any two years, and it rose over the whole period from 0.33 in 1957/58 to 0.64 in 1983/84. Two factors which are likely to account for the general absence of a trend are the varying harvest quality in different years and the presence of outside job incomes in the village. The poverty incidence of households with regular jobs was lowest in the two years during which harvests were poor, and therefore cultivating households had depressed incomes. Similarly, households of the actively cultivating Murao caste registered the highest incidence of poverty in those two years. As our poverty criterion consists of being among the bottom two quintiles in the income distribution, it is clear that variations in income components will affect relative total incomes and hence the identity of the poor in any one year.

Our finding in Table 9 of a high incidence of poverty among agricultural labour households (as well as among Jatab households) suggests the possibility that such households are experiencing chronic poverty. This is an important question and one which will be given further attention in Chapter 5.

In Table 10 we present results from probit analyses of the characteristics of the poor for all survey years. The specifications reported here are the same as those presented for 1983/84 only, in order to facilitate comparisons. Without the inclusion of the caste dummies,

only the regular job dummy exercises a signficant influence, and then only for the 1983/84 survey year. When the caste dummies are included, the regular job dummy becomes weakly signficant in 1974/75 and 1957/58 as well. The caste dummies are found to be most influential in affecting the likelihood of being among the poor in the different survey years. Murao households were significantly less likely to be among the poor in all survey years except 1983/84 (probably due to the effect of the bad harvest). Thakur households were also generally less likely to be among the poor, although only significantly so in 1974/75. The probability that Jatab households were among the poor became statistically significant only in the last two survey years. This suggests that over time their vulnerability has increased. The probability of poverty was strongly significant among Dhimar households only in 1983/84, but weakly so in 1957/58 and 1962/63 as well.

3.5. Apparent Prosperity and the Duration of Poverty

Whether the poor in any one year are always the poor is an important question which merits exploration[20] . Our attitudes towards poverty will be affected by the degree to which poverty is a sustained or temporary condition. In the above sections we have pointed to the advantages in using the apparent prosperity measure of poverty, and have noted that the index is available only for 1983/84. We explore in this section some longitudinal considerations which can be addressed while retaining the use of the apparent prosperity measure. A more complete discussion of mobility and the duration of poverty, conducted in terms of current income, will be postponed until Chapter 5.

In this section we examine the movement of households in the

[20]. In a study using panel data for rural South India, Gaiha and Deolalikar (1990) find, among other things, that about one fifth of households were chronically poor in that they were poor in all nine survey years (between 1975/76 and 1983/84). For a discussion at the all-India level, Gaiha (1988) finds that only about half of the poor in 1968 were also poor in 1969 and 1970.

distributions of current income between the last two survey years. In Table 11 we present a transition matrix showing the movements of individual households between the deciles of the income distribution of the 1974/75 and 1983/84 survey years. For instance, household 571900 moved from the poorest decile of the income distribution in 1974/75 to the second decile of the income distribution in 1983/84. Note that household numbers in these tables are not the same as those in earlier sections, as they are constructed to reflect not only caste (first digit) but also household splits and departures from the village. If a household split between 1974/75 and 1983/84 the last digit of the household number will be greater than 0 but less than 9; if the household split between 1962/63 and 1974/75, the second to last digit will be between 0 and 9, etc. If a household was not present in the village for a year, the corresponding entry in the appropriate digit of the last three digits is 9[21].

In Table 11 we indicate which households are among the poor in terms of apparent prosperity in 1983/84 (in bold type). Not all 59 "poor" households are entered in the transition matrix between 1974/75 and 1983/84, because ten of the poor households arrived in Palanpur between these two survey years. Similarly only 126 out of a total of 143 households in 1983/84 are entered in this matrix. Even fewer of the poor in 1983/84 can be traced before 1974/75[22].

In previous sections we discussed several possible reasons for divergence between rankings according to current per capita income in 1983/84, and rankings according to apparent prosperity and these can

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[21]. For example, if the household with the number 704 in 1957/58 split into two households by 1962/64, the two new household's respective numbers would be 7041 and 7042. If these two households did not split further and were present in the village during the following survey years, their numbers in 1974/75 would be 70410 and 70420 respectively, and 704100 and 704200 respectively in 1983/84. If one of them was not present during a particular year then the entry for the corresponding year would have been a 9.

[22] In this chapter make will not attempt to trace the poor in 1983/84 further back to earlier survey years. Mobility over all four survey years is examined systematically in Chapter 5.

explain why some of the poor, in apparent prosperity terms, are quite highly ranked in the 1983/84 per capita income distribution.

Despite evidence of considerable movement in income space it is significant that among the 14 households which belonged to one of the poorest three deciles of the per capita income scale in *both* 1974/75 and 1983/84, all but one were regarded as poor in terms of the apparent prosperity criterion for 1983/84[23]. This lends some support to the claim that the apparent prosperity measure is successful in identifying those households in 1983/84 which are experiencing sustained deprivation.

Of the 49 households which were "poor" by the criterion of apparent prosperity in 1983/84 and which were already present in the village in 1974/75, 29 households were in the poorest 40% of the distribution in 1974/75. It thus appears that, in spite of the high degree of mobility found in the income space, low current income in 1974/75 is quite a good predictor of low apparent prosperity in 1983/84. Recall that 1974/75 was a good year agriculturally, when bad farming practices were less severely penalised, and that tenancy exerted an equalising influence on land cultivated. Those households which were poor in 1974/75 were thus likely to be disadvantaged in some basic sense, in that they did badly at a time when the environment was generally favourable. This suggests that income poverty in a good year may be a useful measure for analysis and for policy.

3.6. Concluding Comments

The analysis of policy towards poverty and the poor involves first asking "who are the poor?". This requires specifying definitions of the poor which can be used in applied analysis, and identifying who are the poor under the different definitions. We may then ask how policy can be designed so that the standard of living of the poor is advanced, together with the cost and efficiency, appropriately defined, of the different

[23]. 21 out of the 24 households among the poorest 40% in income terms in both 1974/75 and 1983/84 were poor in apparent prosperity terms.

possible policies. Indicators that can be used for applied research may not be feasible for policy administration. The emphasis in this chapter has been on the first set of questions although our answers to them for Palanpur do have implications for the second.

We have concentrated in this paper on two indicators of standard of living for the purpose of examining who are the most vulnerable. The first is the apparent prosperity index constructed independently yet with strongly similar results by Jean Drèze and Naresh Sharma. The second is income, both current and 'permanent' where the latter refers to a simple average over four survey years. Although it has not been our concern here to explore in detail the precise meaning and content of the standard of living (see, e.g., Sen, 1987), we have been concerned via the apparent prosperity index with indicators which go beyond income such as wealth (via land, consumer durables, or productive assets), education, health and occupation.

The index of 'apparent prosperity' was constructed only for 1983/84 since it was based on extended and close knowledge which was available for that year. Some aspects of mobility were explored in terms of the other indicators, notably current income, and the relationship between these and the 'apparent prosperity' criterion was explored. Interestingly, the poor in 1983/84, as identified by the 'apparent prosperity' index, coincided much more closely with the poor defined in terms of current income in 1974/75 than those defined in terms of current income in 1983/84. This points to two things, namely the variability of income, and the fact that poverty in terms of current income in a good agricultural year may provide a better indication of sustained poverty than it does in a bad agricultural year. It cannot, of course, be asserted that income in a good year is the appropriate concept. Generally, the changes in the picture resulting from the different measures ('apparent prosperity', current income, and 'permanent' income), together with the volatility of income, confirm the inadequacy of income, in its short-term sense, as a basis for identifying the poor. This conclusion is strengthened if we consider that 'noise' in

an income measure may systematically bias our conclusions regarding the incidence of poverty among different groups.

Other aspects of the standard of living have an association with 'apparent prosperity' but are far from perfectly correlated with it. The changes in both the inequality of land owned and in landlessness have been particularly associated with the splitting of households in advance of the division of land among sons. Hence, if these sons retain entitlement to the use of their fathers' land, a sharp rise in landlessness should not necessarily be associated with a dramatic increase in poverty, notwithstanding the fact that the landless are more likely to be poor than the landed.

Involvement in agricultural labour (around 30% of households) is strongly associated with poverty. Conversely, those households with regular outside employment are unlikely to be poor. The other group with high "poverty risk" is the Jatab caste, which ranks lowest in the caste hierarchy of Palanpur. Whilst education in Palanpur is unevenly distributed and illiteracy is common, it is remains striking that the Jatabs are almost entirely illiterate.

The identification of the poor, and particularly their association with agricultural labour and the Jatab caste, provides pointers for policy. Notice that one cannot change caste, and we argue in Chapter 5 that mobility out of agricultural labour is low. This suggests that those who are included in these two groups are not likely to be poor as a result of transitory, or life-cycle factors. In addition, where one targets a caste with assistance, it would not be easy for ineligible villagers to claim benefits. Jatabs (who make up 13% of the population), over 80% of whom are poor, could provide a well-targeted group.The provision of regular employment, at current wage levels, could provide substantial improvement in the position of poor agricultural labourers. For the usual reasons there would be the administrative advantages of self-targeting. However, whether such options are politically feasible or palatable is clearly an

important issue which is not being addressed here.

Table 1
Classification of Apparent Prosperity By Naresh Sharma and Jean Drèze

Naresh Sharma / Jean Drèze	Very Rich	Rich	Prosperous	Secure	Modest	Poor	Very Poor
Very Rich	101 217 112 221 125 224 208 502 213	410	205				
Rich	201 706	116 118	702 907				
Prosperous		207 211	111 203 222 902 119 204 225 906 121 210 401 127 215 408 202 220 701	212 704 405 708 412 709 603 909	209		
Secure		126	102 310 106 108 109 110 122	104 216 311 105 218 404 107 219 411 124 227 607 129 305 707 214 306 813	123 406 206 503 223 602 308 617 312 715 402 805		
Modest		226	604	103 409 113 601 115 605 117 811 131 903 403	114 304 615 807 120 309 703 809 128 315 712 810 301 407 713 814 302 504 803 815 303 606 806 816	818 819 901 905	705 817
Poor					501 611 612 801 804	710	307 808
Very Poor					609	608 610 802	613 711 714 812

Table 2

Palanpur: Basic Socio-Economic Characteristics (1983/84)

Caste	No. of Households	No. of Individuals	Traditional Occupations	Main Current Occupations	Land Owned Per Capita (bighas)	No. of Households with at Least One Member in Regular Employment
1. Thakur	30	217	Landlords	Cultivation; outside jobs	3.64	13
2. Murao	27	217	Farmers	Cultivation	6.50	6
3. Dhimar	13	74	Water-Carriers	Cultivation; outside jobs	0.68	10
4. Gadaria	12	83	Shepherds	Cultivation; outside jobs	2.72	5
5. Dhobi	4	27	Washermen	Cultivation; agric. labour	0.53	0
6. Teli	16	92	Oil Pressers	Cultivation; agric. labour	1.13	4
7. Passi	14	79	Mat-makers	Outside jobs	1.30	6
8. Jatab	19	118	Leather workers	Cultivation; agric. labour	1.85	1
9. Others	8	53	Miscellaneous	Miscellaneous	0.30	2
VILLAGE	143	960			2.64	47

Note: Except for the 'others' category, this list of castes follows a tentative hierarchical ranking, with Thakur at the top and Jatab at the bottom (for details see Bliss and Stern, 1982).

Dhobi and Teli households are Muslim.

Table 3

Current Income and Apparent Prosperity

1983/84 pc.income / apparent prosperity	poorest	2	3	4	5	6	7	8	9	richest
poorest	608 711 **804** **812** 714 817 613 801	**501** 808 **811** 812 710	307	610	802	609				
2	303 **810** **814**	**809** 818 819	712 **815** 905	713 **806** **807**	901				705	
3	**803**	309 315 **403**	128 409 816	302 811	504 **806** 703	301	615			
4	113 **903**	**805** **817**	117 **308**		407	**115** 131	103 120 **601**	114		304
5	715	**813**	105 **606** **223** **227**	129 **604** **218** **219**	503 **805**	**602**			123	
6					**108** **607** **124** 305	**107**	**216** **311**	104 602 **306** 312	**804**	206 707
7	**122**		**212**	**126**		**110** 909 412 603	**109** **704**	411	**102** **106** 310	**214**
8	**225**			**121** **203**	**215** **222**	127	**202** **210** 906	**204** 209 902	708 709	
9						**207**	119 **205**	226 614	**111** **608** **211** **701** **401**	**220** 907 **405** **702**
richest				**112**		**125** 410	**221**	**101** **213** **502**	**224**	**116** **208** **118** **217** **201** 706

Note: Each column of the table represents one decile of the scale of "current income" and each row represents one decile of the scale of "apparent prosperity", with deciles ranked in increasing order of afluence (i.e. the poorest are in the top left hand corner. Households cultivating at least 10 bighas are shaded. (Note that 1 acre = 6.4 bighas).

Table 4

Current Income and Apparent Prosperity

1983/84 pc.income / apparent prosperity	1	2	3	4	5	6	7	8	9	10
1	608 **711** 804 612 714 817 613 801	501 **808** **611** **812** 710	**307**	610	**802**	**609**				
2	303 810 814	809 818 819	712 815 905	713 806 807	901				**705**	
3	803	309 315 403	128 409 816	302 811	504 606 703	301	615			
4	**113** 903	605 617	117 308		407	115 131	**103** 120 601	114		304
5	715	813	105 406 223 227	129 [404] 218 219	**503** 805	402			123	
6					108 [607] 124 305	107	216 311	**104** 602 306 **312**	**604**	206 **707**
7	122		212	126		110 909 412 603	109 704	411	102 106 310	**214**
8	225			[121] 203	215 222	127	[202] 210 906	204 209 902	708 709	
9						207	119 205	**226** 614	111 408 **211** 701 401	220 907 405 702
10				112		125 **610**	[221]	[101] [213] 502	[224]	[116] 208 118 217 201 706

Note: Each column of the table represents one decile of the scale of "current income" and each row represents one decile of the scale of "apparent prosperity", with deciles ranked in increasing order of afluence (i.e. the poorest are in the top left hand corner.
Households with 3 members or less are in bold type. Households with 12 members or more are in square brackets.

Table 5

Permanent Income and Current Income

1983/84 pc. income \ 1957-84 avg. income	1	2	3	4	5	6	7	8	9	10
1	**303** 817 612 903 801	810 814	608	613 803 804	711 714 715	113			122 225	
2	309 617 **813** **315** 808 501 812	605 809 819	403 611 818			710				
3	307 905	117 816	223 308	227		128	406 815	105 409	212 **712**	
4	806	129 **302** 811	219	218	**121** 807	203 404	112 713 126 610			
5	**607** 805	503 802	**407** 504 703	**305** 901	222 606			**124** 215	108	
6			**301**	**603**	131 609 909	**127** **412**	107 402 **110** 115		410	125 207
7		**311** 601	**615**	**120**	**706**	**906**	216	**103** 205 **109** 221 **119**	**202**	210
8			**312** **411**	**114 614** **306** 602		**902**		502	**101** **209**	104 226 204 213
9					111 604	**310** 705 **708**	**123** **224**	106 401	222	102 **709** **408** **701**
10				**304**	**405**	**220** 702	**118**	**116** 907	**201 706** **206** 214	208 217 707

Note: Each column of the table represents one decile of the scale of "average income" and each row represents one decile of the scale of "curent income", with deciles ranked in order of increasing afluence (i.e. the poorest are in the top left hand corner).
Households with at least one member in a regular outside job are entered in bold type.

TABLE 6

"Poverty Risk" for Different Household Groups

Household Characteristic	Proportion of Households with Stated Characteristic Classified as Poor: Apparent Prosperity	Current Income	'Permanent' Income	Total Number of Households
With Regular Job	0.25	0.15	0.21	48
Landless	0.70	0.44	0.59	27
Landless without Regular Job	0.76	0.53	0.65	17
Agricultural Labour	0.78	0.63	0.68	41
Landless Agricultural Labour	1.00	0.64	0.73	11
Without Fit Adult Male	0.67	0.56	0.61	18
Landless Without Fit Adult Male	0.57	0.43	0.57	7
With Widow	0.45	0.48	0.48	33
Widow Without Fit Adult Male	0.67	0.67	0.56	9
Joint Family	0.19	0.22	0.30	37
Thakur	0.27	0.30	0.20	30
Murao	0.00	0.26	0.11	27
Dhimar	0.62	0.46	0.46	13
Gadaria	0.25	0.33	0.25	12
Dhobi	0.50	0.25	0.75	4
Teli	0.69	0.44	0.63	16
Passi	0.43	0.36	0.43	14
Jatab	0.89	0.89	0.89	19
Other	0.50	0.38	0.50	8
All Households	0.41	0.41	0.41	143

Notes:

1. In brackets are the total number of households in the corresponding year which have the household characteristic indicated in the respective row.

Table 7

Probit Analysis of the Characteristics of the Poor

Household Characteristic	Poverty Criterion: Apparent Prosperity	Current Income	'Permanent' Income
Without Caste Dummies			
Landless	0.94 (0.00)	0.15 (0.61)	0.61 (0.04)
Regular Job	-0.71 (0.00)	-1.17 (0.00)	-0.89 (0.00)
No Fit Adult Male	0.41 (0.21)	0.23 (0.49)	0.31 (0.35)
Constant	-0.24 (0.10)	0.06 (0.69)	-0.11 (0.43)
With Caste Dummies			
Landless	0.64 (0.05)	-0.03 (0.93)	0.30 (0.35)
Regular Job	-0.91 (0.00)	-1.34 (0.00)	-0.97 (0.00)
No Fit Adult Male	0.55 (0.17)	0.35 (0.32)	0.37 (0.31)
Thakur	-0.31 (0.34)	-0.07 (0.85)	-0.76 (0.03)
Murao	-6.94 (0.99)	-0.46 (0.20)	-1.31 (0.00)
Jatab	1.35 (0.00)	1.36 (0.00)	1.11 (0.01)
Dhimar	0.89 (0.05)	1.03 (0.03)	0.40 (0.36)
Constant	-0.09 (0.71)	-0.05 (0.84)	0.14 (0.53)

Note:

1. Probability Values indicating the probability that the estimated coefficient is equal to zero are in brackets.

Table 8

Correlation Analysis of Household Characteristics on Poverty

Poverty Dummy Based on the Apparent Prosperity Criterion

Household Characteristic		Pearson Correlation Coefficient		Mean	Sum
Landless	(D1)	0.29	(0.00)	0.19	27.00
No Fit Adult Male	(D2a)	0.20	(0.02)	0.13	18.00
No Adult Male	(D2b)	0.04	(0.66)	0.04	6.00
No Outside Job	(D3)	0.23	(0.00)	0.66	95.00
Agricultural Labour	(D4)	0.47	(0.00)	0.29	41.00
D1D2A		0.07	(0.38)	0.05	7.00
D1D2B		-0.02	(0.78)	0.02	3.00
D1D3		0.26	(0.00)	0.12	17.00
D1D4		0.34	(0.00)	0.08	11.00
D2AD3		0.13	(0.12)	0.10	15.00
D2AD4		0.25	(0.00)	0.04	6.00
D2BD3		-0.00	(0.95)	0.03	5.00
D2BD4		na	na	0.00	0.00
D3D4		0.47	(0.00)	0.22	32.00
D1D2AD3		-0.00	(0.95)	0.03	5.00
D1D2AD4		0.14	(0.09)	0.01	2.00
D1D2BD3		-0.02	(0.78)	0.02	3.00
D1D2BD4		0.10	(0.23)	0.01	1.00
D1D2AD34		0.14	(0.09)	0.01	2.00
D1D2BD34		0.10	(0.23)	0.01	1.00
D2AD3D4		0.25	(0.00)	0.04	6.00
D2BD3D4		0.10	(0.23)	0.01	1.00
Joint Family		-0.27	(0.00)	0.26	37.00
Widow		0.05	(0.58)	0.23	33.00
Widow No Fit Adult Male		0.13	(0.11)	0.06	9.00
Thakur		-0.15	(0.07)	0.21	30.00
Murao		-0.40	(0.00)	0.19	27.00
Dhimar		0.13	(0.12)	0.09	13.00
Gadaria		-0.10	(0.23)	0.08	12.00
Dhobi		0.03	(0.72)	0.03	4.00
Teli		0.20	(0.02)	0.11	16.00
Passi		0.01	(0.90)	0.10	14.00
Jatab		0.38	(0.00)	0.13	19.00
Other		0.04	(0.61)	0.06	8.00

Note:

1. Probability values indicating the liklihood that the correlation coefficient is equal to zero are given in brackets.

TABLE 9

"Poverty Risk" for Different Household Groups

Household Characteristic	Proportion of Households with Stated Characteristic Among Bottom 40% in Current Income Terms[1] 1957/58	1962/63	1974/75	1983/84
With Regular Job	0.25 (8)	0.00 (9)	0.34 (35)	0.15 (47)
Landless	0.50 (14)	0.25 (12)	0.50 (10)	0.44 (27)
Landless without Regular Job	0.54 (13)	0.30 (10)	0.40 (5)	0.53 (17)
Agricultural Labour	0.54 (26)	0.75 (16)	0.78 (32)	0.63 (41)
Landless Agricultural Labour	0.33 (6)	0.33 (3)	0.60 (5)	0.64 (11)
Without Adult Male	0.67 (3)	0.00 (6)	0.00 (0)	0.60 (5)
Landless Without Adult Male	0.50 (2)	0.00 (4)	0.00 (0)	0.33 (3)
With Widow	0.48 (27)	0.37 (27)	0.38 (21)	0.48 (33)
Widow Without Adult Male	1.00 (1)	0.00 (4)	0.00 (0)	0.75 (4)
Joint Family	0.39 (38)	0.40 (35)	0.41 (44)	0.22 (37)
Thakur	0.29 (17)	0.37 (19)	0.16 (25)	0.30 (30)
Murao	0.14 (21)	0.28 (25)	0.15 (27)	0.26 (27)
Dhimar	0.70 (10)	0.78 (9)	0.75 (8)	0.46 (13)
Gadaria	0.33 (9)	0.33 (9)	0.50 (8)	0.33 (12)
Dhobi	0.00 (2)	0.00 (1)	0.67 (3)	0.25 (4)
Teli	0.63 (8)	0.56 (9)	0.67 (12)	0.44 (16)
Passi	0.45 (11)	0.19 (16)	0.25 (8)	0.36 (14)
Jatab	0.56 (16)	0.54 (13)	0.79 (14)	0.89 (19)
Other	0.50 (6)	0.60 (5)	0.50 (4)	0.38 (8)
All Households	0.40 (100)	0.40 (106)	0.40 (111)	0.41(143)

Notes:

1. In brackets are the total number of households in the corresponding year which have the household characteristic indicated in the respective row.

Table 10

Probit Analysis of the Characteristics of the Poor

Using the Current Income Poverty Criterion

Household Characteristic	1957/58	1962/63	1974/75	1983/84
Without Caste Dummies				
Landless	0.22	0.10	0.34	0.18
	(0.56)	(0.85)	(0.42)	(0.53)
Regular Job	-0.43	-6.78	-0.24	-1.18
	(0.39)	(0.99)	(0.38)	(0.00)
No Adult Male	0.55	-6.83	0.00	0.06
	(0.48)	(0.99)	(n.a)	(0.92)
Constant	-0.27	-0.10	-0.22	0.08
	(0.06)	(0.45)	(0.13)	(0.55)
With Caste Dummies				
Landless	0.05	0.02	0.08	-0.01
	(0.91)	(0.97)	(0.86)	(0.99)
Regular Job	-0.88	-7.04	-0.47	-1.32
	(0.12)	(0.99)	(0.12)	(0.00)
No Adult Male	0.47	-6.91	0.00	0.36
	(0.55)	(0.99)	(n.a)	(0.55)
Thakur	-0.47	-0.38	-1.16	-0.07
	(0.26)	(0.33)	(0.00)	(0.83)
Murao	-0.99	-0.62	-1.20	-0.48
	(0.02)	(0.09)	(0.00)	(0.17)
Jatab	0.23	0.31	0.60	1.35
	(0.57)	(0.51)	(0.19)	(0.00)
Dhimar	0.77	0.72	0.64	0.96
	(0.11)	(0.18)	(0.25)	(0.04)
Constant	-0.08	0.04	0.25	-0.01
	(0.78)	(0.87)	(0.37)	(0.97)

Note:

1. Prob Values indicating the probability that the estimated coefficient is equal to zero are in brackets.

Table 11

Transition Matrix of Per Capita Income Distribution Between 1974/75 and 1983/84

1983/84 1974/75	g=1	g=2	g=3	g=4	g=5	g=6	g=7	g=8	g=9	g=10
g=1		**571900**	**809010**	**810002**	810001	605030	**605020**	572900 210000	605010	403020
g=2	**813001**	**301000** **805002**	809020 **805001**	**816000**	**813002** **701000** 608000		**604000**	218000	401010 307200	
g=3	**306002** **815000**	**606200** **814000** **804000** **807002**	**807001**	**310002** **704100** **106000**	**408000** **910001**		**310001**	910002		**306001**
g=4		**601001**		**803000** 407000 219000 **309000**	110021	307010	206020	307102 603000	601002 403010 110022	
g=5	**108001** 108002 **607020**	**402001**	404000	**109002**	201000	305000 **402002** 116020	**109003**	**109001**		706200 116010 271900
g=6				115020		101000	906001 102000 **111031**	204030	**704200** 303000	220000 906002 105000 703000 111032
g=7	**606100**		**808000** 216000	113020	207000	110010	209000	171900	161000	103000
g=8	**602003** **802001** **802002**	208010 **812000**	206010	214100		208020 **602001**	**602002**	702000 261010	205000	
g=9		901000	221000	**607010**	**401022**	401021 202000	115010 214300		111020 705110	406000 204010
g=10	573900				211000 117000	**104000**	203000 111010	114000 214400 113010		214200 215000 204020

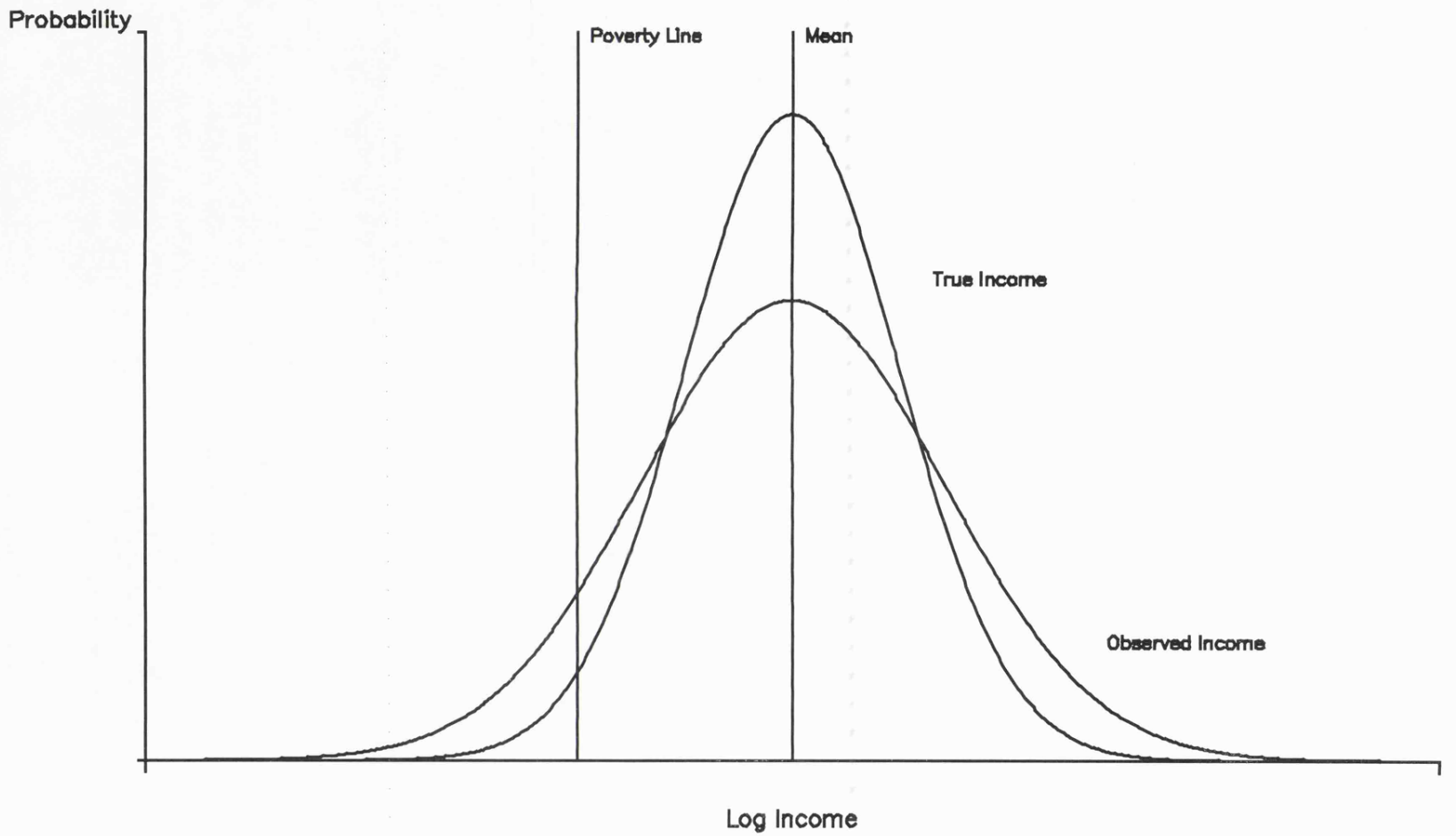
Notes

1. g=1 represents the bottom 10% in income per capita terms. Correspondingly, g=10 represents the top 10%.

2. The 59 households which are poor in 1983/84 (in apparent prosperity terms) are in bold type.

Figure 1

Probability Density Functions



Chapter 4

An Assessment of Living Standard Within the Stochastic Dominance Framework[1]

4.1 Introduction

In this chapter we focus on the measurement of living standards in Palanpur, following an approach which examines poverty, inequality and welfare within a unified framework. In earlier chapters we have discussed some issues associated with the use of income as a measure of living standards. We have suggested that a comprehensive measure of real income could represent the standard of living of an individual, but that income as it is measured from the Palanpur data, does not reflect many components of living standards which might be included in a more comprehensive measure. A more satisfactory indicator would take into account not only earnings but also health, disutility of labour, the consumption of public goods, wealth, life-style, etc. The ranking of households in Palanpur on the basis of apparent prosperity, as was explored in Chapter 3, is an example where we have informally considered several aspects of living standards such as standards of health, income, wealth, life-style, etc., in a simultaneous manner. However, this was possible for one survey year only, and at best could allow an ordinal ranking of the village population into deciles.

We have argued that in a setting such as Palanpur purchasing power, which is represented fairly well in our income measure, is of great importance in determining the standard of living. Many villagers in Palanpur are sharply constrained by cash-shortages in their day-to-day

1 The methodological exposition in this chapter is taken from Howes and Lanjouw (1991a). The methodology is developed further in Howes (1991). For another application of the methods described here, see Howes and Lanjouw (1991b) in which household survey data on urban incomes collected in China are analyzed.

lives and are much concerned with their money incomes. Moreover, the common environment in which the villagers live as well as their common access to public goods, means that differences between individuals in terms of the ability to translate commodity command into welfare may not be as large as in data sets drawn from more widely dispersed or differentiated environments. It is for these reasons that in this chapter we retain the use of income as a useful indicator of living standards in Palanpur.

In the previous two chapters of this thesis we have measured income inequality in Palanpur for different survey years, and have attempted to relate changes in the distribution of income to the evolving village economy and the widening of its links with the outside economy. We have also investigated in some detail the nature and degree of poverty in Palanpur, and have discussed conceptual issues in its measurement. In these chapters we have generally followed the common practice in the literature of treating the measurement of income inequality, poverty, and welfare as separate problems which can be investigated independently.

The measurement of these three aspects of living standards has generated a vast literature and a large number of different measures have been proposed. However, the conclusions which arise from the implementation of any particular measure may carry little weight if we disagree with its embodied assumptions. In addition, the chosen measure for say, poverty, may conflict with that chosen for measuring some other aspect of living standards such as inequality. Only recently has there been a growing recognition in the measurement literature of the many linkages between, for example, inequality, and poverty[2]. This has prompted a number of researchers to adopt approaches to measurement which take explicit account of such linkages (see, for example, Atkinson, 1970, 1987, 1989, Atkinson and Bourgignon, 1987, 1990, Cowell, 1981, Foster and

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[2]. This is not to say that the conceptual linkages between inequality, poverty, welfare and also growth have not been widely recognised and explored. For example, the World Development Report for 1990, published by the World Bank, is devoted to examining the large number of inequality-poverty-growth relationships which can exist in developing countries.

Shorrocks, 1988, Shorrocks, 1983, and Sen, 1976). This chapter draws on an approach originally developed in Atkinson (1970) which makes possible the evaluation of living standards without the need to restrict oneself to specific measures and their embodied assumptions.

The framework adopted in this chapter takes as bench-mark an aggregate "living-standards function" which is assumed to be an additively separable function of the incomes of individuals in Palanpur. Also assumed is that this function is non-decreasing in income and that it is continuous. Within this framework attention can be confined to questions of poverty by paying attention only to those villagers' incomes in the living-standards function which are below some designated upper bound. If our concern is with inequality we examine the incomes of all villagers in this function, but we normalize these by average village income so that our focus is entirely on the dispersion of incomes as opposed to levels. Finally, if our concern is with welfare in the village we focus on the level of all incomes in the village and their dispersion at the same time.

The procedure followed in this chapter is to assess the relative standard of living in Palanpur in different survey years on the basis of how our living-standards function compares between the years. This chapter begins by drawing on the work of Atkinson (1970, 1987) and discussing two possible frameworks within which one can compare the living-standards functions. The first consists of examining for Lorenz dominance and is so-called because it employs the Lorenz curve when comparing distributions of mean-normalized income (for the purpose of evaluating inequality). This approach has been extended by Shorrocks (1983) who introduced the 'generalized' Lorenz curve and showed that it could be used to make welfare comparisons of distributions which have different mean incomes. The Lorenz dominance approach was briefly described and applied to the Palanpur data in Chapter 2, although the discussion of this technique was not detailed.

The second, and closely related, framework within which we can compare

our living standard function is the stochastic dominance framework[3]. This approach (which is also denoted the 'primal' approach, see Atkinson and Bourgignon, 1990) does not involve comparing distributions of income using Lorenz, or 'generalized' Lorenz curves, but rather compares cumulative distribution functions, or alternatively 'deficit' curves (where a 'deficit' curve is the integral of a cumulative distribution function). We argue in this chapter that this second approach is somewhat better suited for our purposes because it more readily permits us to consider poverty as well as inequality and welfare, with only minimal redirection necessary as we turn from one aspect to another.

The two analytical tools described above have been developed to permit comparisons of distributions to be made which command the support of people with differing views and distributional judgements. We describe specific classes of living standard functions and say that one distribution dominates another if it is preferred for all living standard functions belonging to a specific class. These classes of living standard functions can be very wide, such that sharply divergent distributional viewpoints may be represented within a class. Where we find that one distribution dominates another for such a class of living standard functions, we can be confident that our dominance judgement is likely to command widespread support.

A feature of the above framework is that because we seek agreement among possibly divergent viewpoints, we may not always be able to observe a clear dominance relation between two or more distributions. Both approaches may generate only a partial ordering. Moreover, there is no distinction made between a 'strong' or a 'weak' rejection of dominance in such partial orderings. For example, where we compare two cumulative distributions (in the 'primal' approach), dominance of the first distribution over the second would occur if the cumulative distribution of

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[3]. The stochastic dominance approach was initially applied in the literature on risk and uncertainty, see for example Hadar and Russel (1969), and Rothschild and Stiglitz (1970). Atkinson (1970) introduced this approach to the measurement of inequality.

the first was nowhere above the second, and at least somewhere below. If we observed a crossing we would be obliged to reject dominance but would be unable to offer any further judgement between crossings which ocurred at different places. In this chapter a third approach is also considered, that of e-dominance, which explores more closely the relationship between the ranking of distributions and use of specific indices. Here we enquire whether it is possible to improve on our ability to rank distributions when we introduce the more restrictive, but very simple, notion of e-dominance, where e is the inequality aversion parameter of Atkinson (1970). If we restrict our permissible living standard functions to the specific class described in Atkinson (1970) and restrict the range of e which we will accept, then it may be possible to improve on the rankings possible in either of the two approaches discussed above. This third approach can be regarded as intermediate to the very general stochastic or Lorenz dominance approach and the highly specific approach entailed by measuring either poverty, inequality or welfare with any one particular measure.

The outline of this Chapter is as follows. In section 2 we describe the framework of stochastic dominance and Lorenz dominance and we indicate why we follow the former approach in the section 4 of this Chapter. In section 3 we discuss the limitations of the stochastic dominance approach and introduce the e-dominance approach. Following this discussion of methodological issues, the stochastic dominance and e-dominance approaches are applied in section 4 to the Palanpur data for the four survey years. An attempt is made to arrive at some overall evaluation of living standards on this basis. The detailed knowledge of circumstances in the village during the four survey years is invoked to assess the extent to which the stochastic dominance approach allows sensible conclusions to be made. Section 5 concludes.

4.2. Stochastic Dominance and Lorenz Dominance

The framework of stochastic dominance was originally explored in

relation to welfare economics by Atkinson (1970) and we begin by drawing together some results presented by him in his 1970 and 1987 papers. Assume a standard of living function, S, which is additively separable, so that the aggregate standard of living can be written as an integral

$$S = \int_{b}^{Z^{max}} S(Y, Z^{max}) f(Y) dY \qquad (1)$$

defined over the distribution, with density function f(Y), with which one is concerned. The distribution function is assumed to be normalized by population size ($F(Z^{max})=1$, where F(.) is the cumulative distribution) so that S may be seen as per-capita living standard. No other restrictions need be placed on S, other than that it be continuous and non-decreasing in Y. Y is taken to be either income or income divided by the mean. The parameter b is the lower bound of income such that F(b)=0 and Z^{max} is the upper income bound of the segment of the distribution one is interested in.

Our notation allows us to interpret S as a welfare, an inverse-poverty or an inequality measure. If we are looking at welfare, and Y is our income measure, then Z^{max} will be no lower than the maximum income of the distributions being compared (i.e. we are looking at the entire income range). If we are examining poverty, Y is again income but Z^{max} will be typically below the maximum income (although this need not be the case). Z^{max} here is to be thought of as the upper bound on the set of possible poverty lines one is prepared to consider. In other words, we are examining a truncated distribution.

Finally, if we are looking at inequality, Y will be not income, but mean-normalized income. Z^{max} here will refer to the highest income in the population we are considering, normalized by the mean income. While inequality could be studied over a complete or truncated distribution, in practice it is normally used as a tool of analysis for complete distributions, and we follow that convention here.

It is possible to show that all particular forms of S which satisfy our assumptions (additive separability, non-decreasing and continuous), will show an improvement or at least no deterioration in living standards in moving from distribution f^* to f if and only if

$$\Delta F(Z) \leq 0 \text{ for all } Z \in [0, Z^{max}]$$
$$\text{where } \Delta F(Z) = \int_b^z (f(Y) - f^*(Y))\, dY \qquad (2)$$

If this condition holds, then there is said to be first-order stochastic dominance up to Z^{max} (or that $fd_1 f^*(Z^{max})$).

Similarly, if one is prepared to make the additional assumption that $S(Y, Z^{max})$ is (weakly) concave as a function of Y, i.e. that increases in income carry less weight in the living standards evaluation at higher levels of income, then one can use a condition of second-order stochastic dominance, and show that all particular forms of S will show an improvement, or at least no worsening, in moving from distribution $f^*(Y)$ to f(Y) if and only if

$$\Delta G(Z) \leq 0 \text{ for all } Z \in [0, Z^{max}]$$
$$\text{where } \Delta G(Z) = \int_b^z (F(Y) - F^*(Y))\, dY \qquad (3)$$

that is, if $fd_2 f^*(Z^{max})$. Note that first-order implies second-order stochastic dominance but not vice versa.

Whether first-order stochastic dominance holds between two distributions of income can be very easily checked because it involves simply comparing their two cumulative distribution functions. If the first lies nowhere above the other and it lies at least somewhere below the second, then first-order stochastic dominance of the first distribution over the second holds. Checking for second-order stochastic dominance is also straightforward and involves drawing 'deficit' curves by integrating over the cumulative distribution functions for income. A distribution will

second-order stochastic dominate another if over the whole range of incomes in the distribution its deficit curve lies nowhere above the deficit curve of the other, and it lies at least somewhere below. Atkinson (1970), drawing on a result in Rothschild and Stiglitz (1970), shows that if we have two distributions with equal mean income for which $f^*(y)$ could have been reached from $f(y)$ by a sequence of mean-preserving transfers of income from a person with income y_1 to a person with a lower income y_2, then $f(y)$ dominates $f^*(y)$ under the second-order stochastic dominance criterion. In other words the density functions $f(y)$ and $f^*(y)$ would be distributed over the same mean income, but the tails on $f^*(y)$ would be fatter than on $f(y)$. It can be seen that first-order stochastic dominance is a more restrictive requirement than second-order stochastic dominance because any intersection of two cumulative density functions excludes the possibility of the first-order stochastic dominance. However, as long as the area under the intersecting cumulative distribution function F (which is what the deficit curve represents) is always smaller than the area under distribution function F^*, F would still stochastically dominate in a second-order sense. For this to be possible (although it is not sufficient) the dominating cumulative distribution function must cross the other from below if they intersect only once. Where the curves intersect more than once the dominating cumulative distribution function must cross the other from below for the first intersection.

Consistent with our earlier remarks, let us say that, if Y is defined as income, we have **poverty-domination** (for the poverty line Z^{max}) if domination (of whatever order) holds up to $Z^{max} \leq \max(Y^{max}, Y^{*max})$. Note that if we have such poverty-dominance then one distribution will dominate the other not only at Z^{max} but at any poverty line up to and including Z^{max}. **Welfare-domination** is obtained if domination holds up to $Z^{max} \geq \max(Y^{max}, Y^{*max})$. If Y is mean-normalized income we will have **inequality-domination**[4].

[4]. Note, however, that while scale-neutrality is widely regarded as an attractive property in the measurement of inequality, it is not essential that differences in mean incomes be ignored when making inequality comparisons.

These results are important. From each of the perspectives of poverty, inequality and welfare they provide necessary and sufficient conditions for agreement of measures embodying possibly widely divergent assumptions. For a discussion of this in relation to inequality measures see Atkinson (1970). In relation to poverty the conditions of stochastic domination provide conditions for agreement not only over different poverty measures, but they also permit statements to be made about poverty even where there might not be agreement about where to draw a specific poverty line (Atkinson, 1987)[5]. Domination up to Z^{max} is also domination up to any poverty line less than Z^{max}. Of course there is a cost, namely that a stochastic dominance ordering will generally be a partial one. But even so, this approach provides a useful starting point.

Higher orders of stochastic dominance can also be examined but this requires making assumptions on the shape of S beyond the assumption of concavity. It seems unlikely that such restrictions would command widespread support. It is therefore first and especially second-order stochastic dominance which are most widely examined, and which are the focus of this chapter.

It is more common in the literature, however, to find researchers exploit the close relationship between second-order stochastic domination and Lorenz and generalized Lorenz domination, and to work with these more familiar curves. Atkinson (1970) showed how the ordinary **Lorenz** curve could be used to make statements of inequality domination. Shorrocks (1983) has shown how the **generalized Lorenz** (GL) curve can be used to make statements of welfare domination. While not wishing to deny the usefulness and appeal of Lorenz and generalized Lorenz curves, it is argued in Howes

[5]. Note however, that the second-degree dominance condition is not strong enough to ensure the same ranking by the Sen poverty measure or the headcount ratio. This is because neither of these two measures satisfy the Dalton transfer principle which states that a disequalizing transfer from a poor person to someone richer cannot reduce poverty. In the case of the headcount ratio the transfer could raise someone above the poverty line when they had previously been just below. In the Sen index, the weights on individual poverty gaps change with the number of poor people, and again a disequalizing transfer could reduce poverty if the total number of poor are reduced and hence the weights change.

and Lanjouw (1991a) and (Howes, 1991) and also discussed in Atkinson and Bourgignon (1990) that the use of these curves is less natural where we also wish to examine poverty[6].

This point can be demonstrated following the exposition in Atkinson and Bourgignon (1990). As in our discussion above we let F(.) denote the cumulative distribution defined over the finite interval $[b, Z^{max}]$ where Z^{max} is an upper bound for all individual incomes so $F(Z^{max})=1$. Here, we let Y(.) represent the *inverse* of the cumulative distribution, defined on the interval [0,1], where Y(g) indicates the income level at which the gth percentile is attained. We can then define the generalized Lorenz curve by:

$$L(F) = \int_0^F Y(g)\,dg, \tag{4}$$

where F varies between 0 and 1[7]. The generalized Lorenz curve differs from the ordinary Lorenz curve only in that it is not divided by mean income, so that L(1) is equal to mean income in the population, instead of 1 as with the Lorenz curve. The right-hand endpoints of two generalized Lorenz curves will differ if the distributions being compared have different mean incomes.

In the Lorenz dominance approach (which can also be regarded here as

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[6]. Howes (1991) also develops a statistical test for the similarity of deficit curves which permits the assessment of whether claims concerning living standards made about samples can be extrapolated to populations. As the Palanpur data cover the entire village during each survey year, it is not clear that such a test would be meaningful.

[7]. The close relationship between the generalized Lorenz curve and the deficit curve can be seen by recalling that Y(g) is the inverse of the cumulative distribution function and by examining the equation for the deficit curve:

$$G(Y) = \int_b^Y F(Y)\,dY. \tag{1}$$

the "dual", see Atkinson and Bourgignon, 1990) the derived variable is Y(g), the amount of income required for a person to occupy the gth percentile in the distribution of income. This can be compared with the "primal" or stochastic dominance approach, where we start from a particular level of income or less, F(Y). The distinction between these two approaches can be easily recognised where we focus on the measurement of poverty. In the primal approach we simply specify a particular income level as the upper-bound on poverty lines we are prepared to consider, and then we examine whether the cumulative distribution function or the deficit curve (depending on what restrictions we have made on our class of living standards functions) of one distribution lies everywhere below that of another up to the cut-off point which we have designated (Z^{max}).

In the "dual" or Lorenz dominance approach, we have seen that the derived variable for any two distributions we wish to compare is Y(g), the amount of income required to attain the gth percentile. A particular income level (representing our choice of the poverty line) may be associated with different percentiles in the two distributions we wish to compare. Within the generalized Lorenz framework we would not be able to directly infer poverty dominance up to the designated poverty line, but rather we would have to examine whether one generalized Lorenz curve was everywhere above the other up to the *greater* of the percentiles in the two distributions with which the poverty line was associated. If the generalized Lorenz curves intersected at some point below the *lower* percentile, then we would clearly not have dominance. However, if the two generalized Lorenz curves intersected somewhere in between the two percentiles associated with the poverty line, then we are left unclear as to whether we have poverty dominance up to the designated poverty line. In this case, the generalized Lorenz curves cannot provide us with the answer we are seeking (for a more detailed and also formalized treatment of this argument see Howes, 1991).

Since the deficit curve can be simply applied to examine inequality, welfare and poverty, and can be readily generated from the data, the

evaluation of living standards in Palanpur in section 4 follows this approach[8].

4.3. The Limitations of Stochastic Dominance and the Use of E-dominance

In the section above we advocated the use of second-order stochastic dominance rather than generalized Lorenz dominance as a criterion for judgements on living standards. In this section we want to point to some of the weaknesses of the stochastic dominance framework. Note that all these weaknesses will also be shared by a generalized Lorenz framework.

For one distribution to dominate another it is a necessary, but not sufficient, condition that its mean and its minimum income be no lower than those of the other distribution. If we examine two deficit curves at $\max(Y^{max}, Y^{*max})$ the ranking of distributions we obtain will be the same as if we had examined the means of the two distributions (although we must remember that a deficit curve is *ranked* higher than another if it lies *below the other.)* Similarly, our ranking of two deficit curves at $\min(Y^{min}, Y^{*min})$ will be identical to the ranking we obtain if we only look at the two minimum incomes. If this necessary condition is met we will say that **mean-minimum dominance** obtains. This has a very natural interpretation, as focus on the two variables, mean and minimum, spans the range of possible concerns with distribution, namely from zero (in which case only the mean matters) to one approaching infinity (where we focus exclusively on the least advantaged, as in the Rawlsian approach).

While mean dominance is not necessary for third- and further orders of stochastic dominance, minimum dominance is. The sensitivity of stochastic dominance measures to the minimum income may give cause for concern. One must distinguish two problems. The first is one of measurement. It is very hard to ascertain anyone's income, let alone the

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[8]. Atkinson and Bourgignon (1990) also suggest that the 'primal' approach appears to be more direct when one is interested to investigate the treatment of living standards and differences in needs (such as family size).

poorest's. In particular, the reported minimum income will be very sensitive to decisions made concerning cleaning the data. One way to get round the measurement problem may be to widen the income bands for relative frequency groups. For example, one may be prepared to believe that if someone's income is reported as 20 rupees, it is certainly no bigger than 100. However, this could result in the loss of much valuable distributional information.

This problem of measurement is of immediate relevance to the Palanpur data. The income figures calculated, while quite detailed, are not exhaustive nor were they calculated with exactly the same precision for each survey year. There are several components of income which could not be accurately assessed, notably illegal income and income earned from moneylending. In addition, the quality of the data collected in the two earlier survey years is not of the same quality as the data collected in 1974/75 and 1983/84. Both of these factors might make one uncertain as to the reliability of the actual minimum income figure obtained for any one year.

A second problem is conceptual. Do we really want to accommodate the full range of viewpoints, including those of strict 'Rawlsians'? Say that we could measure income perfectly. If one distribution had incomes which were double those of another, except for the minimum income which was ever so slightly less, would we really want to refrain from ordering the former distribution as superior in welfare terms?

Related to this sensitivity to minimum income is the broader problem of what we call 'slight rejection'. The stochastic dominance criteria do not distinguish between a strong and weak rejection of dominance. One distribution may record dominance over one half of the income distribution, and not over the other; another may record dominance over 99%. In both cases the same verdict of dominance-failure will be recorded. But the welfare significance of the former is likely to be much greater than that of the latter, and more robust to small changes in the data.

One way of dealing with the problem of slight rejections is to make more restrictive assumptions on the living-standards function. For example, consider the class of additively separable homothetic functions:

$$S = \frac{1}{1-e}\sum_{i=1}^{H} Y_i^{1-e} \qquad (5)$$

where e is the inequality-aversion parameter introduced by Atkinson (1970). One might be prepared to restrict oneself to this class of functions and to a certain range of values of e[9]. Thus one might specify a maximum value of e, e^{max}, which one is prepared to consider, and look for what we call **e-dominance** over the range 0 to e^{max}.

This very simple procedure has two attractive features. Firstly, e has a very natural interpretation: it increases as we become more sensitive to transfers of income at lower income levels. Secondly, this approach is intermediate to both the very general approach of stochastic dominance and the very specific approach entailed by using any one particular measure. In an examination of inter-provincial variation of welfare in urban China by Howes and Lanjouw (1991b), it was found that switching from second-order stochastic dominance to e-dominance (with an e^{max} equal to 2) more than doubled the number of pairs of provinces that could be ranked, from 39% to 84%.

The notion of e-dominance can be applied to an examination of both inequality and welfare. Where we wish to focus on inequality we simply deal with mean-normalized income rather than by income itself. Extension to the examination of poverty is less straightforward, at least if one wants to consider a range of poverty lines (See Howes, 1991, for further exploration of this point).

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[9]. Howes (1991) also considers the less restrictive General Entropy class of welfare functions in this context.

4.4. Poverty, Inequality and Welfare Dominance in Palanpur

We now turn to an application of the stochastic dominance methodology to income data collected in Palanpur in the four survey years between 1957 and 1984. Where conclusions are drawn regarding poverty, inequality or welfare, it is important to remember that these will be dependent on the extent to which we are satisfied that income represents living standards. In section 1 of this Chapter and in previous chapters of this thesis we have already discussed some of the difficulties involved in the use of our income measure as a proxy for living standards in a village such as Palanpur. Problems may exist with omitted components of a comprehensive "real income" measure, our choice of interval over which income was measured, and the influence of harvest fluctuations in our income measure.

For quick reference, Table 1 provides a broad overview of economic change in Palanpur for the survey years in 1957/58, 1962/63, 1974/75 and 1983/84. The population of the village nearly doubled over the 26 year interval, and village real income also increased significantly. Although real income in either of the earlier two years was at best only about 50% of village income in the later two years (due to the income-enhancing impact of technological change in agriculture and the spread of off-farm employment), income in 1983/84 was less than in 1974/75. This is the consequence of poor harvests for both the rabi and kharif seasons in Palanpur during the later survey year. Per capita real income in the four survey years did not follow a monotonic path either, with the lowest average incomes recorded in the two earliest survey years, and the highest per capita income obtaining in 1974/75.

Figures 1 and 2 provide graphical depictions of the density functions of incomes in the four survey years, following smoothing using a kernel smoothing technique[10]. Two units of analysis are used in these density

[10]. The kernel smoothing technique used here is the Epanechnikov kernel utilized also by Deaton (1989) in his non-parametric analysis of rice prices and income distribution in Thailand. I am grateful to Angus Deaton for his program and advice on these calculations.

functions. In Figure 1 we consider household per capita income, while in Figure 2 the unit of analysis is individual per capita income obtained by allocating to each individual in a household his household per capita income. Although an implicit assumption that income is distributed equally between all household members is made regardless of which of the two income units we use, and this could lessen the appeal of either, the second is considered to be preferable in the evaluation of living standards in Palanpur because it reflects household size not only when establishing household per capita income, but in the weighting of these per capita incomes in the distribution of income[11]. We can see from a comparison of Figures 1 and 2 that the shapes of the distributions can differ significantly when different units are utilized.

In Figure 2 we see that the density functions for the four years are not spread around the same average income, and also that they are very different in shape. All display some skewness to the right. The density function for 1974/75 seems closest to being symmetric while the density function for 1983/84 is not unimodal and has fatter tails than the 1974/75 distribution at both extremes of the income range.

4.4.1 Stochastic Dominance and Poverty

The traditional approach to measuring poverty in a village such as Palanpur would entail specifying a poverty line below which people would be considered poor. For India as a whole, Dandekar and Rath (1971) have proposed a poverty line based on nutritional requirements of Rs 15 per person, per month (at 1960/61 prices). Taking relative prices between Uttar Pradesh and India as a whole in 1963/64 (see the contribution of Bhattacharya and Chatterjee, in Bardhan and Srinivasan, 1974) a poverty line of Rs 11.3 obtains for Uttar Pradesh, in 1960/61 prices. In annual terms this corresponds to Rs 136 per person. It is clear that in arriving

[11]. We have already discussed in an earlier chapter that when drawing Lorenz curves, failure to use individual per capita income instead of household per capita income can lead to some conceptual problems.

at a poverty line such as this, numerous assumptions have been made, explicitly or implicitly. One of the attractions of the stochastic dominance approach is that one is not obliged to commit oneself to a particular poverty line, and in fact, where rankings are possible they will occur over all poverty lines up to a specified upper limit. Although it is of interest to measure poverty up to this 'official' poverty line for benchmark purposes, we will also consider poverty over all poverty lines up to 1.5 times and two times the official poverty line.

Turning first to an examination for first-order stochastic dominance we present in Figure 3 cumulative density functions for real individual incomes in the four survey years with reference lines representing the 'official' poverty line of Rs 136 as well as another representing Rs 204, or 1.5 times the official poverty line. A third reference line is drawn where the cumulative density functions are truncated at Rs 272, or two times the official poverty line. From the figure it is clear that the cumulative density function for 1974/75 lies nowhere above the functions for the three other years, and as a result we can state that poverty, measured by a wide range of poverty measures including the head-count ratio, is lowest in that year. On the basis of the 'official' poverty line, and reading off from Figure 3, just over 10% of the population of Palanpur was poor in 1974/75, about 35% of the population was poor in 1983/84 and around 50% of the population was poor in the earlier two survey years. Even at 1.5 times the official poverty line, poverty in 1974/75 was below 30%, while for the other three survey years it ranged between 55% and 75%.

Measuring poverty using the headcount ratio as in Figure 3, although widely practised, has been criticized by numerous commentators (see for example Sen, 1976, and Atkinson, 1987). The headcount measure ignores the distance of a particular individual from the poverty line and in this way neglects important issues associated with degree of destitution. Similarly, a disequalizing transfer from one individual below the poverty line to a somewhat richer individual also below the poverty line could lead

to a reduction in the headcount measure of poverty, because the transfer recipient might cross the poverty line as a result of the transfer.

If we are prepared to consider a class of poverty measures which does not include the headcount ratio, but which does include the poverty gap and related measures, we can make use of the second-order stochastic dominance result described in section 2 of this chapter[12]. This result states that a distribution will dominate a second distribution if the deficit curve (the integral of the cumulative distribution function) for the first lies everywhere on or below the deficit curve for the second distribution, up to the upper bound of income (Z^{max}) which we will accept as poverty line. Figure 4 presents such deficit curves drawn for the four survey years up to two times the income level of the official poverty line. From this figure we can see that the deficit curve for 1974/75 lies nowhere above the deficit curves of the other survey years. We could have already concluded this point from figure 3, as the cumulative density function for 1974/75 was also below that of all other survey years. As first order stochastic dominance is a sufficient condition for second order stochastic dominance, we know that the deficit curve for 1974/75 will lie below the other curves as well.

From Table 1 we can see that the minimum income recorded in 1983/84 is lower than for all other survey years. This means that 1983/84 cannot dominate, neither first order nor second order, any of the other distributions. Although the deficit curve for 1983/84 appears to lie well below the 1957/58 and 1962/63 curves, in fact at very low incomes the 1983/84 curve lies slightly above the other two curves and therefore we cannot conclude that all poverty measures in the class we are considering will rank poverty as lower in 1983/84 than in the two earlier survey years. In Figure 4a when we focus more closely on the lowest income levels we can see that the deficit curve for 1983/84 incomes starts above the curves for the other years. It intersects with the deficit curve for 1962/63 at about

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[12]. Recall that this class also does not include the Sen poverty index.

Rs 26, and then intersects with the curve for 1957/58 at about Rs 65. At least one of the measures in the class will consider poverty in 1983/84 to be greater than the two earlier surveys. This point emphasizes the observation that the stochastic dominance approach does not always give a full ranking. We can clearly rank 1974/75 above the other survey years, but are unable to do the same with 1983/84.

Comparing the 1957/58 and 1962/63 deficit curves, we know that the latter survey year cannot dominate the former because the lowest income in 1962/63 was Rs 10.3 while in 1957/58 it was Rs 21.5. Close scrutiny of the curves in Figure 4a reveals that the deficit curve for 1962/63 starts rising steeply at about Rs 15 with the deficit curve for 1957/58 beginning to rise more steeply at around Rs 25. Because the deficit curve for 1962/63 lies on or above the curve for 1957/58 over the whole range of incomes up to and including two times the official poverty line (Figure 4), the earlier survey year poverty dominates the latter[13].

4.4.2. Stochastic Dominance and Inequality

Without the need to substantially redirect our attention, the approach we are taking next allows us to evaluate the distribution of income in the four survey years. When we wish to consider this aspect of living standards we can utilize the results of stochastic dominance by considering deficit curves over the whole range of incomes. Because we are specifically concentrating on income inequality, we normalize all incomes by their respective means.

The focus on mean-normalized income allows us to rank one distribution as being more equally distributed (over a wide range of inequality measures) if its deficit curve lies nowhere above the deficit curves of the distributions with which it is being compared, i.e. if the first distribution second-order dominates all other distributions. In the focus

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[13]. Recall that *poverty-dominance* here refers to the situation where the dominating distribution has *lower* poverty than the other.

on inequality we do not work with first-order stochastic dominance because we need to invoke the assumption of (weak) concavity in our class of living standards functions in order to be able to compare distributions which have the same mean. When we examine for first-order stochastic dominance, the only three restrictions on our standard of living function which we allow are additive separability, continuity, and non-decreasing in income. On the basis of these assumptions we are unable to rank distributions which have the same mean but which have diverging distributions.

In Figures 5-8 the results of comparing deficit curves are presented in the form of differences between the deficit curve for a benchmark year against those for the other years. This approach was taken because comparing actual deficit curves for mean-normalized incomes is visually difficult due to the range of normalized income and the magnitude of the differences between the deficit curves. The deficit curves would appear to lie on top of each other. In Figure 5 we compare differences between the deficit curve for 1983/84 and those for the other survey years. If the difference is always positive, then the 1983/84 year is being dominated. Equally if the difference between two deficit curves is always negative, then 1983/84 dominates the distribution with which it is being compared. We can see in Figure 5 that the difference curve comparing 1983/84 and 1974/75 lies clearly above the 0 reference line over the lower range of normalized income. Beyond a mean normalized income of around 1.5 however, the 1983/84 deficit curve lies below the 1974/75 curve, and consequently the difference curve becomes negative. This implies that incomes in 1983/84 would be considered more *equally* distributed than incomes in 1974/75 by measures very sensitive to transfers among the rich, and therefore the 1983/84 survey year is not dominated by 1974/75.

The difference curves for 1962/63 and 1957/58 lie largely below the 0 reference line, but do lie above 0 over a small part of the normalized income range. (Although the 1962/63 difference curve does not perceptibly lie above the zero reference line, we know it has a higher minimum income and therefore *must* cross the reference line from above at least once) We

are therefore unable to rank 1983/84 higher than those two survey years, and can state that there will be at least one summary measure of income inequality which would consider incomes in 1983/84 as distributed more unequally than the earlier survey years. Because the difference curves for the two earlier survey years lie above the 0 reference line at low values of the normalized income range, we can see that inequality measures which are very sensitive to transfers among the poor would be likely to rank 1983/84 below the first two survey years.

In Figure 6 we take 1974/75 as the benchmark year, and see that income inequality in this year was clearly lower than the 1962/63 survey year, but not lower than the 1983/84 and 1957/58 survey years. The 1957/58 difference curve lies just marginally above the zero reference line beyond a mean normalized income level of about 3. For these latter two survey years, there would be some inequality measure (very sensitive to transfers among the rich) which would consider incomes to be distributed more *equally* than in 1974/75. In Figure 7 we compare 1962/63 with the other survey years, and here it is clear that 1962/63 is dominated by nearly all other years. We know (from a comparison of minimum incomes) that a very small part of the curve representing the difference between the 1962/63 and 1983/84 deficit curves must lie below the zero reference line, so we are unable to rank 1983/84 above 1962/63. Finally, in Figure 8 we see that 1957/58 inequality dominates 1962/63, but cannot be ranked against 1974/75 and 1983/84.

4.4.3. Stochastic Dominance and Welfare

An evaluation of welfare using the dominance approach involves the assessment of income inequality while taking into account average incomes as well. If we are only prepared to assume that the welfare function is separable, continuous and increasing in incomes, then the first-order stochastic dominance result states that one distribution will be preferred over another if the cumulative density function of the first distribution lies nowhere above that of the second. If we are prepared to accept a

further restriction on the welfare function, namely that welfare increases at a decreasing rate as incomes rise, then we can make use of the second order stochastic dominance result which compared deficit curves instead of cumulative density functions.

In Figure 9 we present cumulative density curves for incomes in the four survey years. This figure is essentially the same as Figure 3 except that for the purpose of welfare evaluations we now consider the curves over the entire income range. In Figure 9 we can see that the cumulative density curve for 1974/75 lies everywhere below the curves for the other years. This means that we can rank 1974/75 as higher in terms of welfare over the other years, even if we are only prepared to make very unrestrictive assumptions on the form of welfare function to be used (although the assumption of separability is not without its critics, see for example, Sen, 1979). Because first order dominance is a sufficient condition for second-order dominance, 1974/75 will continue to dominate if we make further restrictions on the welfare function.

The cumulative density functions for the other three survey years intersect at several points, and we are therefore unable to extend our ordering any further, unless we are prepared to make the additional assumption of welfare increasing at a decreasing rate with income. In Figure 10a, when we examine deficit curves for the four survey years over the entire income range we are considering, it is difficult to ascertain whether any of the curves are intersecting. We saw in Figure 4a that the deficit curve for 1983/84 lies above those for all other years at very low levels of income, and intersects with the curves for 1962/63 and 1957/58 at slightly higher levels of income. This is because it has the lowest minimum income recorded for all four years. This means that incomes in 1983/84 cannot welfare dominate those of any other survey years. Similarly, we saw in Figure 4a that the deficit curve for 1962/63 rose sooner than that for 1957/58, and was therefore dominated by the earlier survey year at low income levels. We know however, that average income in 1962/63 was marginally higher than in 1957/58, so these two deficit curves

have to intersect at some point, making welfare dominance impossible. As the two deficit curves lie virtually on top of each other at the scale we are drawing when looking at the entire income range, it is preferable to focus on the upper income range in Figure 10b to examine where intersection actually occurs. In Figure 10b we plot the difference between the 1957/58 and 1962/63 deficit curves over the income range between Rs 1050 and 1150. Here we can see that the dominance of the first survey year over the second is overturned at an income level of about Rs 1090. Because of this intersection, we are unable to state that the 1957/58 income distribution welfare dominates that of 1962/63.

It is interesting to note that we have encountered two different cases of a distribution being unable to dominate others because of our insistence that orderings should find agreement even among observers with extremely divergent attitudes towards welfare measurement. In the case of the 1983/84 income distribution, we are unable to rank this year higher than the 1957/58 and 1962/63 survey years because we want 'Rawlsians', whose concern is with the least advantaged in the distribution of income, to agree with our orderings. In the case of the 1957/58 survey year, we find that although incomes in this year are significantly more equally distributed than in 1962/63, we are unable to rank this year higher in welfare terms, because those who hold the opinion that only average income is relevant to welfare comparisons would not be in agreement with this.

Both types of judgements that we are catering for above are somewhat extreme. It is therefore of interest to investigate how we can increase the number of rankings we achieve, if we restrict the range of judgements we are prepared to countenance.

4.4.4. E-Dominance and Welfare

In section 3 above, we introduced the alternative option of evaluating welfare in different years by adopting the approach of restricting the range of the inequality aversion parameter. In the dominance framework

considered so far, the inequality aversion parameter was implicitly allowed to range from zero to infinity. A parameter of zero represents a total indifference to the distribution of income when assessing welfare; only average income is important. A parameter approaching infinity corresponds to concern only for the level of income of the poorest individual in the income distribution[14]. In this section the approach taken is to restrict the range of the inequality aversion parameter from zero to 3. It should be noted that a value of three for the inequality aversion parameter would still be regarded by most observers as a great concern for the lower end of the income distribution. It is most unlikely that in practice making this restriction would be found to be controversial.

In Table 2 we present calculations of per capita welfare in the four survey years at 20 values of e (the inequality aversion parameter) ranging between 0 and 3. If the level of welfare in one year is consistently higher at all values of e, then the distribution of income in that year is said to **e-dominate** the other distributions. We can see in Table 2 that on this basis 1974/75 clearly dominates all other years (once again, first-order stochastic dominance is sufficient for e-dominance, as is second-order stochastic dominance). However, unlike in the previous exercises, we find that now 1983/84 also dominates the two earlier surveys. This is because restricting e to no greater than 3 means that we are able to rank one distribution over another despite it having a lower minimum income. With a range of e from zero to 3 we are still unable to order the first two survey years in terms of welfare.

If we look at the levels of welfare actually recorded at different levels of e for the 1957/58 and 1962/63 survey years we see that with an e value of zero, welfare in 1962/63 is higher than in 1957/58. This is because average income in 1962/63 is (slightly) higher than in 1957/58.

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[14]. The increase in welfare associated with an increase in the income of the ith individual in this function $dW/dY_i = Y^{-e}$. The rate at which this changes as income increases further is $(dW/dY_i)/dY_i = -\varepsilon Y^{-(e+1)}$. It can be seen that if e=0, this second derivative is zero, and for all e>0 it is declining at an increasing rate with e. Hence the greater is e the more transfers from the rich to the poor will increase welfare.

However, with an e of 0.15 welfare in 1957/58 is greater than in 1962/63, and at all other levels of e, this relationship continues to hold. This means that if we were prepared to restrict our values of e from below, as well as from above, we could obtain a ranking of the two earlier survey years as well. The extent to which we have to make a restriction (setting e to no less than 0.15) would probably be very uncontroversial to most observers.

The e-dominance approach has permitted significant headway to be made in the ordering of the four survey years in terms of welfare. Whereas the stochastic dominance approach allowed us to rank 1974/75 as unambiguously higher in terms of welfare than the other years, we were unable to extend our ordering beyond that. Implementing the e-dominance approach we made two restrictions on the range of the inequality aversion parameter in our welfare function. This allowed us to complete the ranking of the four survey years such that 1983/84 emerged as the year ranked below 1974/75, followed by 1957/58 and finally by 1962/63. The approach has the clear attraction of requiring us to explicitly state what kind of assumptions we are prepared to make, and what distributional judgements we are prepared to permit.

4.5. Concluding Comments

This chapter was written with two objectives in mind. The first is an exposition of a specific methodology which permits the analysis of poverty, inequality and welfare within a unified framework. It has the additional advantage of not being prey to criticisms that conclusions are based on specific implicit assumptions or judgements. To recapitulate briefly, we began this paper with a simple presentation of the stochastic dominance results and pointed to the advantage of second-order stochastic domination over generalized Lorenz domination in providing a unified framework for the study of welfare, poverty and inequality. We then turned to some of the weaknesses implicit in the second-order stochastic dominance framework (and *a fortiori* in the generalized Lorenz framework)

and in particular focused on the problem of 'slight rejection', of which the sensitivity of stochastic dominance results to the minimum incomes being compared is a particularly acute example. To obtain more, and more robust, orderings, we introduced the idea of e-domination, in which one uses as a framework a separable, homothetic welfare function, with a restricted range of inequality aversion parameters.

The second objective was to apply this methodology to the Palanpur data; to demonstrate not only the practical simplicity of this approach but also to organize our findings on poverty, inequality and welfare over the four survey years. Given the important caveat that we are prepared to accept the use of income as our sole proxy for living standards, several conclusions can be drawn. Poverty in Palanpur was unambiguously lowest during the 1974/75 survey year. This is true not only over almost all poverty measures available (including the headcount ratio) but over all poverty lines that one could specify. Similarly poverty in 1957/58 was unambiguously lower than in 1962/63 for all poverty lines up to two times the official poverty line. Dominance of 1957/58 over 1983/84 was not observed, however. Nor was it possible to poverty rank 1983/84 and 1962/63. There will be poverty measures, and poverty lines that will lead to different conclusions whenever we compare poverty in these paired survey years. The observation that our poverty ordering over the four years is only partial is not without interest. It cautions us against accepting rankings based on a specific poverty measure or poverty line, because such rankings might easily be overturned if we were to choose an alternative poverty measure or select a different poverty line.

Income is unambiguously more equally distributed in 1974/75 and in 1957/58 than in 1962/63. A wide class of inequality measures, including the Gini coefficient, would be in agreement with this conclusion. However, we would not be able to command such agreement everywhere when comparing other survey years. Incomes in the 1983/84 survey year would be considered more unequally distributed than the two earlier survey years by inequality measures which put much weight on the distribution of incomes

among the very poor, but more equal among other inequality measures. Inequality measures which were extremely sensitive to transfers among the rich would find incomes in both 1983/84 and 1957/58 to be more equally distributed than in 1974/75 while other measures would conclude the reverse.

Welfare evaluations which consider not only the distribution but also average incomes, were also unable to achieve a full ordering. While 1974/75 emerges as clearly dominating the other three survey years, the 1983/84 survey year cannot dominate the earlier survey years because the lowest minimum income was recorded in that year. Because average income was marginally lower in 1957/58 than in 1962/63, the dominance of the former over the latter, observed when considering poverty and inequality, was no longer present when considering welfare.

We next attempted to ascertain to what extent our inability to rank distributions was based on 'slight rejections', i.e. whether we were unable to achieve a ranking because of the insistence, within the stochastic dominance framework, that observers holding highly divergent judgements should be able to agree to any ranking obtained. We examined the consequences in terms of rankings when we restricted the range of judgements we would permit. When we restricted the range of the inequality aversion parameter from 0.15 to 3, instead of from zero to infinity, we found that a full welfare ranking of the survey years was possible. This ranking had 1974/75 at the top, followed by 1983/84, then 1957/58 and finally 1962/63.

If we split the four years into two pairs, with the earlier two distinguished from the later two by the introduction of new agricultural technologies in the mid-1960s, and the expansion of outside employment opportunities in the early 1970s, then there is some evidence to support the assertion that living standards have risen over the 26 year period. This is particularly true when we consider the income distribution as a whole. When we focus more specifically on poverty or inequality, it is

more difficult to convincingly argue that villagers were better off in 1983/84 than in earlier years.

Table 1

Broad Indicators of Economic Change in Palanpur

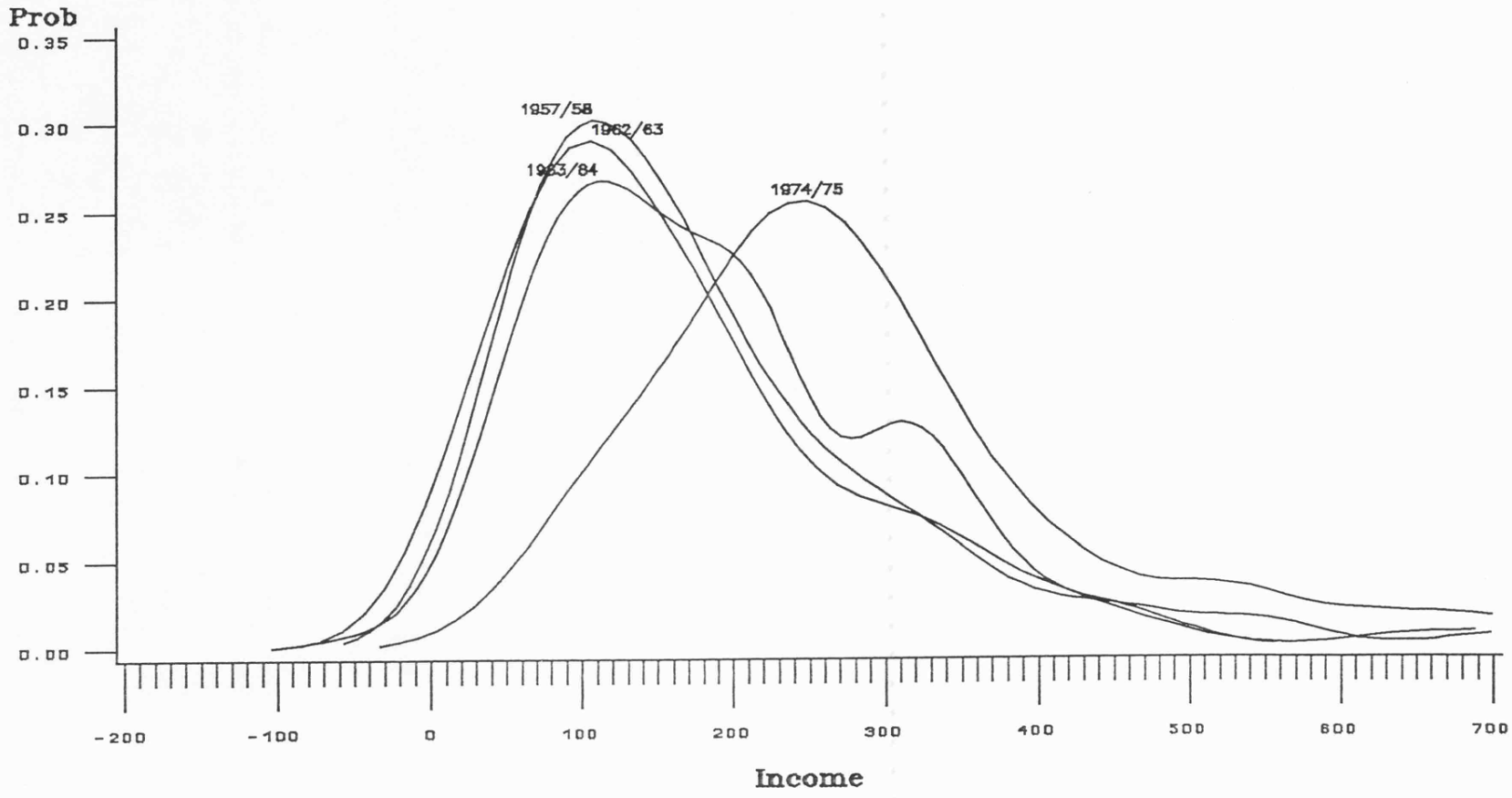
	1957/58	1962/63	1974/75	1983/84
Population	528	585	757	960
Number of Households	100	106	112	143
Village Real Income (Rs)	85,176	94,732	208,001	186,402
Real Income Per Capita (Rs)	161.3	161.9	274.8	194.2
Minimum Income Per Capita (Rs)	21.5	10.3	54.5	-41.0
Maximum Income Per Capita (Rs)	713.1	1188.6	1085.9	494.1
Gini Coefficient for Income	0.336	0.390	0.253	0.307
Price Index (1960/61=1.00)	1.07	0.92	3.78	5.28
Agricultural Wages (1960/61=100)	123	100	123	158
Food Purchasing Power (kg wheat/day)	2.5	2.3	3.1	5.0
Index of Off-farm real wages	n.a	100	122	193
Wheat yields, actual kg per bigha	40	40	114	97
Wheat yields, normal kg per bigha	40/50	50	100	150/160

Notes

1. n.a = not available
2. The price index is the consumer price index for agricultural labourers (CPIAL), which is taken from the *Bulletin of Food Statistics* for the relevant years. See Lal (1976) for the price index for 1957/58.
3. One acre = 6.4 bighas
4 Normal wheat yields correspond to the expected yield for Palanpur ex-ante to the respective year's harvest.

Figure 1

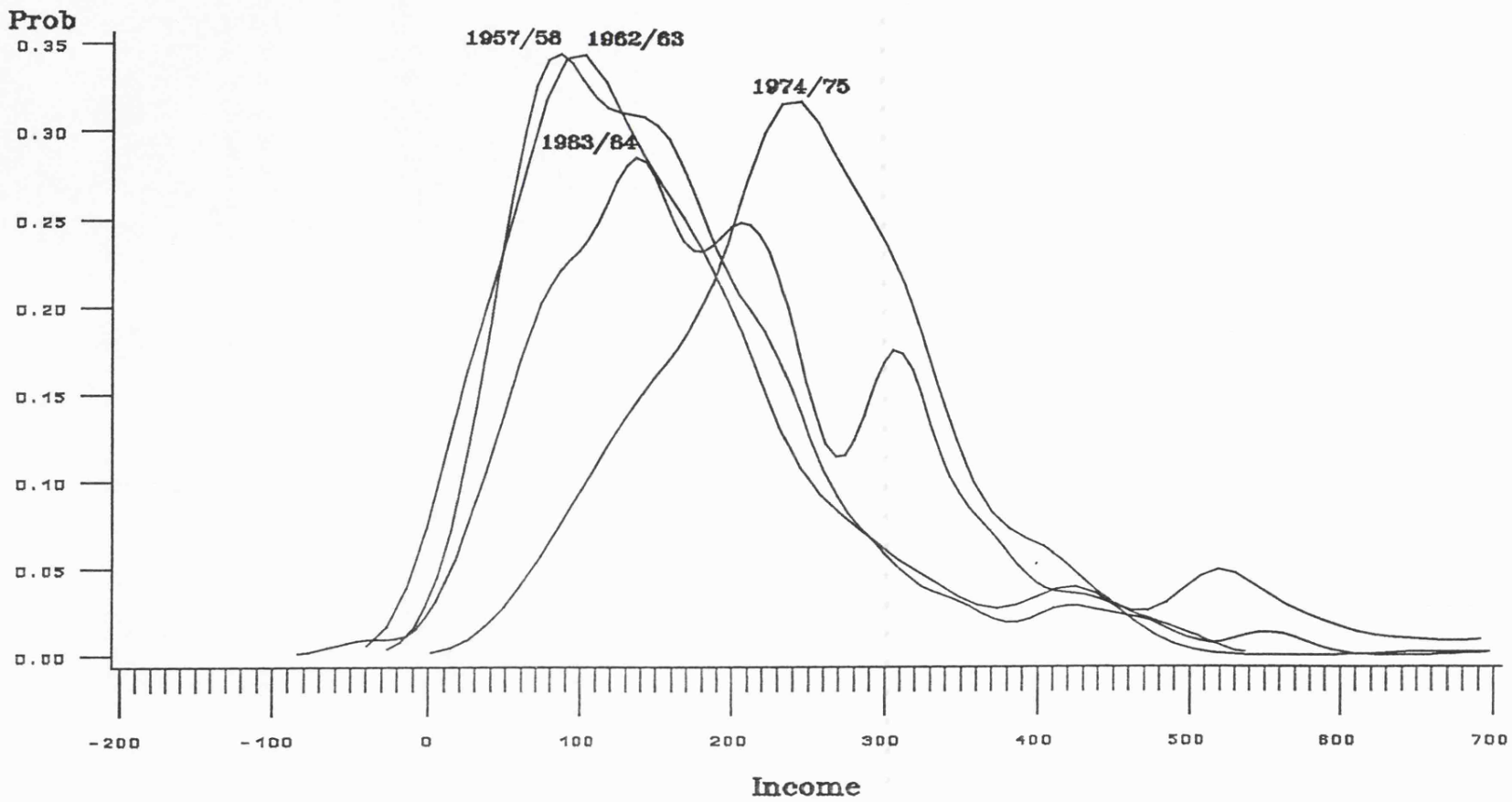
Probability Density Functions



household per capita incomes (1960 Rupees)

Figure 2

Probability Density Functions



real individual incomes (1960 Rupees)

Figure 3
Cumulative Density Functions for Incomes Below Zmax

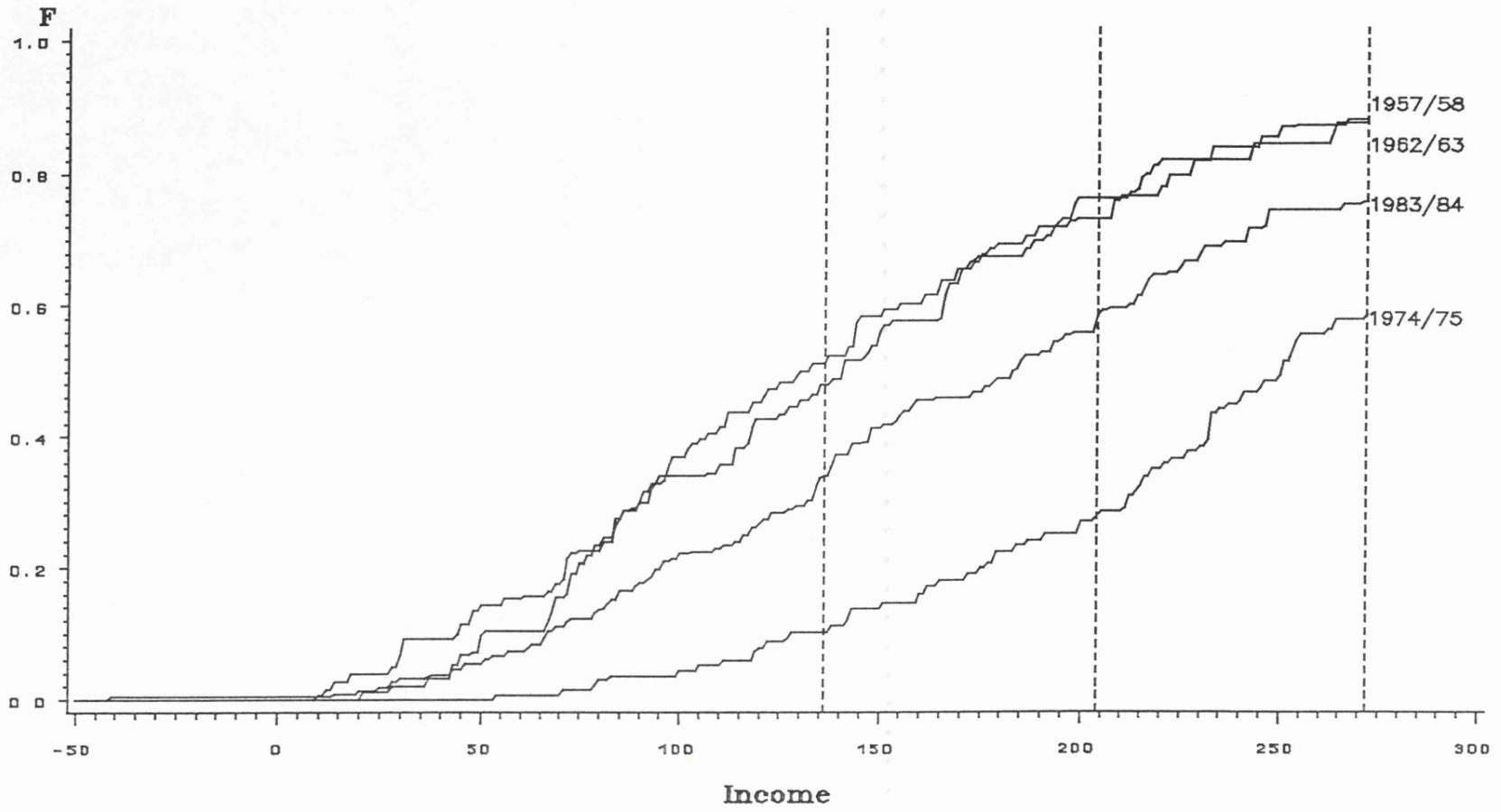


Figure 4
Poverty–Defecit Curves for Incomes Below Zmax

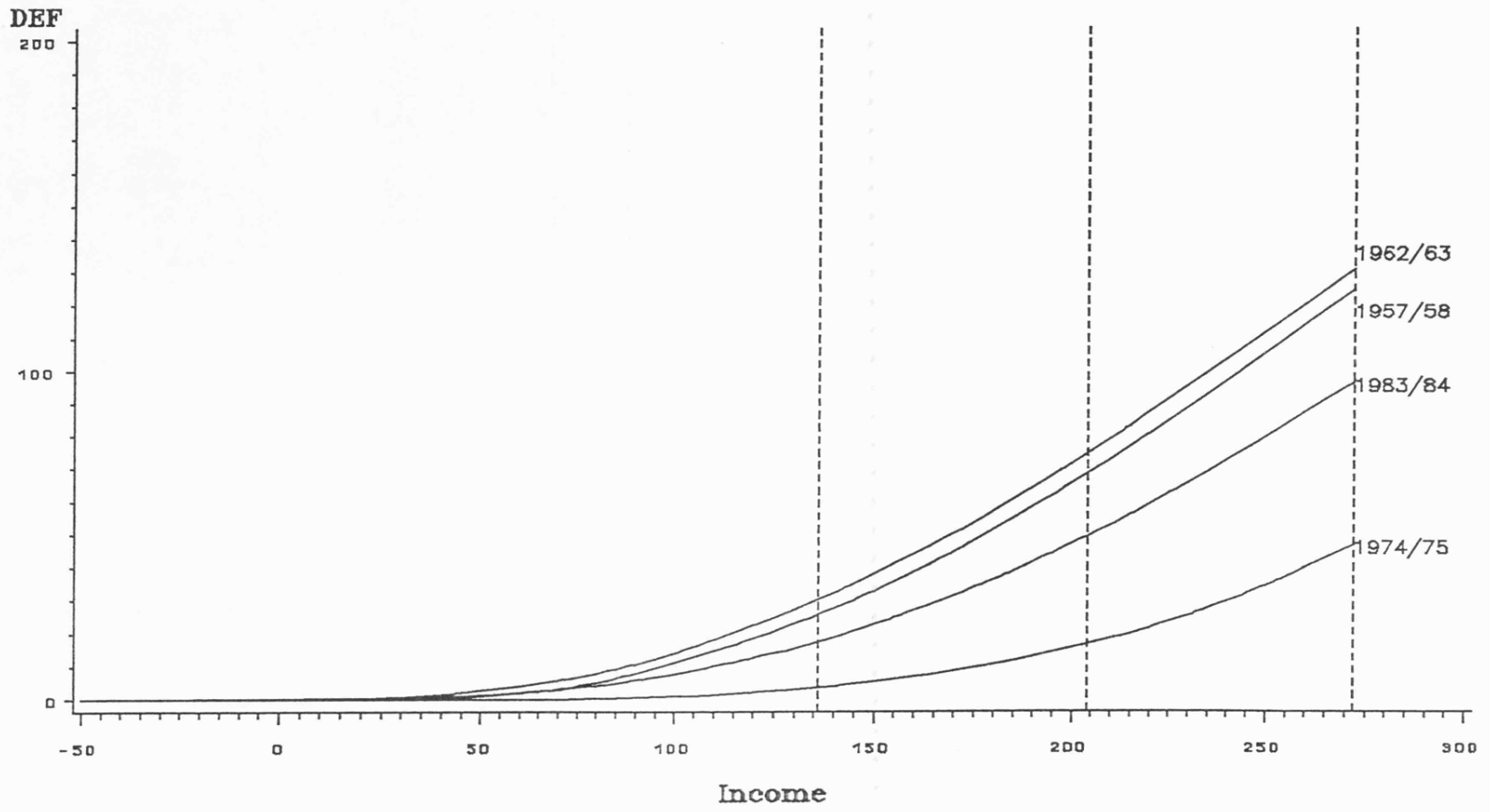
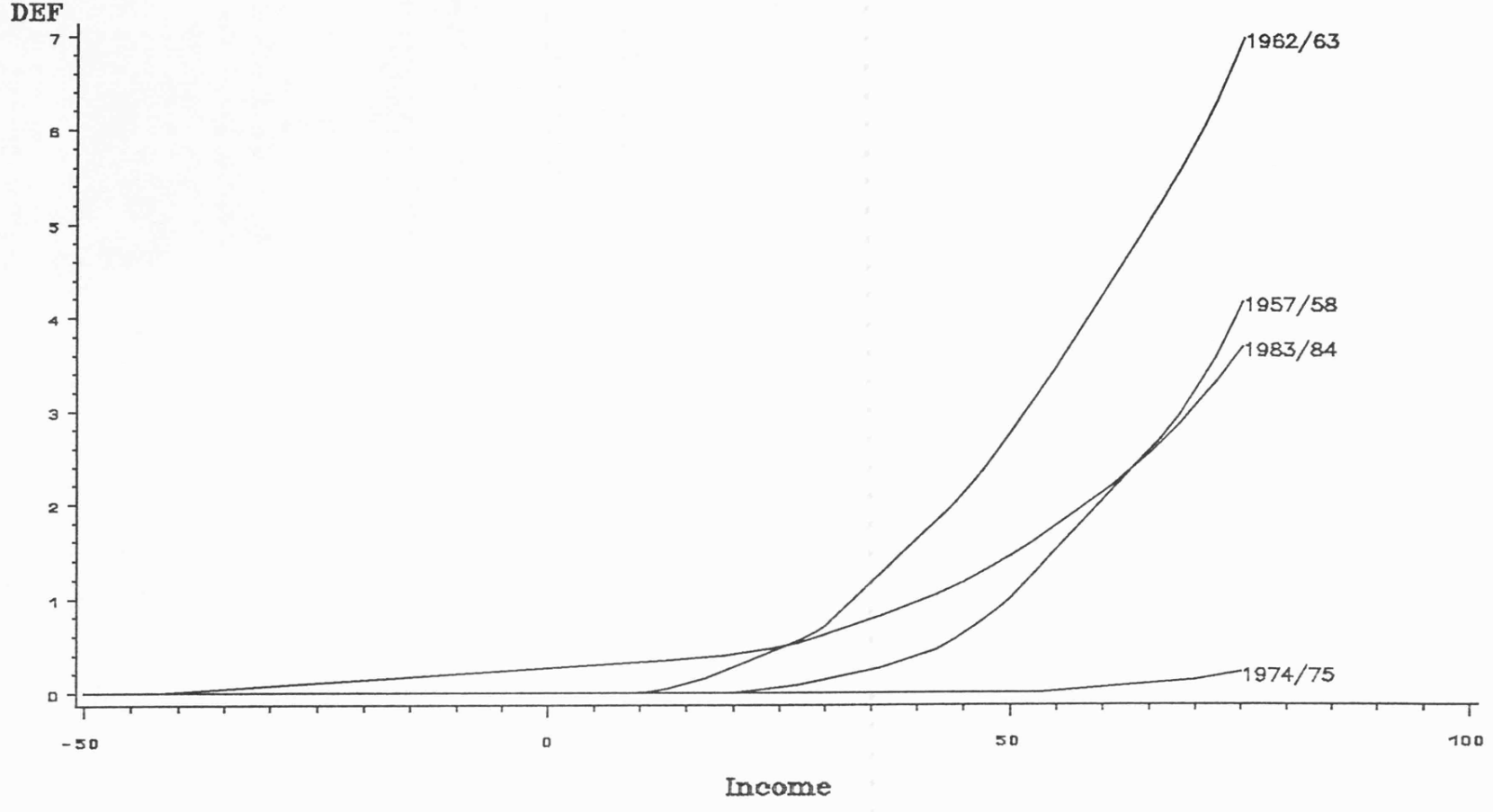
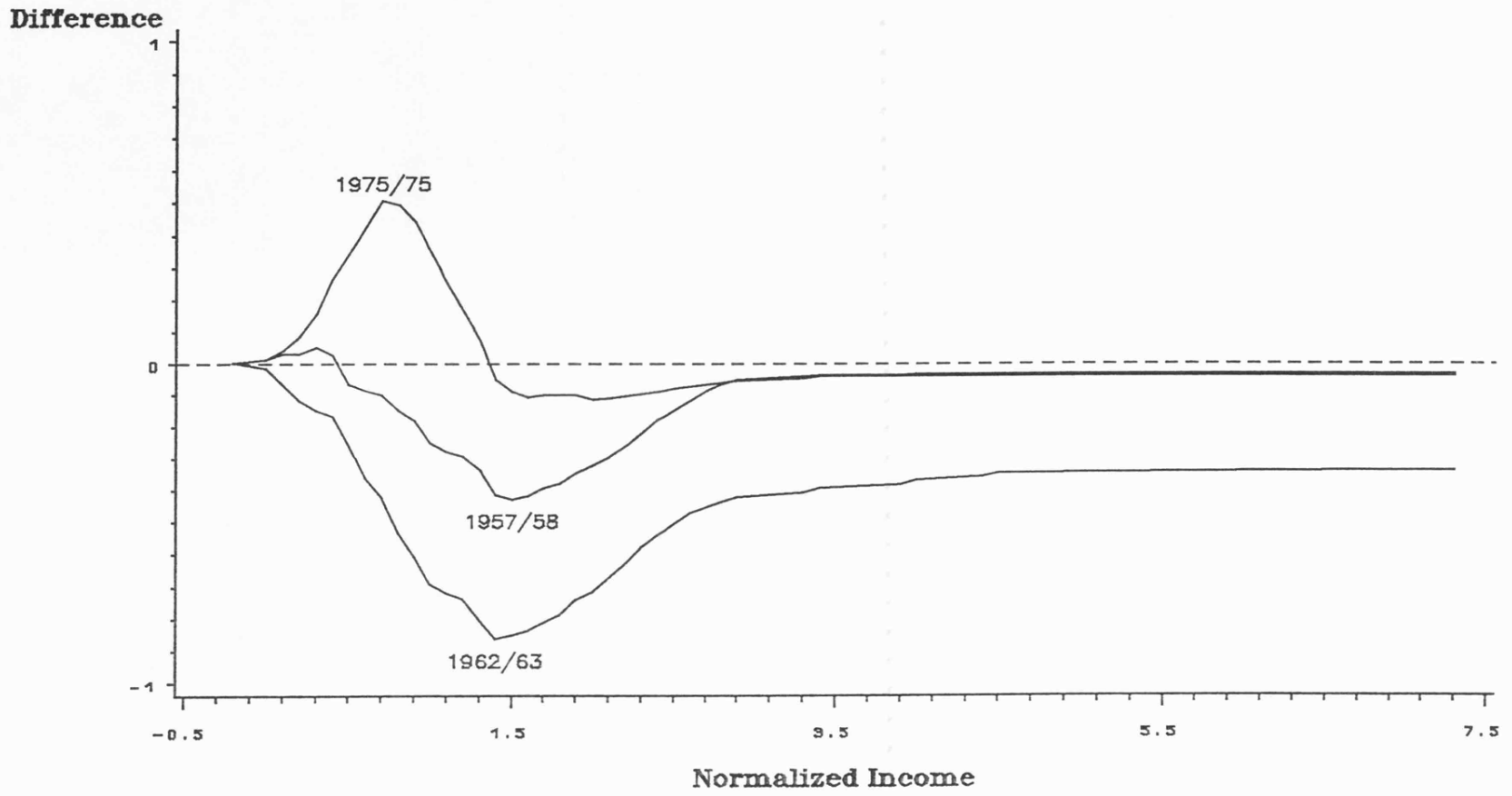


Figure 4a
Poverty–Defecit Curves for Incomes Below Zmax
Crossings at Very Low Income Levels



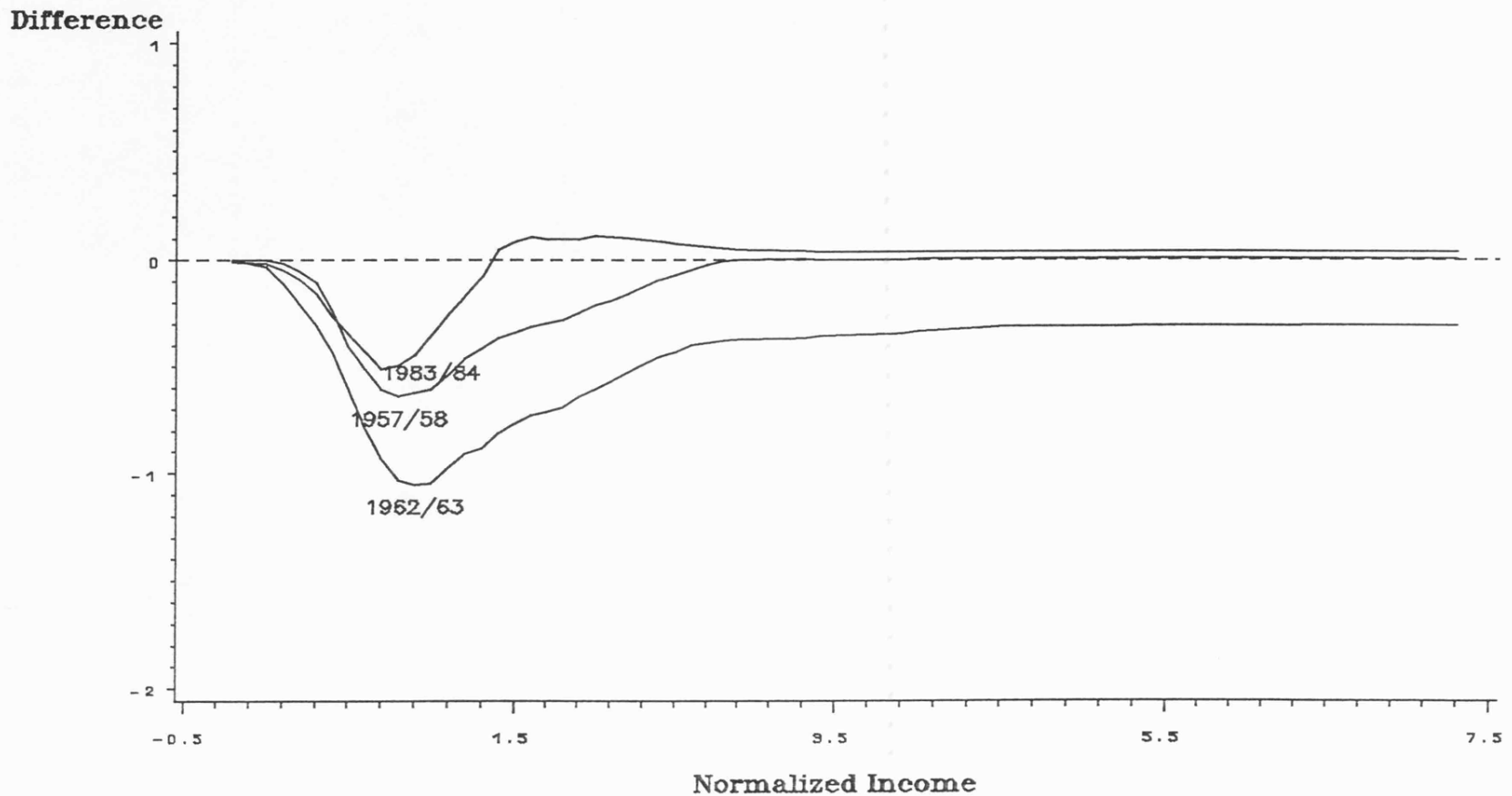
Real Individual Income Per Capita (1960 Rupees)

Figure 5
Differences Between Deficit Curves for Mean-Normalized Incomes
Taking 1983/84 Incomes as Benchmark



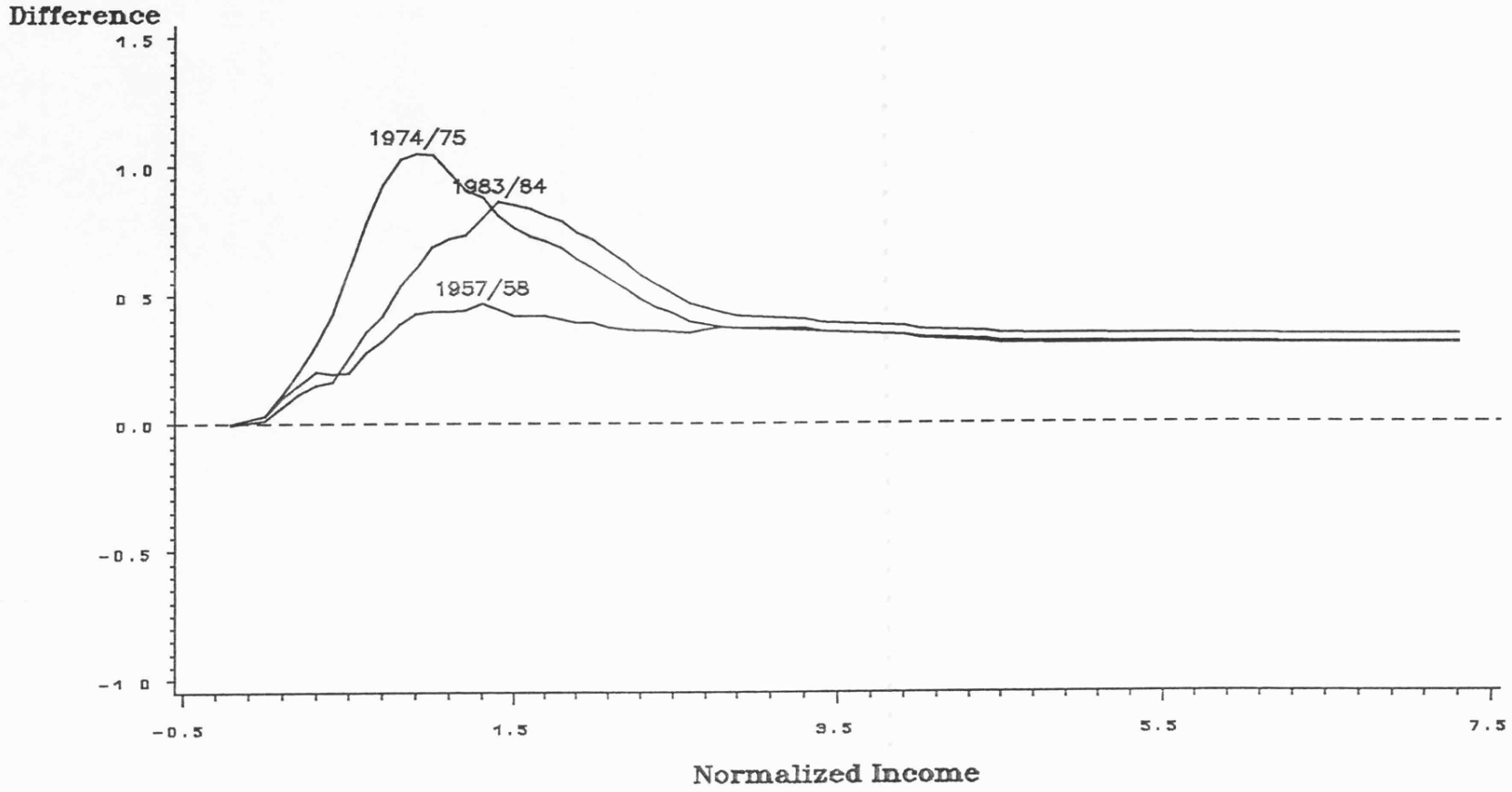
Real Individual Mean-Normalized Incomes (1960 Rupees)

Figure 6
Differences Between Deficit Curves for Mean-Normalized Incomes
Taking 1974/75 Incomes as Benchmark



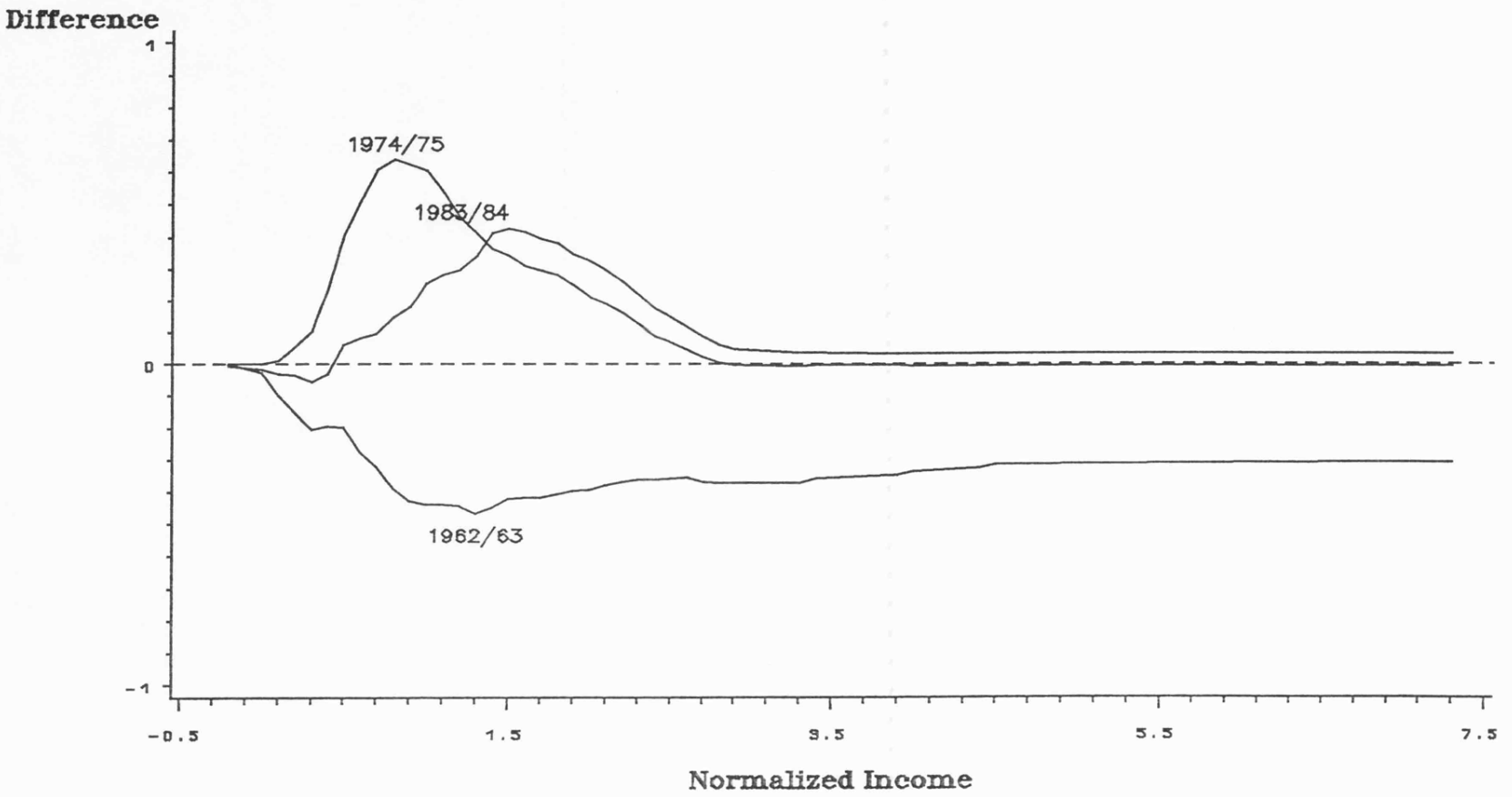
Real Individual Mean-Normalized Incomes (1960 Rupees)

Figure 7
Differences Between Deficit Curves for Mean-Normalized Incomes
Taking 1963/64 Incomes as Benchmark



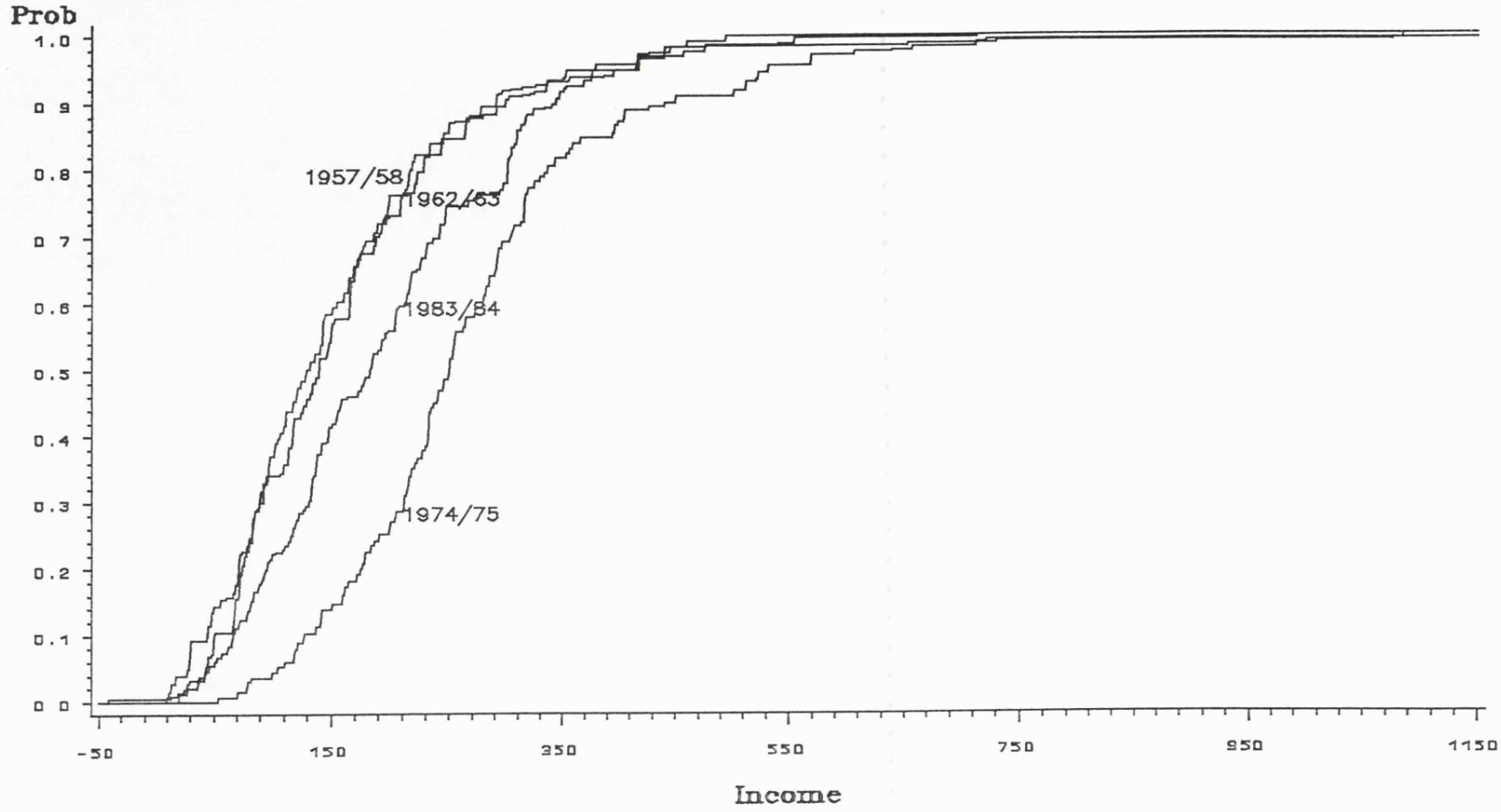
Real Individual Mean-Normalized Incomes (1960 Rupees)

Figure 8
Differences Between Deficit Curves for Mean-Normalized Incomes
Taking 1957/58 Incomes as Benchmark



Real Individual Mean-Normalized Incomes (1960 Rupees)

Figure 9
Cumulative Density Curves for Incomes



Real Individual Incomes (1960 Rupees)

Figure 10a
Deficit Curves for Incomes

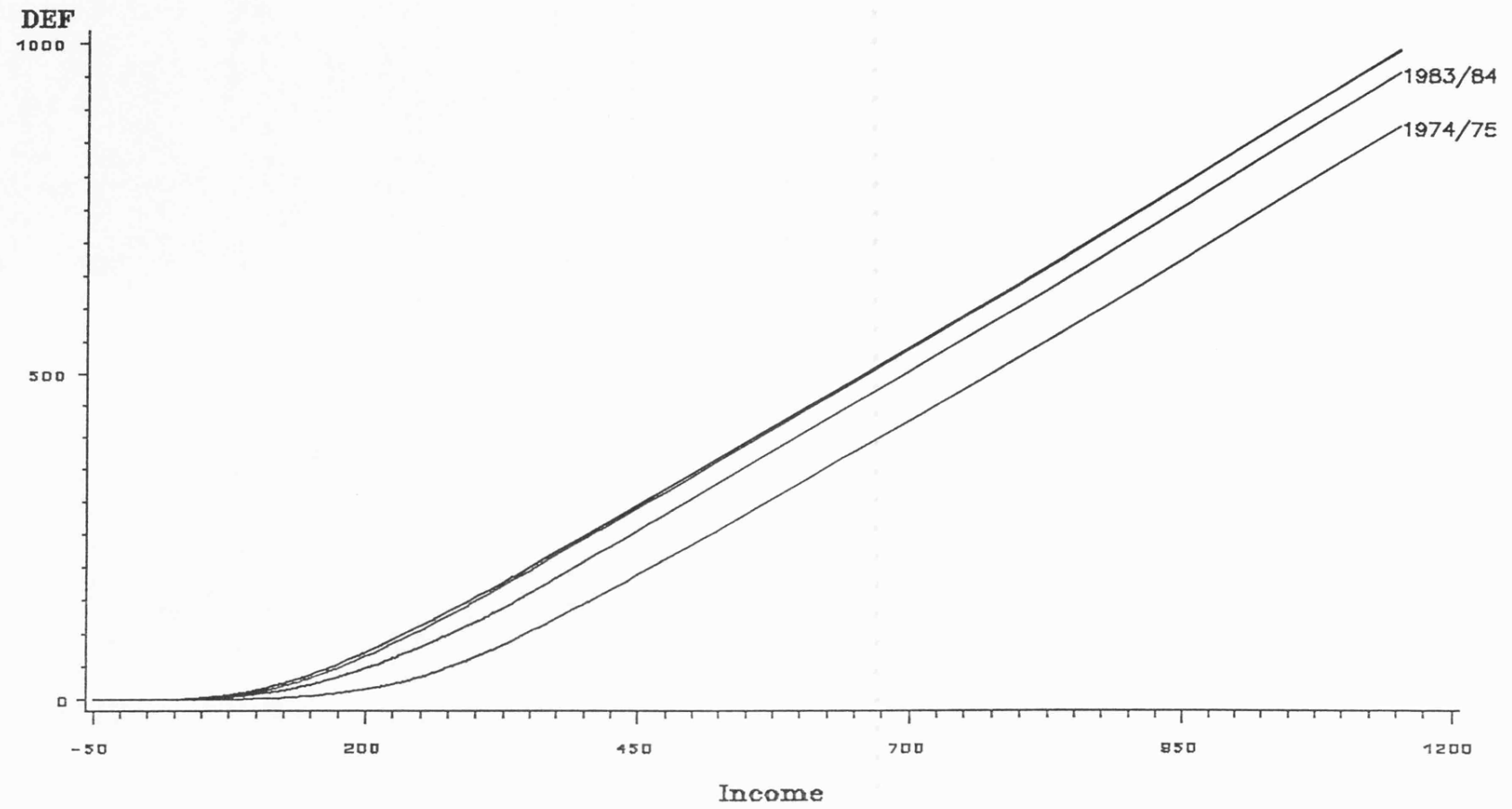


Figure 10b
Difference in Deficit Curves at High Incomes
Comparing 1957/58 and 1962/63

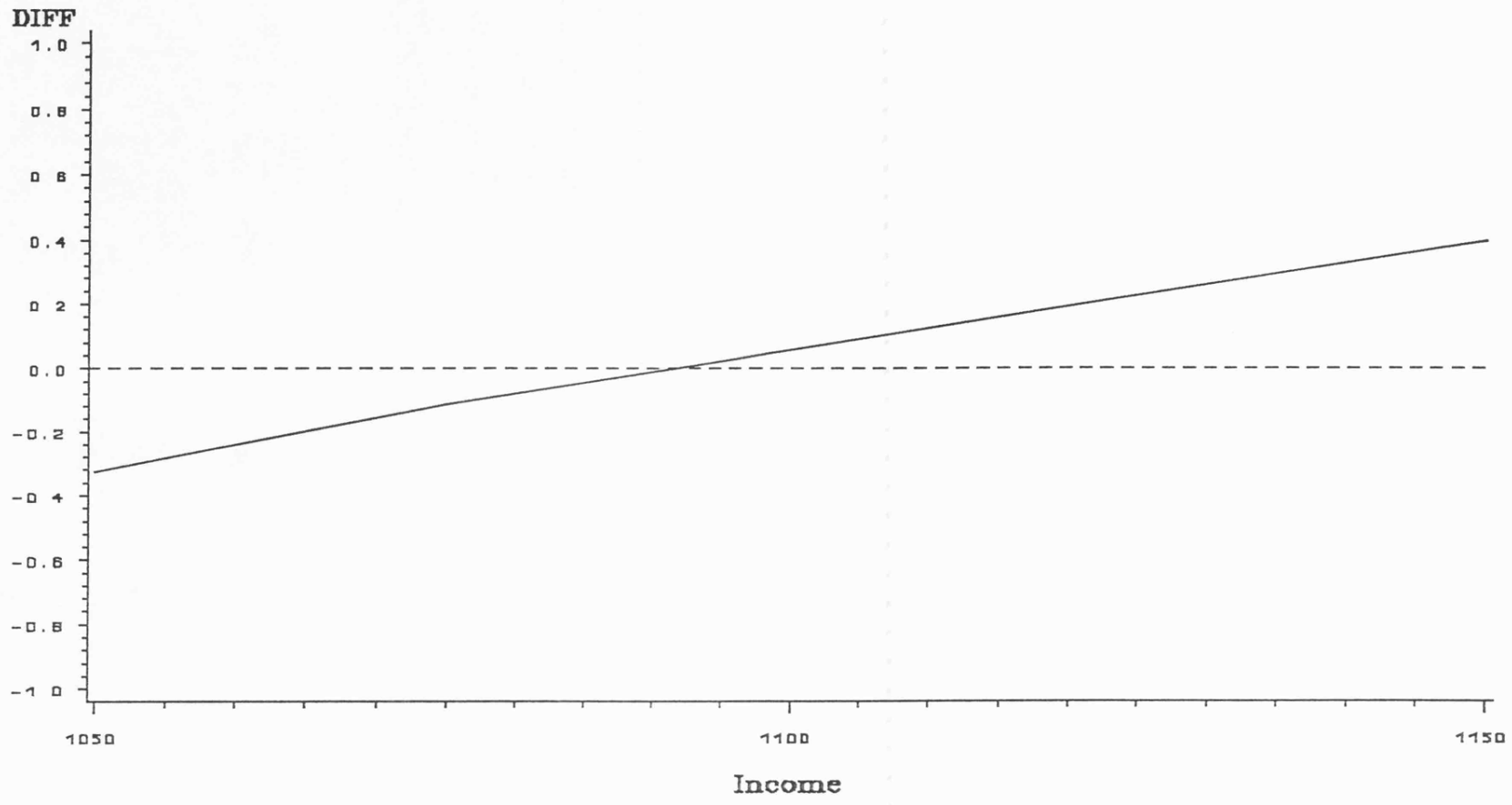


Table 2

Welfare at Different Levels of Inequality Aversion

Value of e	1957/58	1962/63	1974/75	1983/84
0.00	160.843	161.496	274.321	193.718
0.15	86.215	85.552	137.078	101.503
0.30	48.089	47.352	71.053	55.148
0.45	28.350	27.807	38.795	31.607
0.60	18.212	17.860	22.998	19.706
0.75	13.734	13.519	15.943	14.403
0.90	16.329	16.201	17.357	16.583
1.05	-15.676	-15.751	-15.194	-15.409
1.20	-1.899	-1.943	-1.671	-1.807
1.35	-0.531	-0.557	-0.422	-0.489
1.50	-0.184	-0.199	-0.131	-0.164
1.65	-0.071	-0.080	-0.045	-0.061
1.80	-0.029	-0.034	-0.017	-0.024
1.95	-0.012	-0.016	-0.006	-0.010
2.10	-0.006	-0.007	-0.002	-0.004
2.25	-0.003	-0.004	-0.001	-0.002
2.40	-0.001	-0.002	-0.000	-0.001
2.55	-.0006	-.0010	-.0002	-.0005
2.70	-.0003	-.0006	-.0001	-.0002
2.85	-.0001	-.0003	-.0000	-.0001

e-Dominance Welfare Results

	1974/75	1983/84	1962/63	1957/58
1974/75		Dominance	Dominance	Dominance
1983/84			Dominance	Dominance
1962/63				Crossing

Notes

1. Welfare is calculated for twenty different values of e varying between 0 and 3, increasing by an interval of 0.15.

2. The formula used for calculating welfare is

   $W = 1/1-e \; \Sigma \; Y_i^{1-e}$.

   See text for further details.

3. The only crossing which occurs between 1957/58 and 1962/63 results when e=0, i.e. only when average incomes are considered important, and no weight is given to the distribution of incomes.

Chapter 5

Agricultural Labour and Economic Mobility in Palanpur

5.1. Introduction

This chapter builds on the analysis of poverty in Chapter 3 by examining in detail the economic mobility of poor households, specifically the mobility of agricultural labour households. The interest in agricultural labour stems from our finding in Chapter 3 that this particular household characteristic was associated with poverty measured in terms of income and of apparent prosperity. In this chapter we argue that the economic mobility of agricultural labour households is also relatively low.

The links between poverty and agricultural labour have been analyzed in a wide range of contributions, including those of Visaria (1980), Bardhan (1989), Lipton (1983), and Drèze and Mukherjee (1989). The literature on economic mobility in rural India has not been quite so large, partly due to the paucity of appropriate longitudinal data, but a number of studies have emerged in recent years (e.g. Chaudhuri and Ravallion, 1991, Gaiha, 1986, Gaiha and Deolalikar, 1991, Swaminathan, 1988, Walker and Ryan, 1991).

One of the more interesting conclusions which has been emerging from these studies is that mobility in income space, either between consecutive years or over longer periods tends to be quite high[1]. This has prompted some observers to suggest that the chronically poor in rural India (in the sense of sustained poverty over many years for the same household) may be substantially fewer in number than previously thought (Gaiha, 1986, and

[1] However, a study of wealth, as opposed to income, mobility in a Tamil Nadu village between 1977 and 1985, found that mobility was not so pronounced (Swaminathan, 1988).

Gaiha and Deolalikar, 1990).

Studies which specifically consider the economic mobility of agricultural labour households have been relatively rare[2]. In this paper we examine the incidence of poverty and the extent of mobility among such households in Palanpur using the detailed household information for the four separate survey years between 1957/58 and 1983/84. The analysis suggests that income mobility in the village as a whole as well as for agricultural labour households is high. However, agricultural labour households also tend to be highly represented among the poor in any given year and experience little occupational mobility over time[3]. The divergence between high income mobility of agricultural labour households on the one hand, and their apparent poverty can be reconciled by pointing to the largely transitory movements which occur in the income space which do not reflect long-term changes in living standards. These observations suggest that chronic deprivation is common among households involved in agricultural labour in rural India[4].

The outline of the chapter is as follows. In the next section, we describe the labour market in Palanpur and examine the characteristics of households involved in casual agricultural labour in the different survey years. Section 3 considers both the "poverty incidence" of agricultural labour households as well as their "poverty contribution". The treatment

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[2] See however, Epstein (1973), Gough (1987) and Swaminathan (1988) for interesting discussions on the occupational immobility of agricultural labourers in separate studies of Tamil Nadu villages.

[3] Walker and Ryan (1991) report for the ICRISAT study of villages in Andhra Pradesh and Maharashtra that not only were agricultural labour households highly represented among the poor, but that households were less likely to experience income volatility the higher the labour share of income, and less susceptible to sudden shortfalls in income the more heavily they relied on the labour market as a source of income. However, unlike in Palanpur, the poverty contribution of labour households seems to be rather low in the ICRISAT villages (table 4.6, pg 97.).

[4]. Chaudhuri and Ravallion (1991) found that commonly used indicators of chronic poverty such as access to land and food share in a particular year, did not work well in identifying the chronically poor (as defined by average income and consumption over an 8 and 6 year period, respectively) in the ICRISAT villages.

of poverty here differs from that in Chapter 3 in that we do not confine our attention solely to a relative notion of poverty. In Section 4 we look at income mobility for the village as a whole and point to the occupational immobility of agricultural labour households. Section 5 examines more closely the income mobility of agricultural labour households in particular, assessing to what extent relative income movements are caused by transitory or permanent factors. Section 6 concludes.

Central to our discussion in this chapter is an appreciation of the background against which mobility in Palanpur should be viewed. In previous chapters we have described the Palanpur economy in some detail and have discussed how it has been changing. We will therefore not repeat this discussion here. However, it is crucial to recall that the village population has been growing steadily, with households splitting over time. New agricultural practices and technologies have had a major impact on farming incomes. The effect of varying harvest quality has also had a noticeable impact on average income in the different years. The distribution of land cultivated has varied over time, although land sales were relatively rare. Outside jobs have been increasing in number and type, and are of growing importance in the village economy. Income inequality has not declined nor increased monotonically over the duration of the survey periods. In general incomes in the two earlier survey years were more unequally distributed than the later two years, and within each pair the later survey year reflected higher income inequality. The highest average per capita incomes were observed in the same year in which income inequality was lowest (1974/75). For convenient reference Table 1 reviews some basic indicators of economic change in the village.

5.2. Agricultural Labour Households and the Labour Market

Casual agricultural labour accounts for the greater part of labour contracts within Palanpur. Non-casual employment within the village is extremely rare (the main exception concerns *jajmani* contracts, where an

employee performs regular pre-specified services in return for a fixed payment in kind at harvest time, between village artisans and their employers). Casual employment in non-agricultural activities (especially construction) is more common, but still represents a marginal share of total intra-village employment[5]. For simplicity, the term "agricultural labour" will henceforth refer to casual agricultural labour specifically (unless otherwise stated).

For a majority of households with some involvement in casual agricultural labour (hereafter "agricultural labour households"), agricultural labour is not the sole economic activity in which they are involved. There may be more than one paid worker in many households. Other activities include cultivation, wage employment outside the village, non-agricultural employment in the village (e.g. looking after animals or helping in a shop), and various forms of informal self-employment (e.g. making rope or selling tree leaves as fodder). An important feature of agricultural labour is that it acts largely as a "last-resort option", in the sense of an employment option which households resort to in order to complement their income from other sources when the latter is inadequate. This reflects the fact that, on the one hand, agricultural labour is a "free-entry" activity which requires little skill, and, on the other hand for similar reasons, that real wages earned by agricultural labourers tend to be much lower than those applying to skilled or urban employment. This view of agricultural labour as a last-resort option has to be qualified to the extent that this options is, in fact, not available to households without a fit adult male[6].

The involvement of landless households in agricultural labour deserves some clarification. If we view this activity as a last-resort option, and

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[5] For a detailed discussion of the labour market in Palanpur, and of other studies of labour contracts in rural India, see Drèze and Mukherjee (1989), on which this section is partly based.

[6]. As explained further in this section, there are severe social restrictions on female wage employment in Palanpur.

remember that landless households find it extremely hard to obtain land on lease, we would expect to find many agricultural labour households among the landless. In fact, only 11 out of 27 landless households in 1983/84 were involved in agricultural labour. There are three important reasons for this. First, a number of landless households belong to castes which, traditionally, have no involvement in agriculture (e.g. the village carpenter as well as two households from the highly-educated Kayasth caste). Second, some landless households have been able to take advantage of employment opportunities outside the village, and gave up agricultural labour as a result. Third some of the 'landless' households comprise sons who have split from their parents' households but who may retain some usufruct of their father's land. In Palanpur, landlessness is by no means inevitably associated with low income and a corresponding willingness to take up agricultural labour[7].

As a rule, casual agricultural labour is hired on a strictly daily basis. Contracts are usually agreed upon during the evening preceding the day of employment, with the employer approaching the prospective labourers and asking them whether they are willing to work for him the next day. There are three types of wage-payment systems: daily wage, piece rate, and harvest share. Most contracts outside the harvest are based on the daily-wage system. The "going wage" for a day's work is generally the same for all labourers, and (in money terms) it also tends to be somewhat rigid over time despite fluctuations in the level of agricultural activity. As a result, involuntary unemployment is common during periods of slack labour demand. Often, those who have to go without a job during these periods are the less productive labourers.

Women are very rarely employed as wage labourers in Palanpur. Female wage employment is regarded as extremely degrading, and only occurs from time to time among very poor households from the "lower" castes. Even then, a woman would generally work only alongside her husband or (if she

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[7]. See also the related discussion in Chapter 3.

is a widow) one of her sons.

We turn now to an examination of the characteristics of agricultural labour households in the four survey years. Table 2 presents the caste distribution of agricultural households for each year, as well as a number of other variables indicating the position of agricultural labour households vis-a-vis the average Palanpur household. With the exception of one household in 1974/75, there were no Thakur households involved in agricultural labour in any of the survey years. As has been mentioned in previous chapters some Thakur households are averse to manual labour; further, they regard working for another person, particularly within the village, as degrading, given their traditional position of dominance in the social hierarchy.

In all four survey years Dhimar households (traditionally water-carriers) were highly represented among agricultural labour households, as were Telis, a Muslim group, traditionally oil-pressers. Jatab households were the most numerous among agricultural labour households in all years except 1962/63, when for some reason or other Jatabs were apparently comparatively successful in either obtaining some land as tenants, or supplementing their income in some preferred alternative manner[8].

In all four survey years agricultural labour households represented no less than 15% of all households and nearly 30% for the last survey year. Average per capita household incomes for agricultural households relative to the village average ranged from 56% in 1962/63 to 82% in 1983/84, while the average value of livestock owned by agricultural labour households ranged from 34% of the village average in 1957/58 to 53% in 1974/75. As

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[8]. We have already mentioned elsewhere that in terms of confidence in the quality of the data, we rank the four survey years from best to poorest as 1983/84, 1974/75, 1957/58 and 1962/63. For example, one possible reason for the relatively low number of Jatab households ostensibly involved in agricultural labour in 1962/63, is that five households which were involved in agricultural labour in 1957/58 were not surveyed in 1962/63. This could be because they were genuinely not present in the village in that year, or because they had somehow been omitted from the surveyed households in 1962/63.

one would expect, agricultural labour households tend to own little land: the average landholding of these households in all survey years was below half the village average, and as low as 25% of the village average in 1957/58. In 1983/84, 27% of all agricultural labour households (11 out of 41) were landless; for the other survey years the proportion was closer to one fifth. Average cultivated holding of agricultural labour households ranged between 34% of the village average in 1957/58 and 66% in 1974/75. In 1983/84 as many as 41% of agricultural labour households were not cultivating any land. In the earlier years, this proportion tended to be lower (between 19% and 25%).

Wage income as a fraction of total household income for agricultural labour households averaged well over 50% in both 1957/58 and 1962/63, but below 30% for the last two survey years. Agricultural labour, it appears, is increasingly becoming a "secondary" activity for the households concerned. This trend reflects both (1) the participation of agricultural labour households in the expansion of activities in which Palanpur households are involved over the study period, and (2) the "entry" in agricultural labour of some households not formerly involved in this activity. The fact that, between 1957/58 and 1983/84, the proportion of agricultural households has risen only very slightly, from 26% to 28%, while the proportion of casual labour income to total income has fallen from 54% to 29% for these households, suggests that the first of these two factors - the diversification of activities - has been the more important one.

5.3. Agricultural Labour and Poverty in Palanpur.

Our examination of the extent of poverty among agricultural labour households makes use of two approaches. First, we examine the proportion of agricultural labour households belonging to the bottom two quintiles in the per-capita income scale in each of the four survey years. This approach is based on a "relative" notion of poverty - comparing the levels

of income for agricultural labour households with those applying to other households in the village. The other approach, based on an "absolute" notion of poverty, involves specifying a poverty line and considering how many agricultural labour households fall below that line in each survey year.

The poverty line which we have selected follows the work of Dandekar and Rath (1971) who drew a line at Rs 15 per capita per month, at 1960/61 prices, for rural India. Taking into account the difference in price level between Uttar Pradesh and India as a whole, we obtain a poverty line of Rs 11.3 for Uttar Pradesh in 1960/61 (see Bhattacharya and Chatterjee, 1974). On the basis of this poverty line, we find that the proportion of poor households in Palanpur was 46% in 1957/58, 49% in 1962/63, 13% in 1974/75 and 40% in 1983/84. Note that, by construction, the proportion of poor households in 1983/84 (40%) is the same whether we take the "relative poverty" or the "absolute poverty" approach[9].

In Table 3 we present calculations of the "poverty incidence" and "poverty contribution" of agricultural labour households in Palanpur, on the basis of the two poverty criteria discussed earlier, for each survey years. "Poverty incidence" and "poverty contribution" respectively refer to the proportion of poor agricultural labour households among (1) all agricultural labour households, and (2) all poor households. In other words, "poverty incidence" refers to the probability that a randomly-chosen agricultural labour household will turn out to be poor, while "poverty contribution" refers to the proportion of poor households accounted for by agricultural labour households.

For comparison purposes, Table 3 also presents similar calculations

[9] In Chapter 3 we have discussed in some detail various problems associated with the measurement of income. While we cannot claim absolute precision on our estimates of income for Palanpur households, it is unlikely that they involve omissions that undermine our argument. Note that Chaudhuri and Ravallion (1991) have recently argued that current income is in general a better indicator of chronic poverty than current consumption, and that both perform much better than other conventional indicators such as landlessness and food share.

that take Jatab households, rather than agricultural labour households, as the reference group. The motivation for the comparison is that membership of this caste, like involvement in agricultural labour is a rather good "predictor" of poverty[10]. Indeed, as Table 3 indicates, "poverty incidence" among Jatab households was as high as 89% in 1983/84, compared with a poverty incidence of 61% among agricultural labour households and 40% for all households taken together. The "poverty contribution" of Jatab households, on the other hand, was somewhat lower (30%) than that of agricultural labour households (44%) in 1983/84 (and indeed in each of the four survey years), reflecting the larger size of the latter group.

The poverty incidence of agricultural labourers, while lower than for Jatab households in 1983/84, was not markedly different from the incidence of poverty in the latter group in earlier survey years. Using the "relative poverty" approach, the incidence of poverty among agricultural labour households never fell below 54%. Using the "absolute poverty" approach, the incidence of poverty in the same group was as low as 22% in 1974/75 (the incidence of poverty among Jatab households was 21% in that year). This is not surprising since average per-capita income for the village as a whole was at its peak in 1974/75, and the distribution of income was also least unequal in that year. For the first two survey years, the incidence of absolute poverty among Jatab as well as among agricultural labour households was somewhat higher than that of relative poverty, reflecting the comparatively low levels of income in those years.

The "poverty contribution" of agricultural labour households was largest in 1974/75, when the incidence of absolute poverty was lowest by a long margin. In that year, agricultural labour households accounted for over one half of all poor households. We have suggested in Chapter 3 that current income in a good year is a relatively accurate indicator of poverty

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[10]. In Chapter 3 it was found that membership of the Jatab caste was among the best predictors of high "poverty risk" among a wide range of alternative indicators. This applied for a relative notion of poverty, whether poverty was defined in terms of current income, in terms of permanent income (averaged over the four survey years), or in terms of an apparent prosperity measure.

- a household with a low income in a good year is likely to be disadvantaged in some basic sense. The fact that the poverty contribution of agricultural labour households in 1974/75 is quite high therefore lends further support to the view such households are among the most vulnerable.

On the basis of the two criteria, involvement in agricultural labour is thus found to be quite successful as an indicator of poverty in Palanpur, irrespective of year. It should be pointed out however, that what makes involvement in agricultural labour a good indicator of poverty is not so much the low level of wages and earnings for that occupation *per se*. Indeed, as was discussed in the preceding section, income from agricultural labour accounts only for a small fraction of total income for many agricultural labour households. Rather, it is arguably the "last resort" nature of agricultural labour as an activity which makes it a good indicator of the vulnerability of a household.

Whether agricultural labour also indicates sustained deprivation is the question we attempt to address in the next section.

5.4. Income Mobility and the Immobility of Agricultural Labour

5.4.1. The Assessment of Mobility

An evaluation of income mobility usually consists of comparing the position of a particular household in the income ranking in one period with that household's position in a second period[11]. The extent to which households change their ranking over time then indicates the extent to which mobility occurs. There is a large literature on different summary measures of income mobility (see Swaminathan (1988) for an overview). From this literature it emerges that no universally accepted summary

[11]. Although this may be a common approach to the assessment of mobility, we may also be willing to regard a society as mobile even if rankings do not change at all; if for example the society becomes more equal over time.

measure of mobility is available, nor likely to exist[12]. We therefore prefer to scrutinize transition matrices directly as far as possible, and make only limited use of a summary measure.

In the Palanpur study we have four surveys separated by 4 years between 1957/58 and 1962/63 and around 10 years between the other survey years. As Shorrocks (1978a) has discussed, we should expect greater mobility as the interval between observation periods widens because this offers increasing opportunity for movement. Therefore we should expect to see more mobility in Palanpur on the basis of our data than if we had data on adjacent years.

In order to examine income mobility in Palanpur we examine only those households who were present in the village during the entire 26 year interval. There are three reasons why this "permanent" village population does not correspond exactly to the whole village population in any one year. First, while in- and out-migration (both temporary and permanent) from the village over the surveyed period was not very substantial, there were some households who left the village over the interval, and also some households who migrated into Palanpur. It would be interesting to examine the economic mobility of such households but we do not have the data to undertake that task, and thus any household which migrated in or out of Palanpur is omitted from the "permanent" village population. Second, there are some households which simply ceased to exist at some point, without necessarily leaving the village. Such attrition could for example occur with the death of a single person, who made up a one-member household. It is not always possible to verify what happened to such households if the attrition occurred between two survey years, i.e. whether such households left the village or whether they simply ceased to exist, and for this reason these households are also omitted. Finally, a few households omitted or not fully surveyed for one reason or other in a particular

[12] Shorrocks (1978a) takes an axiomatic approach to the measurement of mobility when the data are provided in the form of a transition matrix, and demonstrates that several basic axioms are not consistent with each other.

survey year, and for this reason we do not have complete information on those households for all four survey years.

Eliminating such households from our population reduces our village population to 76 households in 1957/58, 84 households in 1962/63, 98 households in 1974/75 and 120 households in 1983/84. The growth in the number of households in the village is now due entirely to process of households splitting over time. In tables 4 and 5 we present the corresponding details on agricultural labour households in this "closed" village population as were provided in tables 2 and 3 for the village as a whole. In terms of poverty incidence, poverty contribution, and numbers of agricultural labour households, this exercise of establishing comparability over time of households does not alter much.

5.4.2. Income Mobility in the Village as a Whole

In table 6 we present transition matrices between adjacent survey years with the distribution of household per capita income in each survey year divided into quintiles, and with the relative frequencies of households occurring in each column quintile for a particular row year entered in each cell[13]. These relative frequencies are commonly interpreted as representing the probability of occurring in a particular cell. The relative frequencies sum to one along each row[14]. Complete immobility would be represented in such transition matrices by 1's along the diagonal of each matrix, indicating that all households in a particular quintile in one year remained in the same quintile in the following year (at least not crossing quintiles).

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[13]. Note that the impression of mobility obtained when using transition matrices is sensitive not only to the income measure and time period, as discussed above, but also on the decision taken on aggregating households into fractiles. If the income distribution had been divided into deciles instead of quintiles, we would expect to see fewer cases of households in the same fractile, and therefore more mobility.

[14]. Because of the phenomenon of household splits the transition matrices presented here are not 'doubly-stochastic' in the sense of relative frequencies summing to one along both the row and column.

Considering, to begin with, income mobility between 1957/58 and 1962/63 (Table 6.A) the picture is quite mixed. On the one hand there is clearly some rigidity at the top of the scale with as many as 63% of households from the top 1957/58 quintile remaining in the top quintile in 1962/63. On the other hand, there is substantial upward mobility at the bottom of the scale with only 17% of households in the bottom quintile in 1957/58 remaining in the bottom quintile in 1962/63, and 44% in the second quintile still in the second quintile in the later year.

On the basis of this transition matrix, we can calculate the value of a summary measure of mobility such as the Distance Measure (M_D). This measure takes the extent of "off-diagonalness" or distance from the diagonal into account when representing the degree of mobility (Swaminathan, 1988). The value of M_D is equal to zero when all non-diagonal cells are empty and a value of 1 when mobility becomes perfect, i.e. when ones are observed in the cells along the diagonal from the top right hand corner to the lower left hand corner (except for the middle quintile), i.e. when the greatest distances have been jumped[15]. It is defined as:

$$MD = \sum_{i=1}^{n} \sum_{j=1}^{n} (i-j)^2 \, m_{ij} \, / maximum \; value \qquad (1)$$

where, when n is odd,

$$maximum \; value = 2 \left[\sum_{i=1}^{\frac{(n-1)}{2}} (i-n)^2 \right] + \left(\frac{(n-1)}{2}\right)^2. \qquad (2)$$

m_{ij} refers to the probability of occurring in the cell given by row i and column j; n represents the number of fractiles used in the transition

[15] Note that this definition of perfect mobility may not coincide with an intuitive notion which would state that perfect mobility occurred when the probability of appearing in any cell was the same over all cells in the transition matrix. This is one example of the difficulties in obtaining agreement between different axioms.

matrix (in our case 5). For the transition matrix appearing in Table 6.A, M_D takes the value 0.22[16].

For the intervals 1962/63 to 1974/75, and 1974/75 to 1983/84, we observe an increase in mobility compared to that found between the first two survey years (see tables 6.B and 6.C). Between 1962/63 and 1974/75 the value of M_D rises to 0.33, and this then falls back to 0.30 between the last two survey years. The rise in income mobility seems reasonable given not only the longer time period but also the fact that considerable economic changes occurred after the 1962/63 survey year, namely the introduction of new technologies in agriculture and also the substantial growth of outside jobs.

One question of interest when faced with the picture of mobility obtained in tables 6.A, 6.B and 6.C is to ask to what extent this reflects the influence of harvest variations in each survey year. In an attempt to evaluate the sensitivity of mobility in Palanpur to the fact that in some years incomes from cultivation were boosted due to a good harvest, and in another years depressed due to a bad harvest, we tried to correct for these factors between the 1974/75 and 1983/84 survey years. On the assumption that input costs are applied sometime before the quality of harvest has been ascertained, and are therefore invariant to the quality of the harvest, we simply scaled down 1974/75 net cultivation revenues and scaled up 1983/84 revenues by a selection of different factors (given that 1974/75 was a good year, and 1983/84 a particularly bad year) and then re-ranked households to examine to what degree our impression of mobility was affected[17]. In table 6.D we present the transition matrix which obtained when we applied a scaling factor of 30% to both survey years (scaling

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[16]. This figure for the distance measure M_D can be compared with the results obtained by Swaminathan (1988) when assessing *wealth* mobility in a Tamil Nadu village between 1977 and 1985. She found an M_D of 0.094 for the household wealth transition matrix (divided into quintiles) and 0.073 for the per capita wealth matrix (p.124), indicating sluggish change in the distribution of wealth over the interval.

[17] We are also assuming that prices received by cultivators were also invariant to the quality of the harvest (see also Chapter 2).

1974/75 down and 1983/84 up). This corresponds to a very substantial adjustment to cultivation incomes (probably more than what was actually observed), and does reduce the degree of mobility between the two years to some extent. The M_D measure of mobility drops to value of 0.27 from the previous 0.30. Interestingly, if we examine the relative frequencies along the main diagonal of the new transition matrix, we see that among the lowest three quintiles there is a substantial increase in the probability of households remaining in the same quintile between the two years. Among the top two quintiles however, the adjustment does not appear to have increased the likelihood of remaining in the same quintile. This suggests that the effect on mobility of harvest variation is felt most strongly among the poorer households in Palanpur. This point will be explored in greater detail when we consider the income mobility of agricultural labour households below.

It is clear however, that much of the mobility observed prior to the adjustment remains and that we cannot attribute income mobility in Palanpur solely to the effect of variations in harvest quality. A similar conclusion was reached in Chapter 2 when this simulation exercise carried out on measured inequality and resulted in only little change in measured inequality (as summarized by the Gini coefficient). Although cultivation income was distributed very differently between 1974/75 and 1983/84, this was due mainly to differences in the distribution of land cultivated, and only partly to variations in the quality of harvest. It is likely that mobility was affected in a similar manner.

5.4.3 The Occupational Immobility of Agricultural Labourers

Against this background of income mobility we now evaluate to what extent this was matched by the occupational mobility of agricultural labourers. In Table 7 we examine the persistence of agricultural labour as an occupation for Palanpur households by considering the number of households involved in agricultural labour in one year who were found to be involved in agricultural labour in subsequent years. Of the 17

households found to be involved in agricultural labour in 1957/58 (of our "permanent" village population), 12 of them were found in this occupation in 1962/63. 18 households (out of 27) in 1974/75 and also 18 (out of 34) in 1983/84 who were involved in agricultural labour had been involved in this occupation in 1957/58[18]. When we consider the household which newly entered agricultural labour in 1962/63, we see that it was among agricultural labour households in the subsequent years. This is also true for seven of the eight households which entered agricultural labour in 1974/75. With the exception of some decline between the first two survey years, there is thus strong evidence that once a households becomes involved in agricultural labour, it is not likely to stop being involved in subsequent years.

In Table 8a we present probit equations which examine what household characteristics affect the probability of observing a household involved in agricultural labour. We can see that for all three survey years examined (1962/63, 1974/75, and 1983/84) a positive and strongly significant influence was exercised by a dummy variable taking a value of one if the household had been involved in agricultural labour in the previous survey year. If we take all other variables at their means (see Table 8b) and calculate the probability of a household being involved in agriculture first given that it was not involved in this occupation previously, and then second given that it was involved in agriculture previously, we find that the probability increases by 36 percentage points in the 1962/63 equation, 58 percentage points in the 1974/75 equation, and 47 percentage points in the 1983/84 equation[19].

For the 1962/63 survey year no other explanatory variables exercised

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[18] Note that some of the 17 agricultural labour households in 1957/58 split over time, and that therefore it is possible for 18 households in 1974/75 and 1983/84 to be linked directly to 17 households in 1957/58.

[19] This is found by calculating the z value from the probit equation when all variables are at their means (Table 8b), except the dummy variable representing the household's previous involvement in agricultural labour which takes either a value of one or zero. We can then obtain the probabilities from the standard normal table.

a strongly significant contribution although the number of adult males and the Jatab caste dummy variable were of some significance. By 1974/75 the probability of a household being involved in agricultural labour was significantly greater if it was of the Jatab caste. In addition, the more land a household cultivated in that year the less likely it was to be involved in the casual labour market, and the more adult males in the household, the greater the probability the household was involved in agricultural labour. In 1983/84, the Jatab caste dummy was no longer significant, but now the probability of a household being involved in agricultural labour became significantly less the greater the education level achieved by the most educated member of the household (in years of schooling). The more land the household cultivated, the lower the probability that a household was involved in agricultural labour, and the more adult males in the household the greater that probability. In none of the estimated equations did the effect of households splits, nor a dummy representing landlessness exercise a significant independent influence.

5.5. The Income Mobility of Agricultural Labour Households

We have seen in previous sections that income mobility in Palanpur as a whole has been rather high between the different survey years. We have also argued that occupational mobility out of agricultural labour by Palanpur households has been rather low. In this section we scrutinize the income mobility of agricultural labour households specifically in order to better understand the different aspects of mobility which exist as well as the type of factors which influence the degree of observed mobility.

In this section our attention will be focused on the income mobility of the 17 households involved in agricultural labour in 1957/58. In Table 7 we indicated that in subsequent survey years, many of these 17 households were still involved in agricultural labour. In Table 9 we present transition matrices which trace the movements in the income distribution of these 17 households over the survey period. Between 1957/58 and

1962/63, two of the original households split into two, and therefore we observe in the first transition matrix that there are 19 households which are being followed. We attribute to each of the four split households in 1962/63, the relative position of their respective originating household in 1957/58.

From the transition matrix for the first two survey years (Table 9.A) we can observe that even among the 17 agricultural labour households in 1957/58, there was considerable movement in the relative income space. This does not come as a great surprise for a number of reasons. First, the quintiles within which households are located in a particular year, are on the basis of per capita income, and any demographic change occurring between the two survey years can thus affect in a substantial way a household's ranking in per capita income terms. Second, and as we have already suggested in Section 4, the impact of harvest quality on cultivation income could raise the relative position of households reliant on wage income for at least part of their total income. Finally, we argue that although occupational mobility of agricultural labour households is low, it is not absent. We indicate below that income mobility of agricultural labour households who do change occupation is more often in an upward direction than downward.

Of the 19 households in 1962/63 who stemmed from the original 17, only 5 households were positioned in the same quintile in the two survey years. Note that 8 households had improved their relative position between the two survey years, and 6 households dropped in ranking. From Table 1 we can see that actual wheat yields in 1957/58 were roughly equal to "normal" or expected wheat yields, but that in 1962/63 they were slightly lower. Hence, the quality of the harvest in 1962/63 was slightly poorer than in the previous survey year. Given that agricultural labour households are generally less dependent on crop yields for their income than cultivating households (although we must remember that few agricultural labour households are entirely dependent on wage earnings for their income), a poor harvest which depresses the incomes of cultivators (assuming output

prices unchanged), will raise the relative position of wage-earning households. Some support for this can be found in the fact that more agricultural labour households moved up in their relative position between 1957/58 and 1962/63, than moved down. We will see in comparisons of later years more evidence of the influence of harvest quality on the mobility of agricultural labour households.

A stronger contribution to the mobility between 1957/58 and 1962/63 can be seen to have been made by occupational change however. We saw in Table 7 that in 1962/63 12 of the original 17 households were still involved in agricultural labour and we have noted above that a total of 19 households in 1962/63 stemmed from these 17. Thus, 7 households in 1962/63 who had been involved in agricultural labour in 1957/58 were no longer involved in this activity in that year. From Matrix 9.A we can see that 6 of the eight upwardly mobile households between these two years were no longer involved in agricultural labour in 1962/63, and not one of the downwardly mobile households had left this occupation. Thus, while the majority of households in 1962/63 were still involved in agricultural labour in that year, a minority of households had left this occupation and these households accounted for the bulk of the upward mobility of agricultural labour households observed between the first two survey years. A final point of interest is to note that nearly 30% of all movement observed between 1957/58 and 1962/63 occurred in the bottom 40% of the income distribution, and no mobility occurred into or out of the top income quintile. Where we are interested in identifying an indicator of long-term poverty, we will be more interested in evidence of mobility in or out of poverty than among the poor.

In Table 9.B we examine the income mobility of our original group of agricultural labour households between 1962/63 and 1974/75. We have already discussed in section 4 that cultivation incomes for Palanpur farmers in 1974/75 were quite high due to a better than average harvest and relatively high output prices. We would therefore expect to see downward mobility among agricultural labour households between 1962/63 and 1974/75,

as a result of the different harvest qualities of the two years. This is borne out by the evidence, where of the 23 households in 1974/75 who could be traced back to the original 17 households in 1957/58, 14 households moved down in relative position and only 5 households move up. Of the 14 households moving down, nearly all (12) were involved in agricultural labour. Only 3 agricultural labour households were able to improve their position. Once again, more than 25% of the income mobility occurring between these two years occurred in the lowest two quintiles of the income distribution, and therefore did not represent either mobility into or out of poverty (on the relative poverty criterion).

The last transition matrix, Table 9.C, examines the relative movements of the original group of 17 agricultural labour households in 1957/57 between the last two survey years. In 1983/84 there were 28 households which could be traced back to the original 17 households, and 18 of these households were involved in agricultural labour. Once again we would expect to observe an impact on mobility of these households by differences in the quality of the harvest between the two survey years. While 1974/75 was a good year, we have already noted that 1983/84 was a bad year. In this case we would expect to see evidence of upward mobility of agricultural labour households as these households improved their relative position vis-a-vis cultivating households. Between 1974/75 and 1983/84 15 of the 28 households displayed upward mobility, 7 households were downwardly mobile, and 6 remained in the same quintile. More agricultural labour households were upwardly mobile between these two years than downwardly mobile and this once again supports the contention that harvest quality was an important influence on the mobility of agricultural labour households (in relative terms). In 1983/84 there were ten households who could be traced back to the original 17 agricultural labour households, but who were not involved in agricultural labour. Of these ten, six were upwardly mobile between 1974/75 and 1983/84, and only one was downwardly mobile. As in the transition matrix between 1957/58 and 1962/63, this suggests that upward income mobility (independent of the effect of harvest quality) is frequently associated with occupational mobility out of

agricultural labour. Finally, we note that between 1974/75 and 1983/84 more than 30% of all movement occurred between the bottom two quintiles and thus among the relatively poor.

Our discussion above points to two important aspects of mobility which should be kept in mind. First, if we wish to examine the degree to which a particular household characteristic is associated with long-term poverty, then the mobility which occurs within the group of poor households, may not be of immediate relevance. A summary measure of mobility (based on fractiles and a transition matrix) could easily fail to distinguish this type of mobility from movements into and out of poverty. The second, and more difficult to handle, aspect of mobility is the fact that some movements in the relative position of households are due to transitory, or random, factors whilst others represent fundamental changes in long-term living standards. The effect of an event such as harvest failure may temporarily improve the relative position of an agricultural labour household without representing a long-term improvement in its economic prospects. On the other hand, obtaining regular outside employment may indicate that the household has fundamentally improved its position.

The success of our argument linking long-term poverty with agricultural labour households requires a demonstration that the rather high income mobility of this group is essentially transitory and does not represent much fundamental change. This task is attempted in the section below.

5.5.1. Income Mobility: Long-term Versus Transitory Movements

In order to evaluate the income mobility of agricultural labour households we make use of an approach introduced in Shorrocks (1978b). This approach explicitly links the measurement of income mobility to that of income inequality. Shorrocks argues that conventional inequality measurement usually looks at income observations that were calculated over a particular period of time (in Palanpur we have annual income for the four

survey years). The fact that income is a flow variable adds an important consideration to the construction of a mobility index based on incomes, namely, the length of the interval during which the flow variable is observed. As this interval is extended from say, monthly income to annual income, variations in monthly income (due perhaps to seasonal change) become subsumed within annual income. In a similar way, if we were to aggregate annual incomes into lifetime incomes, intra-generational movements would be lost. Aggregating incomes thus tends to improve the relative position of those who find themselves temporarily at the bottom of the income distribution, and the converse applies to those temporarily at the top.

Shorrocks argues that the existence of mobility causes inequality to decline as the accounting period grows and the extent to which inequality declines will be directly related to the frequency and magnitude of relative income variation. He shows that for a wide class of inequality measures, inequality must fall as the accounting period increases. For any inequality measure which is a strictly convex function of mean-normalized incomes, Shorrocks proves that measured inequality of cumulated incomes over m periods, will be less than or equal to the weighted sum of measured inequality during the sub-periods (where the weights are given by the ratio of sub-period mean income to the m-period mean income). Shorrocks introduces a *rigidity index*, R_m which is the ratio of cumulated income inequality to this weighted sum,

$$R_m = \frac{I[Y(t_0, t_m)]}{\sum_{k=1}^{m} w_k I[Y(t_{k-1}, t_k)]} \qquad (3)$$

and where there are m periods, designated k, with $I[Y(t_0,t_m)]$ representing inequality of incomes cumulated over all m periods. The weights, w_k, are given by

$$w_k = \frac{\mu(t_{k-1}, t_k)}{\mu(t_0, t_m)} \qquad (4)$$

where the μ's are the means. The rigidity index R will take a value of 1 if the relative incomes within each of the sub-periods are identical and therefore the cumulated income inequality measure is the same as the weighted sum of the sub-period inequality measures. R will approach zero as cumulated income inequality approaches zero, i.e. as incomes are exactly equalized over the whole time interval of m periods. Shorrocks proposes a measure of mobility based on the rigidity index, M=1-R.

It is possible to construct rigidity curves which map out the extent to which the rigidity index falls as the time periods are increased. When m=1, the rigidity index is always equal to one as cumulated income inequality is the same as the sub-period inequality. As m increases, from 1 to 2 and so on until, with the Palanpur data, m=4, we expect to see R fall as income mobility leads to equalizing long-term incomes. For our purposes, the crucial point is that where there are large variations in *transitory* incomes from year to year, we should expect to see R_m fall over the first few cumulated periods, but then quickly even out as relative incomes rapidly approach their permanent values and there is then no further equalization. Where there is more mobility in permanent incomes, the rigidity curve will continue to decline as the aggregation period is extended. In a simple example Shorrocks (1978c) shows that if all income variation across individuals and over time is due to random fluctuations, and there is a fixed, unchanging permanent income component, the rigidity curve would flatten out noticeably within as few as 3 or 4 periods.

This approach offers an opportunity to examine the extent to which mobility of agricultural labour households in Palanpur is transitory as opposed to permanent. However, before we proceed it is important to stress that the approach outlined above was basically conceived in the context of a number of adjacent intervals during which incomes are calculated and which can be easily combined to create a new interval with a longer

accounting period. This applies readily in the case where we have sub-period intervals consisting of months or quarters, and which can be summed to create a year-long accounting period. Alternatively if we have adjacent annual incomes (as is available for panel-data sets such as the Michigan data on income dynamics in the U.S., or the ICRISAT study in India), then summing these annual incomes to construct a longer-term or 'permanent' income measure seems meaningful. In the Palanpur context however, our annual incomes are separated by many years for which no data was collected. While we would expect 'noise' in our income measures (thus 'transitory' mobility effects) to explain some of the changes in income rankings which are observed as we move from one year to the next, it is clear that the long period of time between the surveys would also permit a comparatively large role to other factors such as demographic change within the household, household partitions, etc. Thus, while applying the approach outlined above to the Palanpur data does not raise any specific problems of implementation, the interpretation of 'transitory' and 'permanent' mobility in this case is rather more difficult. These considerations should serve to stress that our findings here remain suggestive at best.

We proceed by dividing the Palanpur population into two groups: one made up of those households who consist of or stem from the 17 agricultural labour households in 1957/58; the second consisting of all other households. We then draw rigidity curves for the two groups to seek evidence that the curves for the agricultural labour households become flat. It is crucial to stress that this procedure involves us in examining inequality *within* the two groups and thus arguably misses out the mobility of agricultural labour households vis-a-vis the other households. This could potentially mislead. Suppose for example, that incomes of agricultural labour households are identical over all periods (and therefore the rigidity index for these households becomes 1). However, the average income of agricultural labour households changes relative to the average income of other households. Then we will mistakenly conclude that there is no mobility when in fact all agricultural labour households are

changing their relative position in the income distribution as a whole[20].

Before turning to an examination of the rigidity curves, one more issue must be considered. So far we have only mentioned that the inequality measure implemented in this exercise must be a strictly convex function of mean-normalized incomes[21]. However, there exists a very wide range of measures which satisfy this requirement and therefore some form of selection criterion must be established. We have already mentioned in Chapter 4 that different summary measures of inequality attribute different weighting to different parts of the income distribution (often implicitly). We must therefore exercise some care in our choice of inequality measure. In Table 10 we present calculations of the rigidity index for agricultural labour households, non-agricultural labour households and the village as a whole, using three inequality measures. Two of the measures are from the General Entropy class of inequality measures. This class consists of a single-parameter family of inequality measures, whose members are all mean independent, additively decomposable, and strictly convex functions of relative incomes (see Cowell, 1980 and Shorrocks, 1980). In Table 10 we have selected two values for the choice parameter c; zero and 2 respectively. With c=0 the measure becomes the Theil L measure of inequality, which is very sensitive to inequality among the poor. With c=2

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[20]. This point may be pursued further. Suppose we were able to decompose the income mobility of agricultural labour households into two components: one indicating the extent of mobility within the group of agricultural labour households and the other reflecting the mobility of agricultural labour households as a group vis-a-vis all other households. In our proposed analysis the focus is on the first component, and we assess to what extent this mobility can be considered transitory. In order to assert that the conclusions we reach on the basis of this within-group mobility apply to total income mobility, we need to evaluate to what extent the neglected between-group component offsets the within-group component. Because the incidence of poverty among agricultural labour households is quite high, this group as a whole may not have not enjoyed much long-term improvement in its relative position vis-a-vis the rest of the village. Hence it seems plausible that permanent mobility in the between-group component has not been significant.

[21]. In fact, convexity will be sufficient in almost all respects except that in this case zero mobility (or a rigidity of 1) can be associated with some small changes in relative incomes between sub-periods. For the Gini coefficient (a convex, but not strictly convex function), mobility will be zero even if relative incomes change, as long as *rankings* do not change.

the measure is the squared coefficient of variation which attaches a greater weight to the top-end of the income distribution. Finally, we calculate the Gini coefficient which focuses on the middle of the income distribution. As we have shown that agricultural labour households are highly represented among the poor, our preferred inequality measure for the examination of mobility is the Theil L measure.

In Figures 1,2, and 3 we draw the rigidity curves using our three inequality measures in turn (Theil L, squared coefficient of variation, and Gini coefficient). In each graph we show the rigidity curves for the agricultural labour households, other households, and finally for the village as a whole. In Figure 1 it is striking that after we have cumulated the incomes of agricultural labour households over the first three survey years, the rigidity index remains virtually unchanged when we add the fourth survey year. This suggests that relative cumulated incomes have approached their permanent values and there is no further equalization to be expected from increasing the length of period m. While mobility within this group is higher than for the 'other' group (the rigidity curve lies below the curve for the 'others') it appears that for the 'other' group a lengthening of the interval m would lead to a further equalization, and hence the mobility enjoyed by this group is more likely to be sustained.

This notion is also supported further when we examine the curves drawn using other inequality measures. When c=2 there remains strong evidence that agricultural labour mobility is mainly transitory, and that the 'other' group of households enjoys greater long-term mobility (their curve continues to slope downward, although also less steeply). When we consider the rigidity curves drawn using the Gini coefficient, the evidence that mobility of agricultural labour households is transitory is less clear. However, Shorrocks (1978c) has argued that the Gini coefficient may be particularly inappropriate for this type of exercise as the main effect of cumulating incomes is to average out incomes that are temporarily high or low, and thus the strongest egalitarian trend obtained by cumulating

incomes over sub-periods intervals will be found in the tails of the income distribution.

5.6. Concluding Comments

Over the 25-year period for which data on Palanpur are available, there have been many different types of change which have had a profound impact on the village economy. Population growth has been substantial with nearly a doubling in the number of people between the first and last survey year. Many households have split over time with married sons setting up households independently of their parents. New agricultural technologies and intensified cultivation practices have led to large gains in land productivity and have resulted in agricultural income growth. Patterns of cultivated landholdings have altered from year to year with no clearly discernable trend towards concentration or equalized holdings. However, the pattern occurring in a particular year significantly affects the distribution of agricultural income resulting in that year. Year to year fluctuations in the quality of the harvest directly affect agricultural incomes and there is also evidence that with changing agricultural practices the interaction between harvest quality and farming skills is changing. A process of inter-sectoral transfer, as villagers have increasingly found employment outside the village, has provided a growing additional source of income to the village. The distribution of these incomes from outside jobs has had an important influence on the distribution of total incomes within the village.

It is very difficult to separate the impacts on living standards of all these simultaneous changes. It is clear that the changes described above have not affected all households in Palanpur to the same degree. Moreover, even among households affected by a similar aspect of change (for example cultivating households adopting new agricultural technologies) the direction and extent to which they have been affected may be completely different. It comes therefore as no surprise that there is much evidence

of changing relative positions of households in Palanpur. This economic mobility is reflected most strikingly in the changing relative incomes of households in the village as we compare survey years.

This chapter has not attempted a detailed assessment of the economic mobility observed in Palanpur. It has concentrated instead on identifying and describing a particular group within the village which has not participated in the wider economic mobility. These agricultural labour households run a high risk of poverty. Evidence of limited mobility for households in this group therefore suggests that an important proportion of the poor in Palanpur suffer from sustained poverty.

We have defined the group of agricultural labour households as consisting of all households who report at least one member with some involvement in casual agricultural wage labour during the course of a particular survey year. This does not mean that household income is comprised totally of wage income earned by the household member involved in this activity. In fact, only for a minority of households does agricultural wage income make up even the bulk of household income. Most households, certainly in the later survey years, earn the bulk of their income from other activities, ranging from cultivation to self-employment within the village to regular employment outside the village. A central feature of agricultural wage labour, however, is that it is regarded as very unappealing. Involvement in agricultural labour of a particular household member hence ensures that it is in some distress. This is the reason, it is argued, that households involved in agricultural labour are consistently found among the poor. The fact that the number of households involved in agricultural labour make up a sizeable proportion of the village total also ensures that the poor among these households represent a large proportion of all poor households.

An important observation for Palanpur is that most households with involvement in agricultural labour in one year tend also to be involved in this activity in subsequent survey years. Hence, occupational mobility is

very low for agricultural labour households (where we define agricultural labour as an occupation if there is some, however small, agricultural labour income in the household). It is likely that households which are compelled to become involved in this activity have exhausted their other options. In addition, it is plausible that the low earnings associated with agricultural labour (due to low wages as well as low participation rates) prevent the accumulation of surpluses which would assist households in finding alternative occupations.

While the high poverty incidence of agricultural labour households and the low occupational mobility of this group suggests chronic poverty for many such households, the evidence of high income mobility for agricultural labour households does seem to point in the opposite direction. An important consideration here is the degree to which we are satisfied with our income measure. Current income in a particular survey year will inevitably be an imperfect measure of long term living standards. If it can be shown that most of the observed income mobility of agricultural labour households is in fact the consequence of transitory events which enter into our income measure, then our confidence in suggesting that these households suffer from chronic poverty will be restored.

In this chapter we explored an approach to the question of transitory versus long-term mobility, which considers mobility as composed of two components. One component is the income position of agricultural labour households taken as a group as compared with the rest of the village. If the average income of all agricultural labour households rises or falls vis-a-vis average income for the rest of the village, then there will be some mobility of agricultural labour households which can attributed to this relative mean change. The second component abstracts away from relative movements between agricultural labour households and other households and focuses instead on changes in the relative positions of agricultural labour households among this group.

We have found little evidence of any long-term mobility in the sense

of sustained changes in the relative position of agricultural labour households vis-a-vis other households. We have indicated that during years of poor harvest quality the relative position of all agricultural labour households tended to be boosted in the village ranking because households specializing in cultivation had depressed cultivation incomes in those years. To the extent that agricultural labour households earned at least part of their income from sources unaffected by the quality of the harvest (i.e. their wage income), their total incomes were buffered from such events. Similarly, during years when the quality of harvest was good, there is strong evidence that agricultural labour households as a group fell in the village income ranking. In so far that harvest quality is a random event with some years good and others bad, there is evidence that changes in the relative position of agricultural labour households as a group have been for a large part transitory. If instead the harvest quality had shown a declining trend over time (due perhaps to environmental degradation) and output prices did not alter to offset this, we might have seen agricultural labour households as a group enjoying a more sustained rise in relative incomes.

In the analysis of income mobility among the group of agricultural labour households, an approach was implemented which examined how income inequality of this group changed as household incomes over successive years were cumulated. The idea behind this approach is that if income mobility is largely transitory, cumulated relative incomes will soon approach long-term relative incomes as years are successively added together (although admittedly, this seems most plausible if the years are adjacent to each other). For agricultural labour households' incomes this indeed was the pattern observed, and stood in contrast to the pattern observed for other households. Within the two groups, much of the income mobility of agricultural labourers appeared to be transitory while there is a suggestion that the intra-group mobility among other households was longer-term. Of course, because only relatively few survey years could be compared, and these are separated by periods of many years, any conclusions arising from this particular analysis should only be regarded as suggestive

at best.

As our arguments have centred on the long-term poverty of agricultural labour households, one important sub-group among the poor has been neglected in this study. This consists of those poor households without a fit adult male and for whom the option of agricultural wage labour is therefore not applicable. We have indicated that in Palanpur, the ability of women to engage in agricultural wage labour is extremely limited and virtually nonexistent for those women who do not have any household member alongside whom they could work as labourers.

TABLE 1

BROAD INDICATORS OF ECONOMIC CHANGE IN PALANPUR

Indicator	1957/58	1962/63	1974/75	1983/84
Population	528	585	757	960
Number of Households	100	106	112	143
Village Real Income(Rs)	86,166	94,712	208,024	186,402
Real Income Per Capita	161.3	161.9	274.8	194.1
Income Inequality (Gini)	0.336	0.390	0.253	0.307
Price Index (1960/1=100)	107	92	378	528
Agricultural Daily Wages in Real Terms (1962/3=100)	123	100	123	158
Food Purchasing Power (kg. of wheat per day)	2.5	2.25	3.1	5.0
Index of Real Wages for Regular Outside Jobs	n.a	100	122	193
Wheat yields, actual kg. per bigha	40	40	114	97
Wheat yields, normal kg. per bigha	40-50	50	100	150-160

Notes:

1. The price index is the consumer price index for agricultural labourers (CPIAL), which is taken from the Bulletin of Food Statistics for the relevant years. See Lal (1976) for the price index for 1957/58.

2. An acre=6.4 bighas.

3. "Normal" yields correspond to the expected yield for Palanpur without advanced knowledge of each year's harvest.

TABLE 2

AGRICULTURAL LABOUR HOUSEHOLDS, 1957-84

	1957/58	1962/63	1974/75	1983/84
Caste				
Thakur	0	0	1	0
Murao	1	3	2	3
Dhimar	7	6	6	8
Gadaria	0	0	0	2
Dhobi	0	0	0	2
Teli	5	4	7	9
Passi	4	1	3	6
Jatab	9	2	11	11
Other	0	0	2	0
Total Number	26	16	32	41
Total in Village	100	106	111	143
Average per capita income (as a % of village average)	67%	56%	72%	82%
Average per capita income (as a % of village average)[1]	66%	53%	61%	50%
Average Landholding (as a % of village average)	25%	27%	46%	38%
Average Cultivated Holding (as a % of village average)	34%	35%	66%	56%
Average value of Livestock (as a % of village average)	34%	46%	53%	52%
Wage income as a percentage of total household income				
Village	15%	9%	3%	11%
Agricultural Labour Households	54%	60%	17%	29%
Number of Landless	6	3	5	11
Number of Non-Cultivators	6	3	8	17

Note: 1. For agricultural labour households earning at least 20% of total income from wage labour.

TABLE 3

"POVERTY INCIDENCE" AND "POVERTY CONTRIBUTION": AGRICULTURAL LABOUR HOUSEHOLDS AND JATAB HOUSEHOLDS

Agricultural Labour Households

Poverty Criterion	1957/58	1962/63	1974/75	1983/84
1. Relative Poverty (Bottom 40%)				
i) Poverty Incidence	54%	75%	78%	61%
ii) Poverty Contribution	35%	29%	57%	44%
2. Absolute Poverty (Below Poverty Line)				
i) Poverty Incidence	62%	75%	22%	61%
ii) Poverty Contribution	36%	23%	54%	44%

Jatab Households

Poverty Criterion	1957/58	1962/63	1974/75	1983/84
1. Relative Poverty (Bottom 40%)				
i) Poverty Incidence	56%	54%	78%	89%
ii) Poverty Contribution	23%	17%	25%	30%
2. Absolute Poverty (Below Poverty Line)				
i) Poverty Incidence	63%	62%	21%	89%
ii) Poverty Contribution	22%	15%	23%	30%

Notes:

1. "Poverty Incidence" corresponds to the proportion of households with the stated characteristic classified as poor (according to either poverty criterion).
2. "Poverty Contribution" corresponds to the proportion of poor households with the stated characteristic.
3. The poverty line utilized for the absolute poverty criterion is Rs. 11.3 per person per month in 1960/61 rupees. This is an Uttar Pradesh-specific figure derived from the Rs. 15 poverty line proposed by Dandekar and Rath (1971) for India as a whole. Relative prices between Uttar Pradesh and India were taken from Bhattacharya and Chatterjee (1974).

TABLE 4

AGRICULTURAL LABOUR HOUSEHOLDS, 1957-84 ("CLOSED" VILLAGE)

	1957/58	1962/63	1974/75	1983/84
Caste				
Thakur	0	0	0	0
Murao	0	0	0	2
Dhimar	4	6	6	7
Gadaria	0	0	0	2
Dhobi	0	0	0	0
Teli	5	4	7	8
Passi	2	1	3	4
Jatab	6	2	11	11
Other	0	0	0	0
Total Number	17	13	27	34
Total in Village	76	84	98	120
Average per capita income (as a % of village average)	60%	54%	71%	73%
Average per capita income (as a % of village average)[1]	59%	54%	62%	49%
Average Landholding (as a % of village average)	25%	23%	46%	37%
Average Cultivated Holding (as a % of village average)	37%	35%	69%	52%
Average value of Livestock (as a % of village average)	35%	48%	57%	45%
Wage income as a percentage of total household income				
Village	11%	9%	3%	11%
Agricultural Labour Households	49%	63%	17%	30%
Number of Landless	3	3	5	8
Number of Non-Cultivators	2	2	6	12

Note: 1. For agricultural labour households earning at least 20% of total income from wage labour.

TABLE 5

"POVERTY INCIDENCE" AND "POVERTY CONTRIBUTION": AGRICULTURAL LABOUR HOUSEHOLDS AND JATAB HOUSEHOLDS ("CLOSED" VILLAGE)

Agricultural Labour Households

Poverty Criterion	1957/58	1962/63	1974/75	1983/84
1. Relative Poverty (Bottom 40%)				
i) Poverty Incidence	59%	85%	81%	62%
ii) Poverty Contribution	33%	32%	56%	44%
2. Absolute Poverty (Below Poverty Line)				
i) Poverty Incidence	71%	85%	22%	59%
ii) Poverty Contribution	36%	25%	60%	43%

Jatab Households

Poverty Criterion	1957/58	1962/63	1974/75	1983/84
1. Relative Poverty (Bottom 40%)				
i) Poverty Incidence	62%	46%	79%	89%
ii) Poverty Contribution	27%	18%	28%	35%
2. Absolute Poverty (Below Poverty Line)				
i) Poverty Incidence	69%	62%	21%	89%
ii) Poverty Contribution	27%	18%	30%	37%

Notes:

1. "Poverty Incidence" corresponds to the proportion of households with the stated characteristic classified as poor (according to either poverty criterion).
2. "Poverty Contribution" corresponds to the proportion of poor households with the stated characteristic.
3. The poverty line utilized for the absolute poverty criterion is Rs. 11.3 per person per month in 1960/61 rupees. This is an Uttar Pradesh-specific figure derived from the Rs. 15 poverty line proposed by Dandekar and Rath (1971) for India as a whole. Relative prices between Uttar Pradesh and India were taken from Bhattacharya and Chatterjee (1974).

TABLE 6

INCOME MOBILITY IN PALANPUR

A. 1957/58 against 1962/63[3]

Quintile	1	2	3	4	5	Total Households
1	0.17	0.28	0.28	0.22	0.06	18 (16)
2	0.31	0.44	0.19	0.06	0	16 (15)
3	0.20	0.13	0.20	0.33	0.13	15 (15)
4	0.21	0.11	0.32	0.21	0.16	19 (15)
5	0.13	0.06	0	0.19	0.63	16 (15)
Total Households	17	17	17	17	16	84 (76)

B. 1962/63 against 1974/75[3]

Quintile	1	2	3	4	5	Total Households
1	0.18	0.24	0.12	0.24	0.24	17 (17)
2	0.28	0.39	0.06	0.17	0.11	18 (17)
3	0.26	0.11	0.26	0.21	0.16	19 (17)
4	0.15	0.25	0.35	0.20	0.05	20 (17)
5	0.17	0.08	0.21	0.17	0.38	24 (16)
Total Households	20	20	20	19	19	98 (84)

Notes:

1. The relative frequency of households appearing in the respective quintiles is entered in each cell. These can also be interpreted as the respective probabilities of housholds moving from one quintile to another between the comparison periods.
2. The population in these mobility tables consists of the "closed" village population which includes only those households present in all four survey years. The household totals in the "closed" village population are 76, 84, 98 and 120 households in 1957/58, 1962/63, 1974/75 and 1983/84, respectively.
3. In brackets are the household totals which correspond to the row year.

TABLE 6 (cont'd)

INCOME MOBILITY IN PALANPUR

C. 1974/75 against 1983/84[4]

Quintile	1	2	3	4	5	Total Households
1	0.16	0.20	0.36	0.28	0	25 (20)
2	0.42	0.23	0.04	0.08	0.23	26 (20)
3	0.08	0.20	0.20	0.20	0.32	25 (20)
4	0.27	0.23	0.23	0.14	0.14	22 (19)
5	0.05	0.14	0.18	0.32	0.32	22 (19)
Total Households	24	24	24	24	24	120 (98)

D. 1974/75 against 1983/84[4]
(Adjusted Income)

Quintile	1	2	3	4	5	Total Households
1	0.25	0.29	0.13	0.33	0	24 (20)
2	0.31	0.27	0.12	0.08	0.23	26 (20)
3	0.13	0.25	0.29	0.21	0.13	24 (20)
4	0.25	0.04	0.25	0.13	0.33	24 (19)
5	0.05	0.14	0.23	0.27	0.32	22 (19)
Total Households	24	24	24	24	24	120 (98)

Notes:
1. The relative frequency of households appearing in the respective quintiles is entered in each cell. These can also be interpreted as the respective probabilities of housholds moving from one quintile to another between the comparison periods.
2. The population in these mobility tables consists of the "closed" village population which includes only those households present in all four survey years. The household totals in the "closed" village population are 76, 84, 98 and 120 households in 1957/58, 1962/63, 1974/75 and 1983/84, respectively.
3. In Table D revenues accruing from cultivation are scaled *up* by 30% in 1983/84 and scaled *down* by 30% in 1974/75. Costs were left unchanged on the assumption that they had been incurred before the quality of the harvest had become apparent. See text for further details.
4. In brackets are the household totals which correspond to the row year.

TABLE 7

THE PERSISTENCE OF AGRICULTURAL LABOUR

	1957/58	1962/63	1974/75	1983/84
1957/58	17	12 (10)	18 (14)	18 (12)
1962/63	0	1	1 (1)	1 (1)
1974/75	0	0	8	7 (5)
1983/84	0	0	0	8
Total	17	13	27	34

Notes:

1. The entry in each cell indicates the number of agricultural labour households in the year corresponding to that column who had also been involved in agricultural labour in the year corresponding to that row. For example, the entry in the third column and first row, indicates that 18 households involved in agricultural labour in 1974/75 had also been involved in agricultiural labour in 1957/58. Note that it does <u>not</u> mean that the 18 households had <u>also</u> been involved in agricultural labour in 1962/63.
2. In brackets is the number of agricultural labour households in the row year from whom the corresponding column year households stemmed. Thus the 18 households in 1974/75 who could be traced back to agricultural labour households in 1957/58 stemmed from 14 out of the 17 agricultural labour households in 1957/58.

TABLE 8a

PROBIT ANALYSIS OF THE CHARACTERISTICS OF AGRICULTURAL LABOUR HOUSEHOLDS

Dependent Variable: 0-1 Variable taking the value 1 if a household is involved in agricultural labour.

Explanatory Variable	Model		
	1962/63 (84 obs.)	1974/75 (98 obs.)	1983/84 (120 obs.)
Household Split			
1957/58-1962/63	-0.32 (0.64)		
1962/63-1974/75		0.17 (0.70)	
1974/75-1983/84			-0.22 (0.53)
Education			
1964/65	-0.04 (0.77)		
1974/75		-0.43 (0.19)	
1983/84			-0.08 (0.04)
Agricultural Labour Before	2.45 (0.00)	1.71 (0.00)	1.42 (0.00)
Land Cultivated			
1962/63	-0.05 (0.18)		
1974/74		-0.03 (0.03)	
1983/84			-0.02 (0.03)
Landless	-0.70 (0.43)	-0.15 (0.83)	-0.25 (0.60)
Adult Males			
1962/63	0.47 (0.11)		
1974/75		0.45 (0.02)	
1983/84			0.23 (0.08)
Jatab	-1.25 (0.12)	1.95 (0.00)	-0.02 (0.97)
Intercept	-1.79 (0.03)	-1.37 (0.00)	-0.80 (0.03)

Notes:

1. In brackets is the probability that the parameter estimate is equal to zero.
2. The population in the probit analysis corresponds to the "closed" village population which omits any household not present in all four of the survey years. The household totals corresponding to this population are 76, 84, 98, 120 for 1957/58, 1962/63, 1974/75 and 1983/84 respectively.

TABLE 8b

MEAN VALUES OF EXPLANATORY VARIABLES

Explanatory Variable	Mean
Household Splits (dummy)	
1957/58-1983/84	0.17
1962/63-1974/75	0.31
1974/75-1983/84	0.31
Education[1]	
1962/63	2.24
1974/75	0.81
1983/84	4.72
Agricultural Labour Before (dummy)	
1962/63	0.24
1974/75	0.16
1983/84	0.32
Landless (dummy)	
1962/63	0.08
1974/75	0.08
1983/84	0.13
Land Cultivated	
1962/63	29.83
1974/75	24.04
1983/84	20.88
Jatab (dummy)	
1962/63	0.15
1974/75	0.14
1983/84	0.16
Adult Males	
1962/63	1.85
1974/75	2.04
1983/84	2.08

Note

1. The education variable for 1962/63, and 1983/84 corresponds to the years of schooling completed by the most educated member of a households. For the 1974/75 survey year, the education variable takes a value of 0,1, or 2 indicating illiteracy, primary education, or secondary/higher education respectively, for the most educated member of the household.

TABLE 9

INCOME MOBILITY OF AGRICULTURAL LABOUR HOUSEHOLDS[1]

A. 1957/58 against 1962/63

Quintile	1	2	3	4	5	Total Households
1	2(1)	2(2)	3(0)	2(0)	0	9(3)
2	2(2)	1(1)	0	1(0)	0	2(3)
3	2(2)	1(1)	1(1)	0	0	4(4)
4	0	0	1(1)	1(1)	0	2(2)
5	0	0	0	0	0	0
Total Households	6(5)	4(4)	5(2)	4(1)	0	19(12)

B. 1962/63 against 1974/75

Quintile	1	2	3	4	5	Total Households
1	2(2)	3(3)	0	1(0)	0	6(5)
2	2(2)	1(0)	1(0)	0	0	4(2)
3	6(5)	1(1)	0	0	0	7(6)
4	2(2)	1(1)	2(1)	1(1)	0	6(5)
5	0	0	0	0	0	0
Total Households	12(11)	6(5)	3(1)	2(1)	0	23(18)

Notes:

1. The population in these transition matrices consists of those households which were involved in agricultural labour in 1957/58 and which were also present in all four of the survey years. The number of households which appear in the respective quintiles is entered in each cell. Note that the number of households is increasing over time as some of the original 17 households split between two survey years. In addition, not all of the households involved in agricultural labour in 1957/58 were involved in this activity in every survey (see note 2 below).
2. In brackets is entered the number of those households which were involved in agricultural labour during the 1957/58 survey year.

TABLE 9 Cont.

INCOME MOBILITY OF AGRICULTURAL LABOUR HOUSEHOLDS[1]

C. 1974/75 against 1983/84

Quintile	1	2	3	4	5	Total Households
1	4(2)	3(2)	4(3)	3(1)	1(1)	15(9)
2	4(3)	1(1)	0	3(2)	0	8(6)
3	1(1)	0	1(0)	0	1(0)	3(1)
4	1(1)	1(1)	0	0	0	2(2)
5	0	0	0	0	0	0
Total Households	10(7)	5(4)	5(3)	6(3)	2(1)	28(18)

Notes:

1. The population in these transition matrices consists of those households which were involved in agricultural labour in 1957/58 and which were also present in all four of the survey years. The number of households which appear in the respective quintiles is entered in each cell. Note that the number of households is increasing over time as some of the original 17 households split between two survey years. In addition, not all of the households involved in agricultural labour in 1957/58 were involved in this activity in every survey (see note 2 below).
2. In brackets is entered the number of those households which were involved in agricultural labour during the 1957/58 survey year.

TABLE 10

Stability of Real Per Capita Incomes by Two Occupational Groups: Values of the Rigidity Index (R) For Three Inequality Measures[1]

Inequality Index	Period	Agricultural Labour Households	Other Households	Whole Village
General Entropy				
C_0	1957/58	1.00	1.00	1.00
	1957/58-1962/63	0.49	0.81	0.68
	1957/58-1974/75	0.29	0.47	0.53
	1957/58-1983/84	0.28	0.41	0.38
C_2	1957/58	1.00	1.00	1.00
	1957/58-1962/63	0.53	0.72	0.74
	1957/58-1974/75	0.38	0.49	0.54
	1957/58-1983/84	0.35	0.42	0.44
Gini Coefficent				
	1957/58	1.00	1.00	1.00
	1957/58-1962/63	0.76	0.88	0.88
	1957/58-1974/75	0.66	0.73	0.78
	1957/58-1983/84	0.58	0.63	0.68

Notes:

1. The Rigidity Index (R) is defined as:

$$R = \frac{I[Y(t_0, t_m)]}{\sum_{k=1}^{m} w_k I[Y(t_{k-1}, t_k)]}$$

where m is the maximum number of accounting periods which can be cumulated, I[Y] is an inequality measure and

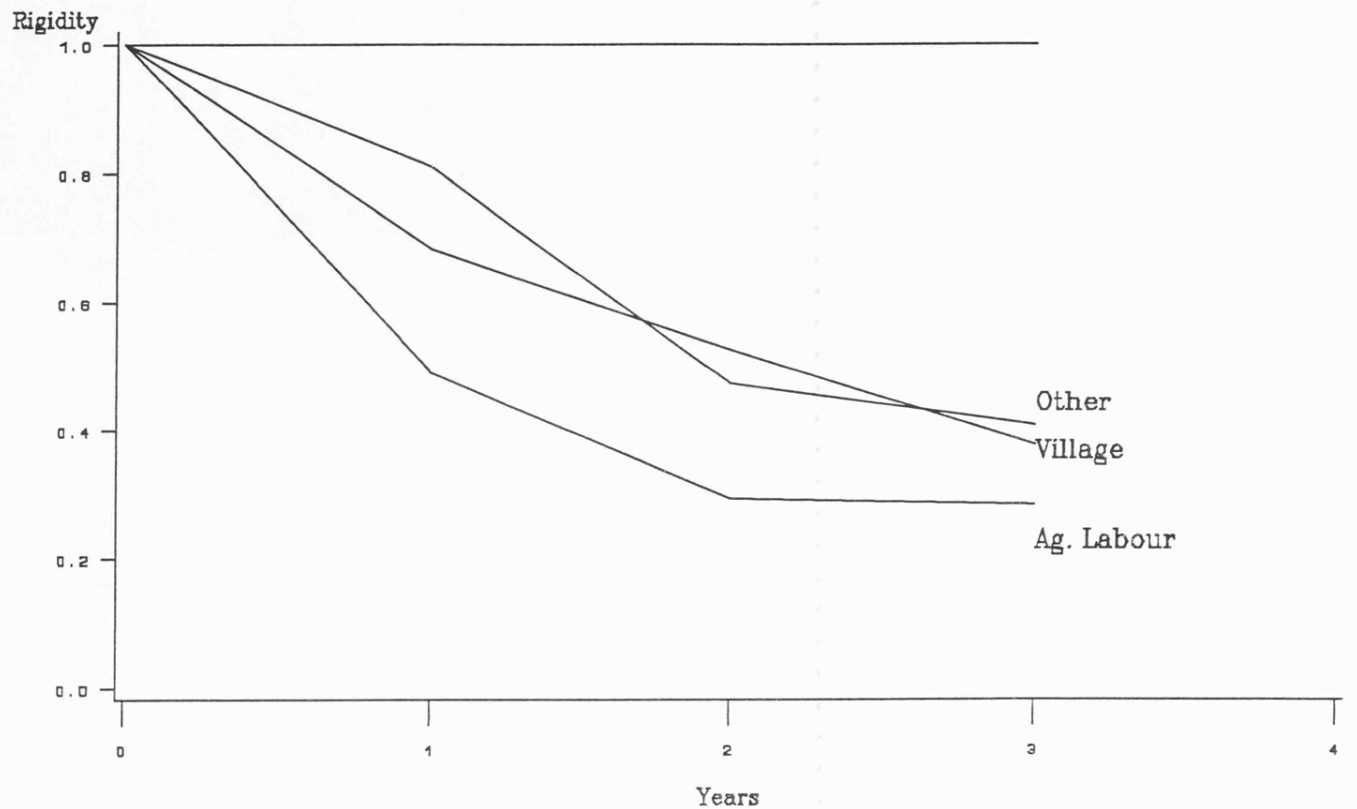
$$w_k = \frac{\mu(t_{k-1}, t_k)}{\mu(t_0, t_m)}.$$

Further details can be found in the text and Shorrocks (1978).

2. The General Entropy measure with a parameter value of 0 corresponds to the Theil L measure which is particularly sensitive to the lower part of the income distribution. With a parameter value of 2, the General Entropy measure becomes the coefficient of variation which is sensitive to the upper part of the income distribution. Finally, the Gini coefficient is particularly sensitive to income movements around the middle of the distribution.

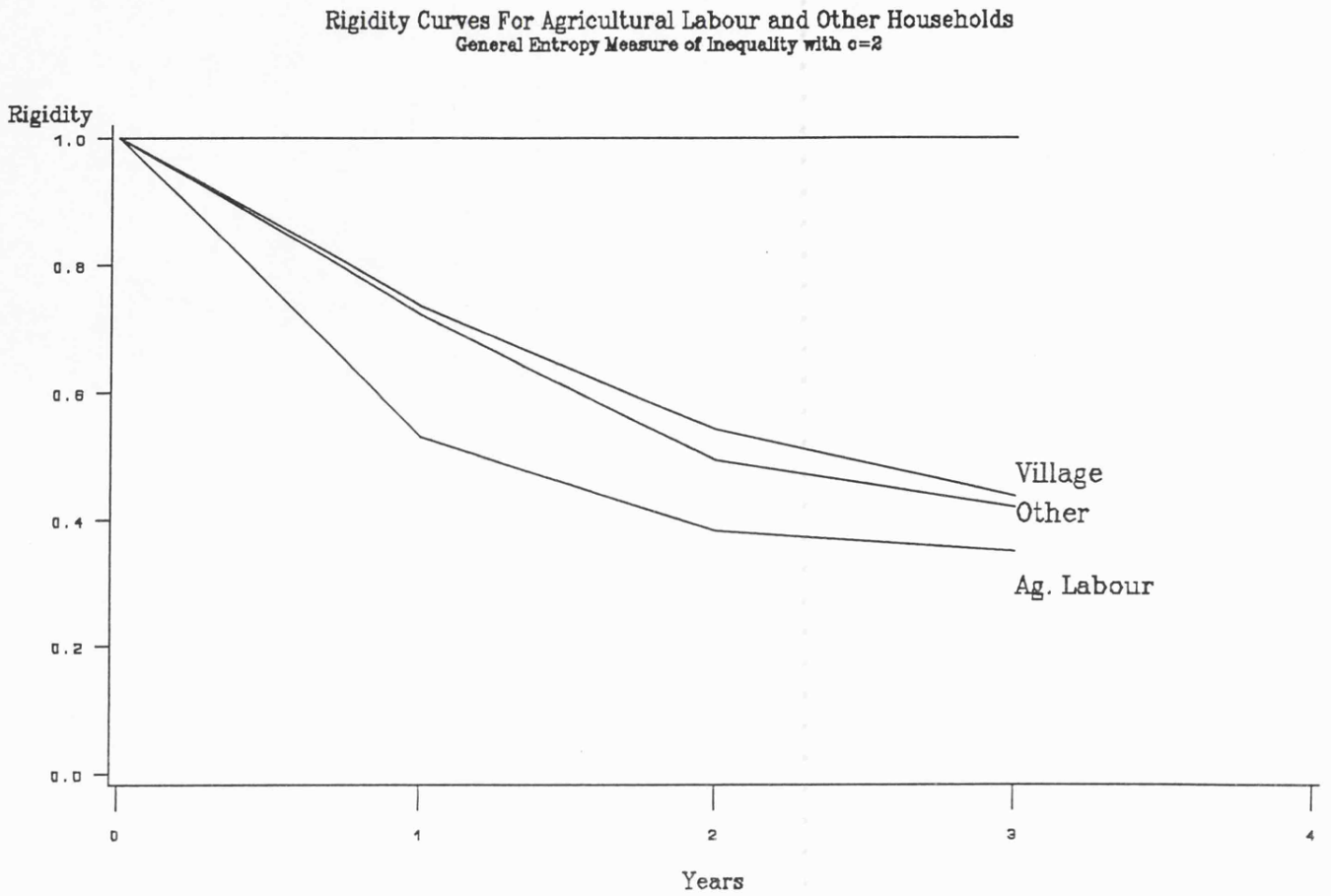
Figure 1

Rigidity Curves For Agricultural Labour and Other Households
General Entropy Measure of Inequality with α=0



Closed Village Population (120 hhs)

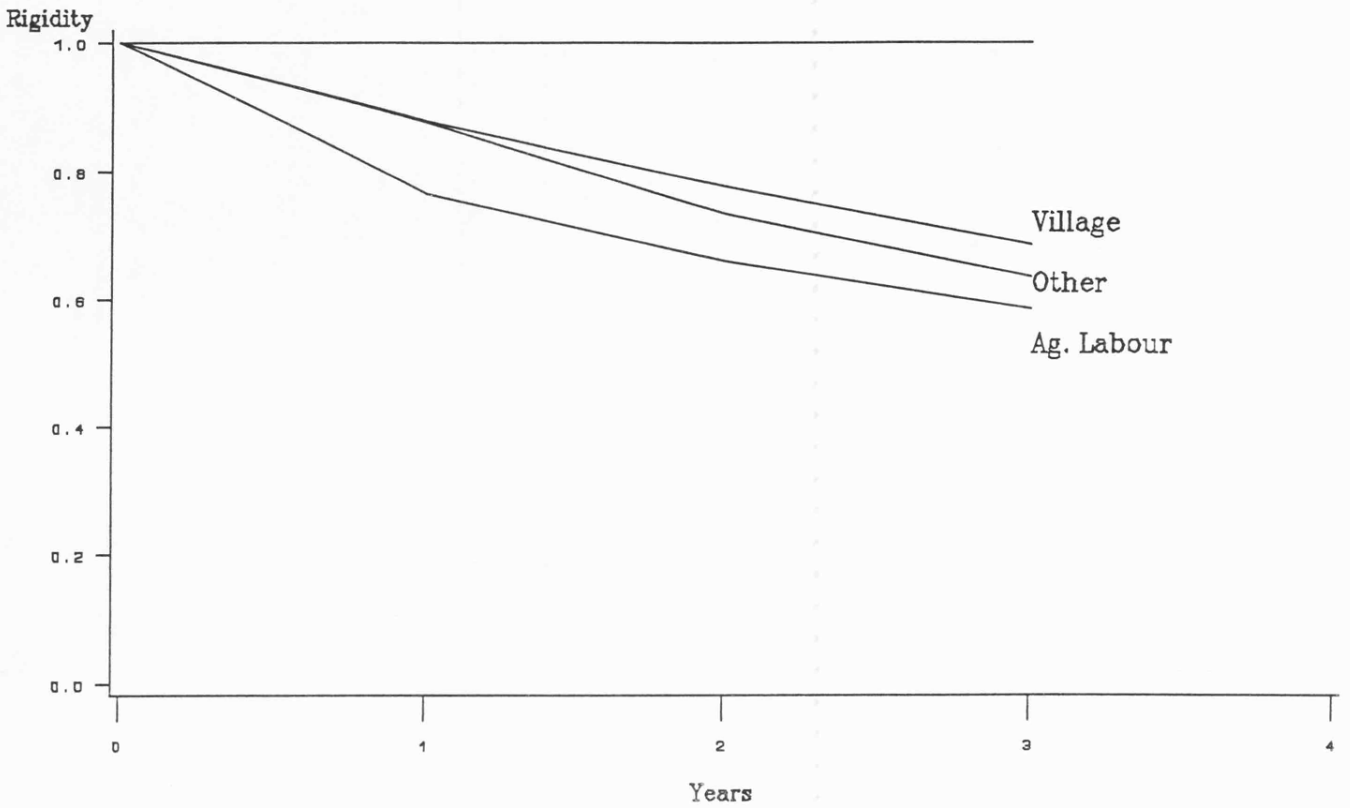
Figure 2



Closed Village Population (120 hhs)

Figure 3

Rigidity Curves For Agricultural Labour and Other Households
Gini Coefficient Measure of Inequality



Closed Village Population (120 hhs)

Chapter 6

The Credit Market in Palanpur: A Comparison of 1974/75 and 1983/84[1]

6.1. Introduction

In this chapter we examine in some detail the operation of the credit market in Palanpur. Credit is clearly an important part of the rural economy. The linkages between credit transactions and other economic decisions and outcomes are numerous and wide-ranging. Growth of agricultural output in the face of fixed quantities of land depends on a farmer's ability to finance capital investments, or to adopt new technologies. In addition, savings behaviour and consumption smoothing over the agricultural year, the emergence of specific terms in tenancy and labour contracts, decisions on fertility, the operation of the land and other markets, the distribution of income, and the functioning of various social institutions such as weddings, may all be influenced by, and influence, borrowing and lending.

If we consider the poor in particular the operation of the credit market is important from several distinct perspectives. Credit (on acceptable terms) can be of crucial importance in enabling the poor to deal with the consequences of their poverty. For example, the ability to borrow for consumption purposes may tangibly reduce the risk of nutritional shortfalls. Credit may also assist the poor to escape their poverty. This appears to have been a guiding principle behind the establishment of the Integrated Rural Development Programme (IRDP) in India[2]. Finally, even if the poor are not able to directly gain access to credit, the benefits from credit going to the rich may still reach them. For example, if credit makes possible the intensification of agriculture, the poor may benefit

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[1]. I would like to extend my thanks to Dr. Joanna Gomulka for advice on the implementation of the double-hurdle model and also for permission to use her model to estimate the equations presented here. Assistance with running the model was gratefully received from David Coady.

[2]. See Drèze (1990) for a critical evaluation of the operation of IRDP in several parts of India, including Palanpur.

from a more active labour market, and/or higher wages.

In recent years, there has been growing interest in studying the linkages between credit and these numerous facets of the rural economy. However, in most developing countries there is a shortage of empirical material on the subject and this means that our understanding of the credit market leaves much to be desired. This is particularly so where we consider the evolution of credit markets over time. Furthermore, evaluating the success of policies intended to improve the functioning of the credit market requires an appreciation of the way the market responds to such interventions. This in turn also provides indicators for the design of new policies. In this chapter, the evolving credit market in Palanpur is described. The study has as primary focus a comparison of the operation of the credit market in two years: 1974/75 and 1983/84. Although we have data covering many aspects of the economy from the two earlier surveys of Palanpur, the credit data in those surveys is not very detailed and as a result will not be the focus of attention in this study.

The 1974/75 credit market in Palanpur was first described briefly in Bliss and Stern (1982)[3]. The operation of the credit market in 1983/84 was described in some detail by Drèze, Lanjouw and Sharma (1991). This chapter extends the analysis in Drèze, Lanjouw and Sharma to specifically consider the manner in which the credit market in 1983/84 has changed relative to 1974/75. Throughout the chapter we will pay particular attention to the position of the poor in the Palanpur credit market.

An examination of the changing operation of the credit market in Palanpur between the two survey years must be related to the substantial

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[3]. Bliss and Stern (1982) make a few comparisons of credit market operations in Palanpur in 1957/58 with the 1974/75 survey year. They found that after taking into account population growth and inflation, institutional sources of credit (essentially the government sponsored Cooperative Credit Society, or Seed Store, in Palanpur) were providing roughly twenty-five per cent more real credit per head in 1974/75 than in 1957/58. Also by 1974/75 the Seed Store had abandoned an earlier attempt to be a general supplier of seed to its members, and lent only one variety of wheat seed during that survey year.

change occurring elsewhere in the village economy during this period. We have seen in earlier chapters the importance of population growth, intensification of agricultural practices as well as variation in harvest quality, changing patterns of landholding and operational holdings, changing inequality of incomes, and the expansion of off-farm employment (for convenience Table 1 presents a brief review of the basic indicators for 1974/75 and 1983/84 by caste). Such processes can result in important changes in the demand for and supply of credit, and can also reflect some of the consequences of the specific operation of the credit market in the village.

The data analysis in this chapter is almost exclusively of information on the stock of debt outstanding at the time of interview in the respective survey years. The interviews on indebtedness during the 1974/75 survey year formed part of the general household survey conducted for 112 of the 118 households in the village in November 1974. This undertaking was completed by the end of November, 1974. In the 1983/84 survey year, a specific questionnaire on indebtedness had been prepared and most interviews took place during the months of May and June, 1984. By the end of August, 1984, all households in the village had been interviewed.

Information on debt outstanding is only an imperfect indicator of the number and importance of credit market transactions which occur during a particular period. Occasionally, it can become quite misleading. For example, we will see below that the large amount of debt outstanding to one particular public sector source, and the increase in the stock of this debt between the two survey years, cannot be realistically regarded as a flow of new credit. Similarly, the amount of debt outstanding at a particular moment in time may fail to capture the importance of those credit transactions which are turned over rapidly. In the example of one lender specializing in loans of wheat over one particular season, failure to collect information on debt outstanding during this season would lead to the mistaken impression that this lender is not an active participant in the credit market. Information on lending is patchy for Palanpur,

particularly lending within the private sector. It is therefore not analysed in any detail in this chapter. In general, credit data are among the most difficult types of data to collect. As a consequence they are not as complete as information collected on other aspects of the Palanpur economy. This is more the case for the credit data collected in the 1974/75 survey year. For example, extensive data on the identity of regular moneylenders in the village in 1974/75 was not collected, nor was it possible to determine the date when debts had been incurred. Nevertheless, extensive double-checking and verification was carried out and was feasible because during both surveys the investigators lived in the village for such an extended period of time. It is therefore likely that the data do carry substantial and useful information.

In the next section we will briefly discuss some aspects of rural financial markets which have been described in the literature, and which are relevant to our examination of the Palanpur credit market. In section 3 we present an overview of changes in levels of indebtedness between the two years. Section 4 considers the evolving role of the public sector in the Palanpur credit market. Section 5 turns to the informal credit market within the village. Informal credit transactions between the village and outside sources are examined in Section 6. In Section 7 we look at the debt burden of Palanpur households and examine the relationship between indebtedness and caste, income and landholdings during the two survey years. Section 8 considers in a more formal manner the characteristics of borrowers from different segments of the market and also examines the determinants of debt levels. Section 9 presents a concluding discussion.

6.2. Rural Financial Markets: Some Issues

The credit market in rural areas has an important role to play in affecting living standards of households. First, the market can fulfil an important intertemporal function whereby households wishing to make productive investments may be able to temporarily expand their expenditures over and above their current revenues and savings. These productive

investments can affect future incomes of households and in this way living standards may be raised substantially and in a permanent way.

Second, the credit market may affect living standards by providing a buffer whereby households facing a temporary downturn in their fortunes (this can be due to a whole host of reasons including bad health, harvest quality, mistakes, accidents, etc.) are able to avoid having to resort to distress sales of assets, or even more drastically, constrained consumption. With access to loans such households might also avoid reinforcement mechanisms which could threaten to make a temporary downturn become a continuous spiral. On the other hand, where the downturn reveals itself to be long-term as opposed to temporary, debts incurred may come to contribute to a further vulnerability of affected households. The need to service debts and rising borrowing costs could pose an additional burden on households which may be facing considerable hardship already. There is therefore some tension in how one views the provision of credit, or at least certain types of credit, for the purpose of consumption-smoothing.

One perspective with which one can assess the operation of credit markets involves asking whether credit is going to both types of borrowers. We are particularly concerned in this thesis to detect evidence of vulnerability, and are therefore interested to see whether those who are likely to need credit to tide over temporary shortfalls are restricted in their access to the market. This requires some information on the purpose for which debt is incurred. Ascertaining this purpose can be difficult in both principle and practice, because of the fungibility of funds. It is possible for example, that a household may declare the purpose of a particular loan to be for investment, but this loan may also permit that household to divert resources which would otherwise be used in investment to, for example, consumption or the purchase of consumer durables.

We are also interested to see whether credit going to different people has different costs attached to it and to examine why this might be. Costs of credit comprise two components. The first component consists of the

interest rate at which credit is being extended. While this component does not raise any great conceptual difficulties, some details must be considered. The time period over which interest rates are being calculated must be determined, and where comparisons of interest rates are being made care should be taken that the time periods are also comparable. An assessment of the interest rate cost of credit to borrowers should take into account price changes, and this may require conversion from nominal to real rates of interest. Finally, a distinction must be made between simple and compounding rates of interest. With simple rates, the interest payable on a loan is a fixed proportion of the principal outstanding and if the principal has been overdue for several periods, the interest payable is the same fixed proportion times the periods for which it is due. With compound interest rates, unpaid interest is added to the principal outstanding. Interest payable here is a proportion of the combined (and changing) amount which is owed. In this chapter interest rates have been converted into annual terms even though the common practice in the village is to refer to monthly rates. Inflation during and immediately prior to the 1974/75 survey was considerably higher than for the 1983/84 survey. As nominal interest rates have generally risen between the two survey years, this means that real rates have risen even more. Interest charged is almost everywhere at a simple rate. Care will be taken to indicate where interest rates can be regarded as compound.

The second component of the cost of credit involves transactions costs. Where loans are quickly dispersed, small and of short duration, transactions costs may be a more important factor than interest rates in the total cost of a loan to the borrower. Transactions costs to the borrower include travel expenses, time spent on waiting and on repeated visits, filling out complicated forms, non-interest charges and inflexibility in repayment terms. It has been argued that despite higher interest rates, informal credit sources may be attractive to borrowers because they impose fewer of these additional costs. Village moneylenders are nearby, require no documentation, make decisions immediately and are flexible about repayment terms. Transactions costs are also borne by

lenders, however, and it has often been observed that attempts to lower borrower transactions costs have resulted in increased burdens being placed on the lender (see Howes, Lanjouw and Lanjouw, 1991, for an overview of credit market operations in developing countries from the transactions costs perspective).

Risk and consequences of default is a third important perspective on credit markets deserving attention. Default risk can become a serious problem particularly when there are strong asymmetries in information between the borrower and lender. A lender knows that borrowers differ in the likelihood that they will default, and it is costly to determine the extent of that risk for each borrower. In addition it is costly to ensure that borrowers take those actions which make repayment most likely. Furthermore, it is difficult to compel repayment. These various types of default risk have been invoked in the literature on interest rate determination to explain the high interest rates commonly observed in informal rural financial markets (Bottomley, 1975). Because a substantial proportion of borrowers may default on their loans, moneylenders have to charge high interest rates so that the returns they earn on the loans which are repaid offset the losses made on those defaulted. This argument has come under close scrutiny in more recent contributions where it has been pointed out that adverse selection and moral hazard may actually increase the risk of default as the lender raises the interest rate (see Stiglitz and Weiss, 1981). The adverse selection effect relates to the situation that as interest rates rise, the only borrowers who are willing to incur the debt are those who perceive their probability of repaying the loan to be low. The moral hazard effect refers to the possibility that as the interest rate rises this induces projects to be undertaken which have a lower probability of success but higher payoffs when successful[4]. These informational asymmetries may play a central role in explaining why credit rationing is such a widely observed phenomenon, not only in developing

[4] Note, the degree to which adverse selection and moral hazard will be influential will depend on the consequences faced by borrowers who default.

countries, but also in the developed country context. Under extreme circumstances, moral hazard and adverse selection could actually lead to demand for and supply of credit failing to coincide at any price[5].

It has been suggested in recent work that informational asymmetries and enforcement problems have led to the emergence of other devices in rural credit markets which attempt to limit the adverse consequences of such problems. This has prompted investigators to view the operation of rural financial markets in terms of the existence of such devices and how they work (see Bell, 1988, Binswanger and Rosenzweig, 1986, and Hoff and Stiglitz, 1990, for useful surveys following this approach). Two which have received much attention are interlinked transactions and collateral.

An interlinked transaction may be seen as one in which the two parties trade in at least two markets on the condition that the terms of all such trades are jointly determined. In the context of the credit market such interlinked transactions are often thought to take the form of trade-credit interlinkages. Lenders who serve as traders for a borrower will possess some knowledge about his ability to generate income and will be in a more favourable position to enforce a loan. Although incentive problems may not be entirely resolved, the severity of the tradeoff between interest rates and default risk will be less for lenders who have greater access to information and to mechanisms to enforce their claims. In Palanpur, trade-credit interlinkages do not seem to play a major role, but individual initiatives towards interlinkage do occur from time to time. For example, a moneylender might lease out a piece of land to a tenant in order to allow him to repay his debt. The quantitative significance of such interlinked transactions in Palanpur is very limited.

The requirement that a borrower provide the lender with collateral of a value equal or greater than the loan taken out transfers the risk associated with lending from the lender to the borrower and obviates the

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[5]. This possibility was originally explored in the context of the second-hand car market by Akerlof (1974).

need to assess the creditworthiness of a borrower. In many rural financial markets, collateral requirements take the form of land titles. Borrowers offering jewelry and other assets as collateral have also been observed. Informal lenders are frequently thought to have access to detailed local knowledge which gives them an advantage over outside institutions in assessing credit risks. They may be prepared to accept 'social collateral' such as reputation to ensure repayment. We have seen in chapter 2 that the land market in Palanpur is not active. This is also reflected in the observation that land titles are not offered as collateral on informal loans. In Palanpur 'social collateral' is the most commonly observed form, although borrowing from goldsmiths in nearby towns, which involves collateral of gold or silver, does occur.

A final aspect of rural financial markets which should be emphasized is that rural credit markets in developing countries are often observed to be highly segmented. Typically this takes the form of a dual structure where a highly regulated and nationally integrated institutional market charging uniform and relatively low rates of interest coexists with an informal market that charges a widely dispersed set of relatively high rates. At the time of the Palanpur surveys all commercial banks operating in rural India were in the public sector, and for this reason all institutional sources of credit in Palanpur may be regarded as public sector sources. In this chapter, "formal", "public" or "institutional" will be used interchangeably to describe lending from specialized government credit agencies as well as the commercial banking sector, while "informal" or "private" will correspond to the non-government sector. Segmentation of the credit market in Palanpur goes beyond simply the formal/informal dichotomy. Essentially four broad credit market segments can be identified, between which the cost of credit varies but within which that cost tends to be relatively uniform. The first segment consists of public sector or institutional credit. The other three are all within the informal sector of the credit market and consist of 1) high-interest credit from village moneylenders, 2) commercial credit from urban goldsmiths and pawnbrokers, and 3) interest-free credit from friends and relatives.

Nominal interest rates vary widely between these four sources but non-price factors tend to limit arbitrage. The different credit market segments operating in Palanpur can influence living standards in very different ways. In addition, there have been changes over time in the way that this influence is exercised.

3. Overview: Changes in Indebtedness Between the Two Survey Years

Indebtedness in Palanpur between 1974/75 and 1983/84 increased almost threefold in real terms[6]. Table 2 shows 1974/75 total debt in the village amounting to Rs 153,193. This represented 14% of total village income in that year. Most of the debt owed by Palanpur households was in cash terms and the value of debt in kind (wheat) outstanding represented only 11% of all debt. By 1983/84 the total amount of debt outstanding had risen to Rs 429,863. With a total village income roughly 10% lower in 1983/84 than in 1974/75, indebtedness as a percentage of total village income increased from 14% to 44% between the two years[7]. Cash debts, as a percentage of all debts, rose from 89% to 96%.

In 1974/75, there were 31 households which had no debts outstanding at all. This number had risen to 36 in 1983/84. As a percentage of all households, indebted households represented about 69% and 75% of all households in the village in 1974/75 and 1983/84 respectively.

While the data for 1974/75 allow us only to consider total debt outstanding, we are able to distinguish debt incurred specifically during the 1983/84 survey from the total debt outstanding at the time of interview in that year. From this we can see that while total indebtedness in

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[6]. All 1974/75 money values in this paper are expressed in 1983/84 rupees. The deflator is the one introduced in chapter 2 where taking 1960/61=100 the price index for 1974/75 is 378 and 1983/84 is 528.

[7]. In Section 7 we will be considering in greater detail the distribution of debts outstanding relative to per capita income levels, as well as land ownership and caste.

1983/84 had risen to nearly Rs 430,000, the total amount borrowed (in gross terms) during 1983/84 amounted to about Rs 56,000 (see the bottom of Table 2). Therefore, the rise in village indebtedness between 1974/75 and 1983/84 reflects the accumulation of debt over an extended period of time. Only a fraction of the total debt outstanding in 1983/84 had actually been incurred during that year. This serves to remind us that the stock of outstanding debt in a particular year should not be taken to reflect the flow of credit in that year. Note that of the Rs 56,000 of debt outstanding which had been incurred during 1983/84 only, slightly more than half came from private sector sources.

In 1974/75, debts outstanding to public lending institutions totalled Rs 115,663. This represented 76% of all outstanding debt in that year. Outstanding debt from this source in 1983/84 amounted Rs 339,607, or 79% of all outstanding debt. Despite a nearly 300% increase in indebtedness to the formal sector, it is interesting that indebtedness to the private sector appears to have risen at roughly the same pace. An important difference, however, lies in the composition of private credit in the two years. While in 1974/75 all outstanding private debt was to sources within the village, in 1983/84 nearly one and a half times as much debt was owed to sources outside the village than within the village.

The range of interest rates reported on debt outstanding widened considerably between the two survey years (Table 3). The interest rates on cash loans recorded in this table are simple nominal rates written here in annual terms, although the practice within the village is to refer to monthly rates. In 1974/75 debts were recorded at rates of interest ranging between 0 and 50%, with the bulk of public sector debt outstanding at 13% and most private sector debt at 25% and 36%. Wheat, valued at Rs 11,169, was owed to the public sector at an interest rate of 25% in kind over the rabi (winter) season. In 1983/84, interest rates ranged between 0 and 300% for cash loans, and between 25% in kind from the formal sector and 50% in kind from the private sector for wheat loans. Debt outstanding to the formal sector was predominantly at 12% interest per annum, while debt to

the private sector was mainly at a rate of 36% and 60% per annum. While the (official) cost of credit from the formal sector did not rise between the two survey years, the cost of interest-bearing loans from the private sector rose substantially over this period. However, between 1974/75 and 1983/84 there was also an important increase in interest free debt. In 1974/75 a total of Rs 1,956 were owed interest-free to private sources. In the later survey year this had increased more than 11 times to Rs 21,826. We have already mentioned that inaccuracies and omissions are more likely to occur with credit data than with other data collected in a village such as Palanpur. This problem may be particularly acute in the case of data on interest free credit. Most of these transactions are between friends and relatives who might be reluctant to divulge information on such transactions, or who might not regard them as part of the credit market. Although the data for 1983/84 are somewhat more detailed, it is very unlikely that the spectacular increase in interest free credit should be attributed entirely to omissions in data collection during the 1974/75 survey. There is therefore evidence of an important new development in the Palanpur credit market.

In this chapter our discussion of interest rates will be focussed on nominal interest rates. However, it is clear that in the presence of inflation real interest rates may be very different from nominal rates. Inflation in the 1974/75 survey year and the year immediately preceding it was 24.7% and 29.5% respectively, on the basis of the General Index of the Consumer Price Index for Agricultural Labourers (CPIAL) in Uttar Pradesh. This means that loans carrying nominal interest charges of 24% or less had zero or negative real interest rates at the time of that survey year. During the 1983/84 survey year and the year immediately preceding it, inflation was running at 7.4% and 9.4% respectively. The lower inflation at the time of the later survey meant that real interest rates were much closer to the nominal interest rates being charged. Taking into account inflation thus heightens our impression of rising interest rates over time between the two survey years.

In summary, levels of indebtedness rose sharply between 1974/75 and 1983/84. Outstanding debt to both the public sector and the private sector rose by roughly the same amount so that the relative share of the credit market of these two sources of credit changed only fractionally. Indebtedness as a proportion of village income rose significantly to over 40% in 1983/84. In Tables 4 and 5, a rough breakdown of credit sources in the two years are presented, detailing the main features of each credit source. Significant changes occurred in the private sector source of credit with a large increase in reported debts outstanding at zero interest, the emergence of outside sources of credit and a rise in typical interest rates on interest-bearing debt owed to the private sector. In Table 6 the most common rates of interest charged by the different sources are detailed in a breakdown of outstanding debt by credit source.

In the following two sections we take up a more detailed discussion of public and private sources of credit in turn.

4. Public Institutions

In both 1974/75 and 1983/84, the most important source of credit, as suggested by outstanding debts, was the formal sector. This sector consisted, in 1974/75, of the Farmers' Service Society (FSS) and Seed Store operating within Palanpur, and the Land Development Bank and to a very minor degree the Cane Society operating outside the village. By 1983/84, an additional source of formal sector credit had emerged - two branches of the Prathma bank in the nearby towns of Nagalia and Jargaon[8]. In Table 7, we see that in 1974/75 the FSS and Seed Store taken together had Rs 89,462 in outstanding loans to Palanpur villagers. This rose to Rs 244,795 for the two institutions in 1983/84. In 1974/75, there were wheat loans

[8]. See D'Mello (1980) for a survey of Indian institutions which have been established to provide credit to small farmers in rural areas. Note that the IRDP programme was not introduced in Palanpur until after the 1983/84 survey, and it is therefore not examined in this chapter. Details of its operation can be found in Drèze (1990).

valued at Rs 16,327 outstanding to the public sector (see Table 5). These were loans issued at a rate of interest of 25% in kind over the rabi season by the Seed Store. Comparing this with the loans outstanding to the Seed Store in 1983/84, we see that outstanding wheat debts to public institutions declined in real terms to a value of Rs. 9,450.

Borrowing from the Seed Store is attractive to poorer cultivating households. The validity of this assertion will be examined further below but it may be useful to mention here the three main reasons why it seems a reasonable one. First, although the seed borrowed is ostensibly to be used for sowing purposes, it is generally of inferior quality so that it can only be used for consumption. This was especially the case in the later survey year; in 1974/75 some farmers were still sowing with the seeds from the Seed Store, but by 1983/84 their quality was widely regarded as having deteriorated, beyond practical usefulness. Second, price movements of wheat over the season when loans were taken out (quite apart from the underlying rate of price change), are usually such that the real interest rate (when rupees are taken as numeraire) can be much lower than implied by 25% interest in kind over the season. Third, borrowing from the Seed Store is said to involve less corruption, fraud, humiliation and travel than other public sector sources (see below). In general its accounting procedures are simple and well understood. These three factors combine to make Seed Store loans important to poorer households in Palanpur, and the observation that the size of this sector's operations declined between the two survey years is therefore of some significance.

What has grown tremendously between the two surveys is the debt outstanding to the FSS. This debt totalled Rs 78,293 in 1974/75 and Rs 228,648 in 1983/84. As discussed in detail in Drèze, Lanjouw and Sharma (1990), fraud and corruption are important features of the FSS's operations; associated both with the allocation of loans and, more strikingly, with the process of repayment. A sophisticated system, known as "transfer-entry", has evolved whereby borrowers who experience some difficulty with the repayment of their debt when due, are able to postpone

repayment at the cost of a very rapid escalation of the principal as well as (higher and *compounding)* interest rates. Essentially, a farmer unable to clear his debt, must pay the interest due plus a "collection charge" expressed as a percentage of his principal in order to be able to defer repayment of the loan. If he is unable to pay the interest plus "collection charge", both are added to the unpaid principal and entered as a new loan to the farmer. The "collection charge" is pocketed by the official administering the loan. In this way, what are initially small outstanding debts can soon become unmanageably large. A nearly three-fold increase in debt outstanding to the FSS between 1974/75 and 1983/84 suggests that a significant factor in the greater presence of the formal sector in the village credit market since 1974/75 might be the result of the "transfer-entry" mechanism. The dramatic rise in debt burden that borrowing from the FSS may entail is illustrated in Table 8 which provides details of credit transactions between the FSS and households of the Jatab caste (among the poorest households in Palanpur) as reported in 1983/84. While it is not possible to systematically control for the occurrence of 'transfer entry', we can assert that as far as FSS credit is concerned, any notion of a massive expansion of new credit extended between the two survey years is likely to be rather illusory. Nonetheless, it is clear that the expansion in indebtedness is not illusory.

Real outstanding debt to the Land Development Bank (LDB) stood at Rs 24,727 in 1974/75 and was virtually unchanged at Rs 24,738 in 1983/84. The LDB is a government-owned rural bank which is mainly oriented to the promotion of agriculture and related activities. It tends to issue longer term loans of greater amounts than the FSS or Seed Store. Interest rates on outstanding loans from the LDB ranged between 7-12% in 1974/75 and remained largely unchanged in 1983/84. Loans from this source were said by villagers in 1983/84 to entail fewer transactions costs than FSS loans, although in 1983/84 some stories of corruption were encountered.

In 1983/84 two branches of the Prathma bank, another government-owned rural bank oriented towards the promotion of agriculture and related

activities, had loans valued at Rs 70,074 outstanding to villagers in Palanpur. In 1974/75 there were no loans outstanding to this source and thus these loans represent a net increase in formal sector lending to Palanpur villagers. As with the LDB, interest rates on outstanding loans to the Prathma bank branches were low relative to rates in the informal sector and transactions costs associated with these loans were not regarded as being as high as those associated with the FSS. However, corruption and irregularities were not unheard of with respect to this source. Moreover, it was suggested by bank officials during the 1983/84 survey year that lending to Palanpur villagers might stop due to low recovery rates. The extent to which these banks will represent a sustained increase in government lending to villagers is therefore unclear.

In Table 9 the distribution of institutional debt by income class is considered. Accompanying the decline in the value of wheat loans outstanding to the Seed Store between 1974/75 and 1983/84 is the fall in the number of households with debts outstanding to this institution. As mentioned above, by the later survey year no farmer was willing to use Seed Store wheat for cultivation purposes. Consequently, the number of households indebted to this source in all but the poorest income class, those most likely to seek consumption loans, had diminished. However, in light of lower average per capita incomes in the 1983/84 survey year and presumably no less need for consumption loans, the fact that the number of households borrowing from the Seed Store did not *increase* might point to the presence of rationed credit from this source.

In 1974/75 only 2% of all non-Seed Store institutional loans went to households in the poorest quintile of per-capita income (Table 9). In 1983/84, only 10% of households with institutional debts outstanding from sources other than the Seed Store or FSS, were in the bottom quintile. In both years, the access of the poor to non-wheat loans from institutional sources appears to have been rather limited, and no significant improvement in this respect is discernable between the two survey years. A closer examination of the debt burden of the households in Palanpur is presented

in section 7, and more formal analysis of the characteristics of borrowers from the Seed Store, FSS and other formal sector sources is carried out in section 8.

5. The Informal Credit Market Within the Village

Despite a nearly three-fold increase in levels of indebtedness to formal sector sources between the two survey years, mainly those operating within the village, the real value of debts outstanding to private lenders within the village in the two years grew marginally from Rs 37,530 in 1974/75 to Rs 38,259 in 1983/84 (Table 2). As a percentage of village income in the respective years, debts outstanding to private sources in the village were never greater than 4% in either survey year. Despite the appearance of constancy there was a significant amount of change in the operation of this part of the credit market in Palanpur between the two survey years. This is clearly seen in the wider range of interest rates on outstanding loans between villagers in the later survey year. It is also reflected in the absence of any 'daur' loans of wheat outstanding in 1974/75 while in 1983/84 such wheat loans, valued at Rs 5,695 were outstanding to Palanpur lenders (Table 5).

In 1974/75 private lending occurred at a relatively narrow range of interest rates. Of the debt with information on interest charges, Rs 1,956 out of a total of Rs 37,530 were outstanding at zero interest. The remaining Rs 35,574 of outstanding debt carried interest rates ranging between 24% and 50% (Table 3). With the exception of loans in kind from the Seed Store, formal sector credit involved substantially lower interest charges. However, as has already been remarked, one must also take into account the possibility of higher transactions costs associated with a number of formal sector sources. By 1983/84 the average, as well as range of, interest rate on loans within the village had increased significantly. Although interest-free loans outstanding had risen to Rs 21,826 (Table 6), in fact only Rs 3,496 of these had come from within the village. The

emergence of a significant outside source of interest-free credit is discussed in more detail below. Of the Rs 34,763 of outstanding debts within the village at a positive rate of interest in 1983/84, only Rs 2,944 were at an interest charge below 37% per annum (Table 6). Interest rates on gambling loans, calculated as a simple annual rate, were sometimes as high as 300% in 1983/84 (although these loans were generally very short term, sometimes as short as one week or even a few days). In the later survey year, a new village-standard interest rate of 60% had emerged on loans from private sources within the village. This is higher than the highest interest rate recorded in 1974/75, and indicates that there has been an increase in the cost of credit from the moneylenders within the village. Examining rates of interest on outstanding debts in 1983/84 provides further support for this claim as loans taken out earlier carry lower interest charges than more recent loans (see Drèze, Lanjouw and Sharma, 1991). It is possible that the expansion in the number of credit sources available (both formal and informal sources outside the village), particularly to well-off and well-connected villagers, is a factor accounting for a rising interest rate on loans from moneylenders within the village. How this might be possible is briefly described below.

Suppose that a moneylender is unable to assess precisely the riskiness involved in lending to a particular borrower, i.e. he does not possess complete knowledge of the circumstances of the borrower. This is somewhat of a departure from the typical portrayal of a village moneylender found in much of the literature. There, it is widely argued that the moneylender possesses near-perfect knowledge of the borrower's circumstances, and it is precisely this which makes him more successful in lending in rural areas than other lending sources. However, in Palanpur even regular moneylenders are not specialized in this occupation and therefore devote only a fraction of their time to this activity[9]. It is reasonable to assume that they are

[9]. Hill (1986) argues that historically in India moneylenders have rarely been fully specialized in credit market transactions. Typically, they have been involved in cultivation as well. In addition, living in a village may provide you with only partial knowledge of other people (this is true whether the village is in the UK, India, or elsewhere). The portrayal in much of the economic literature of moneylenders in this manner

therefore unable to acquire such detailed knowledge of their borrowers as to be able to make a perfect assessment of their credit worthiness. Moreover, with the widening links between Palanpur villagers and the outside economy, it is likely that accurately evaluating the circumstances of borrowers has become more difficult. Hence, let us assume that lenders are only able to distinguish different groups of borrowers, each group with a different probability of default. Suppose further, partly for the reasons given above and partly because of the existence of social norms in the village, that moneylenders are compelled to charge a standard interest rate to borrowers, i.e. they are unable to vary the rate which they charge to groups of borrowers with differing credit worthiness. Village-standard terms for different contracts has been observed in tenancy contracts in Palanpur as well as in the labour market, where a village wage rate has been found to be remarkably sticky, despite involuntary unemployment during some periods, and excess demand at other times (see Drèze and Sharma (1990) and Drèze and Mukherjee (1987)).

The problem facing lenders is essentially one of assessing the credit worthiness of potential borrowers and within this framework the lender's risk hypothesis described by Bottomley (1975) has been widely applied[10]. We have already mentioned that more recent theoretical efforts have been devoted to demonstrating how, in the presence of adverse selection and moral hazard, expected profits of lenders may not monotonically rise with the interest rate charged (Stiglitz and Weiss, 1981, a useful survey is in Bell, 1988). These studies have stressed that the credit worthiness of the pool of borrowers may deteriorate with rising interest rates as only more risky projects are undertaken, or that rising interest rates can induce behaviour on the part of borrowers which is not in the interest of the lender. As a consequence it may be possible for an equilibrium to exist which entails credit rationing.

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may therefore be somewhat artificial. See also Aleem (1990) and Bell (1990).

[10]. A clear and useful exposition of this theory can be found in Basu (1984).

That credit rationing exists in Palanpur is highly probable, but we will not focus here on that aspect of the credit market. We therefore make the assumption that considerations of adverse selection and moral hazard, while potentially important, are not exercising a significant influence over the range of interest rates which we will be examining. Suppose our moneylender finds that, on average, a fraction of his loans are not repaid. For the lender the probability of default, q, on any loan of size L, by any one borrower, is assumed to be distributed with mean q^*, over all potential borrowers in a particular group and their characteristics. The expected probability of default is thus equal to q^*, which is also the average default rate over a particular pool of borrowers. The moneylender's best estimate of the probability of default on a particular loan is equal to the average probability of default of the pool of potential borrowers and he must charge an interest rate so as to receive a positive expected return. If the lender gives a loan of Rs L at an interest rate i, his expected earning (assuming that no interest is paid on what is defaulted) is

$$(1+i)(1-q^*)L-L. \qquad (1)$$

The effective interest rate, r, (which should be equal to the return on the moneylender's funds in some alternative use) is obtained by dividing this by L:

$$r = i(1-q^*) - q^*. \qquad (2)$$

If access to new sources of low-cost credit is not distributed equally over the whole village, so that wealthier villagers, or villagers with higher social status, are increasingly able to satisfy their credit needs outside this village, then this can lead to a rise in i[11]. Essentially, the changing pool of borrowers from the moneylender are perceived to be more likely to default on average because a growing number of the more reliable borrowers are borrowing elsewhere. The distribution of q has shifted in the direction of a higher probability of default. From (2) above, it is easy to see that in order to maintain the effective interest rate as q^*

[11]. The fact that formal sector loans do not go to the poor in rural India has been widely noted, see Adams (1980), D'Mello (1980), Gupta and Shroff (1987). Even within a targeted programme such as the IRDP scheme it has been argued that the poor have not been the sole, or even major beneficiaries, see Drèze (1990).

rises, i must rise[12].

In 1974/75 informal sector loans of wheat outstanding within the village had a total value of Rs 838. In 1983/84, such loans outstanding had increased to a total value of Rs 5,695 (Table 5). These loans are usually taken out for consumption purposes before the rabi harvest and then repaid after the harvest. In 1983/84 such debts involved an interest of 50 per cent in kind over the season, and are known as **daur** loans. As with in-kind loans from the Seed Store, these forms of credit are particularly attractive to poor villagers because of their well-established and understood terms and the usually favourable movements, to the borrower, of the price of wheat over the season in which it is borrowed. It is possible that the rabi season immediately prior to the 1974/75 survey coincided with a good agricultural year, and that there was little need for villagers to borrow wheat to supplement low stocks during the survey year. Certainly, the fact that average income was much higher, and poverty lower, in 1974/75 than in 1983/84 does lend some support to this suggestion. The institution of **daur** loans appears to be well established in Palanpur, and India as a whole (as discussed in Drèze, Lanjouw and Sharma, 1991) and is unlikely to have been introduced for the first time in the village between 1974/75 and 1983/84. It is more likely that for one reason or other it was simply not necessary in 1974/75.

From the 1974/75 data we are unable to consistently identify which individuals were involved in moneylending on a regular basis in that year, nor can we identify the occasional village lenders. It is therefore not possible to check whether the four regular moneylenders operating in the village in 1983/84 (as identified in Drèze, Lanjouw and Sharma, 1991) were

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[12]. In a study of the ICRISAT villages in Maharashtra, Walker and Ryan (1990) observe very similar developments in the village informal financial markets as have been described for Palanpur. The penetration of subsidized institutional credit has led to moneylenders loosing their best clients. New moneylenders have emerged who make loans characterized by very short stipulated repayment periods and a high interest rate structure. These new moneylenders are only resorted to by people who do not have access to institutional credit, and the quality (in terms of repayment capacity) of the pool of applicants coming to moneylenders has declined.

already present in the earlier survey, nor whether 'occasional' lenders in 1974/75 had established themselves further and become more involved in this activity by 1983/84. Nonetheless, a number of observations relating to village moneylending can be made. First, between the two survey years the real value of debts outstanding to regular moneylenders was virtually unchanged. We see in Table 10 that in 1974/75, debts outstanding to regular village moneylenders totalled Rs 18,370. Of this total, one debt valued at Rs 140 was interest-free. In 1983/84, a total of Rs 18,332 was outstanding to regular village moneylenders, including Rs. 2,050 interest-free. Second, outstanding debts to occasional moneylenders within the village, taken as total private lending within the village net of regular lenders' interest-free and other loans, increased from Rs.14,040 in 1974/75 to Rs.16,431 in 1983/84.

Alongside unchanged outstanding debt to regular village moneylenders and a slight rise in debt outstanding to occasional lenders, it is of some interest to see what changes have occurred in the profile of clients to moneylenders. Tables 11, 12 and 13 present a breakdown of the number of debts outstanding to village moneylenders on the basis of borrowers' caste, landownership class and quintile of per capita income. In 1974/75 the greatest number of loans outstanding to village money lenders were held by Jatabs (Table 11). More than half of all Jatab households had some debt outstanding to village moneylenders in the earlier survey year. By 1983/84 this proportion had declined to 37%. It is interesting that while all of the Jatab loans in 1983/84 outstanding to village moneylenders were **daur** loans, in 1974/75 they were paying relatively high interest rates on cash loans[13]. While in both survey years relatively many Murao households were indebted to village moneylenders, they represented less than a quarter of all households in that caste in either of the two years. On the whole, as a percentage of households in their respective castes, Jatabs, Passis, Dhimars and Telis were the most frequent borrowers from village

[13]. One question of interest, which it was not possible to investigate in any detail, is the possibility that in 1983/84 cash loans to scheduled castes were threatened or perceived to be so by 'amnesties' for lower castes offered by electioneering politicians.

moneylenders. This corresponds with the notion that clients of village moneylenders are more likely to be poor (or lower in status), as wealthier households would be more likely to borrow from other sources. This would be expected to be more obvious in the later survey year, when the number of alternative sources had expanded greatly.

Pursuing this point further by looking at the breakdown of clients of moneylenders on the basis of an important wealth indicator (Table 12), we see that the heaviest borrowers from village moneylenders in 1974/75 were households with small landholdings (between 0 and 15 bighas). Landless households were the most under represented of all households in borrowing from this source. In 1983/84, a much greater uniformity over landholding classes was observed, although the largest landholders were not borrowing from this source at all. The percentage of marginal landholders with debts to village moneylenders (between 0-5 bighas) declined slightly from 42% to 37% over the two surveys, but by the later survey this group had become the most likely of all landowning classes to be indebted to village moneylenders. The number of landless households increased from 10 to 27 between 1974/75 and 1983/84, and the percentage of households in this class borrowing from village moneylenders increased from 10% to 22%.

Finally, in Table 13 we consider the distribution of clients of village moneylenders on the basis of quintiles of per capita income in the respective years. Note that income in any one year is likely to be an imperfect indicator of long-run living standards, and that 1983/84 income is particularly deficient as an indicator because of the poor harvest in that year (see Chapter 2). In 1974/75, nearly half of the poorest households (in the bottom two quintiles) had outstanding debts to village moneylenders. Only one fifth of households in the richest two quintiles had outstanding debts to this source. In 1983/84 the percentage of the bottom two quintiles who had borrowed from village moneylenders was 25% (15 out of a total of 59 households) while the percentage of the top two quintiles had risen to 23%. When we consider quintiles of the population in 1983/84 based in terms of "apparent prosperity" (introduced in chapter

3), then the percentage of the poorest two quintiles borrowing from village moneylenders rises to 30% and the percentage of the rich households borrowing from this source declines from 23% to 16%. In both years, less affluent households were more highly represented among borrowers from village moneylenders than the well-off.

The overall picture regarding village moneylending, rising interest rates aside, is one of relatively little change between the two survey years. Occasional lending increased slightly in importance while regular lending continued at roughly the same scale. While **daur** lending was not observed in 1974/75, it did play a role in 1983/84. The general profile of clients of village moneylenders did not change in any substantial sense - generally, the prediction that the poor are more likely to borrow from village lenders is borne out by the evidence. However, it is clear that the poor are not the only ones to borrow from this source, and this may be related to the particular attractions of borrowing from village moneylenders. Loans from village moneylenders are appealing because they can be taken out at short notice, and repayment arrangements may be more flexible than on loans from other sources. Also, in contrast to borrowing from urban moneylenders (see below), social reputation is used in lieu of collateral. Borrowing needs prompted for example, by sudden illness within a household, or the need to hold a wedding feast, may be best served by village moneylenders - despite their higher interest costs. Such motives for borrowing have not changed much over time and can affect both the poor and better off. Where the poor have restricted access to other sources of credit, they will be more highly represented among clients of village lenders. However, moneylenders are likely to extend credit only to those villagers they are confident are able to repay the loans. An attempt to disentangle the determinants of access to moneylender credit from the determinants of the quantity borrowed given access is presented in section 8.

6. Outside Sources of Informal Credit

While the proportion of regular moneylender debt in total village informal debt remained at around 50% in both 1974/75 and 1983/84 (see Tables 10 and 2), the importance of village moneylender debt in the informal credit market as a whole declined sharply. This is due to the emergence of two important new sources of informal credit to the village between the two survey years. Interest-free credit from sources outside the village and the emergence of interest-bearing credit from urban moneylenders were the principle sources of the net increase in the total real amount of debt outstanding to informal creditors from Rs. 37,530 in 1974/75 to Rs. 90,256 in 1983/84. Debt to the informal sector therefore grew almost as quickly as to the formal sector between the two survey years. Insofar that such debts were not likely to have accumulated for reasons such as the "transfer-entry" mechanism, and are generally turned over more quickly than loans from the formal sector, they may actually have grown more quickly in a real sense than credit from the formal sector. This observation has recently been supported by Bell (1990) who demonstrates, using data at various levels of aggregation, that the expansion of rural credit from formal institutions in India has not led to the demise of informal lending. In his analysis he stresses that the growing commercialization of Indian agriculture has encouraged the rise of trader-moneylending. While such interlinked transactions are rare in Palanpur, the phenomenon of outside lending coming from commercial centres nearby has been witnessed. Town moneylending has rapidly become a major source of informal credit to those able to meet the collateral requirements of moneylending goldsmiths and jewellers[14].

The rise in debt outstanding at zero interest between the two survey years was dramatic. While in the earlier survey year interest-free credit accounted for only 5% of all debt outstanding to private sources, by 1983/84 this had risen to nearly one-quarter. In 1974/75, Rs 1,956 were

[14] The emergence of inter-linked credit transactions between farmers and traders, described by Bell and Srinivasan (1985), Bell (1990) and Hariss (1982,1983) for various parts of India has not been observed in Palanpur however. Nor, as argued by Hariss (1982), do the pawnbroking activities of urban moneylenders clearly benefit the poor (see below).

outstanding interest-free to other villagers in Palanpur. By the later survey year, a total of Rs 21,826 were outstanding to friends and relatives, of which Rs 3,496 were outstanding to other Palanpur villagers, and Rs 18,330 were outstanding to friends or relatives outside the village. While we have already mentioned that this aspect of the data may be more likely to suffer from under-reporting in any given year, there is no compelling reason to believe that data inadequacies fully explain the observed increase in interest-free lending during the interval between 1974/75 and 1983/84.

The Rs 1,956 in outstanding debts at zero interest in 1974/75 had come from friends and relatives inside the village. By 1983/84, such debts to friends and relatives within the village had increased to Rs 3,496. In Table 14 we see that just under two-thirds of the interest-free lending occurring within the village in 1983/84 came from regular moneylenders. Most of these moneylender loans went to villagers who were not related to the lender. The biggest expansion in interest-free lending, however, seems to have come from outside sources. In contrast to the pattern of interest-free lending within the village, in 1983/84 these outside sources of interest-free credit were for the most part relatives of the Palanpur borrowers (94% of all debts from outside the village at zero interest came from relatives)[15]. Why there should be such an expansion of borrowing from relatives outside the village is a question of interest which merits further investigation, and may be related to the general expansion of links between the village and the outside world. It is possible, of course, that the increase in debts to friends and relatives does not represent so much an expansion of credit to the village as a shift away from what would previously have been gifts or grants. A further point of interest, taken up below, is that in 1974/75 no Jatabs had any interest-free debts, and in 1983/84 only Rs. 50 were owed at zero interest by Jatabs. Insofar that households of this caste are highly represented among the poor, this

[15] Note that although the interest rate on these loans is zero, there are reasons to argue that they might entail transactions costs which would make such loans less attractive than might appear at first glance (see Drèze, Lanjouw and Sharma for further discussion).

indicates that the poor may not have participated in the growing importance and number of interest-free debts[16].

By 1983/84, town money-lenders and pawnbrokers had emerged as a major new source of informal credit. While in 1974/75 there were no recorded debts outstanding to private sources outside the village, in the later survey year Rs 25,960 were owed to pawnbrokers in the nearby towns of Chandausi and Bilari (see Table 15). Interest rates on outstanding debt from this source were generally lower than on loans from village moneylenders. In 1983/84, more than three-fourths of outstanding debt of urban moneylenders was at a rate of interest lower than 37%, while only 15% of cash loans from village money-lenders were at a rate of interest below 37% (Table 6).

A major feature of urban moneylender sector of the Palanpur credit market is the importance of collateral. Of all the sources of credit available to Palanpur borrowers, only jewellers in Chandausi and Bilari explicitly demanded collateral before making any loans. The standard collateral accepted by these moneylenders was in the form of gold or silver jewelry[17]. The value of this collateral invariably exceeded the value of the loan, thus transferring any risk associated with the credit transaction onto the borrower. This feature of the urban credit market clearly restricts borrowers to those who are able to guarantee repayment of the loan, and as a result excludes many of the poor in a village such as Palanpur. Why any relatively well-off villager, who is probably not

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[16]. Interest-free lending in Palanpur does not appear to play the same role as was described by Platteau and Abraham (1987) and Abraham (1989) for two small-scale fishing villages in Kerala. There, such transactions were found to play an important insurance role in the face of dramatic income fluctuations related to the daily catch. The success of this system was found to depend crucially on the fact that within the village households faced very low covariate risk. A typical characteristic of the risk faced by households in an agricultural setting (as in Palanpur) is that it is highly correlated across households.

[17]. The use of jewelry and gold as important pieces of collateral in credit market transactions has also been observed by Swaminathan (1988) in a study of a village in rural Tamil Nadu. Sarap (1988) finds gold to be the main form of collateral to be used by rich household in a study of informal credit markets in western Orissa.

excluded from borrowing from either the formal sector or urban money-lender, should prefer to pay the relatively higher interest rates charged by the urban lenders, is probably best seen in light of the numerous transactions costs associated with formal sector loans. These could substantially raise the effective cost of credit to the point that this source was no longer attractive[18]. In addition, there might be some attraction to borrowers of maintaining a degree of privacy in their financial matters - something which borrowing from the FSS or Seed Store, located within Palanpur, would not guarantee.

In Table 15 we see that the most important borrowers from urban moneylenders were Muraos, Passis and one Teli household. Muraos had 8 loans outstanding valued at Rs. 8,940, Passi households had three loans outstanding valued at Rs. 5,900 and one Teli household had 3 loans outstanding valued at Rs. 6,375. While Muraos are not ranked highest in terms of status in the village, their average income per capita was highest in the village in both survey years. The Passis, although far from highly ranked in terms of status, were the next most affluent in terms of average income. This confirms that the heaviest borrowers from urban moneylenders were households who were among the better off castes in Palanpur, and that the poor in the village were not likely to have availed themselves much from the expansion of credit from this source between 1974/75 and 1983/84. We might also argue that precisely because Muraos and Passis, although wealthy, are not ranked highest in terms of status, these households face relatively high transactions costs when borrowing from the formal sector and are therefore attracted to the alternative of borrowing from the urban sector. Similarly households from the Thakur caste, who have high status notwithstanding a decline in their relative economic position, may find it more attractive to continue borrowing from formal sector sources. This might go some way in explaining why the value of outstanding debts to urban moneylenders held by Thakurs amounted to less than 4% of the total

[18]. Bouman and Houtman (1988) describe in detail many of the advantages to borrowers with acceptable assets of choosing pawnbrokers over formal sources of credit in developing countries.

outstanding debt of Rs. 25,460 to this source (Table 15).

7. The Burden of Debt and Household Characteristics

In this section we consider changes in debt holdings of Palanpur households between the survey years. We have seen that the credit market in Palanpur is segmented, with different sources of credit entailing quite different costs. We have argued that access to the various sources differs between households. For cash loans from public institutions, status, contacts and an ability to satisfy bureaucratic procedural requirements may be important. These are less likely to be of significance for wheat loans from the Seed Store. Urban loans require an ability to offer collateral. Interest-free loans from outside the village generally come from relatives and are unlikely to be available to households whose relations outside the village are poor. Loans from moneylenders within the village have become more expensive. Any judgement as to the success of the credit market in Palanpur in meeting credit needs will have to consider the degree to which households are able to satisfy these needs, as well as how high the burden of debt and its costs are becoming to villagers. In this section we examine the distribution of debts to formal and private sources by caste, per capita income, and landholding, on the basis of simple cross-tabulations. This provides us with an indication of different households' abilities to sustain their debts.

In Table 16 we consider per capita debt outstanding from different sources for households of the different castes in Palanpur. In 1974/75, the most indebted castes, in per capita terms, were Gadarias, Thakurs and Passis. Average debt per capita in the village as a whole was Rs 202. The castes with the lowest per capita debts were the Dhobis, Telis and Jatabs. Per capita debt was only about one-tenth of per capita income for Muraos in that year. With the exception of the 'other' caste group who had no debts outstanding in 1974/75, the proportion of per capita debt to per capita income was lowest for Telis (8%), Dhobis (9%) and Muraos (11%). It is interesting to note that Muraos, who were among the most actively

involved in the adoption of changing agricultural technologies between the 1962/63 survey and 1974/75, had not become very indebted to achieve this. As a proportion of per capita income, the per capita debt burden of Dhimars and Gadarias were the highest in 1974/75, at 23% and 24% respectively.

In 1974/75, institutional credit (combining the LDB, Cane Society, and FSS/Seed Store) was the most important source of credit for all castes except Jatabs, who owed 57% of their debts to private lenders, and Dhobis who owed 67% of theirs to the private sector. That the Jatabs and Dhobis, with the lowest per capita incomes in 1974/75, were highly represented among borrowers from the highest cost source of credit suggests that they might have been excluded from the lower cost formal sector.

By 1983/84, the debt burden of some castes had increased enormously. The most indebted castes in per capita terms were the Dhimars, Gadarias, Passis, and Jatabs. The debt burdens of these castes were extremely high as a percentage of per capita income - 60% for Gadarias, 67% for Jatabs, 68% for Passis, and 95% for Dhimars[19]. At the other extreme, Muraos had only marginally increased their per capita indebtedness from Rs. 200 to Rs. 230 between the two survey years, representing an increase in debts relative to income from 11% to 18%. Both Thakurs and Jatabs roughly doubled their per capita debts between the two years, and given lower average real incomes in 1983/84, their debt burden as a proportion of income increased substantially. Thakur indebtedness as a percentage of per capita income rose from 15% in 1974/75 to 42% in 1983/84. While institutional credit became more important relative to private credit for most castes, this rise in importance was generally modest, for example in the case of Muraos, institutional credit represented 71% of total debt in 1983/84 relative to 69% in 1974/75, and for Thakurs 94% in 1983/84 relative to 85% in the earlier survey. However, the proportion of total debt owed by Jatabs to institutional sources rose from 43% in 1974/75 to 87% in

[19]. We have not discussed so far the possibility that households may have no intention of repaying some of their outstanding debt, particularly to formal sources. D'Mello (1980) stresses the serious weakness of Indian co-operative institutions in recovering loans advanced.

1983/84. We have already seen how quickly debts to the FSS can accumulate once the borrower has resorted to use of the "transfer mechanism". In Table 8 we provided details of the way in which a number of Jatab households had increased their indebtedness to the FSS as a result of such practices. While at first glance, an important increase in indebtedness to (supposedly) low cost formal sector sources by Jatabs could be interpreted as a relaxation of their credit constraints, this may in fact be far from actually the case. Between 1974/75 and 1983/84, Jatab debts outstanding to private lenders declined from Rs. 7,893 to 4,375. This may be due to lower demand for such loans as a result of rising interest rates on moneylender loans, or an increased reluctance on the part of lenders to lend to this caste. The combined influence of these developments suggests that far from being better served in the credit market by 1983/84, the position of Jatabs in meeting their credit needs may well have become considerably more difficult.

In Table 17 we focus on the distribution of debt to different sources on the basis of per capita income quintiles. In 1974/75 per capita indebtedness was lowest among households in the bottom quintile, and highest in the quintile just adjacent. On the whole, per capita debts were distributed rather equally between quintiles, and as a result the ratio of per capita debt to per capita income declined from around 23% for each of the bottom two quintiles to under 10% for the top two quintiles. The poorest two quintiles had the largest total outstanding debt to private lenders. More than half of all debt outstanding to this sector was held by the poorest 40% of households in Palanpur. Given that this form of credit generally entailed higher interest rates (see Table 4), this suggests that the poor in 1974/75 did not enjoy the same access to the relatively lower cost credit from the formal sector.

By 1983/84, per capita debts for all but the second quintile had risen sharply. As per capita incomes in the latter survey year were lower than in 1974/75, the debt burden of households as a percentage of income had also risen markedly. The poorest quintile in 1983/84 had an average per

capita debt nearly 40% *higher* than average per capita income in that year. This represented a nearly six-fold increase in debt burden compared with 1974/75. For the other quintiles, the rise in debt burden ranged between nearly doubling (the second quintile) to almost quadrupling (third quintile). While the poorest quintile owed 60% of its debts to the formal sector in 1974/75, this had risen to 71% by 1983/84. Interestingly, the poorest quintile in 1983/84 owed 10% of its debts at no interest charge to friends and relatives. This seems somewhat at odds with the earlier claim that the better off in Palanpur were more likely to have relatives outside the village who were in a position to lend money. However, it has already been mentioned that current income in 1983/84 is a rather imperfect indicator of long run living standards due to the very poor harvest in that year which sharply depressed agricultural incomes. As a result, a number of households with good land and other assets were included in this quintile. It is possible that for this reason the poorest were able to receive interest free credit from friends and relatives. A similar argument can be invoked to account for the 12% of outstanding debts owed by the poorest quintile to urban money-lenders (recall that such loans require collateral valued at more than the loan).

In Table 18 the distribution of debts outstanding to different sources is related to the distribution of land holdings. Land is a major indicator of wealth in Palanpur, as well as an important productive asset. Where we have argued that access to credit may be related to wealth and influence, land might be a good proxy of this wealth and we may expect households with large landholdings to have greater levels of indebtedness. Moreover, in so far that large landholdings are correlated with cultivated holdings we may expect a greater demand for credit, for productive assets and working capital, among households with large land holdings.

In 1974/75, average per capita debts among the landless were one seventh of those held by even marginal farmers. This average of Rs. 24 represented just over 2% of average per capita income for this group. For the other landholding classes, average per capita indebtedness ranged

between 10% and 25% of per capita income. In absolute terms average per capita debts of small farmers (with 5 to 15 bighas of land) were the highest at Rs. 249 while the largest landholders (with more than 50 bighas) had average per capita debts of Rs. 239. Marginal farmers were most heavily indebted to private lenders, with 43% of their debts outstanding to this source. Land cultivated in 1974/75 was more equally distributed than land owned, with small farmers leasing in land from the larger landowners (see Chapter 2). This was because during the earlier survey year, many of the large landowners were Thakur households who were not anxious to cultivate for themselves. This is likely to account, at least in part, for the relatively high levels of indebtedness of small farmers both in absolute terms and in per capita terms.

By 1983/84 landless households had substantially increased in number as a consequence of rising population and the increased incidence of sons splitting away from their parents' households before land had been divided. Although landlessness was found to increase the probability of a household being among the poor, not all landless households were poor in that year (see Chapter 3). Those who had regular off-farm employment generally enjoyed a relatively high living standard, while landless households with agricultural labour as main occupation were very likely to be poor. Unlike the early survey year, land cultivated in 1983/84 was distributed more unequally than land owned. Larger land owners were leasing in land, often from small farmers. By the later survey year, many of the large landowners were Murao households - not because they had purchased land in the period between the two surveys (the land market in Palanpur is very inactive), but because their households had been less prone to split over time. Compared with other households in Palanpur, the incidence of joint cultivation among Muraos was relatively common.

In contrast to 1974/75, total debts and per capita indebtedness was the lowest among the largest landowners in 1983/84, and landless households had increased their average per capita debt from Rs. 24 to Rs. 410 - an increase from 2% to 48% of average per capita income. The highest per

capita debts, and debt burden as a percentage of income, were among the fifth landowning class (with 30-50 bighas of land) who owed an average of 74% of per capita income in that survey year. The distribution of debts between sources and land holding class in 1983/84 do not indicate any strong patterns, although the relatively high levels of debt outstanding to friends and relatives at no interest among the landless, may be attributed to the fact that the landless in 1983/84 were a rather heterogeneous group which included both very poor casual labourers as well as relatively affluent households with regular employment in nearby towns. The two smallest landowning classes were most dependent on credit from village moneylenders, while the largest landowning class had 20% of its debts outstanding to friends and relatives.

8. Econometric Analysis

In this section we report results from econometric analysis of data on debt collected for Palanpur in 1974/75 and 1983/84. We examine in turn each of the 4 credit market segments discussed in earlier sections (but also consider separately the three major formal sector sources). Thus we consider, respectively for each year, outstanding debts to the Seed Store, the FSS, other formal sector sources, village moneylenders, urban moneylenders and interest free credit sources. We wish to single out particular household characteristics which are likely to influence the amount that such households will borrow in a particular segment of the market. It is of interest to consider how the determinants of outstanding debt in the different segments of the market may have changed in importance over time, as well as how different characteristics might exercise varying influence in different market segments.

A problem in the modelling of debt outstanding to particular sources arises out of the zero entries observed. We are interested in a model which is able not only to portray the positive entries but which can also account for the zero entries. A model which is widely used for analysis of this kind is the Tobit which has positive entries determined by a

regression model with zeros occurring when the random term and right-hand side variables are such as to give negative predicted entries for outstanding debt. The random term is assumed to be normally distributed.

The Tobit model is a well understood econometric model which has been widely applied to cross-section data. We will not describe it in great detail here (for details regarding its theoretical underpinnings, usefulness to economists, and also extensions, see for example Tobin, 1958, Atkinson, Gomulka and Stern, 1984, Maddala, 1983, and Pudney, 1989). As part of our investigation of the determination of zeros, we will compare the Tobit and probit models. If the Tobit is the true model then, asymptotically, the corresponding probit, where we give the dependent variable the value 1 for entries which are strictly positive and zero otherwise, should give the same estimated (relative) coefficients (see Atkinson, Gomulka and Stern, 1984). Where the Tobit is not the true model, then divergences may arise even in the limit and this may suggest that the investigation of alternative models is warranted.

There are other ways in which a model could describe the generation of positive entries, the mechanism whereby zero entries are generated and the probability distribution for the random terms. An alternative to the Tobit examined in this chapter is the "double-hurdle" model described initially by Cragg (1971). We will be interested in this section to determine for which year, and for which segments, the double-hurdle is a more appropriate model and where we can judge the Tobit to be satisfactory.

The double-hurdle model has not been as widely applied, certainly in the context of developing countries, and it may therefore be of some use to briefly describe its structure and how it is used. The estimating procedure applicable to double-hurdle models was first discussed by Cragg (1971) and has been more recently described by Atkinson, Gomulka and Stern (1984, 1989) and Pudney (1989). A more restricted version of the double-hurdle model was developed by Deaton and Irish (1981). In the context of this study, the basic idea in a double hurdle model is that there are two

particular reasons for which zero's arise in data on outstanding debt. First, a household may be excluded from a particular source of credit and therefore unable to borrow any amount from this source. Or alternatively there may be certain characteristics of the household (e.g. caste, religion, etc.) which lead to the household choosing never to borrow from a particular source. Zero's which are entered in the outstanding debt of such households may therefore arise for quite different reasons than zeros arising from the fact that a 'potentially borrowing' household may simply choose not to borrow from a source at certain levels of price being charged, incomes, or other variables. The double-hurdle model sets out two hurdles, the first to identify those households which will under no circumstances have an outstanding debt to the particular source, and the second hurdle to examine what characteristics influence the debt outstanding of those households which can and may in principle borrow from this source. Household characteristics which are significant in the first hurdle may also be important in the second hurdle.

Formally, the double hurdle model can be defined as follows. A household will be among 'potential borrowers' if $u_h>0$ where,

$$u_h = \Sigma_j \alpha_j Z_{h:j} + \eta_h$$

where attributes $Z_1, Z_2,\ldots,Z_J$ are those which correspond to the first hurdle, and that, as a potential borrowing household, the amount of actually borrowed is $\text{Max}[0,y_h]$, where

$$y_h = \Sigma_k \beta_k X_{h:k} + \varepsilon_h$$

and the set of variables $X_1, X_2,\ldots,X_K$ does not necessarily exclude any of the attributes Z_j. In the specifications undertaken in this paper it is assumed that the disturbance terms η_h and ε_h are normally distributed and are independent, with a covariance matrix

$$\begin{bmatrix} 1 & 0 \end{bmatrix}$$

$\begin{bmatrix} 0 & \sigma^2 \end{bmatrix}$.

Our observations of amount borrowed, y_h^*, then indicate that

$$y_h^* = y_h \text{ if } y_h>0 \text{ and } u_h>0$$
$$= 0 \text{ otherwise.}$$

In selecting which specification best describes the data, note that the Tobit is a special case - and is thus nested within - the double hurdle model. This would occur if the mean of the disturbance term η_h approached infinity. In this event u_h would be greater than zero for all households and thus the Tobit model with

$$y_h^* = \max[0, \Sigma_k \beta_k X_{h:k} + \varepsilon_h]$$

would result. Also, if we were to estimate the special case of the double hurdle model where no Z variables were included we would obtain the p-Tobit model similar to the one examined in Deaton and Irish (1981). For the Tobit model the log-likelihood can be written

$$L = \underset{+}{N} \log 1/\sigma - \underset{+}{N}/2 \log (2\pi) - \tfrac{1}{2}\underset{+}{\Sigma}(y_h - \beta_k X_{h:k})^2/\sigma^2 + \underset{\circ}{\Sigma} \log [1-\Phi(\beta_k X_{h:k}/\sigma)]$$

where $\underset{+}{N}$ refers to the number of positive observations, $\underset{\circ}{\Sigma}$ is the sum over zero observations and $\underset{+}{\Sigma}$ is the sum over positive observations. Φ corresponds to the distribution function of the standard normal. The likelihood function is modified in the double hurdle model to take into account the influence of the first hurdle:

$$L = \underset{+}{N} + \log 1/\sigma - \underset{+}{N}/2 \log (2\pi) - \tfrac{1}{2}\underset{+}{\Sigma}(y_h - \beta_k X_{h:k})^2/\sigma^2 + \underset{+}{N} \log \Phi(\alpha_j Z_{h:j})$$
$$+ \underset{\circ}{\Sigma} \log [1 - \Phi(\alpha_j Z_{h:j})\Phi(\beta_k X_{h:k})] .$$

In this chapter we have not attempted to describe, within a general framework, the amount of debt that different households will hold from a particular market segment. It is clear that a full theoretical model of this kind would contain many ingredients and would need to provide for numerous interactions. The econometric models estimated below may be seen

as reduced form models which have not been formally derived from a structural model, but whose specifications contain elements which have been suggested from the analysis in earlier sections of this chapter as well as previous chapters. Some of the elements of the Palanpur credit market, which should be kept in mind, are briefly mentioned below.

Households may enter the Palanpur credit market for different purposes. In some cases, debts are incurred to undertake productive investments (e.g. a pumpset or the purchase of a draught animal). Other households borrow for 'consumption-smoothing' purposes in the face of shortfalls. Some segments of the credit market have been established to provide credit specifically for investment, not consumption, purposes. It is often difficult to distinguish between these purposes, because of the fungibility of funds. However, the different purposes for which credit is to be used suggest that different types of households, with possibly very different characteristics, may wish to borrow from a particular source.

We have argued that there is good reason to believe that rationing is widespread in the Palanpur credit market. Valuations of risk will make lenders willing to lend to some households and not others, and possibly only at some specific times. This rationing will vary in form between segments and affect various groups in different ways. Collateral, whether explicit (as in the case of borrowing from pawnshops) or implicit (as in reputation) can play an important role. In different segments of the credit market transactions costs will vary in type and these may not affect all households in the village equally, even within one particular market segment.

Lenders may also want to consider a borrower's portfolio of debts to other sources before deciding whether to lend to that particular household. Such factors would suggest treating borrowing from one source as an explanatory variable in another source. Borrowing from a particular segment may, in a full account however, be modelled as a part of a joint decision where a household decides on its borrowing from different segments

at the same time.

Tables 19 and 20 provide a list of explanatory variables which have been used in the econometric estimation. It should be noted at this point that a major factor involved in choosing the particular specifications reported here is the presence of heteroskedasticity. While problems of heteroskedasticity are not so pressing in ordinary regression models (unbiasedness and consistency remain, although estimates are inefficient), with the type of models examined here the maximum likelihood estimator is generally inconsistent (Pudney, 1989). In the results presented below, an LM test is performed to detect the presence of heteroskedasticity in the Tobit models, and the double hurdle model reports robust t-statistics. The models presented below are generally those which appear to suffer least from heteroskedasticity, although in some segments of the credit market, for one or other survey year, it was not possible to obtain a meaningful specification which did not suffer from heteroskedasticity[20]. In such cases, the results are still presented but clearly less weight can be given to them.

In an effort to limit unnecessary repetition and restrict discussion of results which are of only marginal interest, this section will not necessarily scrutinize the results for each segment and each year exhaustively. We will confine ourselves to only brief comments on the results obtained for segments where convergence problems, severe heteroskedasticy and/or lack of degrees of freedom make it difficult to make comments of general interest.

6.8.1 Borrowing from the Seed Store

[20]. Note that in the face of heteroskedasticity a common practice is to transform the model into log form, and this frequently reduces or eliminates the problem. Experimentation along these lines was attempted with the credit data, but on the whole this did not appear to significantly reduce heteroskedasticity (in fact, in some cases it severely aggravated the problem). Note also that taking logs in a Tobit model can be problematic because of the presence of zeroes.

Table 21 presents Tobit models of borrowing from the seed store in 1983/84. We see that in the preferred Tobit model (model 1), four explanatory variables were found to influence the debt outstanding of a household borrowing wheat from the Seed Store[21]. A comparison of values of the log likelihood function when these four variables are included with the value of the log likelihood function when only a constant term is included shows that the log likelihood function increases from -258.84 to -245.02. This indicates that the model does provide a significant improvement over a simple constant term. The Likelihood Ratio (LR) statistic ($2*\log(L_u/L_r)$ for model 1 is 27.64 and the critical value for χ^2 (at a 5% level of significance and with 4 degrees of freedom) is 9.49.

From model 1 in Table 21 we see that if households had borrowed from the FSS during the 1983/84 survey year, then this positively and significantly increased the amount of debt outstanding to the Seed Store. We have already seen that the Seed Store and FSS are two related agencies operating in Palanpur. The (official) eligibility criteria for the two sources are also closely related[22].

If a household was not cultivating during the 1983/84 survey year then this significantly reduced the amount which such a household would hold in outstanding debt to the Seed Store. Although the seed provided in kind from the Seed Store in 1983/84 was not considered useful for sowing purposes, it remains that this source had been established to lend to cultivating households (and this was also reflected to some extent in the eligibility conditions). Many non-cultivating households in 1983/84 had outside employment. Their regular outside incomes may have reduced the

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[21]. We will be discussing below what is involved in this designation of the 'preferred' model.

[22]. Officially, villagers had to purchase shares in the FSS/Seed Store Credit Union and the number of shares that they could own was related to their landholdings. The amount of credit available is then related to size of shareholdings and landholdings. For details see Bliss and Stern (1982). Note that this is according to the official rules and not necessarily how credit is always distributed in practice. Note also, that Seed Store debts which became overdue could become entered as FSS debts, and then become subject to the practice of "transfer-entry".

need to borrow from a source which in 1983/84 appeared to be issuing loans mainly to people with consumption needs. Furthermore, non-cultivating households may not have been well placed to be able to repay a loan in kind from the Seed Store.

If a household could be described as following modern agricultural practices, then this reduced the amount which such a household would have borrowed from the Seed Store. This dummy variable takes a value of one if the household owned a pumpset, tubewell or boring, and zero if it did not. As we have mentioned, Seed Store loans were probably most attractive to poorer households in Palanpur who were interested in consumption loans and seed issued by the Seed Store was not of good quality. It seems reasonable therefore that farmers following modern practices and who owned various productive assets would be less inclined to borrow from this source.

Finally, if a household was among the richest quintile in the village (in terms of apparent prosperity) then this would reduce the amount of outstanding debt to the Seed Store. This relationship does not appear to be as statistically significant as for the other three variables, but this may due to some multicollinearity between this variable and the modern agricultural practices dummy[23].

Note that model 1 in Table 21 decisively rejects the null of homoskedasticity and that the parameter estimates reported for this model are therefore not consistent[24]. In model 2 of Table 21, we have taken

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[23]. Recall in chapter 3 that the apparent prosperity index tended to rank many of the large and active farming households highly, even though in income terms for that year, these households had not done so well.

[24]. The LM test for the presence of heteroskedasticity in a Tobit model is discussed in Pudney (1989), following Lee and Maddala (1985). The model takes the form of a quadratic

$$\xi_t = \alpha_0 + \alpha_1\psi_{1t} + \alpha_2\psi_{2t} + \ldots + \alpha_m\psi_{mt}$$

where $\xi_t = (y_t - \beta' x_t)/\sigma^2 - 1$ when $y_t>0$,

$\sigma^2 = (1/T)\Sigma_t \mu_t^2$

$\psi_{lt} = x_{it}x_{jt}$ for $i \geq j$ $i,j=2,\ldots,k$ $l=1,2,\ldots,m$ and $m=(1/2)k(k-1)$, and

$\xi_t = \hat{b}_t\lambda(\hat{b}_t)$ when $y_t=0$

logs of the dependent variable of rupees outstanding to the Seed Store as well as of the explanatory variable, rupees borrowed from the FSS. While model 2 rejects more decisively than model 1 the null that a simple model with a constant is preferred, in terms of the LM test the model performs even more poorly than model 1. It is for this reason that model 1 was chosen as the preferred model. It should be noted that a fair amount of experimentation with different specifications was conducted but that problems with heterskedasticity in this segment persisted.

To see whether the Tobit model could be considered a satisfactory way of describing the process of borrowing from this segment in the 1983/84 survey year, we compare the estimates in model 1 of Table 21 with probit estimates for the same specification (but with the dependent variable taking a value of one for all strictly positive entries). If the Tobit model is a correct specification, then the relative values of the estimated coefficients should approach those in the probit model having the same set of explanatory variables. In Table 22 we see that after normalizing such that the ratio for the constant is exactly unity, the ratios for some of the coefficients appear to vary substantially from one. This suggests that an alternative approach may be warranted, and we will consider the success of the double hurdle model for this sector in what follows. However, before we turn to this alternative model, we will examine the Tobit model for the same segment of the credit market in Palanpur during the 1974/75 survey year.

In Table 23 the only explanatory variable in the Tobit model which was found to exercise a statistically significant influence on the amount of debt outstanding to the Seed Store in 1974/75 was the amount of outstanding debt incurred from the FSS. In this year, the signs of estimated parameters for the non-cultivating dummy and for modern agricultural

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where $\hat{b}_t = \beta' x_t/\sigma$

and $\lambda(\hat{b}_t)=\phi(\hat{b}_t)/[1-\Phi(\hat{b}_t)]$, the inverse Mills ratio or hazard rate. This is an estimate of $E(\beta^2/\sigma^2 | x=0)-1$ for the censored observations.

Under the assumption of homoscedasticity, $TR^2 \sim \chi^2(m)$.

practices dummy were the same as in 1983/84 but the parameter estimates were not significant. The parameter estimate on the dummy indicating whether a household in 1974/75 was among the richest 20% (in current income terms) changed sign, but was also insignificant. It is useful to recall that in 1974/75, seed from the Seed Store was still occasionally used for sowing purposes and therefore did not represent only a source of credit for consumption purposes. LR tests on the models in Table 23 indicate that the models performed significantly better than a model with a simple constant term In Table 23 we also see that the Tobit model for 1974/75 failed to reject the null of homoskedasticity, and as a result the parameter estimates here are consistent.

In Table 24 we compare the relative estimates obtained for the Tobit model 1 in Table 23 with the estimates obtained with the probit model on the same specification. As was found for the Tobit model for the Seed Store segment in 1983/84, we see that after normalizing such that the ratio for the constant is exactly unity, the ratios for all of the coefficients tend to be rather far from one. For this year too, it appears that looking for an alternative model may not be unwarranted.

The double hurdle model for 1983/84 in Table 25 reveals an interesting observation that both prosperity and non-cultivation make a household less likely to be a potential borrower from the Seed Store (possibly for the reasons suggested above), but that if such a prosperous or non-cultivating household is *a potential borrower* from the Seed Store, it will then borrow *more* from this source. Looking at the two hurdles simultaneously thus presents us with a picture which is strikingly different from that obtained by looking at the Tobit model only. It is possible that prosperous as well as non-cultivating households would find repayment of large debts less difficult (we have mentioned that many of the non-cultivating households in 1983/84 enjoyed high incomes from regular employment outside the village). Moreover, as most non-cultivating households are not entitled to borrow from the Seed Store, if they do succeed in borrowing from this source it may be due to their ability to wield influence, and this may also

contribute to the amount they were able to borrow. Note however that the prosperity variable, while positive in the second hurdle, is not significant as reflected by its robust t-statistic.

Rupees outstanding to the FSS were not seen to affect so much the likelihood of being among potential borrowers from the Seed Store, but rather to positively affect the amount that the household would borrow from the Seed Store, if it was among the potential borrowers. It is possible that debts to the FSS reflect in some sense a commitment to cultivation in 1983/84 (for example, borrowing cash to buy fertilizer etc.) and that such households may prefer to utilize their seed stocks for sowing purposes, and then to borrow seed from the Seed Store for consumption purposes.

The double-hurdle model for 1974/75 indicates once again that in that year only debt outstanding to the FSS contributed to the explanation of debt outstanding to the Seed Store. In that year, unlike 1983/84, outstanding debt to the FSS appeared to contribute both to the question of whether a household was a potential borrower from the Seed Store, as well as the question of how much the household would borrow, if it was among such potential borrowers.

The values of the log likelihood functions for the two models in Table 25 are considerably higher than the values observed in the Tobit models for the respective years. In Table 21, the log likelihood function for model 1 took a vale of -245.02. The likelihood function for the double hurdle model for 1983/84 was -210.87, a considerable improvement. Similarly, the double hurdle model for 1974/75 obtained a value of the likelihood function of -350.00 compared with a value of -420.68 for model 1 in Table 23.

We have discussed elsewhere that the question of whether a household would borrow from the Seed Store or not is probably less related to the issue of rationing as opposed to one of whether a household chooses to borrow from this source. This finds some confirmation in the data, particularly for the later survey year, where rich and non-cultivating

households are found to be less likely to be counted among potential borrowers from the Seed Store, and yet arguably such households are not rationed in any way from borrowing from this source.

8.2 Borrowing from the FSS

Examining the data on outstanding debt to the FSS requires care because of difficulties associated with the practice of "transfer entry" which could indicate the very rapid accumulation of debt to some households while not necessarily reflecting much new credit actually going to such households. It is difficult to assess the importance of the transfer entry component in a given household's outstanding debt. If social status is inversely related to the extent to which transfer entry is applied it possible that among the poor this component will be particularly important while among the rich will be less so.

In Table 26 we present results from the Tobit model for this segment in 1983/84. In the preferred model (model 2) we see that agricultural labour households who own some land have more debt outstanding to the FSS and that this relationship is quite significant statistically. We have seen in previous chapters on mobility and poverty that a household's involvement in agricultural labour is a useful indicator of chronic poverty. Poverty probably indicates at least latent demand for credit, but given lenders' concern for repayment those households regarded as chronically poor may well be thought unable to repay a loan. It is possible that the access of at least one sub-group of such households (those agricultural labour households which own some land) to credit suggests that within the group of agricultural labour households lenders consider that those with land are more likely to be poor because of temporary shortfall in income and have some means to lift themselves out of this condition. However, keeping the "transfer entry" practice in mind, it may also be that it is the poorest households among those officially entitled to borrow from the FSS (some landholding is required for access) who are most likely to run into repayment problems and then rapidly

accumulate large outstanding debts through fraudulent practices on the part of the FSS administrators.

In Table 26 we see further that the more income a household earns from cultivation, and the greater its income from regular employment outside of agriculture, the greater the outstanding debt to the FSS of that household. These two variables lend support to the argument that the FSS is a source of credit which benefits the better-off households in the village. Certainly the various transactions costs associated with borrowing from the FSS are thought to be more severe for poor households than for households which are ranked highly in the village in terms of income or status. This would reinforce the notion of the FSS being of greatest benefit to the well-off.

Interestingly, the murao dummy is negatively associated (albeit not in a strongly significant sense) with outstanding debt to the FSS in 1983/84. We have argued that Muraos are among the best farmers in the village with the largest landholdings. They certainly earned the highest cultivation incomes in Palanpur. Hence it is striking that the parameters on the cultivation income variable and the murao dummy variable should be significant *and have opposite signs.* This finding also indicates that while Muraos have been active in the adoption of new technologies, they do not appear to have done this by incurring large outstanding debts to the FSS.

Model 2 in Table 26 rejects the null that a model with a simple constant term would have been adequate to describe debts to the FSS. While a LR test carried out between model 1 and model 2 fails to reject the null that a specification without the Murao dummy is sufficient, we have chosen to select model 2 as our preferred model because of the particular interest of this variable. Given that we will also consider an alternative model to the Tobit (see below) we wish to retain this variable to see whether it makes any further contribution. Note, both model 1 and model 2 fail to reject the null of homoscedasticity and thus provide consistent parameter

estimates.

In Table 27 we compare the Tobit model with a probit model of the same specification. As in the case of the Seed Store segment of the market, we see that the relative (normalized) parameter estimates are not uniformly close to one. In particular, the relative estimates for the Murao dummy variable are far from one. Although we have seen that this dummy variable is not strongly significant, and therefore we may not be so concerned about this deviation, it does suggest that examining an alternative model is not unwarranted. We will examine results from the double-hurdle model for this segment below, but will first briefly look at this segment of the credit market in 1974/75.

In Table 28, the significance of the landed agricultural labour household variable which we observed for 1983/84 remains. The two income variables which were found to be positively and significantly related to debts outstanding to the FSS were not significant in 1974/75. In fact, even the sign on income from regular off-farm employment changed. We have seen in chapter 2 that in 1974/75 the correlation between regular job income and total income was not strongly positive, unlike in the later survey year. Hence, this income component does not reflect well the total income position within the village. The murao dummy in model 2 is still negative, but once again is not strongly significant. While debt to the FSS does not seem to be so strongly linked with economic status as in 1983/84, the particular reluctance of Muraos to be indebted to this source is observed for both years. Model 2 in Table 28, as in Table 26, cannot reject the model without the murao dummy variable. Both models fail to reject the null of homoscedasticity and therefore provide consistent parameter estimates.

In Table 29 we compare the Tobit model with a probit model on the specification. For the 1974/75 survey year, these two models deviate quite sharply, indicating that an alternative to the Tobit is warranted.

Table 30 presents results for the double hurdle model on the FSS segment for both 1974/75 and 1983/84. In the double hurdle model for 1983/84, the dummy for landed agricultural labour is significant only in the first hurdle (implying that these households did not necessarily have such high outstanding debts to this source). Two variables which were found to influence the amount of debt outstanding to the FSS were household income from cultivation and income from regular off-farm employment. This indicates that FSS loans went mainly to large cultivating households, and to those households which enjoyed stable and high incomes from outside sources. For this year, the common observation that institutional credit goes mainly to the better off in rural areas finds support, while the poorest among eligible borrowers are the most inclined to borrow.

In the double hurdle model for 1974/75, landed agricultural labour households are *less* likely to be among potential borrowers (a negative and significant parameter estimate is obtained for this household characteristic in the first hurdle), but are found to borrow *more* if they do succeed in borrowing. This is also the only variable found to exercise significant explanatory power in the model for 1974/75. It is difficult to account for this observation but one could speculate that at the time of the earlier survey the FSS was concentrating its lending on the more affluent households but that if a landed agricultural labour household was able to obtain credit from this source its high demand would result in a relatively large loan being made.

For both years the log likelihood functions for the double hurdle models represent a big improvement over the Tobit models examined. For the 1983/84 survey year, the log likelihood function increased from -592.1 (Table 26) to -545.98. For the 1974/75 survey year, the function increased from -603.1 to -544.25.

8.3 Borrowing from Other Formal Sector Sources

In Table 31 we present results from the Tobit model on borrowings from

formal sector sources other than the Seed Store and FSS for 1983/84. The Tobit models reject the null of homoscedasticity and are therefore not consistent. However, model 1 was chosen as the preferred model because it appeared to suffer least from this problem. The two variables which had greatest influence on the size of debt to this source in model 1 are a Murao dummy and the number of agricultural machines held by a household. If a household was of the Murao caste it held significantly less outstanding debts to this source. However, the more machines owned by a household the more outstanding debt to this source would be observed. Once again, these results are striking because in Palanpur the Muraos are among those owning the greatest number of productive assets. It is therefore interesting that the data are able to make a sharp distinction between these two groups such that the parameter estimates of these two variables have opposite signs and are statistically significant. It seems that in 1983/84, Muraos were able to finance their investment in agricultural machinery without having to borrow from either the FSS or other formal sector sources.

In Table 32 we compare the results obtained from the Tobit model above with a probit model on the same specification. We can see that for this segment of the credit market the normalized ratios of the parameter estimates are not far from one, and therefore there is some indication that the Tobit model may not be inappropriate here. Given though, that the Tobit model appeared to suffer from heteroskedasticity problems, it was still attempted to examine the double hurdle model. However, this model failed to converge for this segment (for both the 1983/84 and the 1974/75 survey year) and is therefore not presented here.

In Table 33 we see that in the Tobit model for borrowings from other formal sector in 1974/75 problems with heteroskedasticy also remain, and the parameter estimates are therefore not consistent. In addition, in this year, the various models examined were not able to provide significant additional explanatory power over and above a simple constant term. (Note however, that there are only 7 non-zero entries in this segment in

1974/75). In Table 34 we experiment with various specifications in a probit model for this segment and find that the only variable which exercises significant explanatory power is a dummy variable representing whether a household follows modern agricultural practices. Model 1 in Table 34 suggests that the probability of holding outstanding debts to other formal sector sources is greater if the household cultivates in a capital intensive manner. This is not surprising as the loans from this source in 1974/75 were generally for the stated purpose of purchasing a pumpset or some other productive asset.

8.4 Borrowing from Urban Moneylenders in 1983/84

Table 34 presents results from Tobit models for debts outstanding to urban moneylenders in 1983/84. The preferred Tobit model on the likelihood of borrowing from urban moneylenders has as explanatory variables a dummy for Murao households and a dummy variable for agricultural labour households with land. Murao households held significantly greater outstanding debts to this source, and possible reasons for this have already been discussed in previous sections. An additional explanatory contribution (although not strongly significant) was made by the landed agricultural labour household dummy, taking the opposite sign. This finding emphasizes that such households, who are likely to be suffering from some short-fall in income (hence their involvement in this 'last resort' occupation) and who are likely to have at least some latent demand for credit, do not borrow from this source. This may also suggest that urban moneylenders' collateral requirements are quite specific and do not include land. Note that all of the models presented in Table 35 reject the null of homoscedasticity and the parameter estimates are therefore not consistent.

In Table 36, we see that a comparison of results from the Tobit model and the probit yields relative parameter estimates which are quite close to 1. This suggests that the Tobit model may not be a bad way to portray debts outstanding to urban moneylenders. While it was attempted

nonetheless to examine an alternative model, the double hurdle model for this segment failed to converge, and can therefore not be presented.

8.5 Borrowing from Village Moneylenders

In Table 37 the Tobit models for 1983/84 indicate that the most significant explanatory variables on the amount of outstanding debt to village moneylenders are land cultivated, landed agricultural labour households, rupees borrowed from the FSS, and productive assets (either livestock owned, or machinery). On the basis of standard error and failure to reject homoscedasticity, model 5 performs better than model 4, and is therefore preferred. Prosperity is negatively related to the amount borrowed, but this contribution is not strongly significant in a statistical sense when other explanatory variables are included. On the whole, the amount of outstanding debt appears to be closely linked to ability to repay once we have controlled for the fact that the most affluent in the village are less likely to borrow from this source.

In Table 38 we compare the preferred Tobit model with a probit. Relative parameter estimates (after normalization) are in some cases quite close to one, although in particular for the prosperity variable and rupees outstanding to the FSS, the ratio is rather far from one. The consideration of an alternative model may not be unwarranted.

In the Tobits for 1974/75, homoscedasticity is rejected by all models. In addition, only some of the variables found to contribute explanatory power in 1983/84 were also exercising a similar influence in the earlier survey year. In model 5, the explanatory variable representing income rank was significantly and negatively related to the amount of outstanding debt held by households to village moneylenders. Land cultivated and machines owned made a somewhat less significant contribution but the direction of influence remained the same as in 1983/84. In the case of the landless agricultural labour dummy variable the sign in 1974/75 was the opposite from what was observed in 1983/84. While in the later survey years such

households tended to have greater outstanding debts to this source, in 1974/75 the opposite appeared to be the case (although this relationship is not strongly significant). This represents an interesting change of operation in this segment, and may suggest that over time rationing of poor households from alternative sources has become more pervasive such that they are compelled to resort to borrowing in this high-cost segment.

In Table 40 we see that the Tobit model does not appear to be a wholly satisfactory way in which to describe outstanding debts to village moneylenders in 1974/75. As with the 1983/84 data, examination of an alternative model seems to be warranted.

Two alternate specifications for the double hurdle model are reported for the two years as problems of heteroskedasticity in some specifications reduced the robust t-statistics of some variables to the point that they lost statistical significance. In Table 41 none of the double hurdle model parameter estimates (based on model 5 in Table 37) for 1983/84 are significant, although for 1974/75 this specification does yield some significant variables. Interestingly, in 1974/75 prosperity is seen to have a negative, and weakly significant impact in the first hurdle representing whether households are potential borrowers from village moneylenders. In the second hurdle the sign on this variable becomes positive although it is not significant. This might suggest that while richer households were less likely to consider borrowing from this source, if they did they would be able to borrow more than other households. Certainly, a proxy for ability to repay a loan such as land cultivated is positive and strongly significant in this second hurdle. Rupees outstanding to the FSS are also found to contribute positively in a strongly significant manner to the amount that households are indebted to village moneylenders. It is perhaps reasonable for village moneylenders to consider access to other sources of credit as some form of guarantee that they will receive repayment of their loans. This would plausibly be the case if they felt that they would receive priority in repayments from

borrowers[25].

In the specification reported in Table 42, the double hurdle model for the 1983/84 data indicates that the importance of prosperity is more significant in the second hurdle than in the first, although the sign of this variable does change in the two hurdles as found in Table 41. In addition, landed agricultural labour households are more indebted to village moneylenders, as are households with larger operational landholdings. The insignificance of the variable for outstanding debt to the FSS may be related to the fact that in 1983/84 debt outstanding to the FSS is less clearly linked to ability to repay a moneylender loan (due to the transfer entry mechanism). As the value of livestock owned by a household rises, it will tend to borrow less from village moneylenders. For the 1974/75 data, the specification in Table 42 yields roughly the same insights as found in Table 41.

8.6 Interest-Free Borrowing in 1983/84

The final segment of the credit market to be considered is debt outstanding to interest free sources. In Table 43 we consider results for Tobit models for this segment in 1983/84. As we have seen that this is essentially a new development compared to 1974/75 we present only results for the later survey year. All of the models reported reject the null of homoscedasticity and are therefore not consistent. Model 2 is taken as the preferred model as it registers the greatest improvement in the value of the log likelihood function over the model with a constant term only. The variables which exercise the greatest influence on outstanding debts to this source include a dummy variable for those households with regular outside employment, and a dummy for those households among the bottom 20%

[25]. This point has been made by several authors. Taylor and Walker (1991) found that in the Akola villages of the ICRISAT study 10% of borrowers in the formal sector used their first loans entirely to repay moneylenders. Similarly, Bell, Srinivasan and Udry (1991) stress that if the moneylender is in a position to exercise first claim on the returns produced by borrower's activities, the institutional loan will improve the moneylender's expected returns from his loan.

in terms of apparent prosperity (although not in a strongly significant way). Both these variables increase the amount a household of debt a household will hold to friends and relatives. The more a household owes to village moneylenders, the more they will also owe to friends and relatives a zero interest.

In Table 44 we compare model 2 of the Tobits with a probit of the same specification and while some of the relative parameter estimates are close to one, the variable representing outstanding debts to village moneylenders does not perform so well in this respect. We therefore examine the double hurdle model as an alternative to the Tobit model.

In the double hurdle model in Table 45 we see that the household characteristic of a regular outside job dummy was not significant in the first hurdle. In the second hurdle we see that the regular outside employment dummy positively influenced the amount that a household would borrow from friends and relatives. Additional significant explanatory power was exercised in the second hurdle by the amount outstanding to village moneylenders. It may be that households in some form of distress would borrow as much as possible from interest free sources and would also turn to the high-cost village moneylenders where necessary. This finding also suggests that interest free-credit was mainly available to households who also had access to village moneylenders, i.e. who would be judged by village moneylenders as being capable of repayment.

The double hurdle model for this segment does not yield much improvement in the value of the log likelihood function over the Tobit model. In Table 43 we see that the value of the log likelihood function for the specification considered was -218.9. This improved only to -198.67 with the double hurdle model (Table 45) and this model therefore performs only slightly better than the Tobit model in describing outstanding debts in this segment.

9. Conclusions

In a recent contribution to the World Bank Economic Review, Aleem (1990) drew attention to six key characteristics widely observed in credit markets in developing countries. These included: segmentation in market structure; lack of specialization by informal market intermediaries; interlinkages of loan and commodity contracts in informal markets; dominance of non-institutional money markets; limited access of smaller borrowers to institutional credit; and the absence of security in loan contracts given by informal lenders. As we review our observations on the Palanpur credit market it is useful to examine how well the Palanpur credit market fits these 'stylized facts'. We have seen that in Palanpur the credit market is strongly segmented with the terms and conditions for loans in the different segments clearly distinguishable from each other. In Palanpur, there is little evidence that within a particular sector interest rates vary dramatically across borrowers. It would be interesting to discover whether this is also true in general.

In the informal sector in Palanpur we have seen that no moneylender is completely specialized in this activity, and therefore the credit market in Palanpur also fits this stylized fact quite closely. However, with respect to the next characteristic, Palanpur does appear to differ from what is claimed to be typically observed[26]. There is no evidence of loan and commodity interlinkages in Palanpur. Bell (1990) has suggested that we should expect to find loan-commodity interlinkages in the more commercialized parts of India, but in this respect too, Palanpur offers a contrasting picture. There is a high degree of commercialization in the region in which Palanpur is located, and certainly agriculture in this region has undergone dramatic technological change since the 1960s, yet there is no evidence of traders lending to farmers at all.

In Palanpur it is not certain that the non-institutional money market is the dominating sector, at least on the basis of debt outstanding. However, given the problems in describing flows of credit when we are

[26]. Although we have pointed to other village studies in India which also fail to meet this 'stylized fact'.

compelled to examine stocks such as debt, plus strong evidence that outstanding debt to the most important formal sector source is overstated, the fourth 'stylized fact' is not implausible in Palanpur. The final two characteristic of credit markets in developing countries also find support in the evidence for Palanpur (although the poor did have *some* access to institutional credit, and *one* segment in the informal credit market did have collateral requirements). On the basis of the six 'key' characteristics listed above, the Palanpur market does not appear to be markedly dissimilar from many credit markets elsewhere in the developing world.

We now turn to a brief review of the broad changes in the credit market in Palanpur between 1974/75 and 1983/84. Between these two survey years the credit market in Palanpur reflected important aspects of change as well as others of remarkable stability. The importance of credit, measured as debts outstanding at a particular time, appears to have risen dramatically. This is *not* only the consequence of a rapid increase in the availability of credit from formal sources. In fact debts outstanding to the private sector have risen nearly as fast as those to the formal sector. Debts to the formal sector, and to the FSS in particular, have risen not only because of a rise in lending by these institutions, but also because of the rapid accumulation of debts as a result of fraudulent practices associated with the repayment and rolling over of debts. This suggests that while some increase in lending from this sector did take place between the two surveys, it was not as dramatic as the simple examination of figures on outstanding debts would indicate.

Private sector lending within Palanpur did not increase between 1974/75 and 1983/84 in real terms. Significantly, however, it did not decline either and there is little evidence of a displacement of village moneylending by the expansion of formal sector credit sources. Interest rates on loans from village moneylenders rose over the period studied. This may be the consequence of expanding borrowing opportunities elsewhere for the better off, leading to higher default risk for the village

moneylenders.

Two new sources of private sector credit emerged between 1974/75 and 1983/84. First, interest free credit from friends and relatives, frequently outside relations linked by marriage to villagers, emerged as a significant new source of credit. The importance of interest-free credit *within* the village remained minor, and rarely did related households within the village lend to one another. The second new source of private sector credit was the emergence of urban moneylenders who were willing to lend money at interest rates between those charged by formal sector sources and village moneylenders. These lenders were pawnshop owners in nearby towns who demanded gold and silver jewelry with a greater value than the loan as security.

From the econometric analysis in the various segments of the village credit market, the different attractions and accessibility of different households to the segments becomes more apparent. A major difficulty in econometrical examining data on outstanding debt is the treatment of zeros. It is possible that these have been generated because some households simply choose not to borrow from a particular source, given the price of the loans. Alternatively, they may reflect the fact that some households with certain characteristics may never borrow from that source (either because they are never able to, or they never want to). The double hurdle model, a more general formulation in which the standard Tobit model is nested, allows us to examine this possibility explicitly. From this it became apparent that prosperous and non-cultivating households were less likely to want to borrow loans in kind from the Seed Store, but if they chose to borrow from this source, they were able to borrow more than other households. Similarly, while landed agricultural labour households were more likely to turn to the FSS for loans, the rich in Palanpur (both cultivating households as well as households with outside jobs) were able to borrow the most from this source. The double hurdle model for the village moneylender segment confirmed that prosperous households were less likely to borrow from this high-cost source. On the other hand the model

also lent support to the idea that moneylenders would lend more to households which were well-off and which were able to borrow from institutional sources (thereby less likely to default). Further results from the econometrics revealed the high incidence among households of the Murao caste in the urban moneylender segment (as well as their reluctance to be indebted to institutional sources - despite their success in adopting new agricultural technologies), and the importance of outside employment and access to village moneylenders for households able to borrow at zero interest from friends and relatives.

Between 1974/75 and 1983/84 the burden of debt of households in Palanpur increased drastically. For the village as a whole, per capita indebtedness roughly doubled, but this masks considerable variation between the castes. The richest caste in Palanpur registered the smallest increase in per capita debts. Although the poorest caste roughly doubled its per capita indebtedness, some of the middle-ranked castes registered a near quadrupling of per capita debts. Per capita debt as a proportion of per capita income became particularly high for Jatabs, Dhimars and Passis.

Per capita debts were only loosely rising with income ranking in the village within any one year. In 1974/75, as a percentage of per capita income, per capita debt of the poorest quintile was less than 25% and this declined to around one tenth for the richest quintile. By 1983/84 a dramatic increase in the debt burden of all fractiles was observed, particularly for the poorest quintile. On the basis of landholdings, outstanding per capita debt as a percentage of per capita income increased dramatically for all but the largest landholding classes, and particularly for the landless class. Only the largest landholding class saw their proportion of per capita debt to per capita income decline from 10% to 6%. While the landless had outstanding debts of Rs 930 to the public sector in 1974/75, this amount had risen to 37,942 in 1983/84.

In light of this evidence it may be of interest to review the position of the poor in the Palanpur credit market. Does the sharply

rising debt burden of the poor indicate that the credit market is providing an effective cushion against hardship? We have discussed in some detail at various points in this chapter the operation of the "transfer-entry" mechanism for loans from the FSS. We have seen that this phenomenon can result in the very rapid accumulation of outstanding debt for affected households, and that it need not represent any new lending by this particular institution. It is very likely that those households most disadvantaged in the village through low status, inability to pay bribes, lack of education, etc., are also the most vulnerable to this type of systematic abuse. We have argued that the Seed Store represents a source of lending which can potentially benefit the poor because the amounts are small, it has easily understood terms which are relatively low (at least if we take rupees as the numerary), and it is less likely to be monopolized by the rich who have little use for loans in kind[27]. However, between 1974/75 and 1983/84 lending from this segment diminished, and therefore in this respect too, the poor in Palanpur may have become worse off.

Between 1974/75 and 1983/84 interest rates on loans from village moneylenders have tended to rise. It has been argued that this could well be a consequence of the expansion of institutional lending into the region. If new lending from the low-cost institutional sources does not go to the poor, then they will be facing higher interest rates on credit from village moneylenders (in so far that moneylenders will actually lend to them) and once again the poor can be seen to have become worse off. Finally we have seen that the two new sources of credit in the informal sector of Palanpur are also not tapped by the poor in the village. Borrowing from urban moneylenders requires collateral in the form of jewelry, and borrowing from friends and relatives pre-supposes the existence of friends and relatives with surpluses to lend. Despite the degree of change we observe in comparing outstanding debts between the two survey years, we are unable to

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[27]. Of course they could borrow seed in kind, sell it on the market, put the money to the use they wish, then at repayment time purchase the seed needed to repay on the market. However, it is not probable that many of the more affluent households felt that such a round about manner of borrowing was really worthwhile.

point to any evidence that the poor have increased access to credit in the later survey year relative to 1974/75.

Table 1

COMPARISON OF BASIC INDICATORS FOR 1974/75 AND 1983/84 BY CASTE

Caste	1974/75					1983/84				
	No. of households	No. of individuals	Per Capita Income[a]	Av. land Holding (bighas)	Av. land Cultivated (bighas)	No. of households	No. of individuals	Av. Per Capita Income	Av. land Holding (bighas)	Av. land Cultivated (bighas)
Thakur	25	174	1757	30	26	30	217	1119	25	19
Murao	27	178	1812	37	29	27	217	1265	40	41
Dhimar	8	59	1103	11	19	13	74	1026	5	12
Gadaria	10	68	1247	18	18	12	83	1112	16	15
Dhobi	3	22	934	19	18	4	27	921	5	15
Teli	12	71	1064	7	18	16	92	784	6	12
Passi	8	61	1508	13	13	15	85	1202	9	7
Jatab	14	97	994	14	21	19	118	436	11	12
Other	4	27	1117	5	1	7	47	1023	2	3
VILLAGE	111	757	1444	23	22	143	960	1025	18	19
Gini Coefficient			0.253[b]	0.47	0.43			0.307[b]	0.57	0.60

[a] All 1974/75 income figures are expressed in 1983/84 rupees.

[b] The Gini coefficient for per capita income is calculated for individual incomes, not household per capita income. For land ownership and land cultivated, the figures are for household landholdings.

Table 2

VILLAGE DEBT BY SOURCE IN 1974/75[a]

Source	Amount Due by Palanpur Households[b]		
	Cash (Rs)	Wheat[c] (Rs)	Total (Rs)
Public Lending institutions	99,335 (73)	16,327 (95)	115,663 (76)
Private Sources inside Palanpur	36,692 (27)	838 (5)	37,530 (24)
ALL SOURCES	136,027	17,166	153,193

[a] All cash figures are expressed in 1983 rupees (see text, footnote 1).
[b] Percentage distribution in brackets.
[c] Wheat has been valued at Rs 1.30 per kg (prior to deflating), the post-harvest price in 1974/75.

TOTAL VILLAGE DEBT BY SOURCE IN 1983/84

Source	Amount Due by Palanpur Households[a]		
	Cash (Rs)	Wheat[b] (Rs)	Total (Rs)
Public Lending institutions	330,157 (80)	9,450 (62)	339,607 (79)
Private Sources inside Palanpur	32,564 (8)	5,695 (38)	38,259 (9)
Private Sources outside Palanpur	51,997 (13)	0 (0)	51,997 (12)
ALL SOURCES	414,718 (100)	15,145 (100)	429,863 (100)

[a] Percentage distribution in brackets.
[b] Wheat has been valued at Rs 1.35 per kg, the post-harvest price in 1983/84.

VILLAGE DEBT INCURRED DURING 1983/84 ONLY BY SOURCE

Source	Amount Due by Palanpur Households[a]		
	Cash (Rs)	Wheat[b] (Rs)	Total (Rs)
Public Lending institutions	18,221 (43)	9,450 (71)	27,671 (49)
Private Sources inside Palanpur	8,253 (19)	3,795 (29)	12,048 (22)
Private Sources outside Palanpur	16,225 (38)	0 (0)	16,225 (29)
ALL SOURCES	42,729 (100)	13,245 (100)	55,974 (100)

[a] Percentage distribution in brackets.
[b] Wheat has been valued at Rs 1.35 per kg, the post-harvest price in 1983/84.

Table 3

VILLAGE DEBT BY RATE OF INTEREST IN 1974/75[a]

Rate of interest (% per year)	Amount due by Palanpur households at the stated rate of interest (Rs)			
	To public institutions	To Private lenders	Unknown	Total
0	0	1,956	0	1,956
1	1,473	0	0	1,473
7	5,588	0	0	5,588
10	5,867	0	0	5,867
11	6,985	0	0	6,985
13	78,293	0	0	78,293
24	0	4,680	0	4,680
25	0	15,646	0	15,646
36	0	10,547	0	10,547
50	0	1,537	0	1,537
25% in kind[b]	11,169	0	0	11,169
unknown[c]	6,287	0	3,164	9,452
TOTAL	115,663	37,530	3,164	153,193

[a] All debt is in cash figures expressed in 1983/84 rupees (see text, footnote 1).
[b] Wheat loans obtainable at the beginning of the rabi season, and to be repaid after the rabi harvest with 25% interest in kind.
[c] Due either to the interest rate being unspecified by the lender or to the borrower being unaware of the terms of the loan, or to incomplete responses.

VILLAGE DEBT BY RATE OF INTEREST IN 1983/84

Rate of interest (% per year)	Amount due by Palanpur households at the state rate of interest (Rs)		
	To public institutions	To Private lenders	Total
0	0	21,826	21,826
9	28,169	0	28,169
11	2,255	0	2,255
12	286,195	300	286,495
13	2,847	0	2,847
15	324	0	324
16	1,769	0	1,769
17	1,159	0	1,159
18	1,000	0	1,000
19	0	300	300
20	0	4,000	4,000
24	0	300	300
25	0	1,250	1,250
30	0	4,490	4,490
36	0	16,764	16,764
37	0	1,400	1,400
40	0	7,701	7,701
42	0	2,229	2,229
60	0	10,081	10,081
120	0	520	520
180	0	598	598
240	0	2,857	2,857
300	0	78	78
25% in kind[a]	9,450	0	9,450
50% in kind[b]	0	5,695	5,695
usufruct[c]	0	1,660	1,660
unknown[d]	6,439	8,207	14,646
TOTAL	339,607	90,256	429,863

[a] Wheat loans obtainable at the beginning of the rabi season, and to be repaid after the rabi harvest with 25% interest in kind.
[b] Wheat loans available at any time before the rabi harvest, and to be repaid after the rabi harvest with 50% interest in kind.
[c] In lieu of charging interest, the lender cultivates a plot of land belonging to the borrower until the loan is repaid.
[d] Due either to the interest rate being unspecified by the lender or to the borrower being unaware of the terms of the loan, or to incomplete responses.

Table 4

SYNOPTIC LIST OF CREDIT SOURCES IN 1974/75

Credit Source	Typical Range of Interest Rates (% per year)	Total Debt Outstanding[a] (Rs.)	Collatoral Requirements	Elibility Conditions
Friends and Relatives	0	1,956	None	Privileged bond with the lender
Public Institutions	7-13	115,663	None, as long as eligibility conditions are satisfied	Depend on the scheme; may include owning land.
Village Money Lending	24-50	32,410	None	To the discretion of the lender
Other	unknown	3,164	unknown	unknown

[a] All debt is in cash figures expressed in 1983/84 rupees.

SYNOPTIC LIST OF CREDIT SOURCES IN 1983/84

Credit Source	Typical Range of Interest Rates (% per year)	Total Debt Outstanding (Rs.)	Collatoral Requirements	Elibility Conditions
Friends and Relatives	0	21,826	None	Privileged bond with the lender
Public Institutions	9-18	333,168	None, as long as eligibility conditions are satisfied	Depend on the scheme; may include owning land.
Urban Money Lending	30-36	25,460	Gold or Silver	None, as long as collatoral is provided
Village Money Lending	36-60	34,763	Usually none	To the discretion of the lender
Other	not available	14,646	not available	various

Table 5

DISTRIBUTION OF DEBTS OUTSTANDING BY SOURCE IN 1974/75[a]

Source	Total debts outstanding (Rs)[b]		
	Cash	Kind	Total
Public Institutions	99,335 (73)	16,327 (95)	115,663 (76)
Palanpur Money-lenders	31,642 (23)	768 (4)	32,410 (21)
Friends and Relatives	1,886 (1)	70 (1)	1,956 (1)
Other sources[c]	3,164 (2)	0 (0)	3,164 (2)
TOTAL	136,027	17,166	153,193

[a] All debt is in cash figures expressed in 1983/84 rupees (see text, footnote 1).
[b] Percentage distribution in brackets.
[c] Due to incomplete responses.

DISTRIBUTION OF DEBTS OUTSTANDING BY SOURCE IN 1983/84[a]

Source	Total debts outstanding (Rs)[b]		
	Cash	Kind	Total
Public Institutions	323,718 (78)	9,450 (62)	333,168 (78)
Palanpur Money-lenders	29,068 (7)	5695 (38)	34,763 (8)
Friends and Relatives	21,826 (5)	0 (0)	21,826 (5)
Urban Moneylenders	25,460 (6)	0 (0)	25,460 (6)
Other Sources[c]	14,646 (4)	0 (0)	14,646 (3)
TOTAL	414,718 (100)	15,145 (100)	429,863 (100)

[a] All debt is in cash figures expressed in 1983/84 rupees.
[b] Percentage distribution in brackets.
[c] Due to incomplete responses.

Table 6

VILLAGE DEBT BY RATE OF INTEREST IN 1974/75, DISTINGUISHING BETWEEN FOUR BROAD SOURCES[a]

Rate of interest (% per year)	Amount due by Palanpur Households (Rs)
not available	3,164
FRIENDS AND RELATIVES	
0%	1,956
PUBLIC INSTITUTIONS	
1% to 13%	98,207
25% in kind	11,169
unknown[b]	6,287
VILLAGE MONEY-LENDERS	
25% and below	20,326
36%	10,547
50%	1,537
TOTAL	153,193

[a] All debt is expressed in 1983/84 rupees (see text, footnote 1).
[b] Due either to the interest rate being unspecified by the lender or to the borrower being unaware of the terms of the loan, or to incomplete responses.
[c] Due to incomplete responses.

VILLAGE DEBT BY RATE OF INTEREST IN 1983/84, DISTINGUISHING BETWEEN FOUR BROAD SOURCES

Rate of interest (% per year)	Amount due by Palanpur Households (Rs)
not available	14,646
FRIENDS AND RELATIVES	
0%	21,826
PUBLIC INSTITUTIONS	
9% to 18%	323,718
25% in kind	9,450
URBAN MONEY-LENDERS	
30% (gold collatoral)	4,490
36% (silver collatoral)	15,670
other	5,300
VILLAGE MONEY-LENDERS	
below 37%	2,944
37% (old traditional system)	1,300
40-42% (previous standard)	9,930
50% in kind	5,695
60% (new standard)	9,581
above 60% (only gambling loans)	3,653
usufruct mortgage	1,660
TOTAL	429,863

Table 7

INSTITUTIONAL CREDIT IN PALANPUR IN 1974/75 AND 1983/84

Source	Total Amount due by Palanpur Households (Rs)		Remarks
	1974/75[a]	1983/84	
Farmers' Service Society (FSS) and Seed Store	89,462	244,795	Government-assisted cooperative aiming to promote cultivation by lending to its share-holders (recruited among land-owning cultivators). Seed Store gives small loans of wheat at the time of sowing, mainly to small and marginal farmers.
Land Development Bank	24,727	24,738	Government-owned rural bank; gives large cash loans for agricultural investment.
Cane Society	1,474	0	Organization responsible for the collection and processing of sugarcane. Reported one outstanding cash loan to a Palanpur villager in 1974/75.
Prathma Bank	0	70,070	Government-owned rural bank; mainly oriented towards the promotion of agriculture and related activities; started issuing a large number of IRDP loans in Palanpur in 1985.
TOTAL	115,663	339,607	

[a] All 1974/75 debt is in cash figures expressed in 1983/84 rupees (see text, footnote 1).

Table 8

THE FARMERS' SERVICE SOCIETY (FSS) AND THE SCHEDULED CASTES

Name	Details of FSS loan(s), as reported in 1983/84
Mangli	Borrowed 100 kgs of wheat (approximate value Rs. 130 at current prices about 8 years ago. Repaid at least 3 installments (Rs. 600 total). Current balance according to FSS records: Rs. 2,143.
Naubat	Borrowed one bag of fertilizer 5-6 years ago (approximate value Rs 120 at current prices). Repaid at least 4 installments (Rs. 850 total). Current balance as per FSS records: Rs. 2,943. Last year the FSS staff told him that his debt was Rs. 3,600; he came back with a literate Murao friend (grandson of a former village headman), and they were then told that the debt was only Rs. 2,700 after all.
Danni	Borrowed Rs 50 in 1960. Repaid many installments (including Rs. 800 during the last 2 years). Current balance as per FSS records: Rs. 3,523.
Lila Dhar	Borrwoed Rs. 50 around 1960. Repaid many installments (including Rs. 300 last year). Current balance as per FSS records: Rs. 983.
Lochan	Outstanding debt of Rs. 8,000. Details not available.
Chander	Sold land to repay one RSS debt. Another debt of Rs 2,669 remains (inherited from father).
Gangu and Sompal	Borrowed Rs. 140 about 20 years ago. Rs. 1,900 were repaid about 10 years later, but no receipt was given. In 1983/84 they sold property and liquidated the loan by paying another Rs. 5,500.

Note: Between 1960 and 1983/84, the price level in Palanpur increased by a factor of roughly five. All the borrowers are poor labourers or marginal farmers, and all are illiterate.

Table 9

DISTRIBUTION OF INSTITUTIONAL DEBT BY INCOME CLASS IN 1974/75

Quintile of the 1974/75 per-capita income scale	Number of Loans which were outstanding to the Seed Store in 1974/75[a]	Number of Loans which were outstanding to other institutional sources[b]
Poorest	8 (7)	3
2	15 (14)	44
3	15 (14)	35
4	14 (13)	36
Richest	10 (10)	28
TOTAL	62 (58)	166

[a] The number of households which had loans outstanding is in brackets.
[b] This includes loans from the FSS.

DISTRIBUTION OF INSTITUTIONAL DEBT BY INCOME CLASS IN 1983/84

Quintile of the 1983/84 per-capita income scale	Number of Households with outstanding debts to the Seed Store in 1983/84	Number of Households with outstanding debts to other institutional sources[a]
Poorest	7	3
2	7	2
3	6	7
4	4	9
Richest	6	9
TOTAL	29	30

[a] This does not include loans from the FSS (for which the relevant data are not available).

Table 10

OUTSTANDING LOANS OF REGULAR MONEY LENDERS IN 1974/75 BY CASTE[a]

Caste of borrower	Interest Rate				Total Outstanding
	0%	25%	36%	50%	
Thakur	0	0	0	0	0
Murao	140	5588	1397	279	7404
Dhimar	0	0	0	0	0
Gadaria	0	0	1118	0	1118
Dhobi	0	0	0	0	0
Teli	0	0	699	0	699
Passi	0	4401	908	0	5308
Jatab	0	1327	1538	978	3841
Other	0	0	0	0	0
TOTAL	140	11316	5658	1257	18370

[a] All figures are in cash terms and are expressed in 1983/84 rupees.

OUTSTANDING LOANS OF FOUR REGULAR MONEY-LENDERS IN 1983/84

Name	Total value of loans outstanding (Rs)				Total Number of loans
	Interest-free loans	loans in kind	Interst-bearing cash loans[a]	All loans	
Gulabo	450	361	6,363 (50%)	7,024	19
Harpal	500	203	3,058 (37%)	3,261	6
Mohan	734	2,795	1,144 (27%)	4,423	19
Nisar[b]	366	1,053	800 (n/a)[c]	2,219	10
TOTAL	2,050	3,891	11,365 (44%)	18,332	54

[a] In brackets, the average interest rate charged on interest-bearing cash loans (with each loan being given equal weight in the averaging calculation). It should be borne in mind that differences in these interest rates between lenders reflect **partly** different lending strategies, and partly also differences in the dates at which loans were issued (with more recent loans typically bearing higher rates of interest).

[b] Although Nisar was interviewed shortly after the harvest, by which time all his loans in kind (except one) had be repaid, this table describes his credit position **prior** to the harvest.

[c] Instead of charging interest on this loan, Nisar has obtained the right to cultivate a plot of land belonging to the borrower until the loan is repaid (this is a system referred to as "usufruct mortgage").

Note: This table includes interest-free loans (counted elsewhere as coming from "friends and relatives").

Table 11

CASTE DISTRIBUTION OF CLIENTS OF ANY VILLAGE MONEYLENDER IN 1974/75 AT A POSITIVE RATE OF INTEREST

Caste	No. of Households	Number of Households with Debts Outstanding to Village Moneylenders				
		24%	25%	36%	50%	TOTAL[a,b]
Thakur	25	2	0	0	0	2 (8%)
Murao	27	0	4	2	1	7 (25%)
Dhimar	8	4	0	1	0	5 (63%)
Gadaria	10	1	0	1	0	2 (20%)
Dhobi	3	0	0	0	0	0 (0%)
Teli	12	0	2	2	0	4 (33%)
Passi	8	0	3	2	0	4 (50%)
Jatab	14	0	4	5	4	8 (57%)
Other	4	0	0	0	0	0 (0%)
TOTAL	111	7	13	13	5	32 (29%)

[a] The number of households in the row totals need not correspond to the sum of the columns entries in that row because some households may have more than one debt outstanding.
[b] In brackets, the percentage of all households in the respective caste.

CASTE DISTRIBUTION OF CLIENTS OF ANY VILLAGE MONEYLENDER IN 1983/84

Caste	No. of Households	Number of Households with Debts Outstanding to Village Moneylenders				
		"Daur" loans	Cash loans (r<5%)	Cash loans (r=5%)	Other terms[a]	All Terms[b]
Thakur	30	3	1	0	1	5(17%)
Murao	27	1	2	1	1	5(19%)
Dhimar	13	1	3	0	2	3(23%)
Gadaria	12	0	1	0	1	2(17%)
Dhobi	4	1	0	0	0	1(25%)
Teli	16	2	5	3	1	7(44%)
Passi	15	1	1	2	4	5(33%)
Jatab	19	7	0	0	0	7(37%)
Other	7	1	0	0	1	2(29%)
TOTAL	143	17	13	6	11	37(26%)

[a] Interest rates above 5% (gamblings-related loans), not available, or taking the from of cultivation of land ("usufruct" mortgage).

[b] The entries in this column are **not** necessarily the row total, since row totals would involve double-counting of households with several debts outstanding under different terms. In brackets, the percentage of all households in the relevant caste.

Note: r denotes the monthly rate of interest (interest-free loans are excluded from this table).

Table 12

DISTRIBUTION OF CLIENTS OF ANY VILLAGE MONEYLENDER BY LAND OWNERSHIP

Landownership class (bighas)	No. of Households	Number of Households with debt outstanding to any village moneylenders				
		24%	25%	36%	50%	TOTAL[a,b]
0	10	0	0	1	0	1 (10%)
0-5	12	3	1	1	1	5 (41%)
5-15	24	2	6	6	1	13 (54%)
15-30	42	2	3	3	3	9 (21%)
30-50	9	0	2	1	0	2 (22%)
50+	14	0	1	1	0	2 (14%)
ALL SIZES	111	7	13	13	5	32 (29%)

[a] The number of households in the row totals need not correspond to the sum of the columns entries in that row because some households may have more than one debt outstanding.

[b] In brackets, the percentage of all households in the respective class.

DISTRIBUTION OF CLIENTS OF ANY VILLAGE MONEYLENDER BY LAND OWNERSHIP IN 1983/84

Land ownership class (bighas)	No. of Households	Number of Households with Debts Outstanding to Village Moneylenders				
		"Daur" loans	Cash loans (r<5%)	Cash loans (r=5%)	Other terms[a]	All Terms[b]
0	27	3	3	2	2	6(22%)
0 - 5	19	1	2	2	2	7(37%)
5 - 15	35	5	2	0	2	8(23%)
15 - 30	36	7	3	1	3	11(31%)
30 - 50	15	1	3	1	2	5(33%)
50+	11	0	0	0	0	0(0%)
TOTAL	143	17	13	6	11	37(26%)

[a] Interest rates above 5% (gamblings-related loans), not available, or taking the from of cultivation of land ("usufruct" mortgage).

[b] The entries in this column are not necessarily the row total, since row totals would involve double-counting of households with several debts outstanding under different terms. In brackets, the percentage of all households in the relevant landholding class.

Note: r denotes the monthly rate of interest (interest-free loans are excluded from this table).

Table 13

DISTRIBUTION OF CLIENTS OF ANY VILLAGE MONEYLENDER BY PER CAPITA INCOME QUINTILES

Quintiles of the Per Capita Income Scale	No. of Households	Number of households with debt outstanding to any village moneylender				
		24%	25%	36%	50%	TOTAL[a,b]
poorest	23	5	2	3	2	11 (48%)
2	22	1	5	6	2	10 (45%)
3	22	0	1	1	0	2 (9%)
4	22	1	3	2	0	6 (27%)
richest	22	0	2	1	1	3 (14%)
ALL SIZES	111	7	13	13	5	32 (29%)

[a] The number of households in the row totals need not correspond to the sum of the columns entries in that row because some households may have more than one debt outstanding.

[b] In brackets, the percentage of all households in the respective quintile.

DISTRIBUTION OF CLIENTS OF ANY VILLAGE MONEYLENDER BY PER CAPITA INCOME QUINTILES IN 1983/84[a]

Quintiles of 1983/84 per capita income	No. of Households	Number of Households with Debts Outstanding to Village Moneylenders				
		"Daur" loans	Cash loans (r<5%)	Cash loans (r=5%)	Other terms[b]	All Terms[c]
poorest	31	7 (8)	1 (3)	1 (2)	1 (1)	9 (12)
2	28	2 (2)	2 (2)	2 (1)	1 (2)	6 (6)
3	28	3 (3)	5 (7)	1 (1)	2 (4)	9 (10)
4	28	4 (3)	2 (0)	2 (2)	4 (2)	7 (5)
richest	28	1 (1)	3 (1)	0 (0)	3 (2)	6 (4)
TOTAL	143	17(17)	13(13)	6 (6)	11 (11)	37 (37)

[a] The numbers in brackets indicate the corresponding numbers when households are ranked by "apparent prosperity" rather than by per capita income in 1983/84 (see text for details).

[b] Interest rates above 5% (gamblings-related loans), not available, or taking the from of cultivation of land ("usufruct" mortgage).

[c] The entries in this column are **not** necessarily the row total, since row totals would involve double-counting of households with several debts outstanding under different terms. In brackets, the percentage of all households in the relevant landholding class.

Note: r denotes the monthly rate of interest (interest-free loans are excluded from this table).

Table 14

INTEREST-FREE CREDIT FROM FRIENDS AND RELATIVES IN 1983/84

Source	Total debts outstanding (Rs)	Average value of loans (Rs)	Total amount borrowed in 1983/84[a] (Rs)
Outsiders:			
relatives	17,250	1,150	2,950 (5)
others	1,080	360	1,100 (2)
TOTAL OUTSIDERS	18,330	1,018	4,050 (7)
Palanpur:			
regular moneylenders[b]			
same caste	400	133	150 (1)
other caste	1,675	168	950 (4)
others			
same caste	221	74	171 (2)
other caste	1,200	200	400 (1)
TOTAL PALANPUR	3,496	159	1,671 (8)
GRAND TOTAL	21,826	546	5,721 (15)

[a] Number of loans in brackets

[b] This group consists of six individuals who regularly issue interest-bearing loans.

Table 15

DEBT FROM URBAN MONEY LENDERS BY CASTE

Caste	No. of Loans[a]	Rs. Outstanding (% of Total)	Purpose
Thakur	3 (3)	900 (4)	marriage
Murao	8 (8)	8,940 (35)	marriage, farming
Dhimar	1 (1)	200 (1)	medicines
Gadaria	1 (1)	615 (2)	bullock
Dhobi	1 (1)	670 (3)	land purchase
Teli	5 (3)	6,375 (25)	marriage, she-buffalo, land purchase
Passi	3 (3)	5,900 (23)	medicines
Jatab	1 (1)	1,360 (5)	not available
Other	1 (1)	500 (2)	farming expenses
TOTAL	24 (22)	25,460	

[a] The number of households in brackets.

Table 16

REAL AMOUNT OF DEBT OUTSTANDING BY CASTE AND SOURCE IN 1974/75[a]

Caste	LDB	Cane Society	FSS and Seed Store	Private	Total	Per Capita Indebtedness[b]	Per Capita Income
Thakur	5,867 (13%)	1,474 (3%)	32,016 (70%)	6,238 (14%)	45,595 (100%)	262	1,757
Murao	12,573 (35%)	0	11,963 (34%)	11,106 (31%)	35,642 (100%)	200	1,812
Dhimar	6,287 (43%)	0	5,786 (40%)	2,445 (17%)	14,517 (100%)	246	1,102
Gadaria	0	0	19,062 (93%)	1,537 (7%)	20,599 (100%)	303	1,247
Dhobi	0	0	636 (36%)	1,118 (64%)	1,754 (100%)	80	934
Teli	0	0	3,907 (67%)	1,886 (33%)	5,794 (100%)	82	1,064
Passi	0	0	10,250 (66%)	5,309 (34%)	15,559 (100%)	255	1,508
Jatab	0	0	5,840 (43%)	7,893 (57%)	13,733 (100%)	142	994
Other	0	0	0	0	0	0	1,117
TOTAL	24,727 (16%)	1,474 (1%)	89,462 (58%)	37,530 (25%)	153,193 (100%)	202	1,444

[a] All debts are in cash figures, and expressed in 1983/84 rupees. In brackets, the percentage of total debts per caste by source.

[b] Per capita indebtedness is expressed as total debts held by households of a particular caste divided by the population within that caste. Per capita income is obtained in a similar manner.

REAL AMOUNT OF DEBT OUTSTANDING BY CASTE AND SOURCE IN 1983/84[a]

Caste	Public Sector	Urban Money-Lenders	Village Money Lenders	Friends and Relatives	Others	Total	Per Capita Indebtedness[b]	Per Capita Income
Thakur	96,173 (94%)	900 (1%)	2,654 (3%)	2,130 (2%)	100 (0%)	101,957 (100%)	470	1,119
Murao	35,248 (71%)	8,940 (18%)	1,478 (3%)	3,371 (7%)	955 (0%)	49,992 (100%)	230	1,265
Dhimar	54,428 (75%)	200 (0%)	12,859 (18%)	2,716 (4%)	1,975 (3%)	72,178 (100%)	975	1,026
Gadaria	48,828 (88%)	615 (1%)	4,100 (7%)	500 (1%)	1,194 (2%)	55,237 (100%)	666	1,112
Dhobi	2,080 (58%)	670 (19%)	388 (11%)	450 (13%)	0 (0%)	3,588 (100%)	133	922
Teli	16,190 (54%)	6,375 (21%)	4,740 (16%)	2,317 (8%)	400 (1%)	30,022 (100%)	326	784
Passi	42,351 (61%)	5,900 (8%)	5,547 (8%)	9,950 (14%)	6,122 (9%)	69,870 (100%)	822	1,202
Jatab	29,978 (87%)	1,360 (4%)	2,620 (8%)	50 (0%)	345 (1%)	34,353 (100%)	291	436
Other	7,893 (62%)	500 (4%)	378 (3%)	342 (3%)	3,555 (28%)	12,668 (100%)	270	1,023
TOTAL	333,168 (79%)	25,460 (6%)	34,764 (6%)	21,826 (5%)	14,646 (4%)	429,863 (100%)	447	1,025

[a] In brackets, the percentage of total debts per caste, by source.

[b] Per capita indebtedness is expressed as total debts held by households of a particular caste divided by the population within that caste. Per capita income is obtained in a similar manner.

Table 17

REAL AMOUNT OF DEBT OUTSTANDING BY PER CAPITA INCOME AND SOURCE IN 1974/75[a]

Quintile of Income per capita	LDB	Cane Society	FSS and Seed Store	Private	Total	Per Capita Indebtedness	Per Capita Income
poorest	2,096 (9%)	0	12,297 (51%)	9,500 (40%)	23,892 (100%)	157	673
2nd	4,191 (11%)	1,474 (4%)	22,512 (58%)	10,338 (27%)	38,515 (100%)	247	1,097
3rd	0	0	30,532 (86%)	4,910 (14%)	35,443 (100%)	205	1,343
4th	5,588 (23%)	0	9,226 (38%)	9,220 (38%)	24,033 (100%)	162	1,651
richest	12,852 (41%)	0	14,895 (48%)	3,562 (11%)	31,310 (100%)	245	2,679
TOTAL	24,727 (16%)	1,474 (1%)	89,462 (58%)	37,530 (25%)	153,193 (100%)	202	1,444

[a] All debts are in cash figures, and expressed in 1983/84 rupees. In brackets, the percentage of total debts per quintile by source.

REAL AMOUNT OF DEBT OUTSTANDING BY QUINTILE AND SOURCE IN 1983/84[a]

Quintile of Per Capita Income	Public Sector	Urban Money-Lenders	Village Money Lenders	Friends and Relatives	Others	Total	Per Capita Indebtedness[b]	Per Capita Income
poorest	47,400 (71%)	7,780 (12%)	4,864 (7%)	5,950 (9%)	400 (1%)	66,394 (100%)	418	308
2nd	32,828 (74%)	2,000 (5%)	1,805 (4%)	5,092 (12%)	2,345 (5%)	44,070 (100%)	262	629
3rd	74,135 (81%)	4,365 (5%)	8,531 (9%)	2,330 (3%)	1,694 (2%)	91,055 (100%)	440	882
4th	58,999 (74%)	4,700 (5%)	5,749 (7%)	4,438 (6%)	5,717 (7%)	79,603 (100%)	370	1,233
richest	119,807 (81%)	6,615 (4%)	13,812 (8%)	4,016 (3%)	4,490 (3%)	148,740 (100%)	704	1,850
TOTAL	333,168 (79%)	25,460 (6%)	34,761 (6%)	21,826 (5%)	14,646 (4%)	429,863 (100%)	448	1,025

[a] In brackets, the percentage of total debts per quintile, by source.

[b] Per capita indebtedness is expressed as total debts held by households of a particular quintile divided by the population within that quintile. Per capita income is obtained in a similar manner.

Table 18

REAL AMOUNT OF DEBT OUTSTANDING BY LANDHOLDING CLASS AND SOURCE IN 1974/75[a]

Landholding class (bighas)	LDB	Cane Society	FSS and Seed Store	Private	Total	Per Capita Indebtedness	Per Capita Income
0	0	0	930 (72%)	349 (27%)	1,279 (100%)	24	1,035
0 - 5	0	0	7,023 (57%)	5,378 (43%)	12,401 (100%)	153	1,022
5 - 15	2,095 (6%)	0	24,139 (86%)	10,128 (14%)	36,363 (100%)	249	1,056
15 - 30	11,176 (18%)	0	39,513 (65%)	9,849 (16%)	60,538 (100%)	218	1,453
30 - 50	0	0	8,005 (68%)	3,771 (32%)	11,777 (100%)	171	1,728
50+	11,455 (37%)	1,474 (5%)	9,853 (32%)	8,054 (26%)	30,836 (100%)	239	2,146
TOTAL	24,727 (16%)	1,474 (1%)	89,462 (58%)	37,530 (25%)	153,193 (100%)	202	1,444

[a] All debts are in cash figures, and expressed in 1983/84 rupees. In brackets, the percentage of total debts per landholding class by source.

REAL AMOUNT OF DEBT OUTSTANDING BY QUINTILE AND SOURCE IN 1983/84[a]

Land-holding Class (bighas)	Public Sector	Urban Money-Lenders	Village Money Lenders	Friends and Relatives	Others	Total	Per Capita Indebtedness[b]	Per Capita Income
0	37,942 (75%)	2,225 (4%)	3,911 (8%)	4,109 (8%)	2,700 (5%)	50,887 (100%)	410	851
0-5	42,894 (83%)	1,920 (4%)	4,396 (9%)	1,400 (3%)	1,200 (2%)	51,810 (100%)	489	1,070
5-15	65,623 (69%)	9,615 (10%)	5,587 (6%)	9,500 (10%)	4,959 (5%)	95,284 (100%)	454	901
15-30	105,799 (77%)	6,260 (5%)	16,575 (12%)	3,037 (2%)	5,655 (4%)	137,326 (100%)	509	1,082
30-50	72,488 (86%)	5,340 (6%)	4,294 (5%)	1,650 (2%)	132 (0%)	83,904 (100%)	749	1,014
50+	8,423	100	0	2,130	0	10,653	77	1,234
TOTAL	333,168 (79%)	25,460 (6%)	34,763 (6%)	21,826 (5%)	14,646 (4%)	429,863 (100%)	447	1,025

[a] In brackets, the percentage of total debts per class, by source.

[b] Per capita indebtedness is expressed as total debts held by households of a particular class divided by the population within that class. Per capita income is obtained in a similar manner.

Table 19

Definition of Variables for 1974/75

Variable	Mean	Std Dev	Sum	
MURAO	0.24	0.43	27.0	dummy for Murao caste
PASSI	0.07	0.25	8.0	dummy for Passi caste
FSSDUM	0.57	0.50	64.0	dummy if borrowed from FSS
CULTINC7	6278.77	5565.82	696943.23	cultivation income
REGJOB7	1493.87	2725.03	165819.71	income from regular off-farm employment
LNDAGLAB	0.44	0.50	50.00	dummy for landed agricultural labour
LNDLES	0.09	0.29	10.00	dummy for landless
NOCULT	0.16	0.37	18.00	dummy for non-cultivating
JOBDUM	0.33	0.47	38.00	dummy for outside job
FSSRUP	705.34	1309.86	78292.77	outstanding rupees to FSS
MACHINES	0.35	0.69	38.00	number of agricultural machines
MODRNAG	0.13	0.34	15.00	dummy if using modern agricultural machinery
RICH	0.40	0.49	44.00	dummy if household is in top 40%
RICHEST	0.20	0.40	22.00	dummy if household is in top 20%
LDLSAGLB	0.07	0.26	8.00	dummy for landless labourer
DECILE	5.54	2.90	615.00	decile of per capita income
QUINTILE	3.02	1.43	335.00	quintile of per capita income
LCULT	21.96	17.56	2438.00	land cultivated

Table 20

Definition of Variables for 1983/84

Variable	Mean	Std Dev	Sum	
THAKUR	0.21	0.41	30.0	dummy for Thakur caste
MURAO	0.19	0.39	27.0	dummy for Murao caste
PASSI	0.10	0.31	15.0	dummy for Passi caste
FSSNEW	0.05	0.22	7.0	dummy if borrowed from FSS in 1983/84
LOWN	18.15	20.91	2596.0	land owned
LCULT	18.53	22.47	2650.0	land cultivated
CULTINC8	2060.41	4163.68	294638.4	cultivation income
REGJOB8	2325.50	3756.38	332545.8	income from regular off-farm employment
LNDAGLAB	0.22	0.42	32.00	dummy for landed agricultural labour
AP	2.95	1.43	423.00	quintile on the basis of apparent prosperity
FSOLDRUP	95.73	545.39	13690.0	rupees outstanding on FSS loans incurred before 1983/84
LENDRUP	165.96	490.18	23734.6	rupees outstanding to regular moneylenders
VALVSTK	2333.90	2420.35	333760.0	value of livestock
LNDLES	0.18	0.39	27.00	dummy for landless
NOCULT	0.32	0.47	46.00	dummy for non-cultivating
JOBDUM	0.45	0.50	65.00	dummy for outside job
FSSRUP	1645.77	3545.39	235345.11	outstanding rupees to FSS
MACHINES	0.70	1.32	100.00	number of agricultural machines
MODRNAG	0.24	0.43	35.00	dummy if using modern agricultural machinery
RICH	0.40	0.49	57.00	dummy if household is in top 40%
RICHEST	0.20	0.40	29.00	dummy if household is in top 20%
LDLSAGLB	0.07	0.27	11.00	dummy for landless labourer
DECILE	5.50	2.90	787.00	decile of per capita income
QUINTILE	3.00	1.43	429.00	quintile of per capita income
LCULT	18.53	22.47	2650.00	land cultivated

Table 21

Tobit Results for Borrowing from the Seed Store

1983/84

Total Observations: 143
Observations at 0: 115
Observations > 0: 28

Estimated coefficients with asymptotic standard errors in parentheses:

	Model	
Dependent Variable:	**Seed Store (Rupees)**	**Seed Store (log Rupees)**
Variable	**1**	**2**
Constant	-188.57 (90.41)	-2.15 (1.82)
Rupees Borrowed From the FSS in 1983	0.25 (0.08)	
Rupees Borrowed From the FSS in 1983 (Log)		1.49 (0.46)
Non-Cultivator Dummy	-491.93 (166.26)	-11.01 (3.46)
Modern Agricultural Practices Dummy	-386.80 (178.49)	-8.71 (3.76)
Richest Quintile Dummy	-251.10 (188.23)	-7.58 (4.18)
Standard Error	461.82	9.60
Log Likelihood(0)	-258.84	-152.88
Log Likelihood(M)	-245.02	-136.96
LR Test (Model)	27.64	31.84
Degrees of Freedom	4	4
Critical χ^2	9.49	9.49
LM Test (homoskedasticity)	98.21	118.86
Degrees of Freedom	10	10
Critical χ^2	18.30	18.30
Preferred Model	***	

Table 22

Comparison of Tobit and Probit Models for Borrowing from the Seed Store

1983/84

Total Observations: 143
Observations at 0: 115
Observations > 0: 28

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	**Probit**	**Ratio**
Dependent Variable:	**Seed Store (Rupees)**	**Seed Store (dummy)**	**Tobit/Probit[1]**
Constant	-188.57 (90.41)	-0.374 (0.172)	1.00
Rupees Borrowed From the FSS in 1983	0.25 (0.08)	0.002 (0.001)	0.25
Non-Cultivator Dummy	-491.93 (166.26)	-1.279 (0.367)	0.76
Modern Agricultural Practices Dummy	-386.80 (178.49)	-1.086 (0.422)	0.71
Richest Quintile Dummy	-251.10 (188.23)	-0.792 (0.484)	0.63
Log Likelihood(0)	-258.84	-70.72	
Log Likelihood(M)	-245.02	-52.83	
LR Test (Model)	27.64	35.76	
Degrees of Freedom	4	4	
Critical χ^2	9.49	9.49	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 23

Tobit Results for Borrowing from the Seed Store

1974/75

Total Observations: 112
Observations at 0: 54
Observations > 0: 58

Estimated coefficients with asymptotic standard errors in parentheses:

	Model	
Dependent Variable:	**Seed Store (Rupees)**	**Seed Store (log Rupees)**
Variable	**1**	**2**
Constant	7.33 (27.08)	-2.12 (0.78)
Rupees Outstanding to the FSS in 1974/75	0.05 (0.01)	
Rupees Outstanding to the FSS in 1974/75 (log)		0.94 (0.12)
Non-Cultivator Dummy	-13.93 (51.81)	-0.89 (0.98)
Modern Agricultural Practices Dummy	-50.19 (60.45)	-0.43 (1.12)
Richest Quintile Dummy	1.84 (49.86)	-0.04 (0.93)
Standard Error	177.28	3.19
Log Likelihood(0)	-427.94	-212.64
Log Likelihood(M)	-420.68	-179.87
LR Test (Model)	14.51	65.64
Degrees of Freedom	4	4
Critical χ^2	9.49	9.49
LM Test (homoskedasticity)	1.79	5.96
Degrees of Freedom	9	9
Critical χ^2	16.90	16.90
Preferred Model	***	

Table 24

Comparison of Tobit and Probit Models for Borrowing from the Seed Store

1974/75

Total Observations: 112
Observations at 0: 54
Observations > 0: 58

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	**Probit**	**Ratio**
Dependent Variable:	**Seed Store (Rupees)**	**Seed Store (dummy)**	**Tobit/Probit[1]**
Constant	7.33 (27.08)	-0.092 (0.227)	1.00
Rupees Outstanding to the FSS in 1974/75	0.05 (0.01)	0.0005 (0.0002)	1.26
Non-Cultivator Dummy	-13.93 (51.81)	-0.271 (0.451)	0.65
Modern Agricultural Practices Dummy	-50.19 (60.45)	-0.479 (0.536)	1.32
Richest Quintile Dummy	1.84 (49.86)	-0.053 (0.436)	-0.44
Log Likelihood(0)	-427.94	-70.72	
Log Likelihood(M)	-420.68	-52.83	
LR Test (Model)	14.51	35.76	
Degrees of Freedom	4	4	
Critical χ^2	9.49	9.49	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 25

Double Hurdle Results for Borrowing from the Seed Store

White's Robust t-statistics in parentheses:

	Model	
Total Observations:	**143**	**112**
Observations at 0:	**115**	**54**
Observations > 0:	**28**	**58**
Dependent Variable:	**Seed Store Rupees (1983/84)**	**Seed Store Rupees (1974/75)**
Variable	**1**	**2**
FIRST HURDLE		
Constant	-0.463 (-1.5)	-0.22 (-0.72)
Among Most Prosperous Two Quintiles	-0.707 (-1.6)	0.14 (0.34)
Non-Cultivating Household	-1.060 (-2.2)	-0.213 (-0.39)
Rupees Outstanding to FSS	0.0006 (1.3)	0.0005 (2.00)
SECOND HURDLE		
Constant	242.0 (7.1)	164.0 (14.0)
Among Most Prosperous Quintile	114.0 (0.73)	13.7 (0.42)
Non-Cultivating Household	215.0 (2.6)	37.7 (1.40)
Modern Agricultural Practices	22.8 (0.14)	32.0 (0.64)
Rupees Outstanding to FSS	0.022 (1.8)	0.014 (1.8)
Standard Error	130.00	78.8
Log Likelihood(0)	-258.84	-427.94
Log Likelihood(M)	-210.87	-350.00
LR Test (Model)	95.94	155.88
Degrees of Freedom	4	4
Critical χ^2	9.49	9.49

Table 26

Tobit Results for All Borrowing from the FSS

1983/84

Total Observations: 143
Observations at 0: 89
Observations > 0: 54

Estimated coefficients with asymptotic standard errors in parentheses:

	Model	
Dependent Variable:	**All FSS Borrowings (Rupees)**	
Variable	**1**	**2**
Constant	-4246.6 (1081.5)	-3764.1 (1075.6)
Agricultural Labour Household with Land	3415.9 (1409.0)	3218.5 (1384.7)
Income from Cultivation in 1983/84	0.3 (0.1)	0.4 (0.1)
Income from Regular Off-Farm Employment	0.3 (0.1)	0.3 (0.1)
Murao Dummy		-2703.2 (1731.2)
Standard Error	5975.3	5870.7
Log Likelihood(0)	-599.4	-599.4
Log Likelihood(M)	-592.1	-590.8
LR Test (Model)	14.6	17.3
Degrees of Freedom	3	4
Critical χ^2	7.81	9.49
LR Test (Model2-Model1)		2.5
Degrees of Freedom		1
Critical χ^2		3.8
LM Test (homoskedasticity)	9.8	17.4
Degrees of Freedom	6	11
Critical χ^2	12.6	19.7
Preferred Model		***

Table 27

Comparison of Tobit and Probit Models for Borrowing from the FSS

1983/84

Total Observations: 143
Observations at 0: 89
Observations > 0: 54

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	Probit	Ratio
Dependent Variable:	**FSS (Rupees)**	**FSS (dummy)**	**Tobit/Probit[1]**
Constant	-3764.1 (1075.6)	-0.789 (0.174)	1.00
Agricultural Labour Household with Land	3218.5 (1384.7)	0.897 (0.270)	0.75
Income from Cultivation in 1983/84	0.4 (0.1)	0.00009 (0.00004)	0.93
Income from Regular Off-Farm Employment	0.3 (0.1)	0.00006 (0.00003)	1.05
Murao Dummy	-2703.2 (1731.2)	-0.334 (0.326)	1.69
Log Likelihood(0)	-599.4	-94.97	
Log Likelihood(M)	-590.8	-84.10	
LR Test (Model)	17.3	21.74	
Degrees of Freedom	4	4	
Critical χ^2	9.49	9.49	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 28

Tobit Results for All Borrowing from the FSS

1974/75

Total Observations: 112
Observations at 0: 48
Observations > 0: 64

Estimated coefficients with asymptotic standard errors in parentheses:

	Model	
Dependent Variable:	**All FSS Borrowings (Rupees)**	
Variable	**1**	**2**
Constant	-454.9 (376.8)	-304.4 (378.0)
Agricultural Labour Household with Land	1094.7 (442.9)	962.1 (440.9)
Income from Cultivation in 1974/75	0.00 (0.03)	0.02 (0.03)
Income from Regular Off-Farm Employment	-0.02 (0.08)	-0.02 (0.1)
Murao Dummy		-891.4 (506.5)
Standard Error	1886.2	1862.1
Log Likelihood(0)	-608.3	-608.3
Log Likelihood(M)	-604.6	-603.1
LR Test (Model)	7.2	10.4
Degrees of Freedom	3	4
Critical χ^2	7.81	9.49
LR Test (Model2-Model1)		3.0
Degrees of Freedom		1
Critical χ^2		3.8
LM Test (homoskedasticity)	1.9	7.2
Degrees of Freedom	7	11
Critical χ^2	14.1	19.7
Preferred Model		***

Table 29

Comparison of Tobit and Probit Models for Borrowing from the FSS

1974/75

Total Observations: 112
Observations at 0: 48
Observations > 0: 64

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	**Probit**	**Ratio**
Dependent Variable:	**FSS (Rupees)**	**FSS (dummy)**	**Tobit/Probit[1]**
Constant	-304.4 (378.0)	-0.114 (0.238)	1.00
Agricultural Labour Household with Land	962.1 (440.9)	0.755 (0.279)	0.48
Income from Cultivation in 1983/84	0.02 (0.03)	0.00002 (0.00003)	0.37
Income from Regular Off-Farm Employment	-0.02 (0.1)	-0.00002 (0.00003)	0.37
Murao Dummy	-891.4 (506.5)	-0.502 (0.309)	0.67
Log Likelihood(0)	-608.3	-76.49	
Log Likelihood(M)	-603.1	-69.05	
LR Test (Model)	10.4	14.88	
Degrees of Freedom	4	4	
Critical χ^2	9.49	9.49	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 30

Double Hurdle Results for Borrowing from the FSS

White's Robust t-statistics in parentheses:

	Model	
Total Observations:	**143**	**112**
Observations at 0:	**89**	**48**
Observations > 0:	**54**	**64**
Dependent Variable:	**All FSS Rupees (1983/84)**	**All FSS Rupees (1974/75)**
Variable	**1**	**2**
FIRST HURDLE		
Constant	1.39 (4.1)	6.63 (60.0)
Agricultural Labour Household with Land	2.29 (6.3)	-1.40 (-9.0)
SECOND HURDLE		
Constant	-5640.0 (-4.0)	-304.0 (-0.88)
Agricultural Labour Household with Land	1510.0 (0.99)	962.0 (2.0)
Murao Dummy	-2000.0 (-0.98)	-891.0 (-1.6)
Household Cultivation Income Respective Year	0.485 (3.2)	0.023 (0.77)
Income from Regular Off-Farm Work in Respective Year	0.535 (3.2)	-0.018 (-0.28)
Standard Error	6270.0	1860.0
Log Likelihood(0)	-599.40	-603.10
Log Likelihood(M)	-545.98	-544.25
LR Test (Model)	106.84	117.70
Degrees of Freedom	4	4
Critical χ^2	9.49	9.49

Table 31

Tobit Results for Other Formal Borrowings

1983/84

Total Observations: 143
Observations at 0: 115
Observations > 0: 28

Estimated coefficients with asymptotic standard errors in parentheses:

	Model			
Dependent Variable:	**Other Formal Borrowings (Rupees)**		**Other Formal Borrowings (log Rupees)**	
Variable	**1**	**2**	**3**	**4**
Constant	-5543.4 (1332.4)	-4889.9 (1335.2)	-11.4 (3.0)	-11.7 (3.1)
Murao Dummy	-9474.9 (3558.3)	-9813.1 (3707.9)	-17.1 (6.9)	-16.8 (6.8)
Machines	2161.3 (737.9)	2831.5 (945.3)	3.8 (1.5)	3.6 (1.6)
Regular Job Income	0.2 (0.2)	0.2 (0.2)		
Regular Job Income (log)			0.5 (0.3)	0.5 (0.3)
Land Owned		-61.7 (48.4)		
Land Owned (log)				0.3 (0.7)
Standard Error	5280.8	5229.1	10.6	10.5
Log Likelihood(0)	-325.4	-325.4	-152.4	-152.4
Log Likelihood(M)	-317.0	-316.1	-144.6	-144.5
LR Test (Model)	16.8	18.5	15.5	15.7
Degrees of Freedom	3	4	3	4
Critical χ^2	7.81	9.49	7.81	9.49
LM Test (homoskedasticity)	33.8	94.4	41.3	40.3
Degrees of Freedom	7	11	7	11
Critical χ^2	14.1	19.7	14.1	19.7
Preferred Model	***			

Table 32

Comparison of Tobit and Probit Models for Other Formal Borrowings

1983/84

Total Observations: 143
Observations at 0: 115
Observations > 0: 28

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	**Probit**	**Ratio**
Dependent Variable:	**Other Formal (Rupees)**	**Other Formal (dummy)**	**Tobit/Probit[1]**
Constant	-5543.4 (1332.4)	-1.055 (0.174)	1.00
Murao Dummy	-9474.9 (3558.3)	-1.660 (0.661)	1.09
Machines	2161.3 (737.9)	0.364 (0.142)	1.13
Income from Regular Off-Farm Employment	0.2 (0.2)	0.00005 (0.00003)	0.76
Log Likelihood(0)	-325.4	-70.72	
Log Likelihood(M)	-317.0	-63.55	
LR Test (Model)	16.8	14.35	
Degrees of Freedom	3	3	
Critical χ^2	7.81	7.81	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 33

Tobit Results for Other Formal Borrowings

1974/75

Total Observations: 112
Observations at 0: 104
Observations > 0: 7

Estimated coefficients with asymptotic standard errors in parentheses:

	Model			
Dependent Variable:	**Other Formal Borrowings (Rupees)**		**Other Formal Borrowings (log Rupees)**	
Variable	**1**	**2**	**3**	**4**
Constant	-11389.6 (4502.4)	-12945.5 (5067.9)	-22.9 (9.5)	-36.7 (18.9)
Murao Dummy	37.2 (3351.8)	-1509.8 (3524.4)	-1.4 (7.0)	-4.2 (7.1)
Machines	2103.1 (1958.6)	-541.2 (2472.5)	4.2 (4.0)	0.4 (4.6)
Regular Job Income	-1.5 (1.4)	-1.4 (1.4)		
Regular Job Income (log)			-1.1 (1.0)	-1.0 (1.0)
Land Owned		129.5 (93.7)		
Land Owned (log)				5.7 (5.1)
Standard Error	7578.2	7226.1	15.5	14.9
Log Likelihood(0)	-90.3	-90.3	-47.1	-47.1
Log Likelihood(M)	-88.5	-87.4	-45.7	-44.5
LR Test (Model)	3.7	5.9	2.8	5.2
Degrees of Freedom	3	4	3	4
Critical χ^2	7.81	9.49	7.81	9.49
LM Test (homoskedasticity)	83.9	83.7	92.9	102.4
Degrees of Freedom	7	12	7	12
Critical χ^2	14.1	21.0	14.1	19.7

Table 34

Probit Results for Borrowing from Other Formal Sector Sources

1974/75

Dependent Variable: Othdum
Total Observations: 112
Observations at 0: 105
Observations at 1: 7

Estimated coefficients with asymptotic standard errors in parentheses:

	Model			
Variable	**1**	**2**	**3**	**4**
Constant	-1.867	-1.829	-1.649	-1.614
	(0.252)	(0.264)	(0.286)	(0.350)
Dummy for Modern Agriculture	1.244	1.289	1.409	1.481
	(0.429)	(0.448)	(0.479)	(0.649)
Murao		-0.205	-0.363	-0.327
		(0.505)	(0.541)	(0.583)
Job dummy			-0.807	-0.816
			(0.602)	(0.602)
Land Owned				-0.002
				(0.013)
Log Likelihood(0)	-26.185	-26.185	-26.185	-26.185
Log Likelihood(M)	-22.080	-21.963	-20.826	-20.812
LR Test (Model)	8.209	8.444	10.718	10.745
Degrees of Freedom	1	2	3	4
Critical χ^2	3.840	5.990	7.810	9.490
LR Test (Model1)		0.234	2.508	2.536
Degrees of Freedom		1	2	3
Critical χ^2		3.840	5.990	7.810
Preferred Model	***			

Table 35

Tobit Results for Borrowing from Urban Moneylenders

Total Observations: 143
Observations at 0: 121
Observations > 0: 22

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
Dependent Variable: Urban Moneylender (Rupees)			
Variable	**1**	**2**	**3**
Constant	-2632.7 (673.6)	-2417.4 (651.4)	-2214.4 (662.3)
Murao Dummy	1277.5 (735.6)	1959.7 (880.4)	2170.1 (928.5)
Agricultural Labour Household with Land	-1521.3 (986.3)	-1825.3 (1027.8)	-1866.4 (1028.1)
Machines Owned		-455.3 (302.0)	-287.6 (350.0)
Land Owned			-19.3 (23.1)
Standard Error	2492.7	2472.9	2454.3
Log Likelihood(0)	-241.3	-241.3	-241.3
Log Likelihood(M)	-238.0	-236.7	-236.3
LR Test (Model)	6.5	9.1	9.8
Degrees of Freedom	2	3	4
Critical χ^2	5.99	7.81	9.49
LR Test (Against Model 1)		2.6	3.4
Degrees of Freedom		1	2
Critical χ^2		3.84	5.99
LM Test (homoskedasticity)	85.8	75.4	71.8
Degrees of Freedom	2	6	11
Critical χ^2	5.99	12.6	19.7
Preferred Model	***		

Table 36

Comparison of Tobit and Probit Models for Urban Moneylenders

1983/84

Total Observations: 143
Observations at 0: 121
Observations > 0: 22

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	Probit	Ratio
Dependent Variable:	**Urban (Rupees)**	**Urban (dummy)**	**Tobit/Probit[1]**
Constant	-2632.7 (673.6)	-1.073 (0.162)	1.00
Murao Dummy	1277.5 (735.6)	0.596 (0.297)	0.87
Agricultural Labour Household with Land	-1521.3 (986.3)	-0.551 (0.388)	1.13
Log Likelihood(0)	-241.3	-61.39	
Log Likelihood(M)	-238.0	-57.99	
LR Test (Model)	6.5	6.78	
Degrees of Freedom	2	2	
Critical χ^2	5.99	5.99	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 37

Tobit Results for Borrowing from Village Moneylenders

Total Observations: 143
Observations at 0: 106 **1983/84**
Observations > 0: 37

Estimated coefficients with asymptotic standard errors in parentheses:

Variable	1	2	3	4	5
Constant	-1908.7	-1574.9	-1052.1	-905.0	-858.7
	(501.7)	(447.6)	(252.8)	(332.0)	(330.8)
Decile in Apparent Prosperity Ranking	-84.7	-56.3			
	(54.5)	(53.0)			
Quintile in Apparent Prosperity Ranking				-96.4	-115.7
				(106.0)	(105.0)
Dummy for Richest Two Quintiles			-479.7		
			(305.9)		
Land Cultivated (Bighas)	15.5	13.1	13.2	19.5	26.5
	(6.4)	(6.4)	(5.9)	(7.7)	(8.1)
Land Owned (Bighas)					
Outside Job Dummy	417.4				
	(257.8)				
Agricultural Labour Household with Land	778.2	877.0	818.4	703.0	
	(287.8)	(297.8)	(293.2)	(278.0)	
Landless Agricultural Labour Household					439.0
					(440.6)
Rupees from the FSS				0.1	0.1
				(0.04)	(0.04)
Value of Livestock				-0.13	
				(0.08)	
Number of Machines (for Agriculture)					-425.9
					(161.3)
Standard Error	1084.7	1131.4	1115.8	1070.0	1066.9
Log Likelihood(0)	-361.7	-361.7	-361.7	-361.7	-361.7
Log Likelihood(M)	-353.1	-354.4	-353.6	-349.8	-350.4
LR Test (Model)	17.3	14.8	16.1	23.8	22.7
Degrees of Freedom	4	3	3	5	5
Critical χ^2	9.49	7.81	7.81	11.1	11.1
LR Test (Model 1-2)	2.5				
Degrees of Freedom	1				
Critical χ^2	3.8				
LM Test (homoskedasticity)	19.5	8.6	8.7	31.8	13.6
Degrees of Freedom	11	7	6	18	17
Critical χ^2	19.7	14.1	12.6	28.9	21.0
Preferred Model					***

Table 38

Comparison of Tobit and Probit Models for Village Moneylenders

1983/84

Total Observations: 143
Observations at 0: 106
Observations > 0: 37

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	**Probit**	**Ratio**
Dependent Variable:	**Moneylender (Rupees)**	**Moneylender (dummy)**	**Tobit/Probit[1]**
Constant	-858.7 (330.8)	-0.520 (0.312)	1.00
Quintile in Apparent Prosperity Ranking	-115.7 (105.0)	-0.161 (0.105)	0.44
Land Cultivated	26.5 (8.1)	-0.014 (0.009)	1.15
Landless Agricultural Labour Household	439.0 (440.6)	0.276 (0.442)	0.96
Rupees from the FSS	0.1 (0.04)	0.0001 (0.00004)	0.61
Number of Machines (for Agriculture)	-425.9 (161.3)	-0.261 (0.161)	0.99
Log Likelihood(0)	-361.7	-81.76	
Log Likelihood(M)	-350.4	-72.66	
LR Test (Model)	22.7	18.18	
Degrees of Freedom	5	5	
Critical χ^2	11.1	11.1	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 39

Tobit Results for Borrowing from Village Moneylenders

1974/75

Total Observations: 112
Observations at 0: 79
Observations > 0: 32

Estimated coefficients with asymptotic standard errors in parentheses:

Dependent Variable:	**Model** Moneylender Borrowings (Rupees)				
Variable	**1**	**2**	**3**	**4**	**5**
Constant	-661.9	-666.1	-1277.7	-494.7	-217.8
	(534.8)	(531.2)	(469.9)	(557.9)	(527.6)
Decile in Income Ranking	-150.1	-161.9			
	(87.7)	(84.6)			
Quintile in Income Ranking				-389.4	-352.9
				(177.4)	(166.1)
Dummy for Richest Two Quintiles			-324.4		
			(473.7)		
Land Cultivated (Bighas)	14.2	16.5	7.9	14.6	22.9
	(13.9)	(13.1)	(12.6)	(13.3)	(14.8)
Outside Job Dummy	-256.8				
	(526.8)				
Agricultural Labour Household with Land	591.6	456.1	574.6	391.7	
	(500.0)	(410.7)	(420.8)	(418.1)	
Landless Agricultural Labour Household					-1254.0
					(1008.8)
Rupees from the FSS				0.03	0.1
				(0.16)	(0.2)
Value of Livestock				0.19	
				(0.33)	
Number of Machines (for Agriculture)					-590.1
					(412.9)
Standard Error	1640.2	1635.4	1659.4	1615.7	1710.0
Log Likelihood(0)	-320.2	-320.2	-320.2	-320.2	-320.2
Log Likelihood(M)	-316.7	-316.8	-318.6	-316.2	-314.5
LR Test (Model)	7.0	6.7	3.2	8.0	11.4
Degrees of Freedom	4	3	3	5	5
Critical χ^2	9.49	7.81	7.81	11.1	11.1
LR Test (Model 1-2)	0.2				
Degrees of Freedom	1				
Critical χ^2	3.8				
LM Test (homoskedasticity)	58.9	64.6	59.2	62.7	98.7
Degrees of Freedom	11	7	6	18	17
Critical χ^2	19.7	14.1	12.6	28.9	28.9

Table 40

Comparison of Tobit and Probit Models for Village Moneylenders

1974/75

Total Observations: 112
Observations at 0: 79
Observations > 0: 33

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	**Probit**	**Ratio**
Dependent Variable:	**Moneylender (Rupees)**	**Moneylender (dummy)**	**Tobit/Probit[1]**
Constant	-217.8 (527.6)	0.182 (0.352)	-1.00
Quintile in Income Ranking	-352.9 (166.1)	-0.277 (0.110)	1.06
Land Cultivated	22.9 (14.8)	0.011 (0.010)	1.74
Landless Agricultural Labour Household	-1254.0 (1008.8)	-0.928 (0.634)	1.13
Rupees from the FSS	0.1 (0.2)	0.00002 (0.0001)	4.18
Number of Machines (for Agriculture)	-590.1 (412.9)	-0.484 (0.282)	1.02
Log Likelihood(0)	-320.2	-67.01	
Log Likelihood(M)	-314.5	-58.82	
LR Test (Model)	11.4	16.03	
Degrees of Freedom	5	5	
Critical χ^2	11.1	11.1	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 41

Double Hurdle Results for Borrowing from Village Moneylenders: 1

White's Robust t-statistics in parentheses:

	Model	
Total Observations:	**143**	**112**
Observations at 0:	**106**	**80**
Observations > 0:	**37**	**32**
Dependent Variable:	**Moneylender Rupees (1983/84)**	**Moneylender Rupees (1974/75)**
Variable	**1**	**2**
FIRST HURDLE		
Constant	2.39 (0.029)	1.09 (1.5)
Prosperity Ranking (Quintile)[1]	-0.67 (-0.057)	-0.43 (-1.9)
SECOND HURDLE		
Constant	-1010.0 (-0.11)	-860.0 (-1.70)
Landless Agricultural Labour Household	465.0 (0.09)	58.8 (0.1)
Prosperity Ranking (Quintile)[1]	138.0 (0.029)	23.6 (0.19)
Land Cultivated in Respective Year	39.7 (0.50)	54.8 (3.0)
Rupees Outstanding to the FSS	0.034 (0.02)	0.67 (5.0)
Number of Agricultural Machines Owned	-296.0 (-0.21)	-301.0 (-0.64)
Standard Error	772.0	811.0
Log Likelihood(0)	-361.70	-320.20
Log Likelihood(M)	-313.39	-277.81
LR Test (Model)	96.62	84.78
Degrees of Freedom	7	7
Critical χ^2	14.10	14.10

1. Prosperity in 1983/84 is defined using the apparent prosperity criterion. For 1974/75, current income is the criterion used to define prosperity.

Table 42

Double Hurdle Results for Borrowing from Village Moneylenders: 2

White's Robust t-statistics in parentheses:

	Model	
Total Observations:	**143**	**112**
Observations at 0:	**106**	**80**
Observations > 0:	**37**	**32**
Dependent Variable:	**Moneylender Rupees (1983/84)**	**Moneylender Rupees (1974/75)**
Variable	**1**	**2**
FIRST HURDLE		
Constant	1.67 (0.50)	1.05 (1.4)
Prosperity Ranking (Quintile)[1]	-0.54 (0.80)	-0.43 (-1.8)
SECOND HURDLE		
Constant	-803.0 (-1.1)	-673.0 (-1.20)
Agricultural Labour Household with Land	367.0 (1.8)	-126.0 (-0.4)
Prosperity Ranking (Quintile)[1]	206.0 (2.8)	11.2 (0.09)
Land Cultivated in Respective Year	48.1 (5.7)	48.3 (4.7)
Rupees Outstanding to the FSS	0.011 (0.23)	0.66 (6.7)
Value of Livestock	-0.225 (-2.6)	
Number of Livestock[2]		66.0 (0.70)
Standard Error	608.0	787.0
Log Likelihood(0)	-361.70	-320.20
Log Likelihood(M)	-308.42	-277.77
LR Test (Model)	106.56	84.86
Degrees of Freedom	7	7
Critical χ^2	14.10	14.10

1. Prosperity in 1983/84 is defined using the apparent prosperity criterion.For 1974/75, current income is the criterion used to define prosperity.
2. The double hurdle model for 1974/75 with the value of livestock as an explanatory variable failed to converge so the number of livestock was included instead.

Table 43

Tobit Results for Interest-Free Borrowings

Total Observations: 143
Observations at 0: 121
Observations > 0: 22

Estimated coefficients with asymptotic standard errors in parentheses:

	Model			
Dependent Variable:	**Interest Free Borrowings (Rupees)**		**Interest Free Borrowings (log Rupees)**	
Variable	**1**	**2**	**3**	**4**
Constant	-1683.9 (397.9)	-1902.4 (439.5)	-13.2 (3.3)	-12.2 (3.0)
Outside Job Dummy	689.7 (326.9)	807.7 (343.3)	5.6 (2.4)	4.9 (2.2)
Thakur Dummy	-113.6 (386.2)			
Poorest Quintile in Apparent Prosperity Ranking		552.7 (369.0)	2.9 (2.5)	
Borrowings From Village Moneylenders	0.4 (0.2)	0.4 (0.2)		
Borrowings From Village Moneylenders (in logs)			0.8 (0.4)	0.8 (0.4)
Standard Error	1185.6	1170.1	8.1	8.2
Log Likelihood(0)	-225.2	-225.2	-118.2	-118.2
Log Likelihood(M)	-220.0	-218.9	-111.9	-112.6
LR Test (Model)	10.4	12.6	12.7	11.3
Degrees of Freedom	3	3	3	2
Critical χ^2	7.81	7.81	7.81	5.99
LM Test (homoskedasticity)	31.0	52.9	54.8	64.2
Degrees of Freedom	6	5	6	4
Critical χ^2	12.6	11.1	12.6	9.49

Table 44

Comparison of Tobit and Probit Models for Interest-Free Borrowings

1983/84

Total Observations: 143
Observations at 0: 121
Observations > 0: 22

Estimated coefficients with asymptotic standard errors in parentheses:

	Model		
	Tobit	Probit	Ratio
Dependent Variable:	**Interest-free (Rupees)**	**Interest-free (dummy)**	**Tobit/Probit[1]**
Constant	-1902.4 (439.5)	-1.566 (0.245)	1.00
Outside Job Dummy	807.7 (343.3)	0.573 (0.286)	1.16
Poorest Quintile in Apparent Prosperity Ranking	552.7 (369.0)	0.453 (0.317)	1.00
Borrowings from Village Moneylenders	0.4 (0.2)	0.0006 (0.0003)	0.55
Log Likelihood(0)	-225.2	-61.39	
Log Likelihood(M)	-220.0	-54.86	
LR Test (Model)	10.4	19.06	
Degrees of Freedom	3	3	
Critical χ^2	7.81	7.81	

Note:
1. For variable i, coefficient estimate α_i, the ratio is defined as the ratio of α_i(Tobit)/α_i(Probit) to α_0(Tobit)/α_0(Probit) where α_0 is the coefficient estimate for the constant term.

Table 45

Double Hurdle Results for Interest Free Borrowing in 1983/84

White's Robust t-statistics in parentheses:

	Model
Total Observations:	143
Observations at 0:	121
Observations > 0:	22
Dependent Variable:	Interest Free Rupees (1983/84)
Variable	1
FIRST HURDLE	
Constant	5.47
	(42.0)
Dummy for Regular Off-Farm Employment	-0.42
	(-0.9)
SECOND HURDLE	
Constant	1900.0
	(-3.3)
Dummy for Regular Off-Farm Employment	808.0
	(1.9)
Among the Least Prosperous Quintile	553.0
	(1.3)
Rupees Outstanding to Village Moneylenders	0.445
	(2.6)
Standard Error	1170.0
Log Likelihood(0)	-225.20
Log Likelihood(M)	-198.67
LR Test (Model)	53.06
Degrees of Freedom	5
Critical χ^2	11.10

Chapter 7

Summary and Conclusions

The individual chapters in this thesis have concluded with a summary of the main points. We shall be brief here, highlighting some of the principal findings from the study and attempting to relate the conclusions in different chapters to each other.

The impact of change on an economy can be complex and profound, no less for the economy of a small village in rural India than for the large economies of developed countries. The process of change in the economy of Palanpur has been associated with many different (though related) factors, but we have suggested that three have been of major importance. These are population growth in the face of limited opportunities to extend land access; agricultural intensification associated with technological change; and the expansion of employment opportunities outside agriculture. We have seen that the influence of these factors has been such that, over time, the distribution of incomes from economic activity has been neither constant nor moving in a uniform direction.

We saw in Chapter 2 that in Palanpur, the process of agricultural intensification often referred to as the "Green Revolution" has not been to the unambiguous advantage of large landowners. Influential factors on the distribution of agricultural incomes include the quality of harvest in combination with the distribution of operational holdings. There is some suggestion that during the earlier stages of agricultural intensification the correlation between operational and ownership holdings was less marked than later, but that this strengthened as skilled farmers resisted partitioning land in the face of demographic pressure (therefore emerging as the largest land owners) and also increasingly took land under tenancy to expand their operational holdings.

The influence of agricultural income inequality on total income inequality declined sharply between the earlier surveys and 1983/84. This was largely replaced by the rising influence of outside job incomes. In the later survey year inequality in outside job income accounted for nearly half of total income inequality. Outside jobs increased significantly in number over the whole survey period, with the largest rise observed between the 1974/75 and 1983/84. The sharp influence of outside job incomes on total income inequality was not due solely to the increase in the number of jobs. In Palanpur it appears that outside job incomes only recently became attractive to the rich in the village. For example, the correlation between outside job incomes and total incomes in 1974/75 was nearly zero, but by 1983/84 had become very strong and positive.

What has been the impact of the changing economic environment on the position of the poor in Palanpur? To be able to address such a question, one must have an idea of the meaning of poverty as well as the identity of the poor. Such issues are not always straightforward. We have scrutinized in some detail the implications of using income to proxy living standards and therefore lack of income as an indicator of poverty. We demonstrated that conclusions which one reaches about the nature and extent of poverty in Palanpur, as well as the identity of the poor, may be very sensitive to one or a combination of the many assumptions, conventions and definitions we make when we use income. These include decisions relating to the period over which incomes are measured, the components of income we include, the choice of unit of analysis, and so on. Even where we are prepared to accept income as a proxy for the standard of living, we have stressed that the measurement of income inequality, poverty or welfare involves an additional body of assumptions and conventions, related to the choice of which particular measure we use. In standard approaches to measurement, assumptions included in this "second-tier" often remain implicit.

We have indicated that there exist approaches to the measurement of poverty, inequality and welfare which seek to rank distributions on the

basis of any of these three criteria. This ranking is ordinal, and may in some cases only be partial. However, where a ranking does obtain, following this approach, it holds over a wide range of the specific measures which are available, and therefore is not sensitive to the particular assumptions embodied in those measures. This approach can be seen to address many of the issues raised by the presence of "second-tier" assumptions.

In our examination of poverty in Palanpur in Chapter 3 we compared identification of the poor using in turn current income, income averaged over the four survey years and "apparent prosperity" as indicators. This last indicator is a much broader measure of living standard which implicitly embodies components such as wealth, health, life-style, consumption, etc. The "apparent-prosperity" indicator is an ordinal measure available only for the 1983/84 survey year and was constructed by the investigators in the village during that year. While some broad agreement is found between incomes and apparent prosperity, there is clear divergence in some cases, for example where omitted income components are important, or where the apparent prosperity indicator makes implicit adjustments for household size. In addition, where we use current income to calculate the incidence of poverty among households with different characteristics, our comparisons with apparent prosperity reveal the possibility of systematic biases in the use of income. Income is a "noisy" measure of living standard in any particular survey year and calculating the incidence of poverty among different groups can result in systematic overestimation of the poverty incidence among those who are not poor, and underestimation among those who are.

In terms of current income, average income and apparent prosperity we have found that the incidence of poverty among agricultural labour households and among households of the Jatab caste to be consistently high. The incidence of poverty among landless households is not as high as one might expect, but this finding is associated with the phenomena of household partitioning, the increased availability of outside employment,

and the persistence of some traditional non-agricultural occupations within the village. Another household characteristic which is well correlated with poverty is the absence of a fit adult male, in particular in combination with landlesness or with the household head being a widow.

When we implement, in Chapter 4, the approach which permits us to address the question of different underlying assumptions in specific measures of living standards, we restrict our attention to income as our indicator. We suggested that the stochastic dominance approach, or the 'primal', (as opposed to the widely used Lorenz dominance approach - the 'dual') is best suited to the purpose of examining inequality, poverty and welfare within a unified framework. In our attempts to rank the data for Palanpur on the basis of poverty and welfare, although not inequality, we found that the 1974/75 survey year clearly ranks higher than the other survey years. In terms of inequality and poverty (but not welfare), we can also rank the 1957/58 survey above the 1962/63 survey. Further rankings cannot be obtained unless we make some restrictions on the class of living-standards functions accepted. In an intermediate approach which we call the 'e-dominance' approach we restricted the extent to which we accomodated widely divergent distributional views (and the specific measures which embody those views). As a result of making what most commentators might accept as being mild restrictions, we saw that in terms of welfare we are now able to rank all distributions; 1974/75 followed by 1983/84, then 1957/58 and finally 1962/63.

In Chapter 5 we examined economic mobility in Palanpur, in particular the economic mobility of agricultural labour households. We suggested that income mobility in the village as a whole as well as among agricultural labour households is quite high. However, agricultural labour households also tend to be highly represented among the poor in any given year and experience little occupational mobility over time. The divergence between high income mobility of these households and their incidence of poverty can be reconciled by pointing to the largely transitory movements which occur in the income space and which do not reflect long-term changes in living

standards. We suggest that against the backdrop of economic change in Palanpur, the position of a sizeable group in the population experiencing a high incidence of poverty, does not appear to have altered markedly.

Finally we investigated the role of one particular market in Palanpur which has been influential on the outcomes in terms of income levels, income distribution, and poverty which we have observed. The credit market in Palanpur is highly segmented, not only in terms of a formal/informal dichotomy, but also within the informal segment. Debts outstanding to formal sources are much greater than to informal sources but care must be taken in the interpretation of these figures. Fraudulent accounting practices in some formal sources may suggest that more lending takes place in this segment than actually occurs. In addition, the turnover of loans may be higher in the informal segments. There is strong evidence of rationing in the Palanpur credit market, and poor households appear to have restricted access to sources offering credit at low-cost. Over time interest rates from village moneylenders have been rising. New informal sources of credit have appeared in the village. Urban moneylenders in nearby towns lend to villagers, but demand jewelry as collatoral. Interest free lending between friends and relatives has also shown an increase and is greatest among those with outside jobs and access to village moneylender loans. Neither of these two emerging segments are likely to have benefitted the poor in a significant way. There is little in the operation of the Palanpur credit market which suggests that it is well placed to help the poor in Palanpur raise their living standards and reduce their vulnerability.

The study of income inequality, poverty and mobility in Palanpur has provided a number of insights into the way in which a changing economic environment can affect living standards. This type of enquiry for rural India is still relatively rare as it is crucially dependent on the availability of appropriate longitudinal data. Moreover, an understanding of the processes which can play an important role often involves examining several markets and institutions simultaneously as well their various

interlinkages. In both these respects the detailed study of a village is a useful vehicle with which to proceed. We cannot assert that what is observed in Palanpur also holds for villages elsewhere in India, but the analysis and ideas here may be compared with economic theories and with findings from studies elsewhere. If propositions and theories are expounded which do not find support in Palanpur's experience the we may learn something of them by trying to understand where and how they fail. If ideas from elsewhere find confirmation in a very detailed study like Palanpur, then such support would, we hope, be worth having. In addition, it is hoped that ideas generated from the Palanpur study may prove fruitful in understanding problems and circumstances elsewhere.

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