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Transient Poverty in Rural China

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Panel data for rural China indicate that roughly half the poverty is transient. This severely constrains efforts to reach the chronically poor using cross-sectional data. But similar processes are at work in creating transient and chronic poverty.

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Summary findings

Jalan and Ravallion study transient poverty in a six-year panel dataset for a sample of 5,000 households in post-reform rural China.

Half of the mean squared poverty gap is transient, in that it is directly attributable to fluctuations in consumption over time. There is enough transient poverty to treble the cost of eliminating chronic poverty when targeting solely according to current consumption — and to tilt the balance in favor of untargeted transfers.

Transient poverty is low among the chronically poorest, and tends to be high among those near the poverty line.

Using censored quantile regression techniques, Jalan and Ravallion find that systemic factors determine transient poverty, although they are generally congruent with the determinants of chronic poverty. There is little to suggest that the two types of poverty are created by fundamentally different processes.

It appears that the same things that would help reduce chronic poverty — higher and more secure farm yields and higher levels of physical and human capital — would also help reduce transient poverty.

This paper — a product of the Poverty and Human Resources Division, Policy Research Department — is part of a larger effort in the department to use improved data to understand the causes of poverty and implications for policy. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Patricia Sader, room N8-040, telephone 202-473-3902, fax 202-522-1153, Internet address psader@worldbank.org. June 1996. (35 pages)

Transient Poverty in Rural China

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1 Introduction

Some of the poverty at any one date is bound to be transient, in that it is due to a short-lived drop in individual levels of living, as distinct from chronic poverty arising from low long-term welfare. This paper addresses three questions that often arise in policy discussions:

i) How much of the poverty observed at one date is transient? As a rule, policy makers tend to attach more concern to chronic poverty. This is understandable. But it is still important to know about transient poverty, because of its bearing on our ability to reach the chronically poor through informationally feasible interventions; this leads us to pose a second question:

ii) How much does the existence of transient poverty constrain the scope for reaching people who are typically poor? We know very little about the extent of leakage to the transiently poor from the commonly used modes of targeting transfers (in cash or kind) on the basis of various types of essentially cross-sectional data.

iii) Are different processes at work in determining transient versus chronic poverty? It is often claimed that different policies are called for. Transient poverty has been identified as a motive for certain anti-poverty policies, such as various social safety nets (Lipton and Ravallion, 1995, section 6). Insurance and income-stabilization schemes are seen to be more important when poverty is more transient. Increasing the human and physical assets of poor people, or the returns to those assets, are thought to be more appropriate to chronic poverty. Such tailoring of policies to objectives presumes that different processes are at work determining the two types of poverty. But it may well be that the things one does to reduce chronic poverty also reduce transient poverty and vice versa.

These can be difficult questions to answer. Most household surveys are essentially static in that the living standards data refer to a relatively short period, based on a single interview.

Longitudinal observations—in which the same households are surveyed repeatedly to form a panel—are needed to distinguish the two types of poverty. Such data are still rather rare. Yet, even with panel data, explaining transient poverty can be difficult. For example, the transient component could also be the result of highly idiosyncratic random variables (including measurement errors) and, hence, difficult to explain using conventional survey data. Systematic factors in transient poverty may well be buried in considerable "noise".

The paper addresses these questions using a new panel data set for post-reform rural China. Our main aim here is to quantify the extent and nature of transient poverty in this setting. We measure transient poverty by the contribution to expected poverty of consumption variability over time. We focus on consumption because that is likely to be a better welfare indicator for assessing poverty, particularly when incomes vary over time in reasonably predictable ways.[2] The next section outlines our approach, and the sections following that address the three questions above in that order. Our conclusions can be found in section 6.

2 Measuring and modelling transient poverty

2.1 Decomposing poverty measures into "transient" and "chronic" components

Let $(y_{i1}, y_{i2}, \ldots, y_{iD})$ be household i's (positive) consumption stream over D dates. Consumptions have been normalized for differences in demographics and prices, such that y_{it} is an agreed money metric of household welfare. Let $P(y_{i1}, y_{i2}, \ldots, y_{iD})$ be an aggregate inter-temporal poverty measure for household i. (We are more explicit about this measure below.)

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[2] On the arguments for basing poverty measures on consumption rather than income see Slesnick (1993) and Ravallion (1994). There is a large literature on consumption smoothing; for a recent discussion see Deaton (1992).

We define the transient component of $P(y_{i1}, y_{i2}, \ldots, y_{iD})$ as the portion which is attributable to inter-temporal variability in consumption.[3] The transient component (T_i) is thus given by

$$T_i = P(y_{i1}, y_{i2}, \ldots, y_{iD}) - P(Ey_i, Ey_i, \ldots, Ey_i) \quad (1)$$

where Ey_i is the expected value of consumption over time ("time-mean consumption") for household i. The chronic component (C_i) is

$$C_i = P(Ey_i, Ey_i, \ldots, Ey_i) \quad (2)$$

So the inter-temporal poverty measure is simply the sum of the chronic and transient components. Corresponding to each of the household-specific poverty measures there is an aggregate poverty measure across n households, which we denote by dropping the subscripts i. For example, the aggregate measure of chronic poverty is

$$C = C(Ey_1, Ey_2, \ldots, Ey_n) \quad (3)$$

We impose a number of conditions on the poverty measure.[4] Firstly, we require that the measure be both inter-temporally and inter-personally additive. It is common to restrict attention to inter-personally additive measures, whereby aggregate poverty is simply a population-weighted mean of an individual poverty measure.[5] This implies that the measure is "sub-group consistent" (Foster and Shorrocks, 1991) in that if poverty increases in any one sub-

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[3] Here we follow Ravallion (1988) which discusses the theoretical effects of welfare variability on various poverty measures.

[4] There is a large literature on poverty measurement. For an overview and references see Ravallion (1994).

[5] For a survey of the additive measures found in the literature and their properties see Atkinson (1987).

group and does not fall in any other then aggregate poverty must increase. The further assumption we make here is to apply the same restriction to the inter-temporal poverty measure, so that aggregate poverty for a given household is the expected value over time of a date-specific individual poverty measure, denoted by p_{it}. One possible objection to this assumption is that one might deem the extent of a household's poverty at one date to depend on expenditures at a prior date; acquiring a bicycle now may make one less poor in the future. However this objection is unpersuasive if the measure of consumption in a given period captures the value of all commodities consumed in that period, even if purchased previously. We return to this point when we discuss our data.

The second set of assumptions concerns the properties of the individual and date-specific poverty measure p_{it}. Since y_{it} has been normalized for differences in demographics and prices, it is sensible to also assume that the individual poverty function is the same for all households and dates, $p_{it} = p(y_{it})$.[6] The function p is also taken to be strictly convex and decreasing up to a poverty line, and zero thereafter, and we assume that the measure vanishes continuously as one approaches the poverty line from below. In terms of the poverty measurement literature, convexity implies that the poverty measure satisfies a "transfer axiom", such that it penalizes inequality amongst the poor. Continuity at the poverty line also means that we are ruling out the possibility of a qualitative jump in welfare as the poverty line is crossed.[7] The main

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[6] Almost all poverty measures (including those used here, but many others) are homogeneous of degree zero in the vector of individual welfare indicators and the poverty line, so this normalization is possible.

[7] For further discussion on the implications of this property for measuring transient poverty see Ravallion (1988).

empirical poverty measure we will use is the squared poverty gap (SPG) index of Foster et al., (1984). The SPG for household i is:

$$p(y_{it}) = (1 - y_{it})^2 \text{ if } y_{it} < 1$$
$$= 0 \text{ otherwise} \tag{4}$$

where y_{it} is normalized by the (possibly household-specific) poverty line and thus takes the value of unity for someone at the poverty line. The aggregate SPG is the household-size weighted mean of $p(y_{it})$ across the whole population. It is readily verified that this measure satisfies our assumptions. But so do other measures. To test robustness to the choice of the measure we also consider the Watts (1968) poverty index, for which:

$$p(y_{it}) = -\log(y_{it}) \text{ if } y_i < 1$$
$$= 0 \text{ otherwise} \tag{5}$$

2.2 *Transient poverty as a constraint on targeting the chronically poor*

The existence of transient poverty will diminish the impact on chronic poverty from a given anti-poverty budget targeted according to static data. To quantify this loss, we study a stylized policy problem.[8] This does not aim to describe the actual policy problem in this setting (with all the constraints that involves), but rather to quantify the specific constraint due to transient poverty. Consider a set of lump-sum transfers which aim to minimize chronic poverty subject to budget and informational constraints. Let $\Gamma(B)$ denote the minimum level of chronic poverty with a budget B and perfect information about each person's expected consumption and

[8] Here we follow the approach of Chaudhuri and Ravallion (1994).

(hence) chronic poverty level. In practice, the information set is incomplete due to transient poverty. Let $\Gamma_t(B)$ denote the minimum level of chronic poverty attainable with the information set restricted to the observed consumptions at date t.

Within the class of poverty measures considered here, chronic poverty is minimized by giving the person with lowest time-mean consumption the first allocation from the budget so as to bring that person up to the level of the second poorest. Then both receive the next allocation, and so on. (It is readily demonstrated that such step-wise targeting will be the allocation which has the largest impact on any additive, decreasing, convex, and continuous poverty measure.) Thus $\Gamma(B)$ can be readily calculated given the distribution of time-mean consumptions.

In calculating $\Gamma_t(B)$ the transfers are instead based on the observed consumptions at each date, though we evaluate them ex post by their impact on chronic poverty. The transfers are allocated the same way (from the poorest up), though this time it is the poorest in terms of current consumption. The impact on chronic poverty is then based on the new distribution of time-mean consumptions. (We assume that the transfers continue over the whole period, though this is not essential.) Thus the impact on chronic poverty is:

$$\Gamma_t(B) = C(Ey_1 + \tau_{1t}, \ldots, Ey_n + \tau_{nt}) \tag{6}$$

where the transfers τ_{it} for $i=1,..,n$ minimize the chronic poverty index based on current consumptions as given by:

$$C(y_{1t} + \tau_{1t}, \ldots, y_{nt} + \tau_{nt}) \tag{7}$$

subject to the additively absorbed public budget:

$$\sum_{i=1}^{n} \tau_{it} = B \tag{8}$$

By comparing $\Gamma(B)$ with $\Gamma_t(B)$ we can directly measure the extent to which transient poverty reduces the efficacy of transfers based on current consumptions as the means of fighting chronic poverty. (Under our restrictions on the class of poverty measures, the functions Γ and Γ_t are strictly decreasing in B and $\Gamma_t(B) \geq \Gamma(B)$ at a given B.) The value of $\Gamma_t(B) - \Gamma(B)$ measures the amount of chronic poverty which cannot be eliminated with a budget of size B using only the data for date t. We can also calculate the extra budgetary cost of a given impact on chronic poverty, as the dual of the above optimization problem. For example, it is common to calculate the budget needed to eliminate poverty with perfect information as given by the aggregate poverty gap; for eliminating chronic poverty that cost is

$$B^* = \sum_{i=1}^{n} \max(1 - Ey_i, 0) \tag{9}$$

at which point $\Gamma(B^*) = 0$. However, when there is latent transient poverty, the poverty gap calculated using cross-sectional data will underestimate the "true" cost of eliminating chronic poverty, as given by B_t^* such that $\Gamma_t(B_t^*) = 0$.

2.3 Modelling transient and chronic poverty

Having measured transient and chronic poverty at the household level we want to examine their causes. We are particularly interested in whether the household characteristics that one would typically identify as crucial in determining chronic poverty also influence the

extent of transient poverty. Is there evidence that different household characteristics have different effects on the two components of poverty, or do their effects tend to be congruent?

To test this we regress the measures of transient and chronic poverty components on the same set of household characteristics. Censored regression models have to be used. (Standard least squares techniques will not account for the qualitative difference between the limit and non-limit observations due to the fact that for households with consumption levels above the poverty line, the poverty measures take a value of zero.) Thus our model of transient poverty is:

$$T_i^* = \hat{T}_i \quad \text{if } \hat{T}_i > 0 \quad \text{where } \hat{T}_i = x_i'\beta^T + u_i^T$$
$$= 0 \quad \text{otherwise} \tag{10}$$

where β^T is a kx1 vector of unknown parameters, x_i is a kx1 vector of explanatory variables, and u^T are residuals. Similarly, for chronic poverty:

$$C_i^* = \hat{C}_i \quad \text{if } \hat{C}_i > 0 \quad \text{where } \hat{C}_i = x_i'\beta^C + u_i^C$$
$$= 0 \quad \text{otherwise} \tag{11}$$

It is often assumed that the errors in a censored model are independently and normally distributed. Under this assumption, standard tobit models are estimated using non-linear optimization techniques. However, the tobit estimates are not robust to misspecification in the distribution of errors. The presence of heteroscedasticity results in the parameters of the model being inconsistent. In addition, if the true data generating process is not drawn from a normal distribution, then tobit models would once again render the parameter estimates inconsistent. Therefore, it is essential to test for the presence of heteroscedasticity or non-normality.

We constructed diagnostic tests using the tests reported in Pagan and Vella (1989). If the Pagan-Vella tests fail we use censored quantile regression models as suggested by Powell

(1986). These are robust in that the only assumptions required for consistency of the non-intercept coefficients are that the errors are independently and identically distributed, and continuously differentiable with positive density at the chosen quantile. The censored least absolute deviation models (CLAD), where the distribution is "centered" around the median is a special case of the censored quantile regression (Powell, 1984). However, the CLAD method is not always applicable (as we discuss below) and thus we use the censored quantile method to estimate our poverty models. The censored quantile estimators of the regression coefficients are consistent and asymptotically normally distributed.

Within this framework, the censored regression model for transient poverty is:

$$T_i = \max[0, x_i'\beta^T + u_i^T] \tag{12}$$

(With an analogous model for chronic poverty.) The conditional quantile regression is estimated by minimizing the (weighted) average absolute deviation from the chosen quantile. Thus the minimization function for our model of transient poverty is:[9]

$$Q_n(\beta;\theta) = \frac{1}{N}\sum_{i=1}^{N} \rho_\theta |T_i - \max(0, x_i'\beta^T)| \tag{13}$$

which is minimized over all β in the parameter space $B(\theta)$ where ρ_θ is a weighting function used to "center" the data, depending on the quantile θ. Thus $\rho_\theta = 1$ for CLAD, which is centered at

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[9] The intercept in the following equation is not identified (and hence not consistently estimated) without making further restrictions on the distribution of the error term (i.e. normalizing the θ^{th} quantile of the error term to be zero for some fixed θ). The consistency of the non-intercept coefficients requires the θ^{th} quantile of the error distribution to be uniquely defined i.e., the error distribution is assumed to be absolutely continuous with positive density at the θ^{th} quantile. Our choice of θ ensures that the second condition and hence the consistency of the non-intercept coefficients are satisfied. We have no interest in the estimate of the intercept term and thus we do not impose any additional restrictions on the error term to satisfy the first condition for the consistency of the intercept term. In the results section, we therefore, do not report any estimates for the intercept term.

the median.[10] This estimation procedure does not require knowledge about the underlying distribution of the errors, nor does it require the assumption of homoscedasticity. The variance-covariance matrix of the parameter estimates are computed using bootstrap resampling (i.e. repeated resampling of the data to assess the variability of the estimates) because the quantile regressions underestimate the standard errors in the presence of heteroscedasticity (Gould, 1992).[11]

3 How much of the poverty in rural China is transient?

3.1 Data

For the purposes of this study, a new panel data set was constructed from the Household Budget Surveys done by China's State Statistical Bureau (SSB). Since 1984 this has been a well-designed and executed budget survey of a random sample of households drawn from a sample frame spanning rural China (including small-medium towns), and with unusual effort made to reduce non-sampling errors.[12] Sampled households fill in a daily diary on expenditures and are visited on average every two weeks by an interviewer to check on the diaries, and collect other data. There is also an elaborate system of cross-checking at the local level. The consumption data obtained from such an intensive survey process are almost certainly more reliable than those

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[10] For the estimators reported in this paper, $\rho_\theta = 2.q$ if the estimated residuals are positive (where q is the chosen quantile) and $\rho_\theta = 2(1 - q)$ otherwise.

[11] The standard errors reported in this paper are computed using 20 bootstrap replications. One could increase the number of replications to get more precise estimates for the variance-covariance matrix estimators, however this would increase the computational burden immensely. (For the current sample, i.e. for a sample of 4,743 observations with around 100 regressors, 20 replications take approximately an hour on a Pentium 590 omniplex). To test for the significance of the regressors, 20 replications are generally considered to be sufficient even in the presence of heteroscedasticity.

[12] Chen and Ravallion (1995) provide a fairly complete discussion of how the survey was done.

obtained by the common cross-sectional surveys in which the consumption data are based on recall at a single interview. For a six year period 1985-90 the survey was also longitudinal, returning to the same households over time. This was done for administrative convenience (since local SSB offices were set up in each sampled county). The survey was not intended to be a panel survey, but the panel can still be formed. To avoid spurious transience in the data, quite strong conditions were used in defining a panel household ensuring stable household size and composition over time.[13]

We constructed measures of chronic and transitory poverty using the panel data over the six-year period 1985-90 from four contiguous provinces in southern China, namely Guangdong, Guangxi, Guizhou, and Yunan. Three of the provinces (Guangxi, Guizhou and Yunan) form a region of south-west China which is widely regarded as one of the poorest regions in the country. Guangdong on the other hand, is a relatively rich coastal region. Poverty measures are constructed using consumption expenditure per capita as the individual welfare measure. The poverty line is based on a normative food bundle set by SSB, which assures that average nutritional requirements are met with a diet which is consistent with Chinese tastes; this is valued at province-specific prices. The food component of the poverty line is augmented with an allowance for non-food goods, consistent with the non-food spending of those households whose food spending is no more than adequate to afford the food component of the poverty line. The consumption measure is comprehensive, in that it includes imputed values for consumption from own production valued at local market prices, and it also includes an imputed value of the consumption streams from the inventory of consumer durables (Chen and Ravallion, 1995).

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[13] Howes and Ravallion (1995) describe how the panel was formed.

3.2 Summary of the data on consumption and income

Table 1 gives various summary statistics by year. We give the (household-size weighted) means and inter-household standard deviations for current consumption and income by year, the inter-household correlation coefficients between each year's current consumption and time-mean consumption, and a discrete summary of the joint distribution of each date's consumption and time-mean consumption using the poverty line as the cut-off point. Current consumptions and incomes are significantly positively correlated with their respective time means. Yet there is appreciable transient poverty in that (relative to the proportions of chronically poor) there are sizable numbers of people who are poor in the current year but not chronically poor; depending on the year, 6.4-12.4% of the sample fall into this category.

A further indication of the extent of variability can be obtained from Table 2 which gives summary statistics on consumption and incomes by groups of households classified according to their time-mean consumption. The inter-temporal standard deviation of both consumption and income tends to be lowest for the chronically poor and to rise as mean consumption rises, though the coefficient of variations (CVs) varies little with mean consumption indicating that current consumption tends to be proportional to time-mean consumption for a given household (and hence that the inter-household variation in the intertemporal standard deviation is roughly proportional to the differences in time-mean consumptions). So the poor do appear to be exposed to greater variability, either absolutely or relative to their mean consumption. There is a significant positive correlation between changes in consumption and changes in income, and the correlation tends to be highest for the poor, suggesting that they are less able to protect their consumption from income fluctuations.

In Figure 1, the observations from the four provinces are pooled together, and we give the SPG with and without consumption variability. (The results are similar for the Watts index.) We find that 48% of mean poverty is attributable to variability in consumption. Looking at each province separately, we find that the picture is quite disparate between the relatively well off province of Guangdong and the other three provinces (Figure 2). While in Guangdong, 84% of the mean poverty is transient, the percentages are much lower for the other three provinces. In Guangxi and Yunan, 51% and 53% of mean poverty can be ascribed to variability in consumption while in Guizhou the proportion is 41%.

Table 2 also gives the poverty measures by sub-groups defined according to the time-mean consumption as a proportion of the poverty line. (These are the SPG; results were very similar for the Watts index.) By construction, the chronic poverty measure is zero for all except those with time-mean consumption below the poverty line. What is more interesting is that 38% of transient poverty is found amongst those above the poverty line on average. However, the extent of transient poverty drops to a negligible amount for households whose time-mean consumption is more than 50% above the poverty line.

Figure 3 gives the scatter plot and non-parametric regressions of the household-specific transient poverty measure against the time-mean of consumption by province. While the overall negative relationship suggested by Table 2 is still evident, there is also a suggestion of an inverted U with transient poverty tending to peak slightly below the poverty line. Figure 4 gives the transient component normalized by the time-mean poverty measure. The share of poverty which is transient increases sharply until the poverty line is reached.

The low transient poverty we find amongst the most chronically poor households might be surprising. It is often argued that poor households are more exposed to uninsured risk,

because they are more likely to be credit rationed. That may be so, but at the same time consumption variability could well be most costly for the poorest so they will make greater effort to avoid it using savings, income smoothing, or community-based risk sharing. A plausible interpretation of the results in Figures 3 and 4 is that the lower a household's time-mean consumption, the more averse it will be to downside consumption risk, and so it will take (possibly costly) actions to stabilize consumption. By this view it is only the not-so-poor who can afford transient poverty.

4 How much does transient poverty constrain efforts to target the chronically poor?

Perfect targeting on the basis of the six-year mean consumptions will eliminate chronic poverty in all four provinces at a cost of 6.6 Yuan per person in 1985 prices (Table 3), representing 1.9% of mean consumption across all provinces and dates. This is the minimum cost, but it would be virtually impossible to attain in practice. How much more would the cost be under alternative assumptions about the information available? We first compare perfect targeting with a uniform transfer, given by the minimum sum needed to eliminate chronic poverty subject to the constraint that all persons (whether poor or not) receive the same amount. With a uniform transfer the cost is 3.7 times that under perfect targeting (Table 3).

Next consider targeting based solely on each year's current consumption. To isolate the contribution of transient poverty, we assume that targeting is otherwise optimal, in that the poverty gaps are filled exactly. If there was no transient poverty then this cost would be the same as under perfect targeting. However, it turns out that there is so much transient poverty that the cost of eliminating poverty using only current consumptions is much greater than the perfect targeting case; indeed, the cost is typically only slightly lower than the cost of uniform

transfers. There is enough transient poverty to virtually eliminate the cost saving from even optimal targeting on the basis of current consumption.

We repeated these calculations for various budgets. In Figure 5 we give results for the sample as a whole, and each province separately, except Guangdong where there are so few chronically poor households in the sample that the calculations are of little interest. We give the measure of chronic poverty (vertical axis) attainable for each aggregate expenditure on transfers (on the horizontal axis). So, for example, starting with any budget on the horizontal axis, the chronic poverty measure on the "uniform transfer" curve is obtained when that budget is allocated equally to everyone, whether poor or not. The point on the "1990" curve is the measure of chronic poverty obtained if the same budget had been allocated according to current consumption in 1990. The point on the "perfect targeting" curve is obtained when allocated according to the six-year mean consumption. (We have left out the curves for 1986-88 because they are virtually indistinguishable from that for 1989.)

When the budget is less than that needed to eliminate chronic poverty uniform transfers dominate allocations based on current consumptions. Judged by impact on chronic poverty, it would be better to share the budget equally than to rely on current consumptions.

5 Are transient and chronic poverty determined by similar processes?

We begin with some descriptive statistics on the poverty profile. Table 3 gives the measures of chronic and transient poverty by various sub-groups. Large households tend to have higher transient and chronic poverty, though the gradient of poverty with respect to household size is noticeably steeper in terms of chronic poverty. Households with better educated heads tend to have both lower transient and chronic poverty. The proportion of poverty which is

transient varies little with education, except when tertiary levels are reached, at which point the relative importance of transient poverty increases sharply.

Both transient and chronic poverty tend to be higher the lower the average grain yields (output per unit area cultivated), though the relative importance of the transient component is highest for those with highest yields. Both poverty measures tend to be higher the greater the variance of wealth over time, though as one would expect the relative importance of transient poverty is greatest for those households with the greatest variability in their wealth.

The unconditional bivariate relationships in Table 3 do not allow us to disentangle the effect of any one variable from another. For this purpose we estimate the multivariate models described in section 2.3. For the model's explanatory variables, we have aimed to capture the range of variables typically identified as determinants of poverty, notably household-specific human and physical assets, and community effects. The latter are measured by a set of county dummies; there are 119 counties in the sample.

For human capital, we include a number of schooling variables; the proportion of household members with different levels of schooling, educational status of the head of the household and that of the spouse of the head. We also include a wide range of demographic variables in assessing whether chronically and transitory poor households share the same demographic characteristics; rural labor markets appear to be thin in this setting, so demographic characteristics of the household can matter to productivity; these variables may also pick up differences in consumption behavior.[14] Dummy variables for whether or not household

[14] Demographic characteristics of the poor are often found to be significantly different from non-poor households. For example, larger households are generally found to be poorer, at least in terms of consumption or income per person. Scale economies in consumption may be the reason (Lanjouw and Ravallion, 1995); that does not diminish the case for including household size as an explanatory variable

members work in the state sector, in Township and Village Enterprises (TVEs) or are employed out of town, or belong to the village cadre, are also included.

In addition to human capital, access to land and physical capital are likely to be important factors in escaping poverty. We include land holding, grain yield per acre (as an indicator of land quality) and other wealth. To control for the variance in yields for an individual household, we have also included the household specific standard deviation of grain yield. We also include indicators characterizing access to different types of land, i.e, we include hilly area per capita and fishing area per capita.

Household wealth is also hypothesized to be a determinant of chronic and/or transitory poverty. (Wealth is defined as the sum of the values of fixed productive assets, cash, deposits, housing, grain stock, and stock of durables, all at year end.) Households with their own resources will need less credit to smooth consumption. Moreover, even if they need to borrow, they will probably be in a better position to do so if they possess collateral. We include the proportions of the different wealth components in total wealth as additional regressors. This allows for the possibility that wealth may not be fully fungible in this setting.

The Pagan-Vella tests rejected both the normality and heteroscedasticity assumptions of the tobit specification. The more robust censored quantile estimators were used to estimate the transient poverty and the chronic poverty models for reasons explained in Section 2.3. We needed to use censored quantile methods instead of the more standard CLAD because in our model for chronic poverty (and to a lesser extent in the transient poverty model), the dependent variable is heavily censored. For example, we have 4,743 households, of which 820 households

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in our model, though it does have bearing on the welfare interpretation.

are chronically poor (according to the definition in the earlier sections). This implies that less than one-fifth of the sample is non-censored. In these cases, the median tends to be uninformative about the underlying parameters for the majority of the sample and thus the CLAD estimator maybe imprecise. In such a situation, it is preferable to "center" the distribution of the dependent variable at a higher quantile than the median. Thus for the chronic poverty model, we use the 90th percentile to "center" our distribution while for the transitory model, we use the 75th percentile.[15]

Table 5 reports the parameter estimates from the censored quantile regressions. Most physical capital variables affect the transient and chronic poverty components in a similar direction. Demographic characteristics seem to be more important for chronic poverty.

Larger households and those with young children (less than six years old) are more likely to be both transiently and chronically poor while households with older kids (12^{+} years) are less likely to be both transient and chronic poor. Among the education variables, if the head of the household has some education then the household is less likely to face chronic and transient poverty. Households with a higher proportion of members having less than technical and/or university education tend to have higher transient poverty. Households with a higher proportion of members having at least primary school education are less likely to have high chronic poverty. Education of the spouse of the head matters little to transient poverty but has a

[15] "Optimal" choice of θ (i.e. the quantile at which the distribution needs to be centered) is still an open question in the literature. To ensure that the conditional quantile function is informative about the parameter vector, one can choose a value of θ closer to unity. However, such quantiles of the error distribution can typically be estimated less precisely. Thus for our purpose, we have chosen the minimum feasible quantile which provides sufficient information about the parameter vector.

significant impact on alleviating chronic poverty. Finally, households made up of a head and spouse plus two or more kids, are more likely to be chronically poor.

Working in the state sector helps in reducing both transient and chronic poverty. Typically state sector employees are those employed by the government, state-owned enterprises or large-size collective farm owned enterprises. Moreover, during the period under study people working in the state sector did not lose their jobs but were assured a steady stream of income. Furthermore, if the labor force of the household is illiterate, then the household is likely to have higher chronic poverty. Having someone who is a village cadre helps reduce transient poverty.

Higher grain yield and higher wealth reduce transient poverty as well as chronic poverty. A higher inter-temporal variance in grain yields (output per acre) increases chronic poverty, but it has only a weak impact on transient poverty. It appears that households exposed to higher yield risk—presumably associated with adverse local geo-climatic conditions—tend to have lower long-term consumption levels after controlling for a wide range of other household characteristics. Risk-market failures may well be spilling over to diminish longer-term productivity.[16] In this sense, some of the chronic poverty can be attributed to transient poverty. Variance physical wealth increases both transient and chronic poverty. Finally, households with higher cultivated land per capita are less vulnerable to both chronic and transient poverty, while households possessing some fishing area are less likely to be chronic poor.

The regressions included dummy variables for the county of residence. Figure 6 plots the coefficients from the chronic poverty regression against those from the transient poverty

[16] For arguments along these lines and supportive evidence in other settings see Morduch (1994) and Chaudhuri (1994).

regression. There is considerable re-ranking, though there is still a significant positive correlation (the simple correlation coefficient is 0.51).

We re-ran these regressions based on the Watts index. The main results were robust to this change. We also checked robustness to the choice of the poverty line, by re-estimating the models using a lower poverty line. By and large, the parameter estimates for the two poverty lines were fairly stable. We observed some significant differences between Guangdong and the other provinces. Chronic poverty is close to zero in Guangdong. We excluded the observations from Guangdong and re-estimated our model to check whether the significance of variables changed in any way. The estimates were similar both in significance and in magnitude to the estimates for the full sample.

6 Conclusions

There is considerable transient poverty in this setting. Roughly half of the mean squared poverty gap is directly accountable to consumption fluctuations. Amongst the poor, transient poverty tends to be lowest for those who are poorest on average—they are probably the ones who are most averse to consumption risk—and then rises sharply to peak around the poverty line. About 40% of the transient poverty is found amongst households who are not poor on average. But almost all of this is for households whose mean consumption over time is no more than 50% above the poverty line.

Transient poverty is a significant constraint on the scope for reaching the chronically poor using targeted anti-poverty policies contingent on current consumptions. Static consumption data contain considerable noise about long-term poverty status. For example, the full cost of eliminating chronic poverty using a current cross-section of consumptions (which is itself a very

demanding criterion) is three or four times the poverty gap based on mean consumption over six years. Indeed, targeting on the basis of current consumption has less impact on chronic poverty for any given budget than a uniform lump-sum allocation in which the same amount is given to everyone, whether seemingly poor or not.

We also find that, by and large, observed household and community characteristics have congruent effects on the two types of poverty. We can reject statistically the null hypothesis that the same model determines both. But nonetheless, there are few sign reversals when comparing the marginal effects on transient and chronic poverty of a wide range of household and community characteristics. For example, the greater command over physical and human assets which helps reduce chronic poverty also helps against transient poverty; and the lower intertemporal variability in household wealth (and to a lesser extent in farm yields) which helps reduce transient poverty also promotes chronic poverty reduction.

Collectively, these results leave us skeptical of the usefulness in this setting of sharply differentiating policies intended for fighting transient poverty from those for chronic poverty. For one thing, the feasibility of implementing such a distinction is unclear. Even if one puts little weight on a policy's ability to reach the transiently poor—preferring instead to focus on those with low long-term consumption—informationally feasible policies based on currently observed circumstances may have to accept sizable leakage to the transiently poor. But nor is it clear that fundamentally different processes are at work in creating the two types of poverty. It appears that the same things that are going to reduce chronic poverty—higher and more secure farm yields, higher levels of physical and human capital—are also going to reduce transient poverty.

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Table 1: Summary data by year

	1985	1986	1987	1988	1989	1990
Mean consumption (Yuan per person per year, 1985 prices)	320.46 (326.38)	332.07 (360.76)	348.26 (381.25)	348.84 (386.56)	348.14 (417.39)	345.85 (429.97)
Income (Yuan per person per year, 1985 prices)	401.38 (554.74)	434.98 (643.33)	464.97 (674.55)	461.40 (648.15)	459.85 (644.09)	454.50 (655.64)
Correlation coefficient between consumption in current year and mean consumption over 6 years	0.501	0.600	0.603	0.649	0.635	0.539
Rank correlation between consumption in current year and mean consumption over 6 years	0.486	0.591	0.593	0.642	0.623	0.532
Poor in current year and chronically poor(%)	15.12	15.50	14.60	15.23	16.10	15.89
Poor in current year and not chronically poor(%)	12.29	11.18	6.55	6.42	9.08	11.52
Not poor in current year and chronically poor(%)	4.47	4.09	4.98	4.35	3.48	3.70

Note: Standard deviations in parentheses. Correlation coefficients are significant at 1% level.

Table 2: Summary data by time-mean consumption groups

Time mean consumption group	Number of persons in the sample	Consumption			Income			Correlation coefficient between change in consumption over time and change in income
		Mean consumption	Mean of the inter-temporal standard deviation	Mean of the inter-temporal coefficient of variation (%)	Mean income	Mean of the inter-temporal standard deviation	Mean of the inter-temporal coefficient of variation (%)	
Mean consumption (y) < poverty line (z)	4,891	212.76	50.59	20.67	268.92	75.38	25.68	0.461 (0.0001)
$z \leq y < 1.25*z$	6,552	272.07	58.17	19.84	348.86	94.05	25.43	0.380 (0.0001)
$1.25*y \leq y < 1.5*z$	5,905	329.85	68.38	19.87	430.61	110.98	25.01	0.387 (0.0001)
$y \geq 1.5*z$	8,406	481.12	104.98	21.79	643.78	167.24	25.53	0.333 (0.0001)
Full sample	25,754	341.09	73.80	20.57	446.86	117.69	25.39	0.359 (0.0001)

Notes: Consumption and income are in Yuan per person per year at 1985 prices. All means are household-size weighted. Figures in parentheses are the p-values under the null hypothesis of no correlation.

Table 3: A profile of both transient and chronic poverty

Variable	No. of individuals	Transient poverty	Chronic poverty	Total poverty	% of transient poverty in total poverty
Mean consumption (y) < poverty line (z)	4,891	1.82	3.21	5.03	36.18
$z \leq y < 1.25*z$	6,552	0.69	0.00	0.69	100.00
$1.25*z \leq y < 1.5*z$	5,905	0.13	0.00	0.13	100.00
$y \geq 1.5*z$	8,406	0.03	0.00	0.03	100.00
Household size ≤ 2	206	0.50	0.09	0.59	84.75
Household size = 3	987	0.41	0.32	0.73	56.16
Household size = 4	3,576	0.51	0.52	1.03	49.51
Household size = 5	6,640	0.49	0.46	0.95	51.58
Household size = 6	6,036	0.58	0.52	1.10	52.73
Household size = 7	4,221	0.57	0.80	1.37	41.61
Household size > 7	4,088	0.73	0.96	1.69	43.20
Head of hh - illiterate	4,786	0.85	0.93	1.78	47.75
Head of hh - primary school educated	12,567	0.55	0.64	1.19	46.22
Head of hh - secondary school educated	6,265	0.45	0.40	0.85	52.94
Head of hh - high school educated	1,762	0.31	0.36	0.67	46.27
Head of hh - university$^+$ educated	374	0.19	0.08	0.27	70.37
Mean yield ≤ 200 kg	6,633	0.96	1.37	2.33	41.20
200 kg < mean yield ≤ 275 kg	6,819	0.57	0.57	1.14	50.00
275 kg < mean yield ≤ 350 kg	6,976	0.37	0.29	0.66	56.06
Mean yield > 350 kg	5,326	0.30	0.13	0.43	69.77
Hh wealth ≤ 2321.16 yuan	4,014	1.15	2.38	3.53	32.58
2,321.16 yuan < hh wealth ≤ 3,827.63 yuan	7,204	0.78	0.62	1.40	55.71
3,827.63 yuan < hh wealth ≤ 6,310.69 yuan	8,113	0.40	0.18	0.58	68.97
HH wealth > 6,310.69 yuan	6,423	0.15	0.04	0.19	78.95
Standard deviation of hh wealth (std) < 350	4,699	0.88	1.65	2.53	34.78
350 ≤ std < 715	7,671	0.68	0.75	1.43	47.55
715 ≤ std < 1,385.67	6,508	0.45	0.23	0.68	66.18
Std ≥ 1,385.67	6,876	0.31	0.09	0.40	77.50
Sample mean	25,754	0.56	0.61	1.17	47.86

Table 4: Cost of eliminating chronic poverty under various assumptions about the policy-maker's information

Sample	Perfect targeting	Uniform transfer	Targeting on the basis of current consumption					
			1985	1986	1987	1988	1989	1990
	(Figures in parentheses are percentages of the total budget required to eliminate chronic poverty)							
All four provinces	6.59	24.11	24.24	20.39	20.56	20.48	21.04	21.70
	(100)	(366)	(368)	(309)	(312)	(311)	(319)	(329)
All except Guangdong	8.83	31.95	32.23	27.21	27.44	27.31	28.03	28.94
	(100)	(362)	(365)	(308)	(311)	(309)	(317)	(328)
Guangdong	0.33	1.02	0.87	0.66	0.76	0.76	0.81	0.93
	(100)	(309)	(251)	(200)	(232)	(231)	(245)	(281)
Guangxi	6.15	24.05	18.75	17.00	16.65	17.21	16.84	17.97
	(100)	(391)	(305)	(276)	(271)	(280)	(274)	(292)
Guizhou	14.81	47.31	46.90	38.44	38.72	37.42	38.08	38.62
	(100)	(319)	(317)	(260)	(261)	(253)	(257)	(261)
Yunan	6.74	23.06	18.99	17.77	19.05	17.46	20.78	22.92
	(100)	(342)	(282)	(264)	(283)	(259)	(308)	(340)

Notes: The table gives the expenditure per capita (of the total population) in Yuan at 1985 prices needed to exactly fill the poverty gaps in terms of the six-year mean consumption under alternative assumptions about the information available to the policy maker.

Table 5: Determinants of transient and chronic poverty

Variable	OLS with HCSE (Depvar: mean cons)		Transient poverty (Cond. quantile: 0.75)		Chronic poverty (Cond. quantile: 0.9)	
	Coefficient estimate	t-ratio	Coefficient estimate	t-ratio	Coefficient estimate	t-ratio
Single member hh (dummy)	0.02281	0.40	-0.65579	-1.14	5.86248	6.27*
HH with couple, no kids (dummy)	-0.00847	-0.27	0.29873	1.19	2.15560	1.57
HH with couple & 1 kid (dummy)	-0.00056	-0.03	0.01486	0.12	1.10826	4.64*
HH with couple & 2 kids (dummy)	0.00109	0.12	-0.12634	-1.28	0.30298	2.75*
HH with couple & 3^+ kids (dummy)	0.00649	1.09	-0.02680	-0.49	0.10519	1.19
Village cadre hh (dummy)	0.05599	5.17*	-0.26859	-3.31*	-0.13471	-0.85
State empl. in hh (dummy)	0.05796	4.34*	-0.29412	-2.09**	-0.64323	-3.64*
TVE empl. in hh (dummy)	0.02783	1.61	-0.21828	-0.59	0.84038	2.90*
Out of town empl. in hh (dummy)	0.02674	2.10**	0.07067	0.51	0.85864	6.50*
Ed. lvl. of labor force - illit. (dummy)	-0.12532	-3.69*	0.97346	0.93	1.01295	1.82*
Ed. lvl. of labor force - prim. sch. (dummy)	-0.10304	-3.23*	0.77864	0.73	0.26291	0.57
Ed. lvl. of labor force - sec. sch. (dummy)	-0.08277	-2.64*	0.66592	0.62	0.13829	0.31
Ed. lvl. of labor force - high sch. (dummy)	-0.06534	-2.06**	0.44150	0.40	-0.00490	-0.01
Prop. of illit. in hh	0.00338	0.13	0.34199	1.78***	-2.37357	-4.75*
Prop. of prim. sch. ed. in hh	-0.00190	-0.08	0.71619	4.66*	-0.96659	-4.19*
Prop. of sec. sch. ed. in hh	0.01728	0.62	0.95998	5.19*	0.59209	1.43
Prop. of high sch. ed. in hh	0.01429	0.28	1.01308	1.80***	1.20138	1.99**
Age of hh head	0.00712	3.70*	-0.00732	-0.97	-0.03079	-1.61
Age^2 of hh head	-0.00007	-3.11*	0.00003	0.40	0.00010	0.50
Head - illiterate (dummy)	0.05535	2.35**	-0.14123	-0.95	-0.17548	-0.52
Head - prim. sch. ed. (dummy)	0.06902	3.07*	-0.27752	-1.98**	-0.42838	-1.60
Head - second. sch. ed. (dummy)	0.08307	3.67*	-0.33256	-2.35**	-0.98427	-3.25*
Head - high sch. ed. (dummy)	0.07310	2.95*	-0.26650	-1.94**	-0.96564	-2.79*
Spouse - illiterate (dummy)	0.00683	0.18	-0.25560	-1.07	-1.07750	-0.64
Spouse - prim. sch. ed. (dummy)	0.01608	0.42	-0.35716	-1.48	-1.40496	-0.82
Spouse - sec. sch. ed. (dummy)	0.00303	0.08	-0.44121	-1.57	-1.83509	-1.09
Spouse - high sch. ed. (dummy)	-0.01904	-0.43	-0.53844	-1.51	-3.19489	-2.01**
Spouse (dummy)	-0.00029	-0.01	0.11685	0.46	0.31398	0.18
Prop. of presch. kids in hh	-0.10221	-4.69*	0.68490	3.73*	2.69405	8.99*
Prop. of kids 6-11 years in hh	-0.02160	-0.89	-0.14330	-0.65	0.06889	0.22
Prop. of kids 12-14 in hh	0.07642	2.63*	-0.17337	-0.74	-2.08873	-5.08*

Variable	OLS with HCSE (Depvar: mean cons)		Transient poverty (Cond. quantile: 0.75)		Chronic poverty (Cond. quantile: 0.9)	
	Coefficient estimate	t-ratio	Coefficient estimate	t-ratio	Coefficient estimate	t-ratio
Prop. of kids 15-17 in hh	0.08211	2.72*	-0.62778	-1.95**	0.25405	0.52
Log of hh size	-0.21434	-17.28*	0.77778	8.06*	1.99465	12.59*
Mean grain yield	0.00015	3.63*	-0.00233	-8.69*	-0.00492	-8.30*
Std. dev. of grain yield	-0.00006	-3.46*	0.00096	1.64***	0.00108	2.70*
Mean log of hh wealth	0.32275	39.42*	-1.23413	-19.66*	-4.31922	-19.58*
Std. dev of log hh wealth	0.00001	2.17*	0.00008	4.34*	0.00039	11.28*
Prop. of fixed prod. assets in hh with (mean)	-0.03698	-0.97	-0.26467	-0.78	-2.16175	-4.53*
Prop. of cash in hh with (mean)	-0.23249	-4.80*	0.95507	2.38**	-2.31580	-3.59*
Prop. of deposits in hh wealth (mean)	-0.03756	-0.45	-0.67878	-0.66	3.08756	3.07*
Prop. of grains in hh with (mean)	0.44045	7.99*	-2.08884	-4.98*	-4.92084	-7.51*
Prop. of durables in hh with (mean)	0.82486	14.84*	-2.60226	-7.30*	-10.71815	-13.30*
Prop. of grains in hh with (std.dev.)	-0.23140	-2.33**	3.27431	3.95*	-0.62439	-0.49
Prop. of fix. prod. assts. in with (std. dev.)	0.00801	0.10	1.06999	1.55	-1.83770	-1.56
Prop. of cash in hh with (std. dev.)	0.38834	4.82*	-1.53518	-2.73*	-2.31181	-2.47**
Prop. of deposits in hh with (std. dev.)	0.34593	3.22*	1.42115	1.30	-2.56688	-2.26**
Prop. of durables in hh with (std. dev.)	0.03437	0.36	-2.247015	-3.94*	1.10668	1.24
Cultivated land per capita	0.00035	5.01*	-0.00184	-3.54*	-0.00304	-3.87*
Hilly area per capita	-0.12486	-0.98	1.76337	1.47	0.42448	0.21
Fishing area per capita	0.13585	1.52	0.145728	0.27	-3.99459	-3.70*
Guangdong (dummy)	-	-	-0.20247	-2.57*	-	-
Guangxi (dummy)	-	-	0.19987	2.45*	-	-
Guizhou (dummy)	-	-	0.19831	1.77***	-	-
Intercept	3.73609	44.57*	-	-	-	-
	Adjusted R^2: 0.7933		Pseudo R^2: 0.2286		Pseudo R^2: 0.4384	

* (1% significance), ** (5% significance), *** (10% significance)

Notes:

In addition to the above regessors, county dummy variables were also included.

Pagan-Vella test statistics for the Tobit models:

Transient poverty:

- Heteroscedasticity : 37.01
- Skewness : 166.39
- Kurtosis : 64.48

Chronic poverty:

- Heteroscedasticity : 25.57
- Skewness : 37.75
- Kurtosis : 39.34

Figure 1

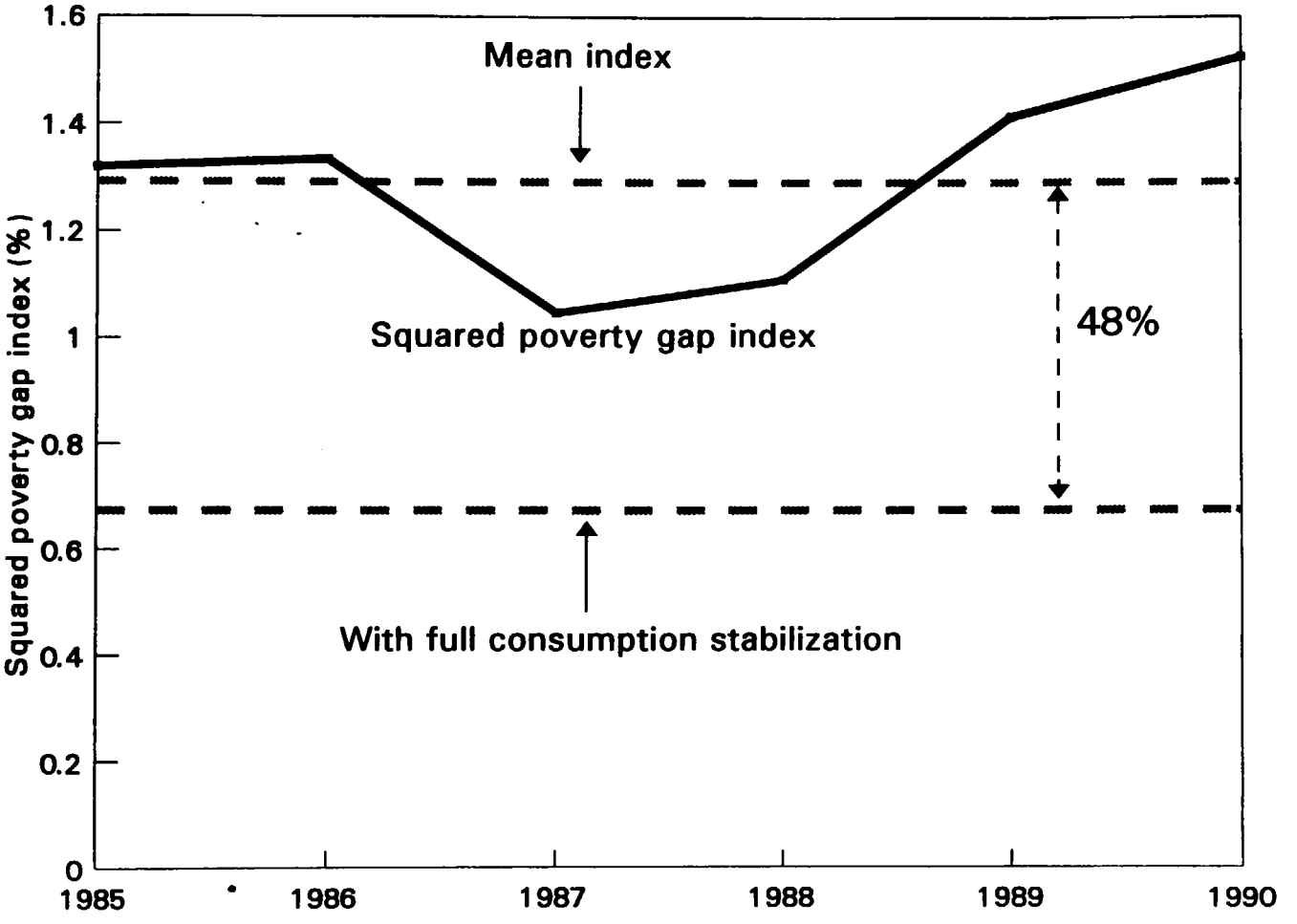
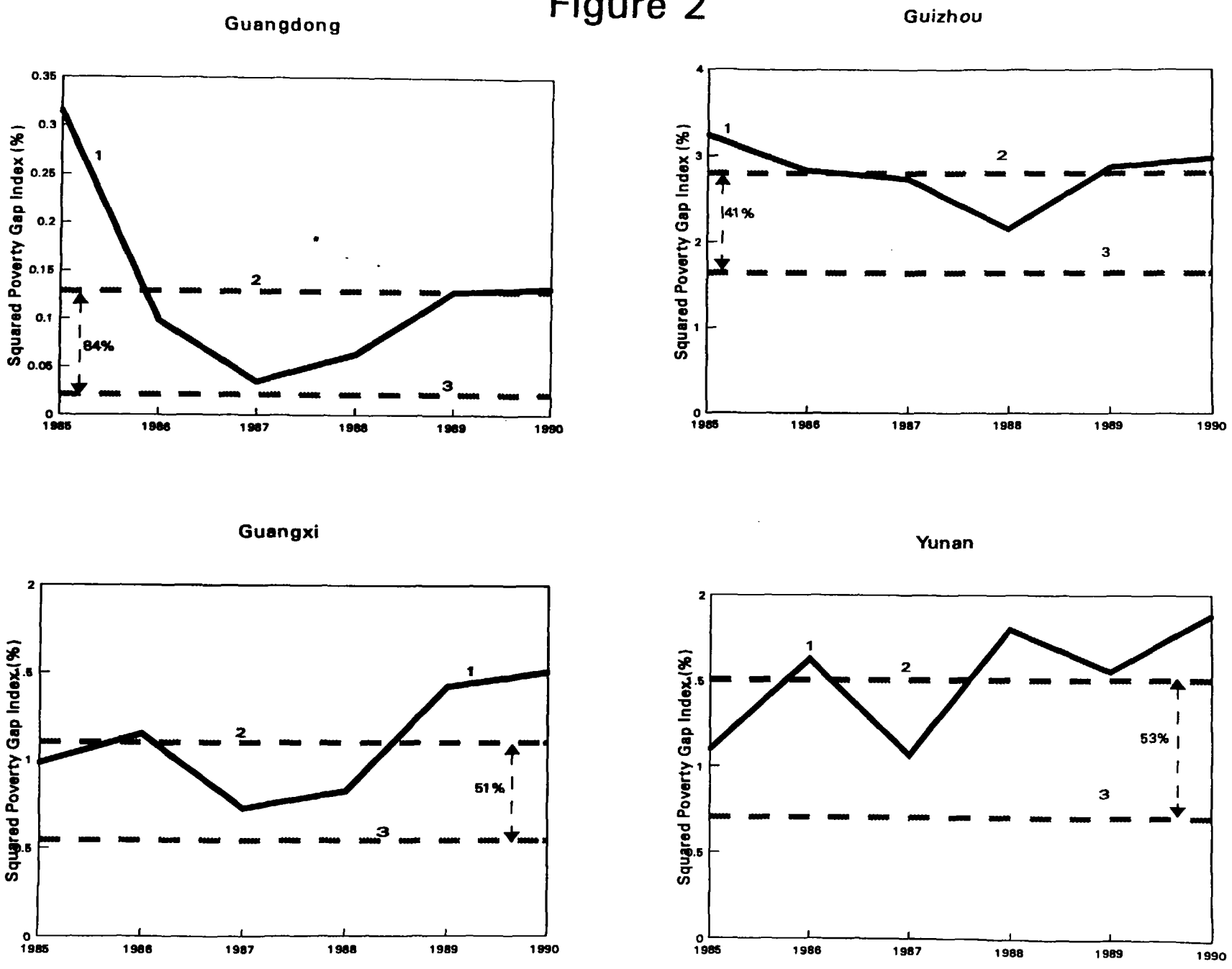

Mean index
Squared poverty gap index
48%
With full consumption stabilization
Squared poverty gap index (%)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1985
1986
1987
1988
1989
1990

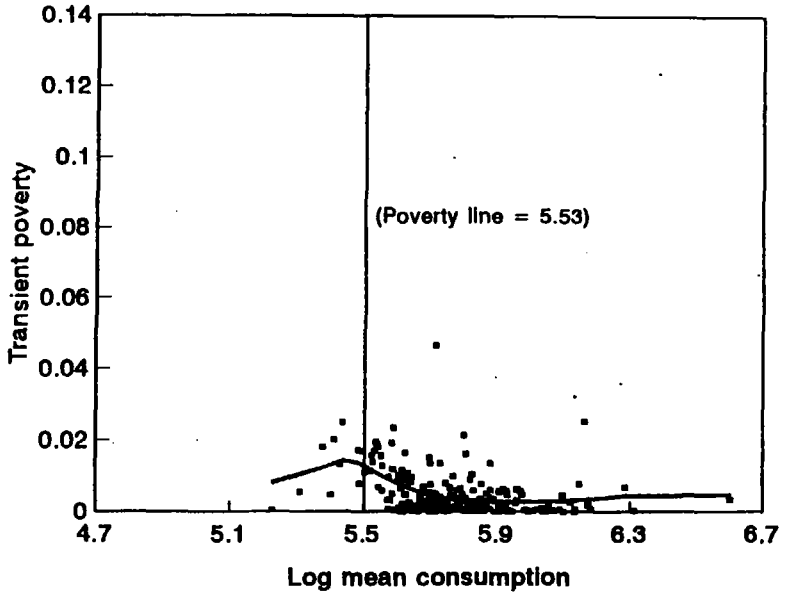
Figure 2



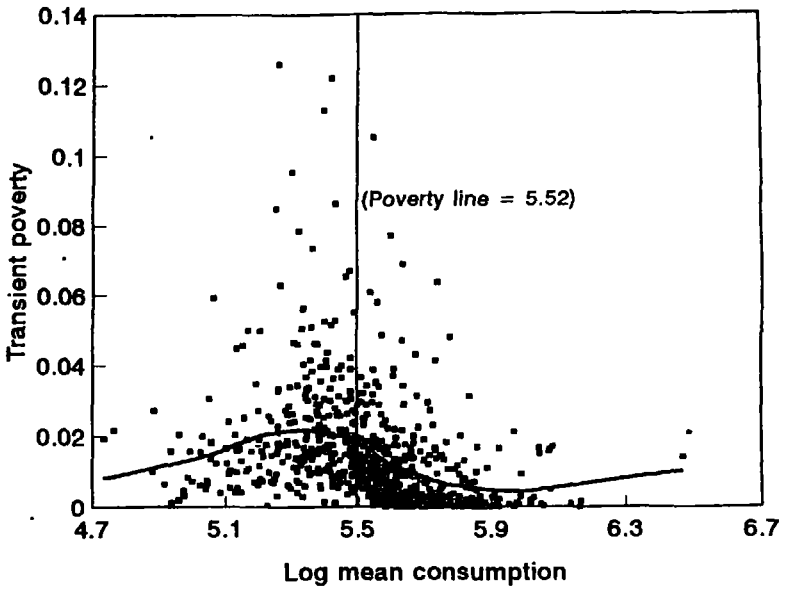
1 = squared poverty gap index; 2= mean index; 3= with full consumption stabilization;

Figure 3

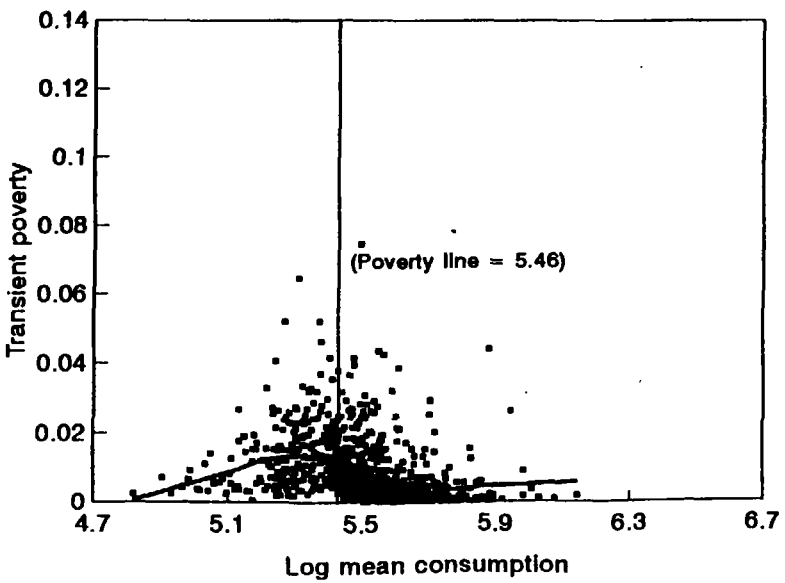
Guangdong (N=215)



Guizhou (N=703)



Guangxi (N=847)



Yunan (N=525)

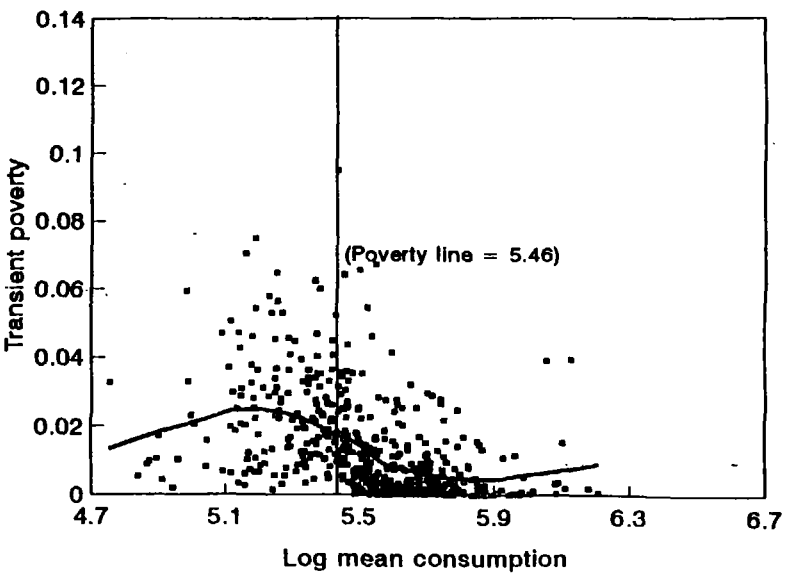


Figure 4

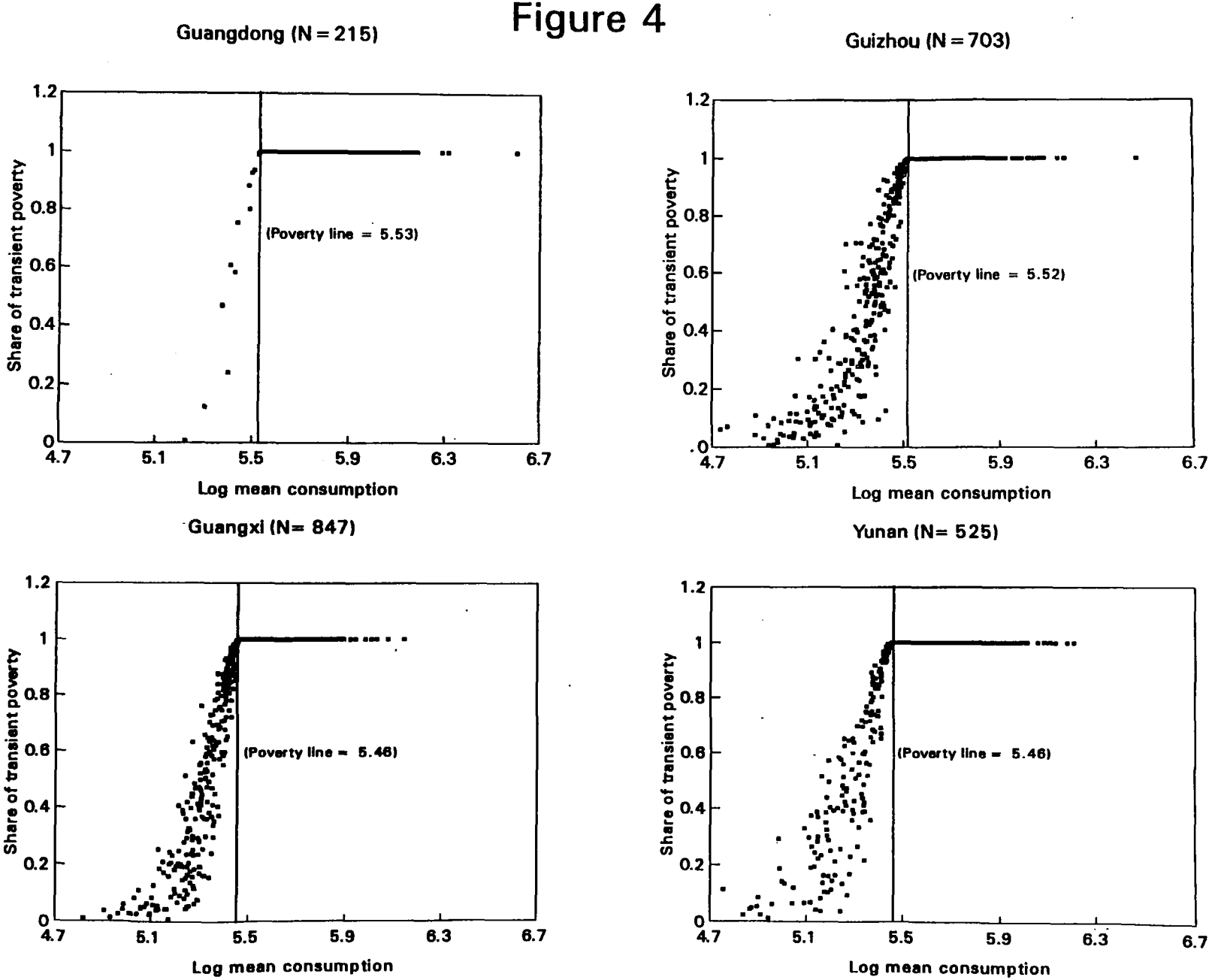
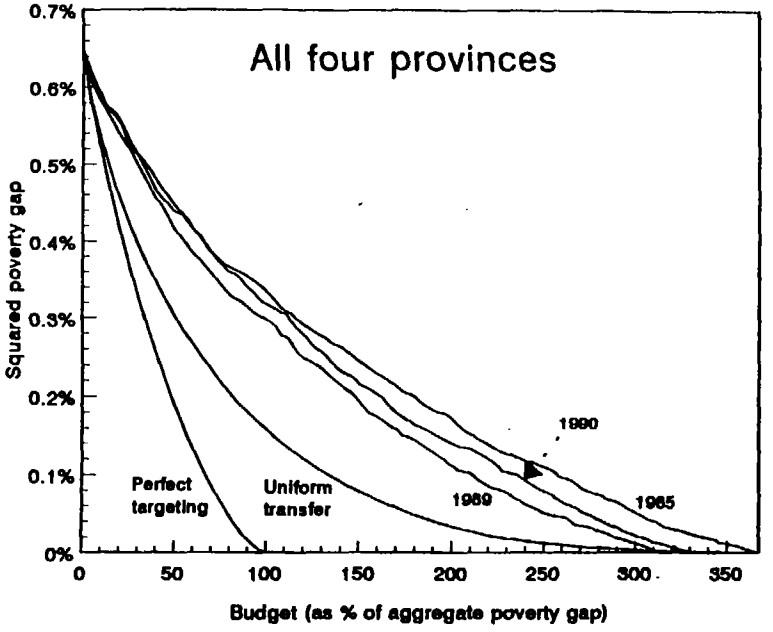
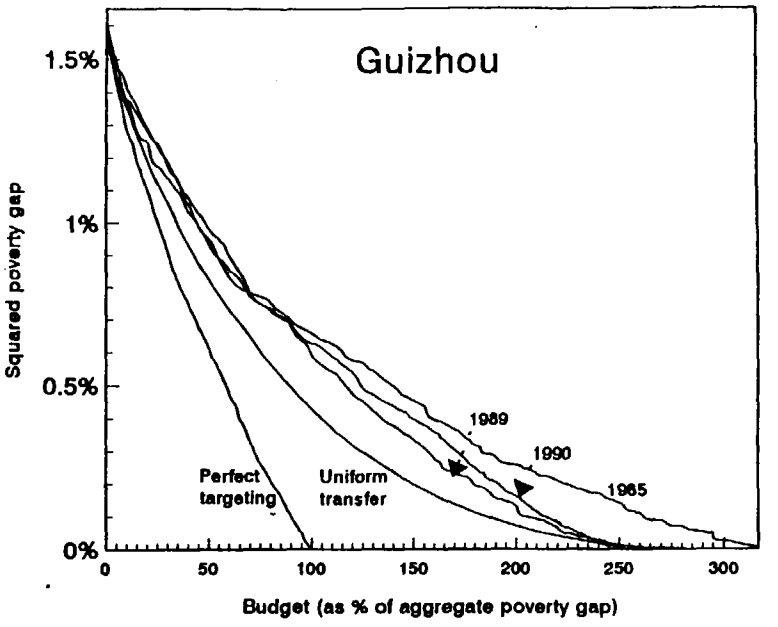
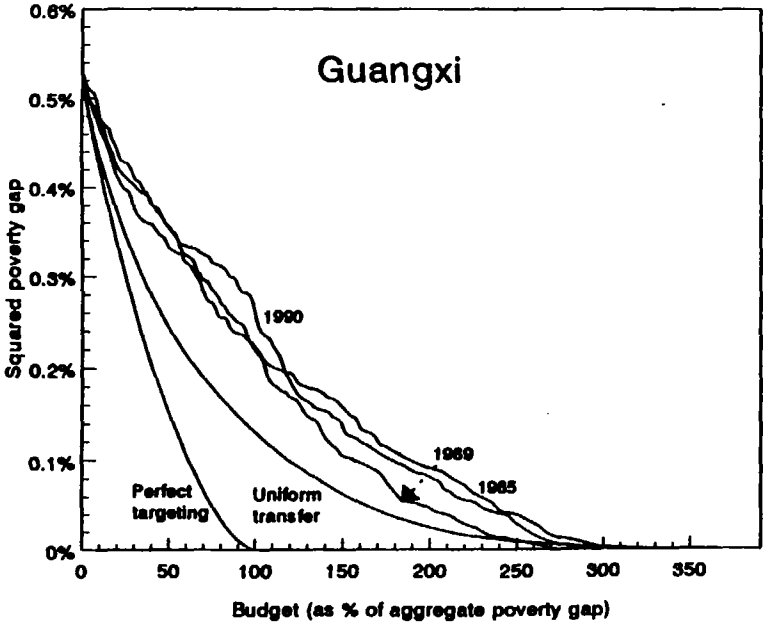

Guangdong (N = 215)
Guizhou (N = 703)
Guangxi (N= 847)
Yunan (N= 525)
Share of transient poverty
Log mean consumption
(Poverty line = 5.53)
(Poverty line = 5.52)
(Poverty line = 5.46)
(Poverty line = 5.46)
0
0.2
0.4
0.6
0.8
1
1.2
4.7
5.1
5.5
5.9
6.3
6.7

Figure 5


All four provinces
Squared poverty gap
0.7%
0.6%
0.5%
0.4%
0.3%
0.2%
0.1%
0%
0
50
100
150
200
250
300
350
Budget (as % of aggregate poverty gap)
Perfect targeting
Uniform transfer
1990
1989
1985


Guizhou
Squared poverty gap
1.5%
1%
0.5%
0%
0
50
100
150
200
250
300
Budget (as % of aggregate poverty gap)
Perfect targeting
Uniform transfer
1989
1990
1985


Guangxi
Squared poverty gap
0.6%
0.5%
0.4%
0.3%
0.2%
0.1%
0%
0
50
100
150
200
250
300
350
Budget (as % of aggregate poverty gap)
Perfect targeting
Uniform transfer
1990
1989
1985

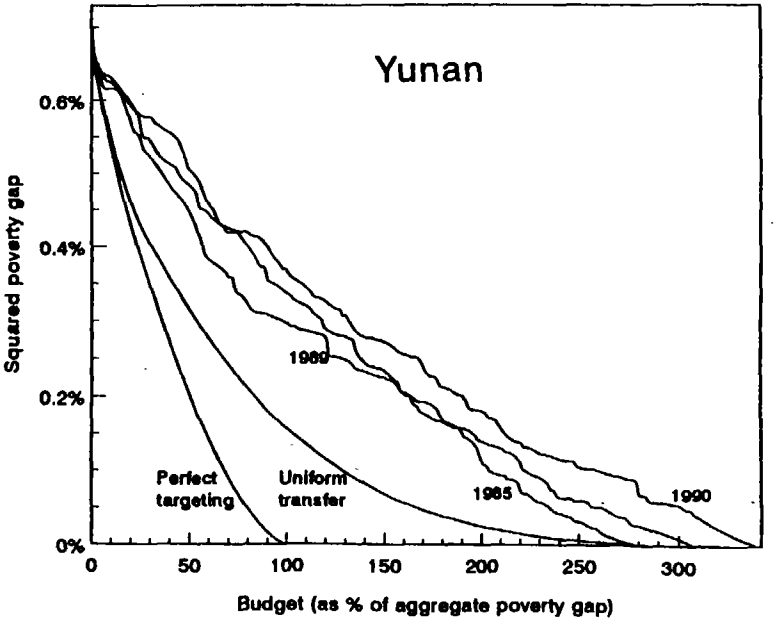
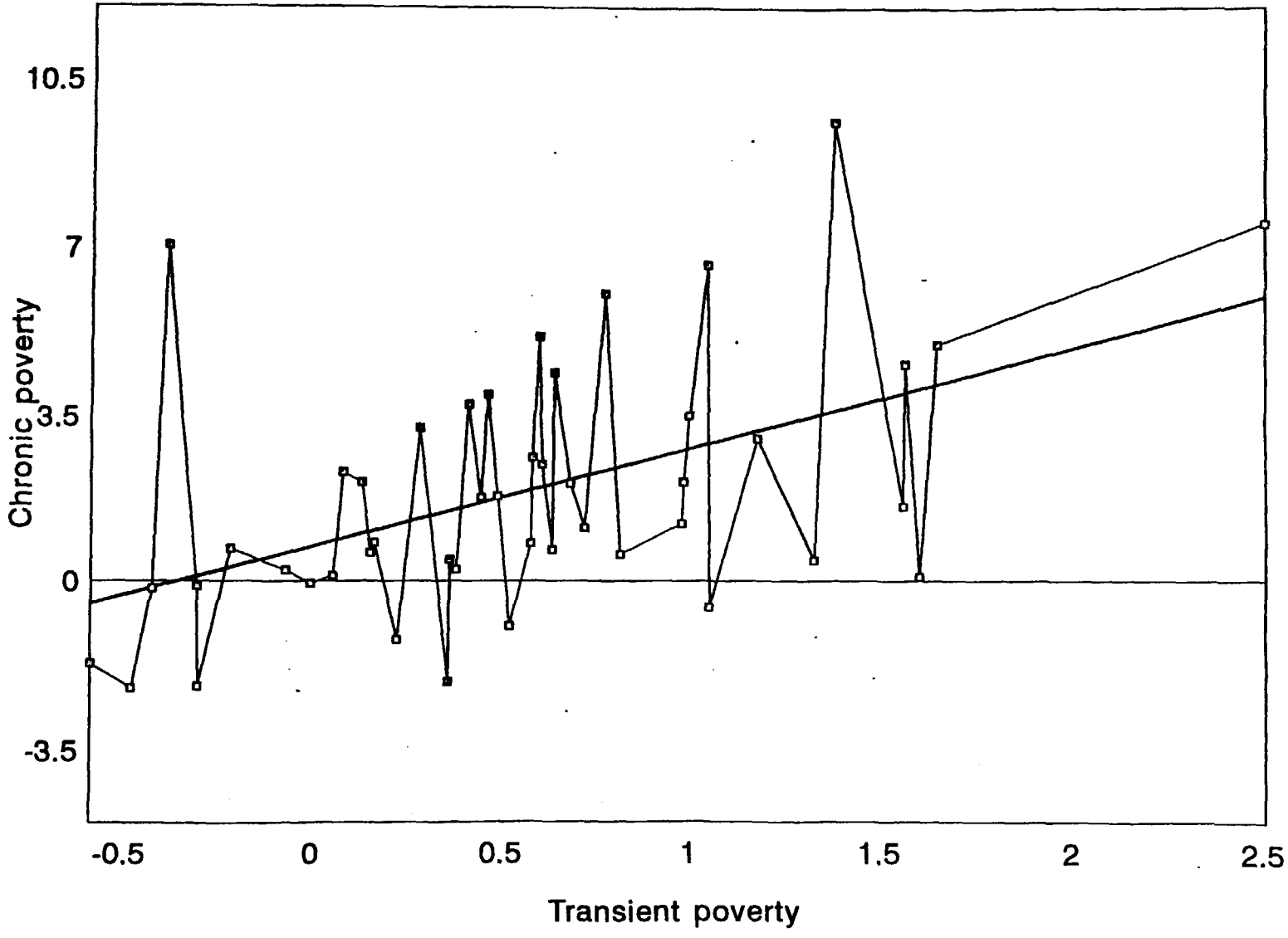

Yunan
Squared poverty gap
0.6%
0.4%
0.2%
0%
0
50
100
150
200
250
300
Budget (as % of aggregate poverty gap)
Perfect targeting
Uniform transfer
1989
1985
1990

Figure 6
Coefficient estimates of county dummies



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