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The balance of all things: Explaining household poverty dynamics in 50 villages of Gujarat, India

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ABSTRACT

Explanations for poverty have often tended to focus on momentous, especially calamitous, events. In this analysis we show how households' longer-term economic fortunes are more significantly influenced by a succession of quotidian, recurring, and comparatively minor events. Rather than any single event, it is the balance of positive and negative everyday events that better explains where a household will eventually land up. Policy interventions can make a deeper impact on poverty by influencing the balance of everyday events.

Keywords: poverty dynamics; poverty traps; Stages of Progress methodology; disaster relief

1. INTRODUCTION: POVERTY RATES AND HOUSEHOLD EVENTS

A horrific earthquake clocked at 7.7 on the Richter scale struck the state of Gujarat, India in January 2001. More than 20,000 people were killed, another 167,000 were seriously injured, and the homes of 1.7 million were entirely or mostly destroyed. The cost of rebuilding was estimated at \$5 billion, amounting to about 20% of annual income for the entire state (World Bank 2001).

The worst damage was caused in the western district of Kutch, which is where the epicenter of the earthquake was located. Most of the deaths recorded occurred in Kutch; over 70% of all buildings in this district were destroyed. Although effects were also felt in the adjoining districts of Patan and Surendranagar, comparably much less destruction was caused in these districts. In popular memory and in local press reports, the event is referred to as the tragedy of Kutch. One would expect that a disaster of these proportions would have grave poverty effects, throwing many people into poverty especially in Kutch, with smaller dips in the two adjoining districts. Surprisingly, however, the opposite trends were observed. Poverty rates have *fallen* by seven percent between 1981 and 2006 in villages of Kutch, whereas they have risen by more than six percent in villages of neighboring Patan district. In villages of Surendranagar district, poverty rates remained unchanged over this period (Figure 1). No sudden spurts in economic activity were observed post-earthquake in Kutch, nor were the rains continuously bountiful in subsequent years. No single sizeable event seems to account for the observed paradox.

This example helps underline a frequent and frequently troubling feature of poverty research. Events like natural disasters, which are visually compelling and surrounded by an engaging narrative of tragedy or heroics, quite often dominate the analysis of



FIGURE 1: POVERTY RATES IN VILLAGES OF 3 GUJURAT DISTRICTS

causes. While not unimportant and definitely not untrue, a focus on cataclysmic events nevertheless tends to draw attention away from less striking and more everyday events, events such as weddings and funerals, illnesses and injuries, which occur constantly, non-dramatically, and on a much smaller scale.

The analysis presented below has some sobering results, showing that a collection of seemingly minor and quotidian events are more closely implicated with households' movements into and out of poverty. Large and sweeping causes matter, but their effects are often overtaken by an accumulation of small causes.

It is a combination of the kinds and numbers of such everyday household *events* (as well as interactions among these events) that collectively help predict the economic trajectory of a household. The events that matter most include marriages, sicknesses, births and deaths, employment, investments in land or a business – occurrences that are very significant for the household concerned but that do not constitute, individually or collectively, some unusual or striking episode for an entire community, far less an entire region.

All households are prone to both negative and positive events. Positive events, such as obtaining a job or making a successful business investment, combine with negative events, such as illnesses or expensive ceremonies, to influence critically the final outcome for that household. The *balance of negative and positive events* is crucial for determining the pathway by which each particular household travels. If negative experiences were removed – or even reduced in severity and frequency – many more households would be raised out of poverty.

Retracing these sequences of events and deducing the balance in each case helps understand better the diverse trajectories of different households. It also helps gain a better understanding of how poverty can be more effectively reduced in the future. Section 2 explains in brief the Stages of Progress methodology that was employed for field investigations carried out in the summer of 2005 in 50 villages of three Gujarat districts. Sequences of events experienced by a total of 2,660 households (selected using random sampling) were retraced with the help of this methodology.

Section 3 focuses on the relationship between household events and changes in households' status. A 'net events' variable, measuring the combination of positive and negative events experienced by a household, is constructed. It helps explain to a considerable extent the variations in trajectories followed by different households. The balance of events is particularly important for understanding why some households escaped from poverty while other households in the same communities fell into poverty over the same period. Section 4 extends this analysis by looking visually at household risk profiles. An interesting result emerges: a natural poverty line arises from the events data and strongly aligns with the poverty line reported by the surveyed communities. Section 5 concludes with a brief discussion of what this analysis implies for future poverty research and diagnostics.

This analysis is partly complementary and partly a corrective for views that regard poverty reduction

as an adjunct or correlate of economic growth. Growth in the aggregate can certainly be good for the poor, but in order to identify how good it will actually be, the effects of growth will have to be tracked through a succession of macro-micro links.

2. METHODOLOGY AND LOCATION

The Stages of Progress methodology was developed by Krishna (2004) in order to identify and explain households' movements into and out of poverty in one region of India. Subsequent investigations have helped to further refine and improve this methodology, extending the results to other parts of India and to regions of Kenya, Uganda, Peru and North Carolina, USA (Krishna 2006; Krishna et al. 2004, 2005, 2006a, 2006b, 2006c). It is a participatory, community-based method, which draws upon lessons learned by similar approaches in the past (Chambers 1997; Salmen 1987).

Results obtained from applying this methodology are amenable to a variety of quantitative and qualitative analyses (Kanbur 2003). The data collected include brief life histories and track households' economic status over time. The Stage of Progress methodology is useful for answering question such as: Why did only some (but not other) poor households escape from poverty in a community or region? What influences were important in their case and missing from the experiences of those who remained poor?

This methodology was developed in response to a paucity of data that tracks households' pathways out of and into poverty. Very little is known about who came out of poverty and why, and who else fell into poverty and for what reason, which has important consequences for policy formulation and program design. Without knowing how households have actually escaped from poverty it becomes difficult to recommend assistance packages for other poor households. Panel data sets have been used traditionally to examine poverty dynamics. However, panel data sets are mostly unavailable for the developing world, and constructing new panel data can take too long, seven to ten years, at least, before the data become reliable and useful (Walker & Ryan 1990). The Stages of Progress methodology helps fill these important gaps in poverty knowledge. It helps to reconstruct households' poverty trajectories following a process of recall. Because recall can be both incomplete and selective, a series of cross-checks have been incorporated into the methodology.

In the present investigation, three teams of eight investigators, drawn from the local area and speaking the local dialects, were trained initially for three weeks, including practical training in two villages located close to the training center. After completing this training, these groups worked in the 50 Gujarat villages, 17 villages in Kutch district, and 16 villages in each of Patan and Surendranagar districts, selected purposively in order to capture the range of variation between larger and smaller, remote and easy-to-access, single-caste and multicaste villages. The following six steps were followed in order separately in each village: ⁱ

Step 1. Assembling a representative community group, including males and females, higher-status and lower-status community members, and older as well as younger members.

Step 2. Presenting objectives. The study teams introduced themselves as researchers, making it clear that they did not represent any government agency or NGO, so there would be no benefits or losses to anyone from speaking freely and frankly in the community assemblies. It was hoped that mentioning these facts would help remove any incentives people might have for misrepresenting the poverty status of any household in their village.

Step 3. Describing 'poverty' collectively. Community groups in each village were asked to delineate the locally applicable stages of progress that poor households typically follow on their pathways out of poverty. 'What does a household in your community typically do,' we asked the assembled community members, 'when it climbs out gradually from a state of acute poverty?' 'Which expenditures are the very first ones to be made?' 'Basic Food,' was the answer invariably in every village.

ⁱ See www.pubpol.duke.edu/krishna for a fuller description of the Stages of Progress methodology, published papers, and a comprehensive training manual.

Which expenditures follow immediately after? 'Some clothes,' we were told almost invariably. As more money flows in incrementally, what does this household do in the third stage, in the fourth stage, and so on? Lively discussions ensued among villagers in these community groups, but the answers that they provided, particularly about the first few stages of progress, were relatively invariant across all 50 village communities. After crossing which stage is a household no longer considered poor, we asked the assembled community members, after drawing up the progression of stages. The placement of this poverty cut-off and the nature of the initial stages (those below the poverty cut-off) were remarkably similar across diverse communities, as Table 1 shows. It was community members and not researchers who defined these stages of progress; the similarity in stages is more remarkable for this reason.

Notice how people's understandings of poverty and movements out of poverty are shaped in terms of acquiring sequentially a particular set of assets and

TABLE 1: STAGES OF PROGRESS IN 50 GUJARAT VILLAGES

1.	Basic Food)			
2.	Some Clothes				
3.	Shelter Improvementys (better roofs)	In Poverty			
4.	School Enrolment				
5.	Start Repaying Old Debts)			
6. 7. 8.	Land Improvement (irrigation, etc.) Start/Enhance a Business Construct Brick House	Middle Income			
9. 10. 11. 12.	Purchase a TV/Electronics Purchase a Tractor/Motor Vehicle Increase Savings Make Investments	> Prosperous			

capabilities. These locally constructed understandings of poverty constitute the criteria within these communities for identifying who is poor. They also constitute a threshold or an objective, which defines the goals and the strategies of poor people.ⁱⁱ

Step 4. Treating households of today as the unit of analysis, inquiring about households' poverty status at the present time, 15 years ago, and 25 years ago. In this step a complete list of all households in each village was prepared. Referring to the shared understanding of poverty developed in the previous step, the assembled community groups identified each household's status at the present time, for 25 years ago, and also for an intervening period, 15 years ago.ⁱⁱⁱ Households of today formed the unit of analysis for this exercise.^{iv}

Step 5. Inquiring about reasons for escape and reasons for descent in respect of a random sample of households. We took a random sample of about 30 percent of all households, and we inquired in detail about the events associated with each household's trajectory over the past 25 years. Up to seven events were recorded in each case. These event histories were ascertained for each selected household from the community groups convened in each village, and they were further verified from members of the households concerned.

Step 6. Following up by interviewing household members. Event histories indicated by the community groups for each selected household were crosschecked separately through individual interviews with members of the household concerned. At least two members of each household were interviewed separately in their homes. Multiple sources of information were thus consulted for ascertaining reasons associated with the trajectories of each selected household. It took the team of eight individuals

ⁱⁱ The Stages of Progress rankings bear more similarity to an asset- or capability-based assessment. Incomes and consumption levels can differ, of course, even among households located at the same stage. Fluctuations from month to month and year to year are more pronounced in terms of income and consumption, particularly within agrarian settings such as the ones examined here.

ⁱⁱⁱ We selected to work with a period of 25 years because it corresponds roughly to one generation in time, and households' strategies are made in terms of generational time horizons. In addition, we also inquired about an interim period of 15 years ago.

^{iv} Households of today are not strictly comparable with households of 25 years ago. However, household composition has been relatively stable in all communities studied; relatively few households have either migrated in or migrated out permanently. Individuals have certainly migrated to towns in considerable numbers, but rarely have entire households upped and left (Breman 1996).

three to four days on average to complete these inquiries in each village community.

The Stages-of-Progress method provides us with a useful methodological device, a benchmark or yardstick, for assessing how high up the ladder of material prosperity a particular household has climbed. Clearly, not every movement upward is equal in terms of wealth gain, but these large and clearly remembered stages help add reliability to recall, as discussed in the last section, where some limitations of this methodology are also reviewed.

Quite remarkable, however, is the fact that communities' understandings of poverty are expressed clearly in terms of sequentially acquired assets and capabilities (Carter & Barrett 2006; Sen 1999). A close correspondence exists between the stage at which any household is placed during community discussions (Step 4 above) and the total number of tangible assets that it possesses, including animals, radios, household furniture, and so on.

These data enable us to examine the effects upon households' wellbeing of different events, comparing these effects across households that have traversed different pathways. We show below how events experienced by different households – more accurately, the *balance* of positive and negative events experienced by each of them – help explain why some households rose out of poverty while others simultaneously became poor.

3. CHANGE IN STATUS AS A FUNCTION OF HOUSEHOLD VVENTS

Within each community that we studied, some households escaped from poverty over the period 1981–2006, while other households concurrently fell *into* poverty. Within each community, therefore – i.e., within the same umbrella of policies and programs – different households experienced very different outcomes. Something quite important is occurring at the household level, which regional-and even community-level analyses have tended to miss.

Table 2 shows the aggregate numbers for all households in villages of each of the three districts that were studied.

Escape and descent occurred in parallel in villages of each of the three districts. Some formerly poor households were no longer poor in 2006. Even in villages of Kutch, despite the devastating earthquake, some formerly poor households escaped from poverty over this period. Something else was going on in their case, which seems particularly important to understand. On the other hand, some other households that were formerly not poor had fallen into poverty by 2006.

Why do households in the same region and community experience such *disparate* fates? How can policies and program be redesigned such that many more households form part of the first group, escaping or remaining safely out of poverty? To examine these questions, we compare below the trajectories of different households, considering for this purpose each household's position on the Stages of Progress in 1981 and in 2006.^v The goal of this analysis is to develop a framework for identifying the nature of events that most significantly effect households' economic status over time.

The variable – *net events* – employed below, is simply a net count of total household events. It measures the sum of all positive events less the sum of all negative events experienced by that house-

DISTRICT	Remained Poor	Escaped Poverty	Fell into Poverty	Remained Not Poor
Kutch	22.4%	23.3%	10.2%	44.1%
Patan	17.7%	6.7%	19.1%	56.5%
Surendranagar	35.6%	8.4%	11.1%	44.9%
OVERALL	27.2%	10.1%	13.8%	48.9%

TABLE 2: HOUSEHOLD POVERTY DYNAMICS (1981–2006)

We are aware that the economic distance between successive Stages of Progress is not strictly equal. However, even these approximate scores for status change help reveal some very important truths about poverty dynamics. We should also acknowledge clearly that what we are studying here are changes in economic status. Changes in social and political status, while certainly important, are outside the limited scope of this study.

hold. This may seem odd at first because different events are not alike in nature or intensity. Consider two separate cases with the same net events score, negative two. The first household experienced a death in the family and high healthcare expenses. The second household experienced large family size, a failed irrigation project, large wedding expenses, and government assistance (three negative events plus one positive equals a net events score of negative two). The net events tally is identical in both cases, even though these two event sequences are not strictly comparable. We find, however, that even this basic net events variable is highly influential and significant for the analysis. There is a strong relationship between the net number of events that a household experiences and its change in status. The trend is clearly discernible on a means plot (Figure 2).

At least three things are notable about this graph. First, there is a clear and strongly positive relationship between the net number of events that a household experiences and its change in status. Second, the relationship has a bit of a sigmoid shape; there is a diminishing effect of events above three and below negative two, which makes sense, since a household's status will likely not change appreciably from experiencing positive six events rather than positive five events. In the middle range, the relationship is strongly linear with some noise at net zero events (possibly because people who experienced no events end up at this point as well as people who experienced an equal number of positive and negative events). Third, the standard errors on the measurements are small, signifying a stable relationship.

This visual depiction provides initial affirmation for our claim that the variable, net shocks – the balance of events – matters significantly for households' economic pathways. But we also need to examine the interaction between the original status of the household and net events. Using the original status of a household in 1981, Figure 3 shows three separate means plots, one each for households classified as Poor, Middle Income, and Prosperous. (As defined by the communities, a Poor household is at Stage 5 or below, a Middle Income household is at Stage 6, 7, or 8, and Prosperous household is at Stage 9 or above).





95% CI for the mean





One can still discern the general characteristics of the previous graph, specifically the positive relationship between net events and change in status, but it is also apparent that households experience events in very different ways depending upon their initial status (in 1981). Poor households tend to be somewhat less adversely affected by negative events, and they tend to benefit relatively more from positive events, whereas prosperous households tend to benefit relatively less from positive events but are more seriously affected by negative events. Middle Income households exhibit a relationship similar to that exhibited by the totality of households, being affected as much by positive as by negative events.

This interaction between households' initial status and net shocks experienced suggests that inequality, instead of widening sharply, as reported for India overall (e.g. by Mahendra Dev & Ravi 2007), has tended to be more stable in these rural regions of Gujarat. One needs to be careful, however, while interpreting these results. Part of the observed variation across categories of households is explained by the forced truncation of the wealth scale – while Poor households cannot move below Stage 1 on the Stages of Progress scale, which seems reasonable, Prosperous households have been artificially restricted to a ceiling at Stage 12.^{vi} The important point is that households' initial status also matters. The variable, net shocks, matters in each case, but it matters somewhat differently for households starting off at different economic levels. We control for this fact in the statistical analysis that follows by employing dummy variables for different initial scores on the Stages of Progress.

Statistical modeling helps facilitate better understanding of how all factors behave collectively. Such models generate insights on the relative sizes and direction of the influence of different events on household status. One should note that the specific parameter estimates are not meant to be exact; omitted variable bias and the discrete nature of the dependent variable prevent a more precise measure-

^{vi} Very few households in these villages are, in fact, located above Stage 12; it implies a level of asset ownership that is rarely experienced here.

ment. The goal of the analysis is to determine *relative size* of the coefficients in the model so that the influence of specific events can be compared, as well as comparing the importance of the net events variable to individual events. To accomplish this the following model was estimated:

 $\begin{array}{ll} Y_{2006} \; Y_{1981} = & \text{Dist } \delta + \text{Village } \beta + \text{Individ } \alpha + \\ & \text{Status } \psi + \text{Mod } \gamma + \text{Event } \phi + \\ & \text{EventInt } \omega + \epsilon \end{array}$

where Y_{2006} Y_{1981} represents the change in status (stage of progress) of a household between 1981 and 2006. *Dist* is a vector of dummy variables for the three districts (Kutch is the reference district that is omitted). *Village* is a vector of village level variables, such as proximity to markets and the number of households in the village. *Indiv* is a vector of individual characteristics of the head of the household such as age and religion or caste. *Status* is a set of dummy variable that represents the household stage of progress (1 through 12) in 1981. Stage 12 is the reference stage.

The Mod variables represent the interaction between household status and the net number of events. These variables measure the moderation effect that status has on the relationship between net events and household status. It was constructed through the interaction of three dummy variables that represent household status in 1981 (poor, middle income, and prosperous), and three dummy variables - negative, zero, and positive – for net number of events experienced. This condensed net negative and net positive event categories are used because including all possible values for net events makes the interpretation of the model unwieldy. The model fit is slightly higher when the full range of values is used, but the core relationship is preserved with the simplified version; mainly that a sizable net events effect is present in the model. The net zero dummy was omitted in order to guard against multi-collinearity.

- Poor in 1981 * Net Negative
- Poor in 1981 * Net Zero (omitted)
- Poor in 1981 * Net Positive
- Middle Income in 1981 * Net Negative
- Middle Income in 1981 * Net Zero (omitted)
- Middle Income in 1981 * Net Positive
- Prosperous in 1981 * Net Negative
- Prosperous in 1981 * Net Zero (omitted)
- Prosperous in 1981 * Net Positive

Event is a vector of dummy variables that represents the primary event that each household reported as the most significant one associated with their change in status (households reported up to 5 nonprimary events). These responses have been condensed into a list of 20 categories of events, which constitute the most frequently reported ones in all 50 villages:

- Government/Charity Assistance: help from the state, a non-profit or religious group
- Formal Employment: new job in either the private sector or with the government
- Expansion of Business: progress in a family-run business or farm
- Land Improvement: usually an irrigation project
- **Positive Marriage:** a marriage that has improved familial well-being
- Improved Technology: incorporation of new technologies into the farm or business
- Control Over Fertility: can mean either a small or large family size, but one suited to the economy of the household
- Education: more schooling
- Unattributed: household reports general bad fortune without attributing the change in status to a particular event
- Incursion of Credit: for the household (mostly related to loans from private moneylenders)
- Negative Health Outcomes: the household experienced an illness or death
- No Control Over Fertility: challenges due to large family size, or small families in labor-intensive settings such as farms
- Lack of Business Progress: challenges or failure in the family business
- Failed Land Improvement: a project was attempted but it failed, such as an irrigation system failing because the water table is too deep for a well
- Ceremonial Expenses: particularly *Mosar* (wedding costs), and *Nata* (formally illegal second or third marital relationships)
- Laziness or Drunkenness: self-reported as the reason for decline
- Accidental Loss: loss of assets due to accident or theft
- Negative Marriage: marriages that increase household conflict or end in divorce
- Litigation: household was involved in a lawsuit
- Disinheritance: mostly regarding family land

The final component, *EventInt* is a vector of binary variables representing the interaction between two or three separate kinds of events within the same household. Each dummy variable is coded 1 if the household experienced all of the events in the interaction. If they experienced none or only some of the events then the dummy is coded zero. In this way the variables capture the synergy associated with a specific constellation of events.

The groups of events were chosen using a method called association discovery, a technique designed to identify patterns of events that commonly co-occur from many different observations of collections of events (Agrawal et al. 1993). It is also known as market basket analysis because it is used by grocery stores to determine products that customers are likely to purchase together. In this case, each household listed up to six events that had an impact on their status. Association discovery was used to identify which ones are most likely to occur in combination, e.g., poor health and credit problems frequently cooccurred. As a criterion, each group of events had to co-occur in at least 5% of the households in the dataset to be included in the model. Eighteen different interactions met this criterion.

- Large Family & Ceremonial Expense
- Marriage & Large Family
- Marriage & Credit Incursion
- Marriage, Large Family & Health
- Marriage, Credit, & Health Problems
- Ceremonial Expenses & Health Problems
- Marriage and Business Progress
- Marriage, Ceremonial Exp, & Family Size
- Marriage, Ceremonial Expense, & Health
- Large Family and Health Problems
- Large Family & Credit Problems
- Large Family and Business Progress
- Large Family and Personal Capability
- Large Family, Credit, and Health
- Health Problems and Credit Incursion
- Land Inheritance and Personal Capability
- Large Family and Disinheritance
- Business Progress & Personal Capability

The model was estimated using OLS regression (see Annex A for details). In order to account for heteroscedasticity introduced into the model by the discrete nature of the variable, White's heteroscedasticity consistent estimator was used to correct the standard errors (Greene 2008: 163). The regression coefficients are reported below. The model demonstrates good fit (F-value of 22244 with 66 and 10,066 degrees of freedom), and a high proportion of the observed variance is explained (Adjusted $R^2 =$ 0.56). A change in one level of status marks a tangible change in a household, so in the analysis reported below a coefficient of greater than one is considered to be a large effect size.

The first set of variables shown in Table 3 is the set of dummies representing three districts in Gujarat. Recall from Figure 1 that poverty rates were falling in Kutch while they were rising in Patan and not changing in Surendranagar. Kutch is the reference group in the model so we would expect to see a large negative coefficient on the Patan variable since poverty rates are rising in this district and falling in Kutch, but in fact the difference is rather trivial and positive (change of 0.078), and it is not significant at the alpha = 0.05 level. It appears that the disparate trends in the two districts are explained by household events and other variables in the model rather than being related to unmeasured inherent features of the districts. The difference between Kutch and Surendranagar is significant, but at negative 0.363 it is not a large change.

The second set of variables relates to village characteristics such as size and distance to marketplaces. These characteristics all have coefficients that are statistically significant denoting a tangible relationship between the village where the household resides and household status, but the magnitude of the relationship is small. The distance from the village to the nearest marketplace averages 26.5 kilometers, for example, which translates to an average effect of -0.053; not at all large, but confirming a slight disadvantage for people living in more remote villages. Village size, measured in terms either of geographic area or the number of resident households, also has a very small though significant average effect.

The next set of variables consists of demographic traits of households, including religion, caste, gender, and age. The coefficients associated with these variables are all quite small (ranging from 0.01 to 0.21), thus the average effect size associated with these variables is moderate. For example, the average age in the dataset is 42 years, so the age effect for the average individual is a status increase of 0.336 since birth or 0.20 over the 25 year period.

Variable	Parameter	t-value	Variable	Parameter	t-value	
Intercept	-9.507	-24.20***	Individual Events Experienced by Households			
			Positive Events			
District Dummy	Variables		Government/Charity Assistance	0.607	3.23***	
Patan [0,1]	0.078	1.78*	Formal Employment	1.442	7.65***	
Surendranagar [0,1]	-0.363	-8.09***	Expansion of Business	0.885	4.89***	
			Land Improvements	1.733	8.27***	
Village Level Char	acteristics		Positive Marriage	0.909	1.73*	
Geographic Area	0.003	3.05***	Improved Technology	0.896	4.42***	
Distance to Nearest Marketplace	-0.002	-2.62***	Control Over Fertility	0.642	3.42***	
Number of Households	0.001	10.21***	Education	1.193	5.06***	
			Negative Events			
Individual Charac	teristics		Unattributed	-0.919	-4.08***	
Land Possession in 1981	0.003	4.06***	Incursion of Credit	-0.067	-0.30	
Age of Household Head	0.008	8.88***	Negative Health Outcomes	-0.282	-1.57	
Male [0,1]	0.212	4.44***	No Control Over Fertility	0.150	0.86	
Hindu [0,1]	0.016	0.43	Lack of Business Progress	-0.254	-1.03	
Scheduled Caste [0,1]	-0.121	-3.06***	Failed Land Improvement	0.331	1.51	
Backwards Caste [0,1]	-0.051	-1.45	Ceremonial Expenses	-0.112	-0.60	
			Laziness or Drunkenness	-0.426	-1.63	
			Accidental Loss	-0.079	-0.29	
			Negative Marriage	-0.120	-0.67	
Dummies for Original H	ousehold St	atus	Litigation	-0.320	-1.14	
Stage 1 in 1981 [0,1]	12.230	32.21***	Disinheritance	-0.087	-0.48	
Stage 2 in 1981 [0,1]	11.429	30.5***				
Stage 3 in 1981 [0,1]	10.663	29.07***	Interactions Between Events			
Stage 4 in 1981 [0,1]	10.111	27.59***	Large Family & Ceremonial Expense	0.385	4.13***	
Stage 5 in 1981 [0,1]	9.235	25.16***	Marriage & Large Family	0.081	1.32	
Stage 6 in 1981 [0,1]	8.545	25.11***	Marriage & Credit Incursion	0.056	1.06	
Stage 7 in 1981 [0,1]	7.851	23.1***	Marriage, Large Family & Health	0.198	1.74*	
Stage 8 in 1981 [0,1]	7.316	21.24***	Marriage, Credit, & Health Problems	0.034	0.33	
Stage 9 in 1981 [0,1]	7.583	34.29***	Ceremonial Expenses & Health Problems	-0.089	-1.25	
Stage 10 in 1981 [0,1]	6.809	26.22***	Marriage and Business Progress	0.558	6.35***	
Stage 11 in 1981 [0,1]	6.102	16.49***	Marriage, Ceremonial Exp, & Family Size	-0.348	-2.74***	
			Marriage, Ceremonial Expense, & Health	0.128	1.40	
Interaction Between S	tatus and Ev	vents	Large Family and Health Problems	-0.132	-1.72*	
(Poor in 1981)*(Net Pos)	0.232	1.56	Large Family & Credit Problems	-0.144	-1.86*	
(Poor in 1981)*(Net Neg)	-0.980	-6.53***	Large Family and Business Progress	0.193	2.27**	
(Mid Income in 1981)*(Net Pos)	0.146	2.70***	Large Family and Personal Capability	0.098	1.27	
(Mid Income in 1981)*(Net Neg)	-0.897	-14.61***	Large Family, Credit, and Health	0.283	2.22**	
(Prosperous in 1981)*(Net Pos)	0.796	2.85***	Health Problems and Credit Incursion	-0.296	-3.81***	
(Prosperous in 1981)*(Net Neg)	-1.912	-6.27***	Land Inheritance and Personal Capability	0.350	4.53***	
			Large Family and Disinheritance	0.171	2.32**	
			Business Progress & Personal Capability	0.281	3.16***	
*** p-value<0.01, **p-value<0	0.05, *p-v	alue<0.10				

TABLE 3: CHANGE IN HOUSEHOLD STATUS REGRESSED ON INDEPENDENT VARIABLES

The very small effect of additional landholding likely arises because of the generally low productivity of land in this region. Female-headed households were at a significant disadvantage, though since most of them started out relatively poor, the scope for further impoverishment was low, resulting in a small observed coefficient. The variables for Scheduled and Backward Caste were not significant, suggesting that even though the numbers in poverty vary considerably, pathways out of or into poverty are not significantly different across caste groups.

The next set of variables consists of dummies indicating the original household status. In order to properly interpret these coefficients we must first consider the intercept term of negative 9.5. By adding this value to the coefficients we see that the poorest households (those at Stage 1 in 1981) tended to experience an improvement by approximately three stages, whereas the most prosperous households (Stage 12 in 1981) tended to experience a loss in status of 3 stages. Households were stable somewhere between Stages 5 and 6, which is interesting since Stage 5 is the last level considered to be poor and Stage 6 is the first level of middle income (we will return to this point in the next section).

Next the model examines the interaction between initial household status and net events. These effects are significant both in statistical and substantive terms. The *balance of events* is significant in every case, though it is interesting to note the difference in size and significance of positive versus negative interactions. While both types of interactions have a large t-value, representing a stronger statistical relationship, the net positive interaction has only a medium effect size ranging from 0.146 to 0.796 while the net negative interaction has a larger effect size ranging from -0.98 to -1.912. One reason for this asymmetry has to do with the variance explained separately by individual positive and negative events. We discuss this feature below.

Examining the coefficients of individual events we see that all eight positive events achieve significance, whereas all but one of the negative events is not individually statistically important. The effect size is also quite large for positive events, as high as 1.733, whereas the change in status due to negative events is more modest, ranging between -0.067 and -0.426. The inference is that negative events seem to be more potent in their cumulative effects (i.e. in terms of the interaction between the net negative dummy and initial household status), whereas positive events have relatively more impact directly and individually.

The most potent individual events are land improvements and formal employment (with coefficients of 1.733 and 1.442 respectively). Although land improvement projects are often risky, the large coefficient implies that they have a big return when they are successful. It also makes sense that formal employment would have such a large effect on household status, since a reliable stream of income goes a long way towards stabilizing a household budget and smoothing consumption. Education also has a large effect (with a coefficient of 1.193). Government or NGO assistance has the smallest effect size out of all the positive events, having a coefficient of only 0.607. Although this is by no means a trivial change, it is interesting to note that the coefficients associated with successful land improvement projects is three times as large, and the coefficients associated with formal employment or education are twice as large.

The last group of variables consists of interactions among multiple events. It is notable that at least some of the three-way interactions are significant, even if the effects are not huge, because they verify that synergies between certain groups of variables do exist. For example, take households that experience health and credit problems. The effect of these two variables can be partitioned into a cumulative effect ranging from -0.897 to -1.912 (depending on the initial status of the household), the individual effects of each event (-0.281 and -0.067 respectively), and an additional synergy effect of -0.296. Note that the synergy is larger than the individual effects, and it is also statistically significant whereas the individual effects are not. The inclusion of interaction variables is important when the effect of some events is dependent upon other events, especially when household events are highly correlated.

Overall, though, these regression results show that while many single events matter, the effects of the net shocks variables are relatively larger. The combination of events - the balance of all things - has the most significant effect upon where households eventually land. This balance is manifest in three different ways. First, the net events variable is extremely important. Households that experience net positive events tend to be on upward trajectories, and households that experience negative events are losing ground. Second, the specific kind of negative event does not seem to be as important as the count of negative events and the balance with positive events. Finally, interactions between specific subgroups of events have an additional effect independent of the individual events and the net events count.

From a policy perspective it is important to distinguish between positive events, which have larger *individual* effects, and negative events, for which the *cumulative* effect is more significant. This result is important for designing poverty interventions; policies to control better against descents into poverty should be directed toward preventing the accumulation of negative events. Policies to help families escape from poverty, on the other hand, might focus better upon single programs such as land improvement projects, education subsidies, or creation of employment opportunities. These key results are re-emphasized when we look below at household risk profiles.

4. HOUSEHOLD RISK PROFILES AND THE NATURAL POVERTY LINE

A *household risk profile* is a way of summarizing a household's exposure to different kinds of events. One way to examine risk is by looking at the net events variable, since a negative number represents relatively greater exposure to risk while a positive number represents a larger ability to seek opportunity and avoid deleterious events. Graphically, we can plot the net events variable against households' status in the initial and final year of the study.

The contour plot below (Figure 5) plots on the X-axis a household's stage in 2005, while on the Y-axis are plotted the household's stage in 1981. Thus, each point on the grid represents a particular subgroup of households – those who started off at the stage represented by the corresponding y-coordinate and ended up at the stage represented by the corresponding x-coordinate. Households falling along the diagonal started at a specific stage in 1981 and they ended up at the same stage in 2005. Any household that falls to the left of the diagonal experienced a decline in its status, and any household located to the right of the diagonal improved its status.

The contour lines represented by different shadings on the plot show the average number of household events experienced by the cohort located at the corresponding location on the graph. For example, the cohort of households that was at Stage 4 in 1981 and moved to Stage 2 in 2005 all fall within the band of -3 to -2 events. Structuring the data in this way allows us to generate some insights from household risk profiles, primarily regarding the correlation between status change and household events.

A prominent feature of this graph is the high density of negative events in the upper-left quadrant and the high density of positive events in the lower-right quadrant. Households located in these quadrants experienced the most significant changes in status over the past 25 years. These are also the households that experienced the greatest number of net events.

The group that was middle income or prosperous in 1981 but entered poverty by 2005 – i.e., those located in the upper-left quadrant – experienced an average of -2.80 net events. On the other



FIGURE 4: CONTOUR PLOT OF AVERAGE NUMBER OF HOUSEHOLD EVENTS

hand, the group that started off poor and left poverty – those in the lower-right quadrant – experienced an average of +1.93 net events.

The group in the lower-left quadrant – those who remained poor – experienced on average -2-21 events, i.e., they did not stay poor because nothing was happening in their case. Rather, whatever positive strides they were making were more than counterbalanced by a succession of negative events. The *balance* of events was negative in their cases, which is why they continued to be trapped in poverty.

The difference in net scores across households presumably does not come from differences in risk preferences. Rather, some households have access to opportunities and are simultaneously able to protect themselves from countervailing shocks. Other households have little control over these negative events or they experience fewer positive opportunities and have higher exposure to risk. The interesting result for poverty researchers is that failed risk management produces a tangible and observable effect.

If we turn again to the contour maps of household events and overlay the poverty line reported by villagers, we see a strong relationship between risk and poverty. Specifically, villagers almost unanimously reported that they considered a household poor if it was at Stage 5 or lower. Interestingly, a clear division is also visible in the contour plot at exactly this Stage. The contour for net zero events aligns itself not perfectly, but consistently with the poverty line reported by communities. The 'true' poverty line, then, is the one reported by villagers the robust social construction of poverty that begins between Stages 6 and 5. The 'natural' poverty line is the line that divides households roughly between those that experience net negative events and those that experience net positive events. This correspondence suggests that on average, measuring the number of negative events a household experiences is equivalent to predicting whether the household will be poor. This insight has important implications for the measure and study of poverty.

What results is a frontier space between being poor and non-poor that entails a relative *balance* of positive and negative events. If a household can maintain a net positive event count then it can become or remain non-poor, but once households begin experiencing net negative events they get pushed toward the knife's edge of descent into



FIGURE 5: RISK EXPOSURE AND THE POVERTY LINE

poverty. If the scales tip in the wrong direction and they experience more than negative two events, then they are plunged into poverty and cannot climb out, unless in future they can manage to accumulate net positive two events (above and beyond their initial negative tally).

The structure of the data highlights important questions about the nature of poverty and the operationalization of poverty as a construct. What is being measured when we say that someone is poor? Villagers were able to unanimously identify a material representation of the poverty line: Stage 5, the point at which they can just begin to retire debt still signifies poverty for them, whereas Stage 6, the ability to undergo land improvements or business expansion signifies being out of poverty. The tangible nature of these Stages is thus just an indicator of an underlying and experienced reality. The risk profiles and the Stages of Progress help identify some dimensions of a concept that is otherwise quite difficult to define and measure.

5. CONCLUSIONS

Multiple research methods are useful for grasping different dimensions of poverty. Combinations of methods dealing with varied levels of societal aggregation are more useful for understanding poverty and its causes than any single method applied in isolation (Johnson 2002; Kanbur & Squire 1999; Lok-Dessallien 1999).

Stages of Progress is particularly useful for ascertaining household-level reasons for escape and descent.^{vii} Applying this methodology and uncovering the reasons for escape and descent helps to provide the rationale for selecting particular interventions over others.

Focusing upon events at the household level acts as a corrective to a view that sees poverty outcomes as a resultant only of macro-national influences. In order to make pro-poor growth a reality instead of a mantra, the intermediate links - between economic growth in the aggregate and poverty reduction at the household and individual levels - will have to much better identified and explored. This analysis helps identify some of these missing links by examining the influences that sequences of events have upon the well being of separate households. We explore the last few links in a longer chain, which connects downward from macro-level outcomes to micro-level results. More work remains to be done by way of tracing other links in this chain, observing them at higher levels of societal aggregation.

The Stages of Progress methodology is helpful in these ways for advancing knowledge about poverty, associated reasons, and helpful interventions. Although there may be some recall bias, recall is generally reliable because several precautions have been built in, many as a result of experience. First, the methodology retraces large steps that are better remembered compared to finer distinctions. Each movement upward along the Stages of Progress represents a significant improvement in material and social status. By seeking recall data in terms of these clear, conspicuous and sizeable referents, the Stagesof-Progress method adds reliability to recall. Second, all information is triangulated; multiple independent sources are consulted for each item of information. Information about each household is obtained separately at both the community and the household level. Discrepancies, when found, bring forth repeat interviews; community groups and the household verify each others' account. Third, corroboration with more 'objective' evidence was found by comparing stages with asset holdings for households. A monotonically increasing relationship was observed in each case; communities' gradations and rankings point in the same directions as the grading schemes that outside experts prefer to employ (Krishna 2007).

Some limitations will need to be addressed as this methodology is extended further. Some other limitations will not be as easily overcome. First, the methodology needs to deal better with intrahousehold differences, particularly those based on gender. Second, it will need to be adapted for dealing better with newly formed communities, particularly those located in large urban centers. To some extent, the study undertaken in North Carolina helped develop amendments in the methods appropriate for studying urban areas (Krishna et al. 2006c). Because 'poverty' is less easily discussed publicly here than in the other countries studied, and because communities are less stable here, the Stages-of-Progress methodology needed to be modified for North Carolina. Further refinements were made for a recent countrywide study in Kenya, where communities in Nairobi and Mombasa were studied along with several others located in rural areas.

Another potential weakness, common to all longitudinal studies, arises on account of the changing compositions of communities and households. Households twenty or even ten years hence will not be the same as the households of today. Because households do not remain the same over time, some simplifying assumptions have to be made in longitudinal studies. Panel data studies consider households in the starting year of the study. They compare these households over time, neglecting all households newly arisen. This neglect does not, however, deter from the purpose of these studies, which is to trace households' trajectories over time. The Stages of Progress method involves an equal though opposite neglect. By considering households at the end of this period, this method neglects all households that have faded away during this period. We have found in a few locations where we inquired about this disappear-

^{vii} With a notable few exceptions, including Barrett et al. (2006) and Sen (2003), panel data studies have not identified processes and events associated with escape and descent at the household level

ance that it was undergone by roughly equal numbers of very rich and very poor households, with members of both groups leaving to try their luck in some city.

By studying households that exist at the present time, we can elicit, particularly in the case of younger households, the difference between some individual's inherited and acquired status: Did a person who was born to poverty remain poor at the end of the period, or did s/he manage to escape from poverty? Is another person who was part of a non-poor household ten years ago still non-poor, or has she, regrettably, fallen into poverty during this time?

Compiling these trajectories – of stability and of change – helped us to assess the overall situation of poverty over time. More important, learning about the reasons for change in each individual case helped to identify sequences of events associated with escaping or falling into poverty. We found that rather than any single event, even an event as momentous as the Gujarat Earthquake, it is the balance of everyday events that more significantly affects households' longer-term trajectories. Those who experience on *balance* more negative events tend to remain poor or fall into poverty. Those for whom the balance of events is positive tend to remain out of poverty or make an escape from poverty.

Policy outcomes can be improved by designing and implementing programs that focus specifically on region-specific pathways into and out of poverty, taking care to identify the nature of everyday events, positive and negative, that influence households' longer-term economic fortunes. Grassroots-level analyses of reasons and events are particularly important for this reason: interventions can be more fruitfully designed only after these reasons are better known within each particular context.

ANNEX A

Each of the eleven Stages of Progress in the study is represented by an ordinal, categorical event. The dependent variable in the model is the change in household status over a 25-year period, i.e. the difference between the household status at present and the status 25 years ago. It ranges from negative 11 to positive 11, is centered at zero, and has an approximately normal distribution.

OLS is the most straight-forward method to estimate this model. Given the discrete nature of the dependent variable, the primary concern with this method is introducing heterogeneity into the error structure. According to Greene, 'If the heteroscedasticity is not correlated with the variables in the model, then at least in large samples, the ordinary least squares computation, although not the optimal way to use the data, will not be misleading.' (Econometric Analysis, p.162). It is, however, necessary to correct for the heteroscedasticity in the model. This is accomplished by replacing the OLS covariance structure with one estimated using White's heteroscedasticity consistent estimator (p. 163), also known as the sandwich estimator. The model was estimated using OLS and the error structure corrected using White's consistent estimator.



ANNEX A: CHANGE IN STAGE OF PROGRESS OVER 25 YEARS

The balance of all things: Explaining household poverty dynamics in 50 villages of Gujarat, India

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