Applying Behavioral Economics to International Development Policy

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C. Leigh Anderson and Kostas Stamoulis, June 2005
cla@u.washington.edu and kostas.stamoulis@fao.org

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Summary

Many national and international economic development policies and programs are premised on a traditional economic model of rationality that predicts how individuals will respond to changes in incentives. Empirical and experimental evidence, mostly from Europe and the U.S., is suggesting that there are a range of situations, especially involving uncertainty and costs and benefits spread over time, in which individuals make decisions inconsistent with the predictions of these models: individuals avail themselves more or less than predicted in health or credit programs, participate more or less than expected in market opportunities, under or over insure themselves, and make short run decisions that are inconsistent with their long run welfare.

Our primary research objective is to identify how development projects, programs and policies can be more effectively designed with a better understanding of how individuals make decisions in ways that systematically deviate from traditional assumptions of rational maximization.

Our secondary objective is to understand if, and how, these systematic deviations differ among institutional actors along the policy chain. That is, do policy makers, program designers and program recipients make decisions about allocating resources, including their own time, in ways that systematically differ from standard assumptions, and systematically differ from each other?

We propose to address our research objectives through understanding whether, and how, the current findings in behavioural and experimental economics from developed country contexts differ:

a. for poor populations in developing countries;
b. across policy and decision domains – financial and credit, seed and food security, and health;
c. among international aid donors, national policy makers, program designers and project recipients.

We begin by describing some of the findings from developed countries, and follow with an outline of some of our results from developing country contexts.

Motivation

Economists are still unable, in some important ways, to fully understand how the poor make decisions, especially under uncertainty and over time. Consequently we do not understand why, for example, through a program to reduce environmental health risks individuals do not regularly adopt subsidized technologies such as ventilated cooking stoves or pit latrines. We do not understand why, despite a massive HIV/AIDS information campaign, individuals do not regularly use condoms. Our models do not explain how an individual can be worse off with unconditional access to credit; even without suffering unanticipated adverse events and despite their best intentions. Participation rates in immunization programs are often below

expectations, and market liberalization policies may end up in less market exchange than predicted. We believe that some of the answers may lie within behavioral economics, that these answers are particularly important for poor populations, and that these answers can improve the design, implementation and subsequent effectiveness of development policy and programs.

Behavioral economics is an approach that rigorously combines the insights of psychology and economics to try to better understand and predict human decision making. Experiments are revealing many behavioral anomalies that may explain seemingly irrational and unpredicted responses to development policy and projects. The regularity of these anomalies suggests that they are anomalous only to our traditional models, but that they are otherwise the norm. We are beginning to learn, for example, how cognitive limitations, fairness, loss aversion, framing of choices, variable discount rates, and the qualitative dimensions of risk -- immediacy, familiarity, proximity, reversibility, and control -- affect decision making. And we have some insights into how these anomalies vary by the policy domain, for example, across financial versus health decisions, and how they vary by the characteristics and situation of the decision maker.

These findings are not about explaining behaviors that conform to cultural norms, or other social and institutional factors that are not regularly incorporated into economic models. These findings are about psychological factors that may be susceptible to, or shaped by, the institutional environment, but which may differ for other reasons in two individuals living in identical cultures.

The accumulated evidence is largely from the U.S. and Europe, with little comparable work from developing or transition countries. Most of the work has been experimental, with far fewer observations from the field. The motivation for trying to understand the preponderance and nature of similar behavioral anomalies in less developed countries is our prior is that they are at least as prevalent, and that they will more acutely affect policy outcomes because there are fewer formal institutions to temper their effects. This prior stems from three developing country characteristics:

a. the greater incidence of poverty and food insecurity;
b. large rural populations;
c. the lower incidence of well functioning markets, combined with
    - greater price and output variability common to rural agricultural markets,
    - greater price and output variability due to extreme events such as natural disasters and war.

The poor may disproportionately represent populations for whom traditional behavioral assertions are inappropriate since many anomalies arise from threshold effects around reference levels, such as minimum subsistence levels of income. Living rurally has also been a strong predictor of differences in time preference and risk tolerance, even when income is controlled for. Our prior, for which we do not yet have evidence to support, is that these results may stem from the relatively high transaction costs faced by rural dwellers, compared to their urban counterparts. In particular, the high cost of exchanging information, and thereby contextualizing and verifying it, may result in fewer, more homogenous, and less reliable or valid sources. Further, critics of behavioral economics argue that the anomalies of imperfect rationality can be ignored because the actions of a few that deviate from utility or profit maximization will be eliminated by arbitrage and competition in well functioning markets. But much of the exchange that occurs in developing and transition economies takes place in small, personal, informal, and poorly functioning markets, such that any anomalous behavior is more likely to influence resource allocation. Finally, rural agricultural markets in particular are subject to high price and output variability, where concerns over fairness and loss aversion could affect both the terms of trade and with whom individuals transact. Hence the potential for harmful, or simply ineffectual, policies seems even higher in developing and transitional economies.

These considerations suggest that it may be particularly important to determine how ubiquitous these anomalies are, and by examining demographics and other factors associated with these behaviors, estimate their prevalence in developing countries. That is, to understand if anomalies are, in fact, regularities, implying that it is the model underlying policy design, analysis and evaluation that must change.

In his 1993 Nobel prize speech, Douglass North argued that explaining the performance of economies through time required a better understanding of institutions and cognition. International development policy now reflects a growing understanding of the role of institutions, but despite Nobel prizes to Herbert Simon, Vernon Smith and the psychologist Daniel Kahneman, what we know about cognition has yet to regularly penetrate our analysis. Yet our research suggests that *getting the institutions right requires understanding patterns of imperfect rationality*.

It is likely not helpful to simply abandon rational maximization and attempt to craft policy on an ad hoc basis. A more productive response is likely to come from retaining the rigor of the constrained maximization model and its predictions where they have been regularly confirmed, but looking for behaviours that systematically deviate for certain populations or in certain domains. It is these systematic deviations that can improve the model, improve our predictions of how people will make decisions and respond to incentives, and hence improve our policy making and program design to achieve the desired outcomes.

Our paper begins by discussing what we mean by behavioral anomalies, and the response of behavioral economists. To give a flavor of this type of research we offer a brief review of some U.S. and Western European experiments and their results. We draw heavily on earlier experimental summaries, and in particular, Daniel Kahneman (2003), Richard Thaler (1991), and Matthew Rabin (1996). In section two, using original field data collected with stated and revealed preference surveys in Vietnam and Russia, we provide evidence of discount rate patterns similar to those found in the United States and Israel. We examine risk attitudes in Russia, and propose tests of the different decision heuristics used by policy makers and program recipients in an ongoing survey in Vietnam. Our final section discusses why we believe these ideas are particularly important for international development, and what some of the obstacles are to change.

1. What are behavioral anomalies and behavioral economics?

Over the past twenty-five years economists have begun to focus more on the behaviors of individuals that "deviate" from what would be predicted from our standard model of rational maximization. These behaviors include individuals foregoing interest earnings by repeatedly withholding too much income tax, joining Christmas clubs that pay no interest but keep members' savings illiquid until December, or teachers on nine month contracts opting to have their annual earnings spread over twelve months. These also include individuals contributing anonymously to public goods, forsaking returns they view as unfair, working fewer hours when the value of their marginal productivity is higher, overestimating small risks, and farming unsustainably. (Rabin 1996, Thaler 1985)

These behaviors, often called anomalous, may only be anomalous to our model of rational maximization, but otherwise be the norm. Behavioral economics, at the juncture of psychology and economics, is an effort to understand empirically how systematic these anomalies are, and to adjust our theoretical models to more accurately reflect these behaviors. Our standard economics model posits choice as being the outcome of an individual maximizing stable, well behaved preferences over a set of goods and services, U(x), subject to a set of measurable or identifiable constraints such as income or prices. If these choices are subject to uncertainty, some form of the dominant expected utility model (EU) is used. This model posits that the individual maximizes expected utility defined as the probability an outcome will occur times the utility derived from that outcome, or EU = p(x)U(x). If the choices are made over time, the dominant model discounts utility (DU) where Ut $(x_t,\ldots x_T)$ =

D(k) U(x_{t+k}), using an exponential discount function $D(k) = (1/1+p)^k$. In all these cases, "Every decision is thoroughly contemplated, perfectly calculated and easily executed." (Mullainathan, forthcoming, p. 1)

Rabin suggests that "Psychological research can be roughly categorized by how radically it challenges this model, and the nature of the modifications implied." (Rabin, 1986, p.2). Changes to the form of the utility function to incorporate regularly observed arguments such as reference levels and fairness, are reasonably tame. Prospect theory is a descriptive model that goes a little further by both respecifying the utility function as a value function over losses and gains, and allowing for errors in maximizing it under uncertainty by replacing the statistical probabilities of the EU model with subjective decision weights. Some observations on the systematic biases that occur when individuals maximize utility can be built into these decision weights, others will likely require additional modifications. The most radical modifications concern assumptions about the stability of preferences. The framing and sequence of choices can affect decisions and individuals reveal preference reversals over time. Incorporating some of these changes such as more appropriate discount functions is straightforward, albeit mathematically complex, others may prove more intractable.

In this paper we focus on four misspecifications that we believe are important to international development policy. The first is what individuals have preferences over, the second is how those preferences are altered by uncertainty and time, and the third is bounds on the maximization process itself. Specifically, we focus on the evidence and importance of 1. including references levels, changes in wealth, and fairness, in the utility function; 2. prospect theory, loss aversion, and risk perceptions; 3. time varying discount rates; and 4. decision heuristics.

1.A The true form of U(x): Reference Levels and Fairness

Most of us understand that behavior is motivated by considerations other than pure self-interest, including altruism, fariness and revenge. For tautological reasons these cannot all be considered part of self-interest, or maximizing self-interest predicts everything, and hence nothing. What we understand less well is how, and when, to weight these motivations. If self-interest is narrowly considered as increasing material wealth, for example, how much self-interest will one foregoe to satisfy fairness, revenge or altruistic motives? And are the motives really governed by more complex issues such as reciprocity? For example, studies suggest that people are more likely to contribute to public goods when they believe others are also doing this, even though from an efficiency perspective there are diminishing social benefits to each additional person contributing. Pure altruism would suggest that one should give more when others give less. (Rabin, 1996, p.13)

Repeated experiments suggest that individuals are willing to suffer monetary losses to punish opponents for outcomes that they perceive as unfair. (See for example, Rabin 1996, and Camerer and Thaler, 1995) They may either judge the resulting distribution or the intent of the distribution as unfair. (Bereby-Meyer and Niederle, 2005) If individuals who are given the role of determining wealth splits choose allocations that deviate much from 50-50, recipients will refuse the split if their refusal means that both players receive nothing. That is, they are willing to give up their smaller share to prevent the other player from receiving their larger one. When can we regularly predict that satisfying the desire to retaliate will outweigh the desire to increase wealth?

Fairness is generally defined relative to a reference level, and it is changes from this baseline that affect perceptions of fairness and well being. Daniel Kahneman, Jack Knetsch and Richard Thaler (1986) conducted several experiments to assess how fairness might be a constraint on profit seeking in the market. They asked telephone respondents a series of questions, such as the following:

Q1A. A company is making a small profit. It is located in a community experiencing a recession with substantial unemployment but no inflation. There are many workers anxious to work at the company. The company decides to decrease wages and salaries 7 percent this year.
N=125 Unfair 62%

Q1B....with substantial unemployment and inflation of 12 percent...The company decides to increase salaries only 5 percent this year.
N=129 Unfair 22%

Q2A. A shortage has developed for a popular model of automobile, and customers must now wait two months for delivery. A dealer has been selling these cars at list price. Now the dealer prices this model at $200 above list price.
N=130 Unfair 71%

Q2B. ...A dealer has been selling these cars at a discount of $200 below list price. Now the dealer sells this model only at list price.
N=123 Unfair 42%

From their experiments they proposed the principle of reference transactions and dual entitlement: that buyers feel entitled to the terms of some reference transaction and firms to some reference profit, without necessarily knowing profit levels at the reference transaction. Transactors found it largely unacceptable for firms to raise prices and appropriate surplus from demand increases, but acceptable for firms to pass on cost increases. This included price or wage changes in response to commodity shortages or labor surpluses. If these views of fairness affect individual's decisions on where, and with whom, to exchange, or constrain profit seeking by vendors in the market, then we should expect that people will respond differently than traditionally predicted to policies that regulate or liberalize markets.

Reference levels also apply to wealth. Considerable evidence suggests that individuals are sensitive not only to final states, but also to the changes in states from some baseline or reference level. The baseline could be their own past wealth, such that it is the magnitude of the increase or decrease in their wealth that matters as much as the final wealth level. Or it could be changes in the wealth of a neighbor, friend, or other individual they are apt to compare themselves to. Thus, for example, an individual could feel poorer, or worse off from the good fortune of their neighbor or from a colleague getting a pay raise, despite no change in their absolute wealth levels.

Many of these ideas on relative well-being stem from the literature around happiness. Beginning with Richard Easterlin in the 1970s, several studies have shown that although on average individuals in wealthier countries are happier than their poorer country counterparts, average happiness levels do not rise as countries grow wealthier (Easterlin, 1976). One hypothesis is simply that as average wealth levels rise, individuals do not necessarily feel proportionately better off vis a vis others, and that this relative measure is important to happiness or well-being. Carol Graham (2004) explores some of these ideas in the context of globalization, growth, and inequality for developing countries. She cites results from Tedd Gurr (1970), who after studying conflict related deaths in over a hundred countries, cites relative, not absolute, deprivation as "the basic, instigating condition for participants in collective violence..." (Graham, p.5)

Clearly, the extent to which it is relative income, rather than absolute income, that affects welfare must be of some concern to development economists. First, judgements of fairness underlie individual responses to all policy decisions that allocate scarce resources. Depending on the allocation principle -- maximizing social welfare, helping the most needy, or helping everyone equally – judgements of fairness may affect program participation. Ignoring perceptions of fairness may affect interventions designed to make markets work for the poor – including increasing access and allocating resources through vouchers, subsidies and other

market-based mechanisms. Second, the goal of economic growth presumes well being rises with absolute income and is neutral with respect to inequality, but that rising inequality may affect the pace of growth. The behavioral literature suggests that the concern with inequality should rest directly with its effect on well-being, not on the long run growth process. For the very poor, however, absolute income may still be the most important consideration. McBride (2001) estimates for a developed country sample that relative-income effects are smaller at lower income levels.

Loss Aversion, the endowment effect and mental accounting

Not surprising, the direction of change matters. Unlike basic utility theory, research suggests that losses hurt more than commiserate sized gains help. Loss aversion implies that individuals are more sensitive to losses than equivalent sized gains – in several cases with losses being weighed more than twice as heavily as gains (Knetsch, 1995). For buyers in the market, the disutility of loss from a vendor appropropriating the return from a price increase was greater than the disutility from eliminating gains from a vendor not passing on a price cut.

Experiments suggest that individuals tend to prefer the status quo to changes that involve losses in some dimension, even when these losses are coupled with gains in another direction. In other words, even policies or projects that are, on net, revenue neutral or even revenue enhancing may be welfare decreasing if they involve losses. Either because of the status quo bias or pure inertia, default options dominate choices. A study of insurance in Pennsylvania and New Jersey found that with full coverage as the default option in Pennsylvania, the take-up rate was 79%. With limited coverage as the default option in New Jersey, only 30% of drivers choose full coverage. (Eric Johnson *et. al*. 1993). We should expect project recipients to be willing to take bigger gambles to maintain the status quo than to acquire it in the first place, and that default options in projects and policies will dominate choice for reasons other than welfare maximization.

The endowment effect may reflect loss aversion. In an experiment with University of Victoria undergraduate students, respondents were divided into three classes. One class was given a choice between a mug of value $4.95 and a chocolate bar of approximate value $6.00. Students were not told the purchase price of the items. Student in the first class were given a choice between the two items and 56% chose the mug over the chocolate, giving us a sense of the normal distribution of preferences. A second class was initially given the mug, and then five minutes later given the opportunity to trade for the chocolate. 89% choose to keep their mug. The third class was initially given the chocolate and then the offer to trade for a mug. Only 10% choose to switch to the mug. (Kahneman, Knetsch and Thaler, 1990)

Evidence suggests that individuals have mental accounting systems that influence decision making in ways not predicted by traditional economic theory. Richard Thaler has documented numerous examples, including how individuals are more likely to spend "windfall" winnings on luxury items than equivalent sized salary increases. People often give gifts that recipients value but would not purchase for themselves. Many individuals seem to have mental accounts for different expenses, such as entertainment and education.

Consider Thaler's example.

Q1. Imagine that you have decided to see a play where admission is $10 per ticket. As you enter the theater you discover that you have lost a $10 bill. Would you still pay $10 for a ticket to the play?

Yes: 88% No: 12%

Q2. Imagine that you have decided to see a play and paid the admission price of $10 per ticket. As you enter the theater you discover that you have lost your ticket. The seat was not marked and the ticket cannot be recovered. Would you pay $10 for another ticket?

Yes: 46% No: 54%

The bundling and sequencing of monetary gains and losses also matter. With equivalent cash outcomes, people are happier winning two small prizes ($50, $25) than one large prize ($75), paying one large penalty (-$150) than two small penalties (-$100, -$50), paying one large penalty and winning one small one (-$200, $25) than paying one medium sized penalty (-$175), winning one small prize ($20) than winning one large prize and paying one medium penalty ($100, -$80). (Thaler, 1991, p55, from Thaler 1985). Experiments in health indicate that with the same net outcome, people prefer improving sequences to declining sequences and that the duration of a sequence of events is less important than the experience of the final frame. (Chapman, CTT)

Loss aversion, the endowment effect, and mental accounting may explain current challenges to how we conceptualize opportunity and sunk costs: people often behave as though opportunity costs matter less than out-of pocket expenses and sunk costs do matter. But these same people would not mow their neighbors lawn for $20. The under weighting of opportunity costs is an example of the endowment effect. (Thaler 1991) People are more likely to sit through a bad performance or unpleasant sporting event if they bought the ticket themselves rather than if they got it for free, even if they would rather spend the next two hours elsewhere.

Economists have long argued that money is the best gift because it can be redeemed on whatever the recipient wants, and that the most efficient redistribution is via lump sum transfers to the poor. These examples suggest that how money is received, and what it is mentally ear marked for, matter both in terms of the recipients welfare and their decision on how to use the resources. The results have implications for debates over vouchers versus cash, whether it makes a difference to earmark funds, it suggests that cost-neutral welfare gains are possible by segregating gains and bundling losses, and that foregone gains are not the same as realized losses.

1.B. Decision making under uncertainty

The traditional model of individual choice under uncertainty represents preferences by an expected utility (EU) function, the shortcomings of which have been well documented (Allais, 1953, Kahneman, Slovic and Tversky, 1982, Machina, 1987, and Camerer, 1989). Experiments instead support prospect theory, with a value function defined over changes in one's position rather than wealth, and which is assumed concave over gains, convex over losses and more steeply sloped over losses than gains (Kahneman and Tversky (1979). These features allow for the impact of losses and gains, loss aversion, and subjective decision weights. They reflect common experimental findings that individuals, for example, are risk averse over gains but risk seeking over losses. And they seem especially relevant for developing countries where income levels can be highly variable and many individuals live at, or near, subsistence.

The subjective weighting function of prospect theory reflects three characteristics of observations on decision-making: the overweighting of small probabilities and underweighting of large ones; decreasing relative sensitivity that discounts probabilities further from one proportionately less than probabilities closer to one (sub proportionality); and increasing absolute sensitivity towards the endpoints of probabilities equal to zero and one (subadditivity) (Prelec, 2001, p.86).

In addition to magnitude, the qualitative dimensions of risky outcomes have been shown to affect risk perceptions. The characteristics that shape decision making about risk include magnitude, severity, certainty, voluntariness, control, familiarity, proximity and distribution of impacts, among others. (Slovic, Fischoff and Lichtenstein, 1979; Pate, 1983; NRC, 1996). The risk perception literature shows that individuals systematically overestimate the size of

risks that are small, novel, unfamiliar, involuntary and uncertain. By contrast individuals underestimate the size of risks that are more certain, larger, familiar or in some sense voluntary.

1.C Decision making over time

Discount rates affect all investment and intertemporal choices – investments in education, health, the environment, borrowing and saving – where something has to be given up in the present for a return in the future. The intertemporal choice theories of the early economists John Rae, Eugen von Bohm-Bawerk and Irving Fisher were based on an individual's propensities to exercise self-restraint, imperfect foresight, and fashion. These psychological characteristics were all condensed into a single discount rate by Paul Samuelson in 1937. (Frederick,, Loewenstein and O'Donoghue, 2002) Since then intertemporal choices have been most commonly modeled with discount rate that is invariant to the period in which the choice occurs. The assumption is that individuals have constant discount rates, that is, their discount rate between any period, such as 24 hours, is the same regardless of the proximity of that 24 hour period. Equivalently, this suggests that we experience the same short run discount rate in postponing immediate consumption as the long run discount rate we use in planning future tradeoffs. (Harris and Laibson, 2001)

Yet, as Matthew Rabin (2002, p.669) writes, "Common sense, millennia of folk wisdom, and hundreds of psychological experiments all support present-biased preferences"(see Ainslie and Haslam (1992), in Lowenstein and Elster (1992)). For most of us, the cost of foregoing something today for tomorrow is higher than the cost of agreeing to give up something 10 days from now for a return on the 11th day. Many economists believe that intertemporal choices are better represented by a hyperbolic or quasi-hyperbolic discount function than the more commonly employed exponential function (Rabin (2002), Rabin (1998), Laibson (1997), Loewenstein and Elster (1992), Loewenstein and Prelec (1992), Ainslie (1991)). The evidence suggests that discount rates do vary with time, and that short-run discount rates, experienced at the moment, are higher than the long run discount rates we project forward into our planning horizon. The tradeoff of present for future consumption, as projected forward from one's present position, becomes increasingly expensive as the future date approaches. Hence people with time varying discount rates, if they lack perfect self-control, may pursue short-run actions that they had previously calculated were not in their best long run interest: they may consume their savings, fail to stick to a repayment schedule, skip school or health care visits, or choose environmentally unsustainable production methods.

1.D Systematic errors in maximizing U(x): decision heuristics

The expected utility model is particularly inappropriate for more complex and infrequent decisions, where evidence from psychology and experimental economics supports a bounded rationality model. In these cases, individuals will often resort to decision heuristics that can produce behaviour that appears imperfectly rational.

Decision heuristics refer to the simple rules of thumb that individuals use to make decisions either in the absence of full information or when they are unable or unwilling to process all the information that is available. Some common heuristics are the representativeness, availability, anchoring, and affect heuristic. (Tversky and Kahneman, 1974) We include some specific questions used to demonstrate these different effects from Kahneman and Tversky, 1983, and later discussed in Thaler, 1991.

When people use the representativeness heuristic, their judgement of the probability that one event or person originates from or belongs to another class is based on how the events or people resemble each other. The representativeness heuristic judges such a frequency by comparing the similarity of the case with the image or stereotype of the class, often to the exclusion of prior probabilities, base-rate frequencies, sample size, regression to the mean and other factors that should affect judgements of probability (Kahneman and Tversky, 1974). So,

for example, people tend to over estimate how often a small group will closely resemble the parent population. The bias occurs when frequency and similarity are not well correlated. As an example:

Q.1 Consider a regular six-sided die with four green faces and two red faces. The die will be rolled 20 times and the sequence of greens (G) and reds (R) will be recorded. You are asked to select one sequence, from a set of three, and you will win $25 if the sequence you choose appears on successive rolls of the die. Please check the sequence of greens and reds on which you prefer to bet.

A. RGRRR
B. GRGRRR
C. GRRRRR

Since A is a subset of B, it must be more probable than B. But B may appear more representative of a probable sequence because of the two G's. In this experiment 63% of respondents chose B, and 35% chose A. (Thaler, 1991, p.153, originally from Tversky and Kahneman, 1983)

The availability heuristic arises when people estimate the frequency of a class by the ease of recalling specific instances in that class. For example, in the first question below, respondents were given several ranges of numbers that might represent the frequency and asked to choose their best estimate. The median response was 13.4:

Q2. In four pages of a novel (about 2,000 words), how many words would you expect to find that have the form _ _ _ _ i n g (seven letter words that end with "ing")?

Q3. In four pages of a novel (about 2,000 words), how many words would you expect to find that have the form _ _ _ _ _ n_ (seven letter words that have the letter n in the sixth position)?

In the second question, the median response was 4.7, even though the first question is a subset of the second, and therefore the frequency of seven letter words that have an n in the sixth position must be at least as high as seven letter words that have an n in the sixth position and an i in the fifth and g in the seventh position. Words ending in ing, however, are much easier to recall. (Thaler, 1991, p. 153, originally from Kahneman and Tversky 1983)

The availability heuristic leads individuals to overestimate probabilities of recent or vivid events, which we posit is influenced by how one gets their information and news, and one's stock of internal experiences.

People also use anchoring heuristics, where arbitrary amounts become the bases for forming numerical estimates of uncertain quantities. One example of this is an experiment where subjects were asked to state the percentage of African countries in the United Nations after being given an arbitrary starting point (based on a ball thrown on a spinning wheel with numbers from 1 to 100). The median estimates of membership were 25 percent for groups with ten as a starting point, and 45 percent for groups that received sixty-five as a starting point. (Tversky and Kahneman, 1974).

The affect heuristic, recently proposed by Slovic and others (2002), describes the bias estimating probabilities that results from an individual's like or dislike of an outcome. They argue that the affect heuristic can affect one's evaluation of costs and benefits and even the predicted economic performance of various industries. (Kahneman 2003, p. 1463)

Finally, choices between alternatives can also be affected by the context of the event and the way in which a risk is framed (Kahneman and Tversky, 1979). In a well-known experiment, for example, McNeil, Pauker, Sox and Tversky (1982) framed a hypothetical choice about lung cancer treatments from surgery in two ways -- as either a 68% chance of survival or a 32% chance of not surviving. With a 68% chance of survival, 44% of respondents chose

surgery over radiation. Framed as a 32% chance of not surviving, the number dropped to 18% (Daly, Wilson and Eckel, 2002).

2. Developing Country Studies

We have undertaken, or are in the midst, of four studies of these anomalies: discount rates in Vietnam, discount rates and risk in credit demand in Russia, views of fairness and market seed sourcing in Chiapas, Mexico, and decision heuristics by level of policy maker in Vietnam.

Examining behavioral anomalies in the field first requires developing and implementing a stated and revealed preference survey-based methodology for eliciting and measuring characteristics that affect individual risk and discounting preferences and decision making. Stated preference methods involve asking for responses (by choosing, ranking, rating, or providing an open-ended answer) to sets of hypothetical scenarios, defined by underlying attributes. For example, to elicit a discount rate a stated preference experiment might ask a respondent to choose between an immediate lump-sum payment and a series of constant payments over a number of years (Cameron and Gerdes, 2002) or to provide an amount of money that would equate lump sum payments to be received at different points in time (Anderson *et. al*., 2004).

Revealed preference questions are more traditional, and measure actual behaviours. For example, to study risk, a stated preference question may ask a respondent to indicate their preference for a different set of hypothetical gambles with a coin toss, or a question may ask them to indicate how important they believe risk-taking is for certain outcomes like financial success or food security. Revealed preference surveys would try to measure risk preferences by actually looking, for example, at how the individual has diversified their income sources.

The stated preference data can be used on its own to analyze the impacts of psychological characteristics on behaviour, but they are especially useful when combined with revealed preference data. Important determinants of actual behaviour are likely to exhibit little variation over the spatial and temporal scale of the data collection because of common and slowly changing institutions and economic opportunities available to respondents. Augmenting actual behavioural data with additional stated preference data can provide the needed variation to estimate models with improved statistical properties (see for instance Adamowicz *et. al*. 1994).

Two common concerns with stated preference surveys are validity and learning. Skeptics worry that especially without remuneration respondents will not put much effort into responding, though in a review of over 70 experiments, Camerer and Hogarth (1999) conclude that overall there is no effect on mean performance though response variance declines with financial incentives. Performance of some specific tasks, including particularly complex ones, does improve with remuneration. The authors note, however, …"that no replicated study has made rationality violations disappear purely by raising incentives." (Camerer and Hogarth, p.7) Though learning may occur in repeated experiments, since there is often no "correct" answer it is not clear that learning matters. Where there is a more preferred response, experimenters have found that amateurs and experts in the field tend to perform similarly.

The vast majority of the methodological work on stated preference survey design has been in developed counties with strong market-based social contexts, and elements of these survey instruments can be adapted for our use. But initial experiences with these surveys in Vietnam, Russia, and Mexico, suggest that great care must be taken at both the survey design phase and data analysis phase to control for potential context effects (Cameron and Gerdes, 2002; Corso *et. al*.; 2001; Swait *et. al*., 2002.) To adapt these instruments to developing country and transition economy contexts we expect, for example, to rely more on visual and oral questions, rather than on written responses, and to adjust time and spatial frames to local contexts. The

successful implementation of stated preference style surveys requires understanding local norms that influence responses to stated preference exercises (Kohlin 2001). Given these unique challenges, these surveys often rely heavily on pre-testing and focus groups.

Much of the experimentation has been in laboratory, rather than field based experiments, using college students. Accordingly, little information has been gathered on response variation due to demographics or other respondent characteristics. In the cases that we report on, in addition to understanding anomalies in developing country contexts, our goal has also been to gather information on respondent characteristics and to compare across policy domains. Full details on these cases can be found in Thaler (1981), Benzion, Rapoport and Yagil (1989), Anderson, Dietz, Gordon and Klawitter (2004) and Anderson (2004).

Example 1. Intertemporal Choices in VN and RU

There is a considerable literature on time preference and discount rates – the rate at which individuals trade off future, for present, consumption. One type of experiment to reveal discount rate patterns compares discount rates calculated from respondents comparing smaller, earlier rewards (or penalties) to larger, later rewards (or penalties). In 1981 Richard Thaler asked University of Oregon students to state the amount of money they would require to either postpone a fine or expedite the receipt of lottery winnings, assuming no risk. Several years later, Uri Benzion, Amnon Rapoport and Joseph Yagil (1989) conducted a similar study with students at the University of Haifa and the Technion-Israel Institute of Technology. Their questionnaire asked for intertemporal choices over four scenarios of postponing or expediting a receipt or payment, time delays, and sizes of cashflow. For both the U.S. and Israel we show the results in Table 1 for the scenario that most closely corresponds to the Vietnam and Russia experiment.

Table 1: Inferred discount rates – U.S.A. (median) and Israel (mean)

Original amount U.S.A.	Later amount paid in			Original amount Israel	Later amount paid in			
	3 months	1 year	3 years		5 months	1 year	2 years	4 years
$15	277	139	63	$40	53.5	33.0	26.5	20.6
$250	73	34	23	$200	32.1	23.6	21.0	15.7
$3000	62	29	23	$1000	31.0	21.9	16.6	16.3
				$5000	26.1	19.2	14.9	13.6
N = 20				N = 204				

The Vietnam and Russia studies were undertaken more than ten years later. In 2000, interviewers from Vietnam's Institute of Sociology randomly sampled individuals from two communes in Vietnam near Hanoi city: the urban commune of Quynh Mai and the more rural commune of Thach Ban. In 2002 we replicated the Vietnam study with a random sample from in and around two Siberian cities, Novosibirsk and Irkutsk.

We sought to replicate the U.S. and Israel questions as closely as possible in Vietnam and Russia, but we encountered several difficulties during pre-tests. First, respondents had strong feelings about receipts or payments from public institutions – often either extreme distrust or extreme allegiance. Non-governmental organizations (NGO) elicited less emotion. Second, respondents had some difficulty with the idea of hypothetical tradeoffs. Third, the discount rate for respondents in Vietnam and Russia fell to almost zero after 3 months; respondents were unable or unwilling to differentiate among longer time periods. Finally, we could not use comparable monetary amounts, even adjusted for purchasing power parity. Respondents in Vietnam were unable or unwilling to differentiate among large amounts beyond about half their annual income.

Ultimately in Vietnam we asked respondents to imagine that they had the opportunity to receive a loan from a NGO and that they had the choice of paying back the loan immediately or postponing the payment to a later date, at which time they would have to pay back a larger amount. The questions used sums of Vietnamese Dong (VND) 100,000, 1,000,000, and 4,000,000, and time periods of one day, three months, and one year. At the time of the study, U.S.$1 was worth about VND 14,500, so the survey amounts were worth about $7, $70 and $276.

Russian respondents were asked to imagine that they had just received a loan with the choice of paying it back immediately or postponing the payment to a later date, at which time they would have to pay back a larger amount. We used sums of Russian rubles (RUR) 1500, 6000, and 30000 for the same time periods of 1 day, 3 months and 1 year as the Vietnam study. At the time of the survey, U.S.$1 was worth about RUR 30, so survey amounts were worth about U.S. $50, $200 and $1000.

Table 2 reports the results the results for Vietnam and Russia. We report median rates for the U.S. and the Russian study, where the size of the inferred discount rates and the standard deviation of responses was much larger. Thaler speculates that this may be due to the hypothetical nature of the study or the age of the respondents. There are, however, cases of similar results in studies without hypothetical questions (Hausman, 1979), and Benzion, Rapoport and Yagil compute considerably lower rates with a similarly young sample. Nonetheless, as Thaler points out, what matters is the relative, not the absolute levels.

Table 2: Mean Inferred discount rates – Vietnam and Russia

Original amount Vietnam	Later amount paid in			Original amount Russia	Later amount paid in		
	1 day	1 month	1 year		1 day	1 month	1 year
$7	66.9	2.5	1.5	$50	102.4	3.2	1.3
$70	33.5	0.9	0.7	$200	56.2	2.4	1.1
$276	18.3	0.7	0.6	$1000	55.8	1.8	.9
N = 232				N = 417			

In all cases, the results suggest that discount rates are not constant, and that they decrease as the size of the cash flow increases. That is, the smaller the postponed fine or delayed receipt, the higher the discount rate. Discount rates also vary inversely with the period of time until repayment or receipt. Despite field and experimental differences and despite the vastly different demographics and circumstances of the respondents, the discount rate patterns are all inconsistent with assumptions of time invariant discount rates. All suggest the same conclusion: respondents' discount rates are not constant over time, but rather vary inversely with time and the size of the cashflow, and in contradiction to the standard DU model.

Consistent with other studies, we found discount rates decreased with age and were negatively associated with income (Davies and Lea (1995), Anderson and Nevitte (2004). Irving Fisher (1930, p.73) asserted that "a small income, other things being equal, tends to produce a high rate of impatience." Emily C. Lawrence (1991, p.54) found similar evidence of this in the United States. Her results may imply that impatience leads to poverty, as individuals with high rates of time preference choose jobs with low and flat pay scales rather than ones that pay well only after a period of training or education. Alternatively, poverty breeds impatience from living at or near subsistence. It may also be that relative, rather than absolute, income affects discount rates, since there is considerable evidence that individuals assess their own well-being at least partially by the wealth of those around them or over time against their own baselines (Easterlin (1996) and McBride (2001). Even within a poor, rural commune in Vietnam, for example, members will distinguish between who is "poor" and who is not. Living rurally was a strong indicator of higher discount rates.

Example 2: Risk Perceptions in Russia

Our Russian data were collected during a three month period in the summer of 2000. Russian-speaking U.S. graduate students teamed with Russian graduate students to survey residents of Novisibirk and Irkutsk oblast in southwestern Siberian. Just over five hundred respondents were surveyed in each locality. We expected the localities to differ in potentially important ways.

Novosibirsk grew to prominence during WWII when the Kremlin, for security reasons, decided to relocate its military-industrial complex and the Academy of Sciences there. With over two million inhabitants, Novosibirsk is Russia's third largest city after Moscow and St. Petersburg. The city hosts both the arts, industry, and government, with an opera house, ballet, and theatre; machine building and light industrial activity; thirteen institutes of higher education including its "Academgorodok" university campus; and the seat of regional government. The Soviet legacy is readily apparent in the physical, bureaucratic, and professional appearance of Novosibirsk (Carver, 2003. p.9).

Irkutsk lies further to the east, near the world's largest fresh water lake, Lake Baikal, and has a history dating from the mid-1600s as a trading juncture between China and the Russian south. In the mid-1800s the exile of several intellectual radicals to Irkutsk associated Siberia with labour camps and prisons. In 1898 the trans-Siberian railroad added to its importance as a trading post between central Asia and the far East. It is populated with small businesses, traders, and its 650,000 inhabitants are more ethnically mixed. The intellectual and institutional legacy of Irkutsk is unlike any other city in Russia, certainly unlike Novosibirsk.

The survey contained multiple stated preference questions that are intended to somehow measure risk and related psychological parameters: three coin toss questions, nine discounting questions, two risk and optimism attitudinal questions, and six questions on uncertain outcomes intended to represent qualitative dimensions of risk. We report only on a few results here.

The coin toss questions took the usual form, with even odds for flipping heads or tails. Situation 1 and 2 involved simple prospects: a sure positive outcome for option one versus gambling for a positive payoff in option two. Situation 3 was a binary prospect, offering two gambles, both with a possible loss. Payoffs in rubles, the percentage of responses for option one (%) and total sample size (N) are in Table 1. At the time, $1U.S. = 30 rubles.

Table 1: The expected values of the options in the three scenarios

	Option 1	%	Option 2	N
Situation 1	10,000	62	EV = .5(20,000)+.5(0) = 20,000	948
Situation 2	300	52	EV = .5(450)+.5(0) = 225	914
Situation 3	EV = .5(900)-.5(30)=435	76	EV=.5(6000)-.5(4500)=750	890

Sixty-two percent of respondents chose the riskless option in a fair gamble (option 1 in situation 1). More people were willing to gamble when the expected value of the gamble was less than the sure bet, as in situation 2. But in situation 2 the amounts are small – even in Siberia 300 rubles ($10) is not a lot of money. Hence we expect that the small magnitude of the gamble is affecting this result, that is, people are more willing to give up a sure 300 rubles to gamble with smaller amounts (Rabin, 2000). The results in situation 3 are consistent with loss aversion. People are willing to gamble for a much lower expected value in order to avoid a potentially large loss.

We estimated a simple probit model for two coin toss questions to assess the probability of an individual being risk averse given certain characteristics. Previous empirical work posits that risk attitudes are influenced by some demographic and socio-economic variables: age, gender,

marital status, income and education. There are potential problems with the endogeneity of education and income, and we have concerns with the truthfulness of income responses (Compare Jianakoplos and Bernasek, 1998, Powell and Ansic, 1997, to Schubert, Brown, Gysler and Brachinger, 1999, and Palsson, 1996.) Instead, we include a variable on whether or not they own their own house as a measure of wealth. To reflect different information sources we add a dummy variable to indicate whether or not they have access to the internet. Results appear in Table 2.

Table 2: Probit estimates of the probability of choosing the less risky option in coin game one (riskless = 1) and three (smaller loss = 1)

Dependent variable	CG #1			CG #3		
	B	Sig.	Exp(β)	β	Sig.	Exp(β)
Age	.023	.000	1.024	.022	.002	1.022
Gender, m=1 f=0	-.471	.001	.624	-.694	.000	.500
Education	-.037	.416	.964	-.010	.860	.991
Own house, yes=1 no=0	-.119	.453	.888	-.547	.004	.579
Internet access, yes=1 no=0	.393	.028	1.481	.488	.023	1.629
Constant	-.087	.753	.917	1.013	.002	2.754
n=828	$\chi 2 = 30.6$ $p<.001$	Nagel R^2 = .04		n=782	Nagel R^2 = .04	$\chi 2 = 33.7$ $p<.001$

What conclusions can we draw from these initial results? First, although the overall fit of the models is reasonable, the low R^2 indicate that little variation is explained by the included variables. Nonetheless, age, being female, and having internet access are positively associated with choosing the less risky prospect. These results are consistent with other findings. All else equal, for someone twenty years older, the odds would be 1.5 times greater that they would choose the riskless prospect. Unlike other results, education was not significant. It may be that education levels vary less in Siberia than in some other populations. We did not include locality as the proportion of rural dwellers in our sample is small. Owning your house is only significant in coin toss three, where the riskier option has a higher expected value but a much larger potential loss. The higher one's wealth the more likely they choose the riskier option.

The question on the qualitative dimensions of uncertain outcomes was primarily intended to assess if risk perceptions varied by experience, that is, if small business owners perceived these risks differently than non-small business owners. Arguably some of these outcomes represent other dimensions that have been found to affect risk perceptions, such as proximity, control, dread, and familiarity.

The survey asked respondents to indicate which, of a number of listed reasons, they thought might lead someone to not be interested in borrowing. Responses were coded from a zero, for strongly agree, to a three, for strongly disagree. The mean responses are below.

Q: Why would people not want to start a business? 0 = strongly agree – 3 = strongly disagree	
No interest in business	1.4
Not enough business training	0.87
Don't want to be in debt	0.82

No trust in legal system	0.79
Taxes too high	0.80
Interest rate too high	0.81
Mafia is a problem	1.1

The OLS results, comparable to ordered probit estimates but easier to interpret, appear in Table 3. The dependent variable is the degree to which respondents disagreed with proposed reasons for individuals not wanting to borrow money to start a business: hence the higher the response of the individual, the more likely they disagreed. Because of our concerns with the income variable we excluded it as an explanatory variable, but added the city where the interview took place. Estimated coefficients appear in Table 3.

Table 3: Perceptions of the qualitative dimensions of risky outcomes

Dependent Variable	Taxes too high	Mafia is a problem	Worried about debt	No trust in legal system	Interest rate too high
Constant	.553***	.989***	.679***	1.28***	.985***
Age	9.74E-05	-.007**	.001	-.011***	-.006**
Gender, male=1	.314***	.103	.059	.093	.105
Education	.042*	.041	.030	-.016	.009
City of interview Irkutsk = 1		.272**	-.149*	-.032	.089
Internet access, yes=1 no=0	.027	.122	.155*	.010	.037
Small business owner, yes =1	-.174**	.253**	.004	-.020	-.151*
N=610	R^2 = .03	R^2 = .05	R^2 = .01	R^2 = .03	R^2 = .03

*** significant at 1%, ** significant at 5%, significant at 10%

Age is again one of the most robust predictors of risk attitudes. In this case, the older one is, the more likely they are to believe that concerns about the mafia, legal system, or interest rate would deter someone from small business ownership. Mafia is more of a concern in Irkutsk, debt is less (despite earlier results that discount rates are significantly higher). Small business owners see these risks differently from the population as a whole. They are more likely to find taxes and interest rates too high, and less likely to view mafia involvement as an issue.

These results are preliminary, but suggest that risk perceptions are indeed subjective, that loss aversion matters, and that certain risky outcomes are perceived differently by individuals once they become more familiar with those outcomes.

Example 3. Decision Heuristics by Decision Maker

Our first research question was: how can rules be more effectively designed with a better understanding of how the poor make decisions in ways that systematically deviate from assumptions of rational maximization? Arguably, this can be accomplished simply by understanding if, and how, the behavioral parameters described above affect the decision making of recipient groups. Project recipients are expected to respond to program incentives in a way generally consistent with rational maximization, to produce a desired policy or program outcome. If they are imperfectly rational, then something other than the desired, or predicted, outcome will result. This knowledge can then be used to improve their policies and programs.

The second research question on crafting better policy, however, requires understanding rationality along the policy chain, and identifying systematic differences in patterns of bounded rationality between the policy makers, program/project designers, and

program/project recipients. A comparable set of experimental questions to those who make policy for these poor populations is necessary to understand if, and in what ways, there are systematic differences in behavioral anomalies between these groups. Are the patterns similar for dimensions of risk over one's own health, but different for risk preferences over financial decisions? Do discount rates and knowledge of self-control vary similarly, such that microfinance programs will be designed with appropriate savings and other self-commitment mechanisms? Do ideas of fairness differ in a way that may explain differences in preferred allocation mechanisms or program participation? Do policy makers value the probabilities of a program's success equally against the probabilities of failure, whereas recipients weigh losses more than commiserate sized gains? Do policy makers and recipients similarly receive, view and avail themselves of information to make decisions under uncertainty, or can differences lead to different decision heuristics that decrease welfare and produce perverse policy results?

There are at least four reasons we believe it is important to understand imperfect rationality for all groups along the policy chain:

1. To provide a common metric at each decision making level. This will assist in understanding how policies or programs/projects could be changed from their current levels, given patterns of imperfect rationality, to achieve their desired outcomes.
2. To better anticipate responses at each decision-making level. Just as program designers can craft better rules if they are using the right model of how program recipients will respond, international donors can make better aid policies if they understand behavioral anomalies in how national policy makers respond to the incentives donors deliver.
3. To craft better policies at the initial stages that determine priorities and allocate resources prior to the program or project stage. Understanding project recipient decision making helps in designing particular projects, but not in understanding the particular share of resources allocated to the project.
4. To help decision-makers to understand decision making within their own heterogeneous groups.

The policy chain

We can consider a simplified version of the policy chain as resources moving from national levels governments, to intermediary groups, and finally to target populations. For developing countries receiving substantive amounts of international aid, this chain may begin with decision makers in donor countries. Although donors now tend to impose fewer conditions than in the 1980s and early 1990s (budget rather than project and programme support) they nevertheless have to make decisions over what amount to give, to whom and to which functional domains of development policy (health, education, rural development). Those decisions are influenced by information and solicitations they receive from national governments and organizations. Some aid moves directly from the donors to the intermediary groups and bypasses national governments. The international donors are mostly large foundations or governments, directly or indirectly through their contributions to bilateral and multilateral organizations. And increasingly non governmental organizations are contributing large sums of money that are independently raised through public contributions.

National governments of recipient countries are most likely to be engaged in making policy, that is, making statements or imposing conditions that convey broad, ideas, directions and priorities, and thereby a flow of resources that may or may not have conditions attached. Intermediary groups, be they government agencies, quasi or non governmental organizations (NGOs), or members of the private sector, then receive some share of these funds and are engaged in program or project design and implementation. They convert policy statements into a set of rules that represent the incentives – constraints and opportunities – faced by recipients. These rules may appear at the broader program level, or within a particular project. These levels of decision making are summarized in Table 4.

Table 4: The Policy Chain

Level of Decision Making	**Who They Are**	**What They Do**
A. International Donors	National Donor Governments, Multilateral and Bilateral Agencies, Foundations, NGOs	Set priorities and allocate funds among countries, policy domains, target populations, organizations, and preventative vs. reactive measures.
B. Policy Makers	High level government officials – various ministries	Set priorities and allocate funds among policy domains, target populations, organizations and preventative vs. reactive measures.
		Assign government vs. market distribution.
C. Program/project designers and implementers	NGOs, govt and quasi-govt agencies, private companies	Decide details of what is delivered, where, when, how, and by whom.
		Allocate program funds
		Implement programs
D. Program/project Recipients	Generally the poor and food insecure in developing countries, may include target groups like women or ethnic minorities.	Decide frequency and type of participation
		Decide how to allocate their time and resources in response to a new set of incentives

How do we expect cognitive processes to differ?

We expect that at every level decisions will be affected by the views of fairness, the risk and time preferences, and perhaps most importantly, the decision heuristics used by the decision makers. The decisions at each level allocate resources and frame the decisions for the group that follow.
Kahneman (2003) describes two modes of thinking, or two systems in the architecture of cognition: intuition and reasoning. Of the characteristics that distinguish these two processes, we are interested in differences in effort and association: intuition is effortless and associative, while reasoning is slow, effortful and rule-governed.

We posit that the thinking applied to decision making is some combination of the cognitive characteristics of effort and association, and the outside influence of exposure. The amount of effort one chooses to expend making a decision is a function of the responsibility they bear and experience they have over decision making and the outcome, and the expected net value of the outcome. The expected net value of the outcome depends on the decision-makers risk attitudes, and their expectations about the benefits relative to the effort, time, and other resource costs of making the decision. These costs are affected by their access to information, both internal (through association) and external (through exposure). Benefits depend on the probability of the outcome occurring and the qualitative dimensions of risky outcomes: how much control they perceive over it, their familiarity with it, and its regularity, proximity, and reversibility.

If this theory holds, then the degree to which one expends effort and the type of decision heuristics they use is expected to vary by experience and responsibility. Further, the process will vary with risk perceptions, which initial evidence suggests are related to demographics and socio-economic characteristics, and sources of information. For most developing and transition countries, these characteristics can be expected to differ significantly between the policy-makers and program recipients.

These parameters are also assumed to depend on the decision-making domain, or policy context. For example, one may be very conservative in financial decisions, but reveal a high risk tolerance in health decisions or a strong willingness to experiment with a variety of seeds.

These domain sensitivities may split according to decision making roles, which are often segregated by age and gender. Evidence suggests that discount rates do vary between health and money. (Chapman, 2003) Yet policy makers implicitly allocate resources among domains when they set priorities and allocate public funding. When these decisions are not in accord with domain specific discount rates or time preferences of the program recipients, individuals in countries with well functioning insurance markets can arbitrage these differences. Such is not the case in most developing countries.

One outcome of this research may be an evaluation of the effectiveness of participatory policy making and program design. In a simple sense, trying to get representatives from the program design group at the policy level (for example, representatives from NGOs involved at the donor or national policy making level), or trying to get representatives from the target program group involved in program design, is a response to concerns over systematic biases among these decision-making levels. These representatives are generally chosen based on measurable demographics, such as, gender, income or ethnicity. Does this create a representativeness heuristic? Are these the characteristics that explain patterns in behavioural anomalies? If not, perhaps we can do better. For example, if it is the decision heuristics that drive decision making, and these in turn are driven by the information presented to the policy makers versus the program recipients, then taking representatives out of the field and into the cabinet may not align expected and realized outcomes as much as working on an information campaign that equipped everyone to assign similar probabilities to uncertain events.

If every decision maker was perfectly rational, then with reasonable assumptions about preferences and constraints – including allowing for groups to differ in what they were maximizing beyond program recipient welfare, such as their own wealth, power, or re-election possibilities -- we could predict responses to the policy and program incentives handed down. But, if not, then we are constructing less than optimal incentives. It is easy to suggest that all policy decisions are about politics, and that individuals along the aid chain are concerned with agendas that include their own power, position, and self-interest. If this is true, we suggest, then development work should be focused exclusively on lobbying. That it is not, and that good ideas and programs do get designed and implemented, suggests that most individuals in this chain, despite holding their own agendas, are also concerned with policy and programs that help the poor in developing countries.

We are currently conducting field research in Vietnam to understand if there are different levels of decision effort, and different subjective probabilities, across domains, and between groups of rural poor and the district and country level officials who draft and implement rural development polices.

Example 4. Fairness in the Market

Following on the work of Kahneman, Knetsch and Thaler (1986), weare beginning to examine how farmer's views of fairness in Mexico might affect their seed sourcing choices. Farmers can choose to save seed from their own harvest (farmer varieties or landraces), or trade with neighbors, family and friends. Alternatively, they can choose to purchase modern (improved) varieties in local seed markets. The rate of adopting new technologies, such as modern variety seed, is often assumed to be closely linked to market access. In Chiapas, however, the farmers in our sample good market access, yet maintained a mix of landrace and modern varieties. These choices are likely to be driven by a number of considerations, many of which fit standard economic rationales. Nonetheless, a significant number of respondents indicated that they viewed price variability in the price of landraces as fair, and in the price of modern varieties as unfair. Our interest is in whether, or to what extent, these views affect farmer seed sourcing choices.

3. Why does this matter for international development policy?

Three developing country characteristics may lead behavioral anomalies to be even less anomalous than in the U.S. and Europe. These characteristics are the: 1. greater incidence of poverty and food insecurity; 2. lower incidence of well functioning markets, combined with greater price and output variability in rural agricultural markets and from extreme events such as natural disasters and war; and 3. greater rural proportion of the population.

The poor may disproportionately represent populations for whom traditional behavioral assertions are inappropriate if anomalies arise from threshold effects around base levels such as minimum subsistence income. More individuals in developing countries live in poverty and with fewer assets. 2002 gross national income per capita, adjusted for purchasing power parity, was U.S.$2,110 for low income countries compared to U.S. $28,480 for high income countries (World Bank (2004). World Development indicators Table 1.1).

More individuals in developing countries exchange in small and informal markets where anomalous behaviours are less likely to be eliminated by competition and arbitrage. Friedrich Schneider and Robert Klinglmair (2004) estimate the average size of shadow economies as a percentage of official GDP to be 18 percent for OECD countries, 38 percent for transition countries, and 41 percent for developing countries. Estimates ranged from the United States with the smallest shadow economy at 8.6 percent, to Georgia at 67.3 percent.

Price variability is common to developing country markets. Price and output variability in agricultural commodity, input and labor markets is chronic, and can become extreme in times of drought, floods, pestilence, and war. Kahneman, Knetsch and Thaler (1986) demonstrated how buyers feel entitled to the terms of some reference transaction and firms to some reference profit, without necessarily knowing profit levels at the reference transaction. If fairness motives influence decision making in response to price changes, then we would predict, on average, that resource allocation would be particularly affected in the more volatile markets of developing countries.

More individuals in developing countries live rurally, with South America an exception to low average urbanization rates. More than half of the population of most African countries live rurally, with rural populations over eighty and ninety percent in Ethiopia, Uganda and Burundi. Two thirds to three quarters of the population live rurally in the largest countries in Asia (United Nations statistics, Table 6. Urban and total population by sex: 1991-2000). In the wealthier countries of North America and Europe these numbers tend to be reversed, with the majority of the population living in urban centers. Rural populations also tend to be poorer and have access to fewer formal institutions and markets that might offer opportunities to insure against present-consumption biases and perceived risks.

Transition economies vary widely in terms of rural living and poverty, but they share some characteristics such as market experience, a history of controlled information, and growing levels of inequality. To the extent that individuals are evaluating their well-being against others, the rising wealth of some, all else constant, may decrease their perceived well-being. In Russia, for instance, there is evidence that individuals measure their well-being relative to reference points, either their own baseline, or relative to others, also applies to Russia (Easterlin, 1996; McBride, 2001; Graham, Eggers and Sukhtankar, 200X). For seven consecutive years after the "fall of the wall" GDP per capita annual growth declined, and current levels remain below 1989 levels. Hence we can expect that some individuals, at least relative to their income pre-transition, perceive themselves as being worse off than previously. The Gini coefficient for Russia in 2000 was 45.62, high by OECD country standards, higher than estimates of 29 in 1992, and most certainly higher than estimates prior to 1989 (Graham, p.6)

For some transition economies we also expect a market effect, but different than a developing country where price variability arises from a reliance on agriculture. The market effect for Russia arises from changes in how scarce resources are allocated. Traditionally allocation mechanisms were time, as evidenced by long queues, and personal networks; the more

impersonal price system is more novel. List (2003, 2004a, 2004b) has conducted several experiments that suggests market experience is important to the distribution of rents, and overcoming the endowment effect, but that with "sufficient" experience, learning occurs and competitive market outcomes can be expected. The pace and extent of this learning, however, can be expected to vary with age and experience with the former regime.

Manfred Kuechler (1998) has argued that a country's recognition of freedom of speech and culture of individualism will affect survey responses. Certainly in Russia one can imagine that there are still many individuals who fear answering questions or offering opinions that might deviate from official expectations. This is less of a concern with hypothetical questions, since there is generally no right or wrong answer. To try and minimize eliciting "official" answers in other contexts we phrased the questionnaire in terms of what respondents thought might motivate other people, not necessarily themselves.

In addition poorly functioning markets in developing countries make it difficult for the poor to mitigate the effects of unexpected resource allocation. For example, Gretchen B. Chapman (2003) found that discount rates for health outcomes differ from discount rates for financial outcomes. In most developed countries, markets allow individuals to arbitrage these differences. For example, individuals with relatively higher short run discount rates for health compared to financial outcomes can purchase extra insurance against medical contingencies. This is not the case for developing countries.

How might behavioral economics contribute?

We have tried to refer to policy implications throughout, but we will mention a few specifics here of how we see the lessons of behavioral economics being applied to international development programs:

- Loss aversion – protect against downside risk and irreversibility, for example, use safety nets and guard against losses in insurance schemes; design programs so that if there is a sequence of valued outcomes the best comes last, similarly, start small since cutbacks hurt more than increases help, even if the net gain is the same.
- Fairness – recognize that individuals are willing to suffer losses and that fairness matters; in market trials set reference prices
- Risk perception – consider how interventions affect the qualitative dimensions of risky outcomes -- control, familiarity, proximity, etc. -- not just the magnitude of the risk.
- Endowment effect – recognize that opportunity costs matter less than out-of-pocket expenses; recognize that property rights can have an immediate endowment effect and will affect market redistribution plans. When property rights are incomplete, and individuals assume competing rights, they will be willing to expend more than the value of the property (in violence, law suits, etc) in order to secure what they believe is theirs (Mullainathan, forthcoming, p.18)
- Mental accounting – bundle losses, segregate gains, earmark funds
- Vivid events – avoid locating new trials near failures
- Confirmatory bias – reduce diverging beliefs with visual information
- Framing – consider the difference presenting choices between losses rather than gains, (for example, to encourage a certain health behavior frame the choices as reducing the chance of different negative outcomes) the effect of the default option, and the influence of the menu of choices
- Public goods – ensure the visibility of other contributions
- Discounting – offer or mandate self-commitment devices such as safe savings mechanisms; bundle multiple decision about small magnitude outcomes into one decision about a large magnitude outcome; frame decisions in terms of a sequence of outcomes rather than individual outcomes.

Since most of our results to date are on discounting, we offer a few final comments on microfinance and the massive increase in the supply of credit. We recognize that credit can help smooth consumption, arbitrage discount rate and risk differences, and provide the opportunity to invest or make otherwise unobtainable large purchases that can improve one's livelihood and possibly even "break the poverty trap." It is the offer of credit without acknowledging imperfect self-control, and hence without the appropriate institutional incentives, that is the problem. This problem stems from the traditional, but erroneous, assumption that individuals can only be made better off with access to credit, since they can always chose not to avail themselves of it. Failing to recognize that even with good intent, the initial, optimal borrowing and payback plan of individuals can change assumes away a possible source of repayment difficulties and unsustainable debt.

Programs that offer voluntary or mandatory savings and insurance services together with credit may mitigate repayment problems. There is evidence that the poor do try to save, and that many are sophisticates who seek self-commitment mechanisms. Ashraf, Karlan and Yin (2004) find a relationship between hypothetical time preferences and the probability of opening an experimental commitment savings account in the Philippines. Gugerty (2004) provides evidence from Kenya that women join rotating savings and credit associations because the group helps to provide a self-commitment mechanism. But most people in developing countries have fewer opportunities to use control mechanisms to manage present consumption biases than those in developing countries.

Many organizations have recognized the importance of offering savings and insurance services in addition to credit, but thousands have not. And there are other problems, including the high volume of these small loans required for a lending organizations' financial sustainability, which can lead commissioned loan officers to pressure potential borrowers (Wright (2001), Rahman (1999). We continue to read about remarkable repayment rates, suggesting time variant discount rates are not a problem. But what has failed to reach most policy circles are academic or accounting critiques of the oft-cited repayment rates, tales of debt recycling, and the occasional borrower uprising, complete with dynamite and hostage taking, demanding microdebt forgiveness (Murdoch, Pearl and Phillips (2001) and Wiedmaier-Pfister and Von Stauffenberg (2001). It is the potential for creating crippling debt for poor individuals, especially individuals who are not living in countries with bankruptcy laws that provide a fresh start, that is cause for concern.

What is stopping us?

As Knetsch noted (1995, p.75), "One explanation for this persistence in taking little account of the behavioral evidence is predicted by the findings themselves..." But the problem may run deeper than the status quo bias to which Knetsch refers. Strotz argued that the policy implications of time invariant discount rates suggested uncomfortable compromises to consumer sovereignty. "…ought we allow people to behave imprudently?" (1956, p.179) Colin Camerer et. al. (2003) have suggested "asymmetric paternalism;" regulations that would create large benefits for those who are not fully rational, but impose little or no harm on those who are.

Without a better understanding of how, and when, the deviations from traditional predictions are systematic, it is still difficult to know just what policy should look like. But considering the important role that we now understand institutions play in development, this argues for a research agenda that allows us to better predict how individuals in developing countries will respond to those institutional incentives.

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