Project Description. SURE 2008. Erika Lamanna/Dr. Steve DeLoach.

More than one-sixth of humanity lives on less than one dollar per day (Sachs 2005). Under these conditions of extreme poverty, infant mortality rates and incidence of disease are much greater than in developed countries, causing the standards of living in these developing nations to be substantially lower. A primary difference between developing and developed countries is the level and consistency of economic growth. The role of economic growth in reducing poverty is well established, with the primary sources of economic growth being capital accumulation (human and physical) and technological change (Besley, Burgess 2003).

Besley and Burgess also note how expanding opportunities for households leads to increases in economic growth. A primary method for expanding opportunities for households includes providing households with access to credit. With credit, the poor are able to undertake many activities that can increase their economic well being. These include enhancing their ability to meet basic needs (food, shelter) and provide for their children. For example, in Mbam, Senegal, a group of ten women used a loan to start a basket-making business using recycled products. The women used the profits to first pay back the loan and then to purchase more fruits and vegetables for their households to improve their nutrition.

In developing nations, many poor people do not have access to credit because they lack access to banks or other formal financial institutions. Microfinance Institutions (MFIs) attempt to fill this void by offering financial services to the poor. MFIs vary in the financial products offered, but they typically offer microcredits (small loans), insurance, savings, and transfer services. Microfinance is a fairly new field with the earliest experiments dating back to the 1970s in Bangladesh and Brazil ("Microfinance"). Perhaps the most well known Microfinance Institution is the Grameen Bank, founded by Professor Muhammad Yunus in 1976 in Bangladesh. The bank extends banking facilities to poor men and women and works to create opportunities for self-employment for the unemployed in Bangladesh. As of September 2007, the bank has 7.31 million borrowers with its services covering more than 95 percent of the villages in Bangladesh (Goldberg). Does the presence and utilization of microcredits lead to improved well being for households?

Previous research suggests access to credit increases a household's income level, allowing them to make critical investments (Morduch 1999). Among the most important investments a household can make is to invest in their children. Investment in a child's welfare and education represents a

commitment to long-term development and growth.   The implications of this research can be extended to other developing nations throughout the world and hold particular importance for Microfinance Institutions seeking justification for providing microcredits to the poor.

Methodology

The purpose of this study is to develop a regression model to explore the relationship between child health outcomes and the household's access to credit in developing countries. Control variables will include such factors as household assets, child outpatient utilization, nutrition levels, and additional demographic variables.

To investigate this question, access to credit and child health outcomes need to be examined at across time at the individual level. One of a few longitudinal surveys available for developing countries that contain such information is the Indonesia Family Life Survey (IFLS). The IFLS is a longitudinal socioeconomic and health survey representing 83% of Indonesia's population. The survey, available for 1993 (IFLS1), 1997 (IFLS2), and 2000 (IFLS3), covers about 8,000 households and 30,000 individuals per survey period, with a re-interview rate of 95%.

The use of such large, pooled datasets pose a significant challenge to economists. Erika has taken Mth 112, Eco 203 (Statistics for Decision Making) and Eco 347 (introduction to Econometrics) so she is well-versed in undergraduate level statistics and econometrics. But the problems accompanied with the use of pooled cross-section and times series (panel data) are typically reserved for graduate PhD students. In particular, we will have to estimate fixed effects and random effects models, possibly examining issues of simultaneity in the structural model and sample selection biases. These topics are covered in texts like Wooldridge's *Econometrics Analysis of Cross-Section and Panel Data*.

Quality economic research requires more than just applied statistics. The regression model needs to have a solid theoretical underpinning. These theories are commonly expressed mathematically. So the first thing Erika will have to do is to "build" a mathematical model to examine the impact of access to credit on household decisions. Such models typically assume households are seeking to maximize total family welfare (utility) subject to the realities of their budget constraints. This is where the access to credit (borrowing to expand one's expenditures beyond one's current income) can allow families to make the long-term investments that will allow them to get out of poverty.

Erika has taken 3 semesters of Calculus and Mathematical Economics and is well-prepared for this task. Building on the calculus of constrained optimization, we need to carefully model the decisions that typical households in rural villages make (e.g., choosing consumption levels for adults and children, investments in children's education and investments in other productive household activities like purchasing cow or ox). After setting up the Lagrangian function, we can use of first-order conditions to solve for optimal decisions. Following that, analysis of comparative statics will allow us to deduce theoretical predictions that will serve as the empirical hypotheses for the regression analysis.

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Description of Responsibilities & Timeline

1. Completion of the literature review (Lamanna) – May
2. Development and solution of the mathematical model (Lamanna and DeLoach) – 1st and 2nd weeks of June
3. Creation of the data set in STATA (Lamanna, with oversight from DeLoach) – 3rd and 4th weeks of June
4. Creation of the STATA codes to perform regression analyses (DeLoach, Lamanna) – 1st and 2nd weeks in July
5. Writing up draft of results section (Lamanna, DeLoach editing) – 3rd week in July
6. Presentation of preliminary Results (Lamanna) – 4th week of July

Description of Educational Benefits

My participation in SURE and this research project will be extremely beneficial both educationally and for my goal of going to graduate school. While I have conducted previous research, this particular project will involve developing theoretical models and utilizing STATA, both of which I have never done before and are important for graduate studies in economics. Working on this project will strengthen my research skills and provide an avenue for going into greater depth on this topic. I am very interested in development economics and I'm planning on entering a PhD program in economics upon graduation from Elon. Participation in SURE will provide me with the unique opportunity to conduct research full-time and gain greater insight into how economics research is conducted.

Planned Mentoring Relationship

I plan to work closely with Erika throughout this project. I have mentored or co-mentored 3 previous SURE projects and I have a good idea of what it takes to make a significant amount of progress in a two-month period such as this.

During the summer, I plan on being in the office at least 3 days a week. I anticipate that Erika and I will be working together on all of these days. We plan to continue meeting weekly throughout the end of April and May to complete the literature review that Erika has already begun. Once June hits, the two of us need to work together to develop a theoretical model and solve it for the optimal household decision rules. Her math skills are every bit as good as mine; my only advantage is 15 years of experience creating and solving these sorts of models. Nevertheless, this will be a highly creative and collaborative part of the project as I know of no existing models in economics that deal with the sorts of issues we are trying to model for rural households. The main challenge will be to figure out a way to model the "degree of credit availability" in a meaningful way. This will mean playing around with different "credit cost functions" to figure out which one has the most desirable and economically interesting properties. This will easily take days of 9-5 math, probably sitting side-by-side in our department's research room.

Following that, it is up to Erika to write up the paper sections. I, of course, will read over drafts as needed. The most time consuming part of the project will be to download the data and create a usable dataset in STATA. Since Erika only knows SAS, I will have to work closely with her to teach her basic STATA coding. I anticipate she will have to come to my office for coding help dozens of times a day until she gets proficient at it. Obviously, this is the reason I need to be in the office 3 days a week to be available for her. On the days I am not in the office, I will be working on my other research from home and will be available on email. I have STATA on my laptop so it will be easy to send code back-and-forth as needed.