



**Assessing the Impact of
Microenterprise Services (AIMS)**

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**RISK AND THE IMPACTS
OF MICROENTERPRISE SERVICES**

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FOREWORD

The Assessing the Impact of Microenterprises (AIMS) Project seeks to gain a better understanding of the processes by which microenterprise programs strengthen businesses and improve the welfare of microentrepreneurs and their households. In addition, it focuses on strengthening the ability of the U. S. Agency for International Development (USAID) and its partners to measure the results of their microenterprise programs. The project's core agenda includes desk studies, focused field research, three major impact assessments, and the development and testing of tools for use by private voluntary organizations and non-governmental organizations to track the impacts of their microenterprise programs. Further information about this USAID-funded project and its publications is available on the AIMS home page (<http://www.mip.org>).

This paper is one in a series of desk studies that addresses specific substantive and methodological issues. The studies are intended to inform the design and implementation of the focused field research, the three core impact assessments and the tools. Each core impact assessment will focus on a specific microenterprise program. Information will be obtained from program participants and a comparable group of non-participants in two main rounds of data collection, with a two year interval between the rounds. Complementary information will be gathered in qualitative interviews and from secondary sources. While this paper furthers the agenda of the AIMS Project, it is also intended to be of interest to others seeking to understand and document the impacts of microenterprise programs.

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EXECUTIVE SUMMARY

This study analyzes the interactions between risk, household income levels, and microenterprises. It contributes to a better understanding of the concept of risk as it relates to the impacts of microenterprise services on household economic security and enterprise stability and growth. Microenterprise services may improve household economic security over time by contributing to risk reduction at the household level and by enabling individuals and households to take risks.

Risk and Household Decision Making

Risk can be defined as the chance of loss or the loss itself. The sources of risk fall into six categories: market, natural, technological, strategic, political, and personal. The risks in all six categories interact to create the risk environment in which the household makes its microenterprise decisions. In addition, the decision-making environment of low-income households is characterized by imperfect or incomplete markets, multiple and interlinked production and consumption activities, and increased vulnerability to the effects of risk. Multiple and interlinked economic activities imply more sources of risk but, also, more possibilities for diversifying risk. The addition of a new microenterprise can balance and diversify a household's portfolio. The use of the household as the unit of analysis allows the measurement of some of the impacts of microenterprise programs that are not captured at the enterprise level.

Microenterprise, Risk, and the Household Economic Portfolio

The conceptual framework for analyzing the role of risk is provided by a model which defines the household economic portfolio as 1) the set of household resources (human, physical, and financial); 2) the set of household activities (consumption, production, and investment); and 3) the circular flow of interaction between household resources and household activities. Household resources and household activities are linked through the allocation decisions of household members and the outcomes of those decisions. Household members allocate their resources to a set of consumption, production, and investment activities which, in turn, act to satisfy current household wants and needs while returning resources to the household for use in future periods. While the household members have control over which activities are selected, the outcomes of those decisions are determined, in part, by the risk environment in which the household operates.

Risk Reduction Strategies

In order to avoid the negative consequences of a loss, low-income households employ various strategies to reduce the possibility of a loss and to mitigate its harmful effects. Risk reduction strategies, also known as income-smoothing strategies, are designed to reduce the household's *ex ante* risk exposure and smooth the flow of income to the household. Households with low levels of economic security are more vulnerable to suffering severe consequences in the event of a loss. Low-income households may follow a strategy of selecting activities that have a lower probability of loss, but these economic activities are typically less profitable.

Diversification of the household economic portfolio to include a number of distinct economic activities is another key income-smoothing mechanism. A new microenterprise may reduce the risk faced by the household by expanding its set of activities. On the other hand, a high-risk enterprise may increase the overall level of risk faced by the household by increasing the variability of income. Low-income households that are resource constrained may choose not to allocate additional resources to the microenterprise, thus limiting the growth of the microenterprise. Resources originally intended for the microenterprise may end up being used in other activities to ease the effects of income shocks.

In addition to low-risk activities and diversification, households build insurance mechanisms that can be drawn upon in the event of a loss. Principal among these is the accumulation of savings and assets. Households may seek to maintain non-market relations, such as communal or kinship relations, as a means of accessing resources and spreading risk through sharing. Establishing access to credit is also a critical insurance mechanism that can be called on later for consumption smoothing.

Loss Management Strategies

Loss management strategies, or consumption-smoothing strategies, are designed to improve the household's *ex post* ability to cope with a loss. Three stages of coping strategies are discussed. Stage one strategies use insurance and reversible mechanisms, such as increased labor sales, temporary migration for employment, and reduced consumption, to deal with income loss. In addition, households may liquidate self-insurance assets, which are held primarily as stores of value. Stage one strategies are characterized by their reversibility and by their relatively low impact on the future income-earning capacity of the household.

Stage two strategies include the disposal of key productive assets, possibly at less than full value, in order to smooth consumption. Another strategy at this stage is borrowing money at extremely high interest rates. Both the liquidation of key productive assets and the payment of excessive interest rates jeopardize the future economic welfare of the household.

Stage three strategies signal the destitution of the household. Among the desperate measures included at this stage are the reliance on charity, breakup of the household, and distress migration.

Conclusion

The study identifies the importance of incorporating risk-related issues into an evaluation of the impacts of microenterprise services at the household and enterprise levels. Microenterprise services can contribute to both the risk reduction strategies and the loss management strategies of the household and its members. This may enable households to engage in higher risk, higher return enterprises, thus increasing the impacts of microenterprise services and the potential for economic growth. The study concludes with recommendations on risk-related hypotheses and measures for reducing risk-related selection bias in the samples selected for the core impact assessments of the Assessing the Impacts of Microenterprises (AIMS) Project.

RISK AND THE IMPACTS OF MICROENTERPRISE SERVICES

I. INTRODUCTION

A. Purpose

There is an impression among some researchers and practitioners working with microenterprise programs that entrepreneurs from the poorest households tend to undertake low-risk microenterprises which, in turn, provide them with low returns. This is partially based on observations that, among poorer households, the impacts of microenterprise programs on household income and enterprise profits appear to be lower. These observations have led to the assertion that microenterprise programs should not be targeted at the poorest households, since these households are too conservative and will not undertake the types of microenterprises necessary to increase their incomes.

These observations may be related to the types of risks confronted by poor households and the strategies they use for dealing with such risks. By analyzing the interactions between risk, household income levels, and microenterprises, we can gain a better understanding of the ways that microenterprise services impact households, microenterprises, and individuals at all income levels. The Assessing the Impacts of Microenterprise Services (AIMS) Project team has presented some tentative hypotheses about the relationship between risk and microenterprise services. In particular, it is hypothesized that microenterprise services contribute to risk reduction at the household level, help individuals and households manage risk, and help households and individuals take risks.

However, the household manages risk in the context of its overall economy, and not just in the context of the targeted microenterprise. Thus, an analysis based solely on the microenterprise is likely to overlook the subtle but potentially important impacts of microenterprise services on the welfare of the household. By improving the mechanisms available to the household for coping with income shocks, the availability of microenterprise services may lead to improvements in household economic security over time. Through formal tests of hypotheses relating risk, the household economic portfolio, and microenterprise services, we may gain significant new insights regarding the impacts of microenterprise services.

This desk study has two primary purposes. The first purpose is to clarify the concept of risk as it relates to the impacts of microenterprise services on household economic security and enterprise stability and growth. The second purpose is to identify options for empirical implementation of risk-related concepts in order to improve the design of the AIMS core impact assessments. The outstanding research issue addressed by the paper is how to incorporate risk-related issues into an evaluation of the impacts of microenterprise services at the household and enterprise levels.

B. Key Questions: Why Risk Matters

There are three key questions related to risk and the impacts of microenterprise services:

1. How does the availability of microenterprise services affect the household's ability to deal with risk?
2. How do the risk attitudes and the available risk management strategies of the household affect the impacts of microenterprise services?
3. How should possible risk-related differences between client and non-client (control) groups be addressed in the research design of the core impact assessments?

The AIMS team has developed an overall hypothesis that microenterprise services improve household economic security by helping households to manage or reduce risk. To address the first question, this paper considers household risk management strategies and the potential role that microenterprise services can play in improving the effectiveness of those strategies.

The second question is related to the first. As explained in the introductory remarks, there is a possibility that microenterprise services will have little impact on the poorest households, with one of the key explanations for low impacts being the inability or unwillingness of these households to bear the increased risks that are associated with higher return microenterprises. At the end of the third section, we will revisit the first two questions and examine the relationship between them.

The third question is concerned more specifically with the strength of the overall research design. By advancing our understanding of risk, this paper provides additional information for dealing with self-selection issues in the core impact assessments. The discussion of this third question occurs primarily in the final section of the paper.

C. Organization of the Study

Section II provides an initial understanding of risk, the characteristics of the household economy, and the role of microenterprises in the household economic portfolio. A rationale is presented for selecting the household as the appropriate unit of analysis in understanding the relationships between risk and microenterprise services. A conceptual model of the household economic portfolio is developed and used to analyze the role of risk in the household economy, typologies of households, and gender differences relative to risk. Section III reviews a variety of strategies that households use to deal with risk and distinguishes between strategies for *ex ante* income smoothing and for *ex post* loss management. The loss management strategies are described in terms of three stages in the household's response to risk. In section IV, we revisit the key questions of the study and synthesize the relationships between risk, microenterprises, and the impacts of microenterprise services. This leads directly to recommended hypotheses and suggestions for empirical implementation. The annex to the paper provides a brief review of the economic literature on risk and outlines the problems that would need to be dealt with in a direct empirical analysis of risk.

II. RISK, HOUSEHOLDS, AND MICROENTERPRISES

A. Initial Concept of Risk

Low income households make their economic decisions in environments that are uncertain and risky, with risks coming from a variety of sources. As a basic starting point, risk may be defined as both the chance of a loss (*ex ante*) and the loss itself (*ex post*). In this concept of risk, both the degree of chance (probability of loss) and the size of the potential or actual loss are considered. In addition, it is implicitly assumed that households will assess the consequences of the loss; in other words, they will consider the implications of the loss in terms of their household economic security. The concept of risk as loss or the chance of a loss provides a sufficient basis for the discussion in the main body of this paper. More detailed concepts of risk are provided in the annex to the paper.

B. Sources of Risk

Households face risks from many different sources, and there are site-specific variations in the prevalence and magnitude of these risks. Despite this variability, it is possible to organize the sources of risk into six general categories: market, natural, technological, strategic, political, and personal. These categories are not necessarily discrete, as some specific risks might fall into more than one category. The risks in all six categories interact to create the *risk environment* within which the household makes its decisions regarding microenterprises.

Market risks are extremely important sources of risk for households and microentrepreneurs. Unfavorable price changes are a key type of market risk. Significant increases in input prices or decreases in output prices can reduce or eliminate microenterprise profits. In addition, an enterprise can be adversely affected by disruptions in vital business services such as marketing channels, credit, and transport. Losses from market risks act to lower the return to the household's investment in a microenterprise. Apart from microenterprise activities, households face other important types of market risks, such as the possibilities of job loss and increases in the prices of consumer goods.

Natural risks can also have an adverse effect on the microenterprise investments of households. Natural risks include floods, droughts, frosts, storms, and pests. Risks related to nature are particularly important for production activities that rely heavily on natural processes, such as farming, retail trade in cultivated and collected plants, and small-scale manufacturing based on natural materials. Urban-based microenterprises in certain areas may also face natural risks related to storms or flooding.

Microenterprises that transform inputs into outputs may face *technological risks*. Interpreted broadly, this includes a wide range of microenterprises. Whenever an entrepreneur incorporates a new process into the enterprise, there may be a chance for loss. For example, a new type of oven for a small bakery may not function as expected, or an enterprise that switches from manual to electrical equipment may suffer losses due to equipment breakdown or interruptions in the power supply. Technological risks can also be simpler, such as lack of colorfastness in a cloth or lack of

adhesion in a glue. The possibility of technological risks, and the inability of the entrepreneur to accurately assess the probability of a loss, can lead to a reluctance to adopt new technologies.

Strategic risks relate to the existence of information asymmetries and the tendency of individuals to engage in opportunistic behavior. A microentrepreneur may face strategic risks from business partners, competitors, customers, suppliers, creditors, and debtors. Group saving and lending schemes can also be a source of strategic risk. Unless institutional safeguards are in place or mutual trust has been established through a series of transactions, an entrepreneur may incur significant transaction costs in order to guard against the chance of loss from strategic behavior. In addition, there may be risks associated with strategic behavior in nonmarket settings. For example, members of a household may behave opportunistically toward each other, as may members of social networks and individuals in patron-client relations.

Political risks refer to the chance of loss due to the exercise of power. In the traditional sense, this category includes losses from riots, wars, or unfavorable acts by the state or its officials. The actual prevalence of these types of political risks is highly site specific. In general, urban microenterprises are more subject to riot losses and the interference of municipal officials. Microenterprises in the urban informal sector may be subject to Aconfiscation@ by the police or municipal authorities. In addition, robbery can be a serious risk to microenterprises located in urban slums. Rural microenterprises, on the other hand, may face greater potential losses from war-related disturbances, particularly from prolonged, low-intensity guerrilla conflicts. A less traditional concept of political risk includes the losses that are possible due to the exercise of power within a community or household. The entrepreneur's incentives for generating microenterprise profits may be reduced if these profits can be arbitrarily seized by another member of the household or community.

Personal risks include crises within the household. A primary example is the illness of a family member, which can pose a risk in two ways. First, the illness may lead to a sudden increase in the need for income for medical treatment. Second, if the ill family member is one of the household's income earners, there can be a simultaneous drop in household income levels. In the case of a fatal illness, such as AIDS, the loss in income-earning capacity is permanent. Another source of personal risk is spousal abandonment, whether physically or through chronic problems such as alcoholism. The need for cash to cover funerals, dowries, or expensive rituals could also be considered a type of personal risk. While risks in the other categories are generally related to a loss in income or profits, personal risks can also have a negative effect on the household by suddenly increasing the level of expenses.

C. Characteristics of the Household Economy

There are four key characteristics of the household economy that are important for understanding the role of risk in household decision making. First, households make production and consumption decisions in settings that are often characterized by imperfect or incomplete markets. This leads to the second characteristic, that the household's production and consumption decisions are interlinked. This implies that losses in production can translate into adverse impacts on household consumption levels. The third characteristic is related to the

second, namely, in order to understand the role of risk in household decision making, it is important to understand why low income households in developing countries tend to engage in multiple production activities. The fourth characteristic for understanding the role of risk in household decision making is that households at very low income levels are vulnerable and may suffer extreme consequences in the event of a loss.

1. Incomplete markets

Low-income households make their production and consumption decisions in settings characterized by the presence of imperfect or incomplete markets (Ellis 1993). This means that many resource and output markets may be missing, or may not function well. In the context of risk, it is especially important to note the condition of markets for credit and for insuring against idiosyncratic risk. When credit and insurance markets function perfectly, the household will have market mechanisms for helping to ensure that shocks to income do not create shocks to consumption. However, when these markets are incomplete, production and consumption decisions are interlinked and the household must rely on a variety of nonmarket relations and risk management strategies to fill this void.

2. Interlinked production and consumption

Economic decision making at the household level is concerned with both consumption and production activities. Production and consumption considerations are considered simultaneously when the household is deciding how to allocate its resources, such as labor and capital, to the set of possible production activities aimed for the market or for home consumption. This interaction between consumption and production may result in decisions about each individual enterprise that differ from the predictions of standard neoclassical theory.¹

Because production and consumption are linked, shocks to production (income) can translate into shocks to consumption. Therefore, a household's desire to protect consumption levels will have an effect on production decisions. Thus, a household approach is necessary for modeling the direct linkage that exists between the selection of production activities, the success of production decisions, and the well being of the family. A close relationship between production success and the well being of the family is typical of low-income families.

Central to a household's decision about whether to incorporate a new activity or to reallocate

¹A detailed account of the differences between a household approach and the standard neoclassical theory of production and consumption is provided in the household desk study (Chen and Dunn 1996). The critical difference is that standard neoclassical theory treats production and consumption decisions independently, whereas the household approach allows for a linkage to be made between production and consumption decisions when the decision maker is operating in an environment of incomplete markets. Household approaches have been extensively applied in rural areas, beginning with Chayanov (Ellis 1993; Singh, Squire and Strauss 1986; Low 1986). However, due to the existence of incomplete markets in urban areas, the concept of interlinked consumption and production is relevant in the urban context as well.

resources among existing activities is an assessment of the degree of uncertainty and chance of loss from doing so. Because of the interlinked relationship between production and consumption, the household's decisions relative to a particular microenterprise are likely to include consideration of the risk impacts of that enterprise on household consumption levels. In addition, decisions about any particular microenterprise will be made within the context of the household's multiple production activities, with the consideration of risk including an assessment of the total risk associated with the portfolio of activities.

3. Multiple production activities

Low-income households tend to be engaged in a number of production activities. Some of these activities are oriented toward home consumption, others are for both consumption and sale, while other activities are intended exclusively for the market. Both urban and rural households rely on multiple production activities, and their activities fall into similar categories. The main distinction between rural and urban household is that rural households, if they have access to land, undertake one or more agricultural production activities. Urban households, on the other hand, will be more heavily dependent on income from wages and microenterprises. Both rural and urban households will have some degree of production for household consumption, and may or may not be heavily engaged in work for wages.

There are four principal motivations for households to engage in multiple production activities. First, the household may not be able to obtain an acceptable level of income by devoting all of its resources to a single activity. In other words, there may not be any single activity that can productively and profitably employ all of the household's resources and generate sufficient income to meet the consumption needs of the household members. The second motivation is related to the first: since many production activities are seasonal in nature, the household may need to undertake a number of activities in order to spread income more evenly over the year. Third, low-income households in developing countries will almost always need to produce some goods and services for home consumption (e.g. fuel gathering, child care),² while at the same time needing to earn cash income by producing for the market or working for wages.

The fourth motivation for engaging in multiple production activities is the household's need to diversify its income sources as a strategy for dealing with risk. The chance of a sizeable loss of income from any one production activity represents a threat to the economic security of the household. Where insurance or contingent markets are absent or incomplete, this risk must be borne privately (Bromley and Chavas 1989). Diversification as a strategy for reducing the chance of a sizeable loss of income is discussed in section III. For now, it is important to note that households may engage in multiple production activities for a number of reasons, with one of the reasons being that it permits the use of a diversification strategy for dealing with risk.

²The new home economics (Becker 1991) provides a framework for analyzing the production of these goods, which are designated as Z-goods. The type of production activities that result in these goods and services are referred to in the conceptual model below as household maintenance activities.®

4. Vulnerability

Finally, it is important to note that low-income households are vulnerable to the effects of risk. The lower the levels of household income and assets and the fewer the mechanisms the household has for coping with risk, the greater the vulnerability of the household. For those households that are close to the lower edge of material survival, a loss associated with a risk could have devastating long-term consequences. Even when material survival is not threatened, the detrimental consequences of a loss can be far-reaching.

5. Summary and rationale for household approach

Since the household economic portfolio consists of multiple, interlinked production and consumption activities, the household is the most appropriate unit of analysis for understanding how risk affects decisions related to specific enterprises. Multiple and interlinked economic activities imply more sources of risk but, also, more possibilities for diversifying risk. Indeed, the addition of a new microenterprise could be used to balance and diversify a household's portfolio. Because of the interlinked nature of production and consumption, and given the fungibility of credit, resources from microenterprise credit can be utilized in alternative activities related to consumption smoothing (Pitt and Khandker 1994). Therefore, risk may affect the level of resources allocated to a microenterprise and condition the specific impacts of microenterprise credit and other services. On the other hand, microenterprise services may affect the risks households confront. By providing an alternative mechanism for dealing with risk-related losses, microenterprise credit can affect the household's selection of economic activities. The benefit of a household approach is that these relationships can be captured and any positive or negative externalities to the household can be described and possibly measured. The household approach responds to the need to account for impacts of microenterprise programs that are not captured at the enterprise level (Sebstad et al. 1995).

D. Microenterprise, Risk, and the Household Economic Portfolio

1. Conceptual model

The *household economic portfolio* can be defined as a) the set of household resources, b) the set of household activities, and c) the circular flow of interaction between household resources and household activities.³ A model of the household economic portfolio is illustrated in Figure 1. *Household resources* are the set of human, physical, and financial resources available for use by the household in a given period of time, whether through ownership, customary use, common property, borrowing, or social networks. The human resources include the time, labor power, and skills of the household members, which depend on the household composition at any given point

³This conceptual model of the household economic portfolio is described more fully in the household desk study and referenced in the debt desk study.

of time. Physical resources are the assets of the household and include any tangible items that are at the disposal of the household members such as land, buildings, tools, raw materials, input stocks, inventory, equipment, livestock, personal items, and so on. Financial resources include cash and other forms of liquid savings. It is important to note that resources may be owned or they may be accessed through borrowing or through social relationships and social networks.

The set of *household activities* includes the consumption, production, and investment activities that the household undertakes in a given time period. *Consumption activities* are defined as the satisfaction of material wants and needs through the provision of items such as food, clothing, medical services, liquor, and entertainments. *Production activities* include three distinct categories:

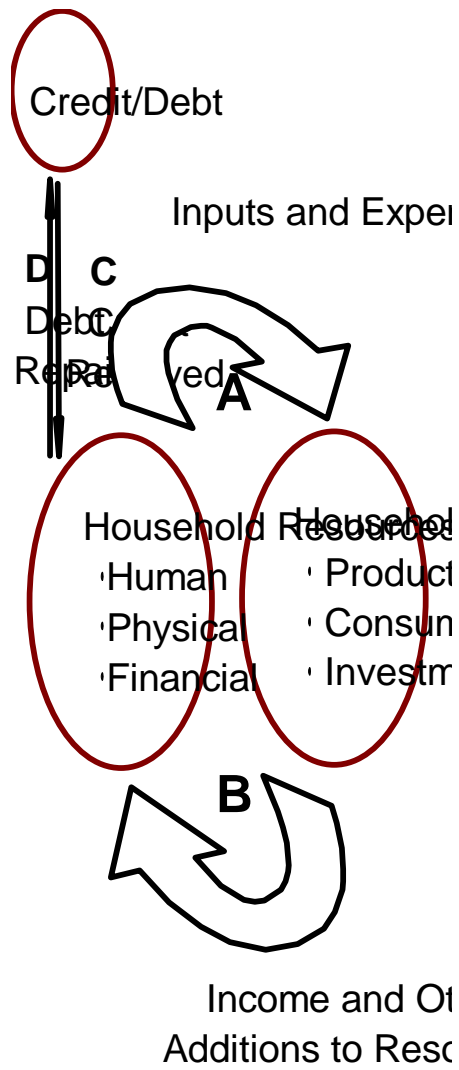


Figure 1: Conceptual

1) income generating activities; 2) household maintenance activities; and 3) wage and outside work. *Income generating activities* are any productive enterprises that generate a marketable good or service. This category would include all types of microenterprises. The product of an income generating activity may be agricultural or nonagricultural, and it may be sold or consumed by the household. A *household maintenance activity* results in a good or service that is strictly for consumption within the household, such as family meal preparation, maintenance and improvement of the house, child care, and water and fuel gathering.⁴ *Wage and outside work* is performed outside of the household's own production activities and is for the purpose of earning cash or fulfilling external obligations.

The assets that result from *investment activities* can take many forms, but they are characterized both by their expected endurance into the next period and by their enhancement of the resource base of the household. The products of investment activities may be real property (i.e. land, housing), physical stores of wealth (i.e. jewelry, livestock), financial stocks or interest bearing accounts (i.e. savings accounts, money loaned out), productive assets (i.e. sewing machine, truck, inventories), or improvements in human capital through training or education. In summary, investment activities act to build up the resources base of the household.

There are two links between household activities and household resources, and these are illustrated in Figure 1 by flows in both directions. The top flow, denoted by A and running from resources to activities, represents the allocation of household resources to support the different household activities. This includes cash expenditures, labor inputs, and other tangible inputs. The human, physical, and financial resources of the household provide the base of support for the household's activities and are allocated to the various household activities through the household's decision making process. All of the household's activities must be supported by the set of available resources. A single type of resource (e.g., labor) may be distributed among more than one activity, and each activity will typically require a number of different resources.

The bottom flow, denoted by B and running from activities to resources, represents the income and other additions to resources that are created by the household's production and investment activities. This flow reflects the outcome that results from the household's decisions. In summary, the household allocates its resources to the consumption, production, and investment activities which, in turn, act to satisfy current household wants and needs while returning resources to the household for use in future periods.

The role of credit in the household economic portfolio can be interpreted relative to this conceptual model. When credit is received (flow C in Figure 1), it creates an addition to the resources available in the current time period for support of the household activities. Because of the fungibility of credit, it may be allocated to any one or all of the activities. If credit has been

⁴While markets may exist for the products of certain household maintenance activities (e.g. collected firewood), the distinguishing feature of goods and services generated by household maintenance activities is that the household does not participate in those markets.

received in a previous period(s), then some portion of the resources generated by the household's activities will flow out of the household economy and to the lender in the form of a debt repayment (flow D in Figure 1). Note that if the credit has been used in production or investment activities, then it may increase the size of the resource flow generated by the household's activities, thus increasing the repayment capacity of the household. Also, if the resources of the household are low in any given time period, then credit can be used to smooth consumption.

2. Risk in the household economy

The conceptual model of the household economic portfolio can be used to help clarify the links between risk, the decisions made by the household, and the outcomes of those decisions. In addition, it provides a framework for understanding the role of microenterprises in the overall household economy and the ways that risk enters into decision making about microenterprises. These decisions are shaped by the risk attitudes of the household and the risk environment that it faces.

It is easier to understand the role of risk in household decision making if we consider a dynamic interpretation of the conceptual model. At the beginning of each period, the household makes the key economic decisions of 1) selecting the set of production, consumption, and investment activities to undertake in the period and 2) allocating the set of household resources to the selected activities. The activities then take place during the given time period.⁵ At the end of each period, the results of the activities flow back to the set of household resources in the form of income, assets, and adjustments to human capital. This results in an adjustment to the household resource base. At the beginning of the next period, the household starts with this adjusted resource base, which may be different in size and composition than it was in the previous period.

The results, or outcomes, of the household's activities depend in part on the risk environment in which the household operates. As discussed above, the risk environment is the amalgamation of relevant risks from each of the possible categories. For example, a market risk in the form of adverse price movements could reduce the profits of a microenterprise, leading to a smaller income flow at the end of the period. At the same time, the microenterprise could suffer a loss of output due to technological risk. While the household has control over which activities it selects and the levels of those activities, the outcomes of those decisions are at least partially determined by the risk environment in which the household operates.

How, then, does the household take the riskiness of outcomes into account when making its activity selection and resource allocation decisions? The answer depends on several factors, including the risk attitudes of the household and the availability of alternative risk management strategies. A household's risk attitudes reflect its relative willingness to operate under different levels of risk. The less tolerance that a household has toward a chance of loss, the greater the *risk*

⁵The dynamic model described here is abstract in the sense that it assumes that all activities have a uniform duration. In reality, production and investment activities are nonuniform in duration.

aversion of the household. Households that are risk averse will seek mechanisms for reducing and managing risk. Possible risk management strategies are discussed in detail in section III. As we will see in that section, financial services, such as microenterprise credit, can play an important role in altering the impact of risk on decisions about the household economy. In summary, household decision making relative to its microenterprises is affected by many factors, including the availability of resources, the risk environment, the risk attitudes of the household, and the availability of alternative strategies for managing risk.

3. Household typologies

It is possible to distinguish different types of households by examining differences in their household economic portfolios. The different types of households can also be distinguished by differences in their risk environments, risk attitudes, and available strategies. Here we suggest two possible typologies of households, constructed on the basis of 1) location of residence (i.e. rural vs. urban) or 2) level of economic security. It is important to note that these are generalizations only, and that risk attitudes are heterogenous and risk environments are highly site-specific.

Rural and urban households can be distinguished based on general differences in their set of resources, set of activities, and risk environment. Farm households would have more agricultural enterprises in their productive activities and a greater emphasis on land and in-kind income in their resource bases. While the farm household may have one or more non-agricultural microenterprises, these are not as likely to play the central role in the household economy that they play in some urban households. On the other hand, rural nonfarm households would be more dependent on non-agricultural activities, such as microenterprises or wage labor. All rural households, whether landed or landless, would probably have a greater dependence than urban households on household maintenance activities related to natural resources (e.g. collection of firewood, housing materials, noncultivated plants and natural materials). Urban households would be likely to have a greater reliance on microenterprises, have less seasonal fluctuation in their wage work, and depend more on purchased consumption items and production inputs. Both rural and urban households operate in a risk environment that may include risks from all six categories. However, rural households may be more subject to natural risks, than urban households.

Households with lower levels of economic security can be distinguished in the conceptual model as being those households with a smaller set of resources.⁶ Their resource bases would include fewer physical and financial resources, and they would support their economic activities largely through their available labor. In addition, households at the lower level of economic security may also be short on human resources, and may be operating with only one income earner. This would imply a reduced capacity to support household activities, possibly including lower

⁶This suggests at least two possible indicators of the household's level of economic security: 1) a flow measure would be the income and other additions to resources flowing from the household activities to the household resource base and 2) a stock measure would be a measure of the value of household resources.

consumption activities and fewer production and investment activities. Households with fewer resources may only be able to undertake new microenterprise activities if they receive an initial infusion of resources, such as through borrowing. Because of their lower levels of resources, households with low levels of economic security would be more vulnerable to suffering severe consequences in the event of a loss, thus leading to the possibility that, in their economic decisions, they may behave as if they were more risk averse than households with higher levels of economic security.

4. Gender and intrahousehold decision making

Up to this point, the discussion has treated the household as if it were a single decision maker with a pooled set of resources and activities and a single set of uniform risk attitudes. In fact, there can be a number of decision makers within a household, with the typical household unit including both an adult male and adult female decision maker.⁷ Rather than being a monolithic entity, the household may be more like a mini-conglomerate, with many decision makers and with a number of activities that simultaneously cooperate and compete with one another. Depending on the setting, men and women may have separate spheres of activities and support these activities out of distinct sets of resources, with some reciprocal interaction.

In general, women tend to demonstrate more concern than men for supporting consumption and household maintenance activities through a disproportionately large allocation of their time and resources to these activities (Thomas 1990; De Groot 1994; IFPRI 1992; Quisumbing et al. 1995). This is true in spite of the fact that women tend to have control over fewer assets and enjoy fewer wage earning opportunities than their male counterparts. This has an important implication for gender-related differences in decision making relative to risk. Since the resources at the disposal of women tend to provide the foundation for securing the consumption of household members, especially children, then placing these resources at risk could lead to significant interruptions in household consumption. Women tend to display a reluctance to jeopardize consumption, thus leading to the assertion that they behave as if they were more risk averse than men.

⁷The dynamics of intrahousehold decision making are discussed in the study by Chen and Dunn (1996).

III. RISK MANAGEMENT STRATEGIES

A. Introduction

Risk, defined as the chance of loss or the loss itself, may threaten the economic security of low income households. This can be especially important at low income levels, because low-income households are more vulnerable to negative consequences in the event of a loss. In order to avoid these negative consequences, households will employ various strategies to reduce the possibility of a loss and to mitigate its harmful effects. These strategies can be classified into two categories.

First, there are the *risk reduction strategies*, which are designed to reduce the household's *ex ante* risk exposure and smooth the flow of income to the household. Major risk reduction strategies, which are also known as *income smoothing strategies*, include the selection of low-risk activities and diversification of the household economic portfolio. In addition, the household may undertake an *ex ante* strategy of building insurance mechanisms that can be drawn on in the event of a loss.

The second category includes *loss management strategies*, which are designed to improve the household's *ex post* ability to cope with a loss. Also known as *consumption smoothing strategies*, one purpose of these strategies is to prevent a loss, or income shock, from leading to a consumption shock. In addition, effective loss management strategies can prevent an income shock from leading to a long-term reduction in the household's productive capacity. In the event of a loss, a household may attempt to mitigate the negative effects of the loss through increased labor sales, liquidation of assets, borrowing and dissaving, nonmarket mechanisms, and reduced consumption and human capital investment.

In order to understand the impact of risk on household decision making, it is important to recognize the relationship between risk reduction strategies and loss management strategies: the greater the access to *ex post* loss management mechanisms, the lower will be the household's need to engage in *ex ante* risk reduction strategies. In other words, if the household has a number of good strategies for mitigating the negative consequences after a loss has occurred, it will be less concerned with protecting itself from a loss in the first place. In this section of the paper, we describe both risk reduction and loss management strategies.

B. Risk Reduction Strategies: Income Smoothing

1. Selection of low-risk activities

An important strategy for reducing *ex ante* exposure to risk is the selection of activities that have lower levels of risk. However, economic activities that have a lower probability of loss are typically less profitable (on average) than higher risk activities. According to Alderman and Paxson (1992, 3), "The extent to which [a] household [will] trade off average incomes for less variable incomes should depend, in theory, on available technology, preferences towards risk, and opportunities for smoothing consumption given income." Thus, the household's selection of low-risk activities is affected not only by the availability of *ex post* loss management mechanisms,

but also by the household's level of risk aversion. A household with a higher level of risk aversion, all things being equal, will select lower-risk activities.

A household economic portfolio that is based on the selection of low-risk activities will also tend to generate a smaller flow of income back to the household resource base. Over time, this could lead to lower levels of accumulated wealth. The empirical evidence indicates that there is an inverse relationship between household wealth and the tendency to select low-risk, low-return activities (Dercon 1996; Rosenzweig and Binswanger 1993). Households with fewer assets tend to behave as if they were more risk averse and select economic activities that have lower risk. This leads to the possibility of a "poverty trap" in which there is a causal chain from the selection of low-risk activities, to the generation of lower incomes, to the accumulation of lower levels of wealth, to higher levels of risk averse behavior, to the selection of low-risk activities--thus completing and perpetuating the cycle.

An income smoothing strategy based on the selection of low-risk activities has obvious implications for the impacts of microenterprise services. To the extent that clients of microenterprise services are risk averse and have few loss management mechanisms, they will tend to select low-risk microenterprises. The result may be that the most vulnerable clients of microenterprise services will tend, on average, to generate the lowest returns in their microenterprises.

2. Diversification of the household economic portfolio

A second important strategy for risk reduction is diversification of the household economic portfolio through the selection of a number of distinct economic activities. The principal idea underlying diversification is to develop a portfolio of investments and activities with returns that are not perfectly correlated (Robinson and Barry 1987, 142). The objective of diversification is to construct a household economic portfolio that has lower overall income variability, even though the individual activities in the portfolio may have different levels of variability.

While diversification of a portfolio may not be *prima facie* evidence of a risk reduction strategy,⁸ a number of researchers have cited diversification as a key income-smoothing mechanism (Morduch 1995; Alderman and Paxson 1992; Reardon et al. 1992). The previous discussion of a poverty trap relating income smoothing strategies, levels of wealth, and risk aversion is also relevant to the strategy of diversification. Reardon et al. (1992) found that households exhibited greater risk averse behavior as their level of wealth declined (where wealth was measured in land and nonland assets) resulting in higher levels of portfolio diversification.

There is considerable research on diversification in agriculture, where crop diversification has been described as a type of *homemade* insurance (Fabella 1989). In addition, the diversification of the household's resource base to include livestock can reduce the negative effect of a crop loss,

⁸Obviously, the objective for creating a diversified portfolio with a high overall level of variability would be something other than income smoothing.

especially in semi-arid and arid environments where yield variability is very high and there is a high level of risk in crop production. Investing and building assets in the form of livestock compensates for the existence of few loss management strategies, including imperfections in the credit market. Livestock can also minimize the loss of sunk costs, such as those invested in damaged crops, which can be salvaged as feed for the livestock. Many studies have focused on weather and rainfall variability and the general conclusion is that households choose assets that are differentially sensitive to weather variability and other types of risks.⁹

Diversification strategies that rely solely on agricultural activities are less effective as a risk-management tool if they are location specific and weather and yield risks are high in small geographical areas. This suggests that private means of managing risk are limited in terms of guaranteeing survival. It also suggests why diversification into nonagricultural activities can be a critical component of the household's risk management strategy. By diversifying the portfolio to include a new microenterprise or other activity with outcomes not correlated with agriculture, the rural household can reduce the covariance of income sources.

The inclusion of a wage labor activity in the household economic portfolio can be an important component of a diversification strategy for both rural and urban households. For urban households, wage-earning jobs held by several household members can be a diversification strategy in itself, if these jobs are not covariant in their generation of earnings. In addition, urban households may rely on several microenterprises for alternative sources of income.

Thus, a new microenterprise may reduce the risk faced by the household by expanding the possibilities for diversifying the household economic portfolio. On the other hand, a high-risk enterprise may increase the overall level of risk faced by the household by increasing the variability of income. In addition, a microenterprise that requires relatively high cash outlays may compete with household consumption needs during periods of low income. Because low-income households may seek to maintain a diversified portfolio while at the same time being resource constrained, they may choose not to allocate additional resources to the microenterprise, thus limiting the potential growth of the microenterprise. In fact, due to the fungible nature of credit and the interlinked nature of production and consumption, resources originally intended for the microenterprise may end up being used in other activities to ease the effects of income shocks.

3. Building insurance mechanisms

Finally, under conditions of imperfect markets for labor, land, credit, and insurance, households will try to build a number of alternative insurance mechanisms that they can draw upon in the event of a loss. Principal among these will be the accumulation of savings and assets. In addition,

⁹There are many studies on risk and diversification in agriculture, especially in arid and semi-arid environments where production risk is exaggerated. In order to understand the possibilities for diversification and the role of resources and social relations in reducing the chance of loss, these studies use the household as the unit of analysis (Rosenzweig and Binswanger 1993; Reardon et al. 1992; Valdivia et al. 1995; Bromley and Chavas 1989; Kusterer 1989).

households may seek to maintain active non-market relations, such as communal or kinship relations, which represent important non-market mechanisms for accessing resources and spreading risk through sharing (Ellis 1993). A third potential insurance mechanism is the establishment of access to credit, which may become a critical mechanism for consumption smoothing. Each of these insurance mechanisms is discussed in more detail in the following section on loss management strategies.

C. Loss Management Strategies

1. Introduction: Stages of loss management

Households use a variety of strategies to cope with the losses to income associated with risk. The particular strategy they select depends on the severity of the loss and the opportunities available to the household. The pattern of loss management strategies tends to follow a predictable sequence (Corbett 1988; Webb 1992). For relatively small losses, the household will select one of the more reversible loss management strategies. As the magnitude of the loss becomes greater and the economic security of the household declines, the household will be forced to turn to less reversible loss management strategies.

In a study of household responses to famine, Corbett (1988) identified three stages of coping strategies. In the first stage, households turn to the insurance mechanisms that they have established or that are otherwise available to them. Stage one responses to loss also include other reversible mechanisms, such as increased labor sales, temporary migration for employment, and reduced consumption. Stage two strategies are less reversible and place the future economic welfare of the household into jeopardy. Stage three strategies indicate the destitution of the household.

By classifying the loss management strategies of the household into stages, it is possible to distinguish between two types of household assets. First, there are the assets that the household holds primarily as stores of value, such as livestock, jewelry, household items, and savings accounts. The purpose of these assets is to provide insurance mechanisms that the household can turn to in the event of a loss. Disposal of these *self-insurance assets* occurs as part of a stage one loss management strategy. The second type of assets are the *key productive assets* which are necessary for the productive activities of the household. The disposal of key productive assets lowers the future income earning capacity of the household and signals that the household has entered the more serious stage two of loss management strategies.

It is interesting to note that households may be willing to reduce their consumption levels as part of a stage one strategy before they are willing to dispose of key productive assets. In responding to a loss, therefore, the protection of future income generating capacity appears to be more important than the complete smoothing of current consumption levels. This implies that protection of productive assets may be a better indicator of the household's ability to manage risk than a measure of consumption smoothing.

2. Stage one: Use of insurance and reversible mechanisms

There are a variety of stage one strategies that the household can use to manage *ex post* income losses due to risks. These strategies are characterized by their reversibility and by their relatively low impact on the future income-earning capacity of the household. Many of the strategies involve drawing on the insurance mechanisms that had previously been created or maintained by the household. The stage one strategies can be organized into five categories: 1) labor sales and temporary employment migration; 2) liquidation of self-insurance assets; 3) borrowing; 4) use of nonmarket mechanisms; and 5) reduced consumption and human capital investment

Labor sales and temporary employment migration. As discussed earlier, wage work can be an *ex ante* risk management strategy that helps to smooth income. In addition, an increase in labor sales can be used as a loss management strategy in response to an income shock. However, it should be noted that increased wage labor participation may not be a feasible option for a household, either because of lack of employment opportunities or because of lack of available time to divert to wage labor. In rural areas, a household may follow a strategy of extending itself outside of agriculture either longitudinally--by placing the next generation outside of agriculture (Kusterer 1989)--or spatially--by sending part of the family to work in areas where there are employment opportunities. Temporary migration by some members of the household can be both a loss management strategy and an income smoothing strategy, since migration can contribute to the reduction of covariant risk when risks are location specific. Employment migration is common in the case of the rural poor (Townsend 1995a), with important examples of migration by male heads of household found in cases from Africa, Asia, and Latin America.¹⁰

Liquidation of self-insurance assets. A common strategy for dealing with a risk-related loss is to draw upon self-insurance assets, which include both cash savings and physical assets. Of course, a prerequisite for using this strategy is the prior accumulation of some type of asset. Assets may be held in many different forms, and the types of assets preferred by households differ according to site. In rural areas, food stocks and livestock are the most common forms of asset accumulation.¹¹ In both rural and urban areas, households seek several key characteristics in their self-insurance assets. These desirable characteristics include security, liquidity, and retention of value. Where households do not have access to preferred types of self-insurance assets, they have fewer loss management strategies available to them, and their ability to manage risk is reduced. Thus, the household's ability to manage risk can be immediately improved by microenterprise services that include a savings component characterized by security, liquidity, and retention of value.

Borrowing. Borrowing is a third type of loss management strategy that the household can use in the initial stage of loss management. The availability and conditions of formal and informal credit markets for low income households vary with location, and households may have access to a

¹⁰See Kusterer's (1989) appendix for specific case studies.

¹¹While livestock was not found to play a role in consumption smoothing in a study of Indian households (Townsend 1995b), it did contribute to consumption smoothing in studies of rural Andean and West African households (Valdivia et al. 1995; Reardon et al. 1992).

number of complementary sources of credit.¹² In general, however, low income households do not have access to formal markets for consumption credit. Even where formal markets are available, households may prefer to access informal credit sources, such as friends and relatives (Rosenzweig 1988). In a study of strategies used by the urban poor in India, Nojonen (1991) found that borrowing was the most prevalent response to economically stressful events. In developed economies, consumption credit has proven more effective and less costly than market insurance against risk (Eisenhauer 1994).

Nonmarket mechanisms. Marriage and family remittances are also important mechanisms for managing losses. The evidence from a study of Indian households (Rosenzweig 1988) suggests that kinship ties can in part be understood as risk-mitigating strategies. Kinship in a risky world tends to bond families together over space and time in implicit insurance-based transfer schemes which contribute to smoothing consumption in the face of income losses. Using longitudinal data from a South Indian village, Rosenzweig and Stark (1989) concluded that marriage with migration contributes significantly to a reduction in the variability of household food consumption. This marital arrangement also contributes to the spatial diversification of risk among households.¹³ Inherited wealth was found to contribute significantly to consumption smoothing. Interhousehold income transfers as a safety net may also be important in reducing the need for diversification, though some authors have found that the magnitude of such transfers is not a significant share of income (Reardon et al. 1992; Rosenzweig 1988).

Other social mechanisms are also important in smoothing income and consumption. For example, a study of social safety nets, social capital, and reciprocity relations indicates that these have a positive effect on the success of families in the Andean region (Markowitz and Jetté forthcoming). Nonmarket relations tend to mitigate the differences that exist with land ownership (Cala 1994) and provide an important source of initial capital to newly married couples (Espejo 1994). Extended families, including intergenerational families, also provide a mechanism for transfers of land outside of market mechanisms (Rosenzweig and Wolpin 1985).

Reduced consumption and human capital investment. In stage one loss management, the household may decide to respond by reducing certain types of consumption and human capital investments. Obviously, among the consumption items, the first ones to be cut would be the non-essentials. To the extent that reductions in consumption are made unequally by members of the household, there may be intrahousehold equity concerns associated with this kind of loss management strategy. Investments in human capital, such as expenditures for education and health, may compete with immediate consumption needs in the presence of an income shock. In such a situation, there may be a shift in resources away from these important long-term investments.

¹²There is a separate desk study on the sources of debt and uses of debt by the household.

¹³The authors also suggested that the introduction of formal credit that facilitates consumption smoothing may reduce risk and effectively reduce the role of spatial marriages and rural migration. This, in turn, could reduce the importance of dispersion of daughters for risk reduction, which may result in less resources allocated to young girls in the household (Rosenzweig and Stark 1989).

3. Stage two: Disposal of key productive assets

If a household has effective mechanisms for stage one loss management, then it may never need to undertake stage two strategies. In stage two, the household turns to the disposal of its key productive assets in order to smooth consumption. These assets, such as land, tools and equipment, support the income generating activities of the household, and disposal of productive assets may signal a decline in household welfare. Not only does this reduce the ability of the household to generate income in future periods, but a critical problem is that there may be a high cost to the household from having to sell durable, productive assets at less than their full value. An additional stage two strategy is the borrowing of money at extremely high interest rates. Both the liquidation of productive assets and the payment of excessive interest rates jeopardize the future economic welfare of the household. As part of a stage two strategy, the household members will continue to seek ways to reduce consumption.

4. Stage three: Destitution

When both stage one and stage two loss management strategies are no longer available to the household, it has very few responses it can make to a loss. Stage three strategies can signal the destitution of the household. Among the desperate measures comprising stage three strategies are the reliance on charity, breakup of the household, and distress migration (Corbett 1988).

D. Summary

Low-income households have a variety of strategies for reducing risk (*ex ante*) and for mitigating the negative effects of income shocks (*ex post*). Households can reduce risk by selecting a diversified portfolio of economic activities with returns that are not covariant. Microenterprises can contribute to portfolio diversification. In addition, households with lower levels of economic security may select low-risk microenterprises that offer lower average returns. Households have a number of mechanisms for managing losses in the event of an income shock. These loss management strategies are undertaken in stages, with the stage one strategies being the most reversible. Self-insurance mechanisms are prominent in stage one. Microenterprise services can contribute to self-insurance mechanisms through the provision of microenterprise credit and savings services. By participating in microenterprise credit and savings programs, households are better able to protect themselves against idiosyncratic income shocks (Townsend 1995a, 14). This may induce these households to engage in higher risk, higher return enterprises, thus increasing the impacts of microenterprise services and the potential for economic growth.

V. IMPLICATIONS FOR MICROENTERPRISE IMPACT ASSESSMENTS

A. Synthesis of Main Ideas

1. Key questions revisited

As a way of summarizing and synthesizing the information that has been presented up to this point, we will revisit two of the key questions listed in the introduction to this paper and attempt to answer them on the basis of the main ideas covered in this paper relating microenterprise, microenterprise services, and household risk management:

1. How does the availability of microenterprise services affect the household's ability to deal with risk?
2. How do the risk attitudes and the available risk management strategies of the household affect the impacts of microenterprise services?

In answer to the first question, the availability of microenterprise services can affect the ability of the household to deal with risk by providing additional risk reduction (income smoothing) and loss management (consumption smoothing) opportunities. In other words, microenterprise services can improve the household's ability to deal with the chance of loss (*ex ante* risk) and can improve the household's ability to deal with actual loss (*ex post* risk).

The evidence for answering the second question is somewhat contradictory. The answer to the first question implies that microenterprise services should have a positive impact on all clients. On the other hand, groups which are more vulnerable to risk may respond differently to the opportunities provided by microenterprise services, reflecting differences in their management of risk. We will now examine each of these questions in more detail, with the purpose being to move toward the generation of a set of testable hypotheses for inclusion in the core impact assessments.

2. Microenterprise and risk reduction

Microenterprise(s) can be part of a household's risk reduction strategy and can contribute to income smoothing by helping to diversify the household economic portfolio or by providing an additional low-risk productive activity. A new microenterprise can help the household to improve the composition of the household economic portfolio so that it has a lower level of covariant risk. It also provides the household (and individual members of the household) with an additional productive activity, which can be the source of additional income. If household resources are constrained and spread over a number of productive activities, then the household may not necessarily seek to expand the microenterprise over time. Also, the household may select low-risk, low-return microenterprises as part of its strategy to smooth the flow of income. Households that are less concerned with income smoothing may select more risky microenterprises as part of a strategy to generate higher returns.

3. Microenterprise services and loss management

Microenterprise services can improve the loss management capabilities of the household by expanding the household's options for stage one loss management strategies. This is true because microenterprise services improve the ability of the household to engage in the financial management of risk. Microenterprise credit can provide the household with an alternative source of credit on reasonable terms. To the extent that this source of contingency credit allows borrowing for consumption purposes, the microenterprise program's positive effect on the household's loss management capabilities may be increased. In addition, microenterprise programs that include a savings component can enhance the ability of the household to accumulate financial assets as a self-insurance mechanism.

By providing the household with alternative stage one loss management strategies, microenterprise services can help the household to avoid the need to undertake stage two strategies. This implies that the productive assets of the household and, hence, its future income-generating capacity are better protected. In addition, the household may be able to avoid incurring debts at excessively high interest rates. It is also possible that the improved capacity for financial management of risk will enhance continuity in consumption and human capital investment.

4. The Impact Gap: Risk and the impacts of microenterprise services

We would also like to know whether microenterprise services can help to eliminate the **Apoverty trap** that keeps the most vulnerable entrepreneurs in the lowest return microenterprises. It is possible to construct both positive and negative arguments on this issue. On the positive side, since the availability of microenterprise services increases the available loss management alternatives, the participating household should have less motivation for engaging in income smoothing strategies. Thus, households at all levels of economic security should be more willing to engage in higher risk, higher return microenterprises, and microenterprise services can be expected to have positive impacts on all households.

On the negative side, however, households with higher levels of risk aversion and fewer alternative loss management mechanisms (other than microenterprise services) may continue to have strong incentives to engage in income smoothing by a) selecting low-risk, low-return microenterprises; b) refusing to specialize in, and therefore expand, a profitable microenterprise; and c) allocating an excessive amount of household resources to self-insurance mechanisms rather than to the microenterprise and other productive activities. This leads to the conclusion that microenterprise services will have lower impacts for households that have higher levels of risk aversion and fewer loss management alternatives, thus possibly perpetuating the poverty trap.

This issue has important implications for evaluating the impacts of microenterprise services. To the extent that households engage in income-smoothing and self-insurance behavior, the profit and income impacts of microenterprise services will be reduced. In concluding their synthesis of literature on risk and consumption in developing countries, Alderman and Paxson (1992, 36) refer

to the efficiency losses associated with risk averse behavior:

While there is not a single risk premium which summarizes the cost of risk aversion in developing countries, available evidence indicates that there is some relationship between *ex post* consumption smoothing possibilities and production decisions. Moreover, the poor appear to be less able to bear risk. As such, there is a convergence of efficiency and equity issues. For example, Binswanger and Rosenzweig (1990) find that the poor have a return for every rupee invested that is 30% below that earned with a profit maximizing portfolio similar to that held by the wealthiest households. As restricted access to consumption credit is often inferred to be a primary explanation for such patterns, it is plausible - but to date not indicated - *that interventions which improve access to credit markets can raise producer efficiency*. For a variety of reasons effective instruments to achieve such ends are difficult to identify (Besley 1992), although *the benefits of such programs may be underestimated to the degree that the efficiency gains due to risk diffusion are not considered*. [italics added for emphasis]

In an article examining the relationship between consumption smoothing and income smoothing, Morduch (1995, 108) also indicates that income smoothing strategies, designed to reduce *ex ante* risk, can result in lower returns for the most vulnerable households:

When full markets for consumption smoothing do not exist, risk aversion can affect how households decide both the composition and nature of income-generating activities. Not surprisingly, many studies point to risk aversion as the culprit when results indicate that households are not maximizing profits. All the same, there are relatively few studies that take the issues head on. The evidence is slowly accumulating, however, that the effect of risk on production (and consequent efficiency losses) can be large, *especially with respect to choices made by most poor (and most vulnerable) households*. [italics added for emphasis]

In summary, risk management strategies may result in an impact gap such that the impacts of microenterprise services are disproportionately low for the most vulnerable client households. If, indeed, such an impact gap does exist, then an evaluation of the impacts of microenterprise services may be able to incorporate this effect into the analysis.

B. Evaluating the Impacts of Microenterprise Services

1. Proposed hypotheses

In order to address the key questions above, it is recommended that the core impact assessments be used to test three related hypotheses. These hypotheses make indirect use of the concept of risk and build on the conceptual foundations of risk and risk management that have been developed in this paper.¹⁴ In particular, they draw on the models of household decision making, stages of loss management, and the relationships between *ex post* loss management and *ex ante*

risk reduction.

The first hypothesis (H1) is based on the idea that the availability of microenterprise services improves the ability of the household to deal with loss (i.e. *ex post* risk management). The second hypothesis (H2) asserts that the availability of microenterprise services improves the ability of the household to deal with the chance of loss (i.e. *ex ante* risk management).

The first two hypotheses can be stated as follows:

By improving the household's ability to manage losses, access to microenterprise services leads to ...

(H1): ...greater stability or growth in productive assets.

(H2):...greater reliance on high-return microenterprises in the household economic portfolio.

The justification for these hypotheses can be based on an argument containing several observations: 1) In dealing with the chance of loss (*ex ante* risk), households undertake low-risk, low-return microenterprises. This strategy has been associated with a poverty trap¹⁴, 2) In dealing with actual loss (*ex post* risk), the strategies pursued by households fall into stages. Microenterprise services can improve the household's stage one alternatives, where the effectiveness of stage one strategies is indicated by the degree to which the household's productive assets are protected; and 3) Households with better *ex post* loss management strategies have less reason to rely on *ex ante* risk reducing strategies. Therefore, by improving a) the effectiveness of stage one loss management strategies and b) the willingness of the household to undertake high-risk, high-return activities, microenterprise services will have a positive impact on the level of productive assets.

In this argument, the emphasis is on the productive assets of the household. However, the willingness of the household to undertake high-risk, high-return activities is considered to be a factor that contributes to the growth in assets. Because it may take a number of years for microenterprise services to have a measurable impact on assets, while the length of time between the two data collection periods for the AIMS assessments is limited to two to three years, we suggest that the separate hypothesis on high return activities (H2) be included as both an impact in itself and as an intermediate impact. In other words, changes in productive assets may take longer to observe, while changes in the household economic portfolio may be observable in the relatively short interval between data collection points.

The third hypothesis (H3) is designed to test whether there is an impact gap in the economic

¹⁴The annex contains a brief survey of some of the theoretical and methodological issues associated with the direct inclusion of risk in an empirical analysis.

impacts of microenterprise services. The hypothesis can be stated as follows:

(H3): Households and entrepreneurs with higher levels of risk aversion and fewer alternative loss management strategies will experience the impacts in (H1) and (H2) to a lesser degree.

The argument underlying the third hypothesis is that greater risk aversion and fewer loss management alternatives will result in the selection of more conservative (low-risk, low-return) microenterprises. Over time, this will lead to lower levels of accumulation of productive assets.

2. Empirical implementation

The recommended approach for testing the hypotheses stated above is to collect data during the field focused research and core impact assessments that would allow the independent estimation of two empirical models:

where ASSETS = change in the household's level of productive assets;
HRME = change in the relative importance of high-risk, high-return productive activities in the household economic portfolio;
MES = participation in microenterprise credit program (1 if client; 0 otherwise);
SIA = access to stage one loss management alternatives;
WEALTH = initial wealth of the household;
GENDER = gender of the client (1 if female; 0 otherwise); and
REPEAT = measure of repeat borrowing.

The explanatory variables are the same for both equations. The first two hypotheses would be tested by testing the sign of the coefficients on MES in the first and second regressions, respectively. Positive (and significant) coefficients would provide statistical evidence that microenterprise services contribute to the accumulation of assets and the selection of high-return microenterprises. A test of the third hypothesis would be based on the estimated coefficients on the variables in each of the regression equations, with WEALTH and GENDER providing proxies for level of risk aversion (the expected signs being positive and negative, respectively), while SIA measures the access to stage one loss management alternatives (the expected sign being positive). The variable REPEAT is expected to have a positive sign, reflecting that clients learn over time about the ways that microenterprise services help them to deal with risk.

The variable SIA would be implemented empirically by a) identifying the most relevant stage one strategies¹⁵ for the specific site during the field focused research and b) measuring one or two of the relevant type(s) during the core impact assessments. It is important to note that the microenterprise program can contribute to the SIA variable if it offers a savings program or readily available consumption credit.

¹⁵As discussed earlier, stage one alternatives include cash savings, self-insurance assets, wage labor, borrowing, and nonmarket mechanisms

Development of the HRME variable would also begin during the field focused research. The initial task would be to inventory the productive activities in the study site and to classify each activity on a risk-return scale, where the scale would probably have two to four levels. During the core impact assessments, the households would be asked to list all of their productive activities and provide a rough approximation of the relative importance of each one. The importance of each activity would be used to create a weighted linear sum of the household's activities:

where $HRME_i$ is the relative importance of high-risk, high-return productive activities in the economic portfolio of household I, w_n is the relative importance (weight) of the n^{th} production activity, R_n is the risk-return rating of the n^{th} production activity, and the household has N production activities.

C. Reducing Risk-Related Selection Bias in the Sample

In order to control for risk-related selection bias in the core impact assessments, the ideal case would be to match the client and control samples in terms of 1) risk environment; 2) access to risk management strategies; and 3) risk attitudes. If the client and control groups live and work in the same location, then they should have a similar risk environment, with the possible exception of personal risks. If the client and control group are from different locations, then the field focused research should be used to assess the sources of risk in each area in order to ensure that they are well matched.¹⁶ Access to risk management strategies could be approximated by access to stage one loss management alternatives, as reflected in the variable SIA (discussed above). This could be measured during the core impact assessments and used to statistically match the client and control samples.

In order to account for possible differences in risk attitudes, it is recommended that proxy variables be used for statistically matching the samples. The variables WEALTH and GENDER recommended above could be used, as could some measure of income level or assets. However, these may not capture any differences in psychological risk attitudes that attract certain kinds of people to microenterprise programs. One possible approach would be to attempt to statistically match households by their microenterprise types (i.e. subsector), although this could be difficult given the heterogeneity of enterprises. Given the limitations on interview length and the greater importance of measuring other variables, it is not recommended that the core impact assessments make any attempt to directly elicit risk attitudes. However, if this is considered, the annex to this paper briefly reviews the issues associated with measuring risk attitudes.

¹⁶See section II.B of this paper for a discussion of the risk environment and sources of risk.

ANNEX: CONCEPTS AND MEASUREMENT OF RISK

A. Modeling Decision Making under Uncertainty

In this paper, risk has conceptualized as the chance of loss. While this concept of risk has intuitive appeal and has been extensively used, it is by no means the only or even the most commonly used concept of risk. In some studies, risk is defined as a measure of the dispersion of possible outcomes (e.g., variance). Yet, in others, it is defined as the maximum possible loss. These and other concepts of risk derive from a variety of models that attempt to characterize the decision making process that humans use under conditions of uncertainty. In general, decision making involves evaluation and choice among alternative actions.

The theory of expected utility maximization (EUM) has been central to the economic theory of decision making under uncertainty. The idea of EUM is that the decision maker will seek to maximize his or her expected utility (satisfaction), given the probabilities associated with each of the possible uncertain outcomes. The EUM approach is based on several key assumptions: 1) the decision maker's preferences can be represented by a mathematical utility function; 2) all of the alternatives in the choice set are known to the decision maker; and 3) the probability distribution for each alternative is also known to the decision maker. Given such conditions, an individual makes decisions by maximizing his or her utility after sorting through all alternative actions and their respective probability distributions, with the result being represented formally as follows:

where E indicates summation over the K states of nature and Y_{jk} is the monetary outcome of action A_j when state of nature s_k prevails. The EUM decision rule effectively distinguishes between a decision maker's perception of uncertainty, expressed as probability density functions $P(s_k)$, and his or her attitudes toward additional income, captured by the utility function U .

For any particular action A_j , expected utility may be represented as a weighted sum of the moments of the relevant probability distribution function. That is:

$$EU_j = f(\mu, F, M_3, M_4, \dots),$$

where μ , F , M_3 , M_4 , and so on represent the mean, variance, skewness, kurtosis, and higher moments of the probability distribution of outcomes for action j . The number of moments required to represent EU depends on the characteristics of the probability distribution and the utility function at hand. For example, when the utility function is quadratic or when outcomes are normally distributed, EU becomes a simpler function of the mean μ and variance F (Freund 1956). Under these conditions, variance is the appropriate concept of risk. In more general cases, risk is represented by a vector of moments of the relevant probability distribution.

The choice among alternative models of decision making has important implications for the way that risk can be operationalized in the context of empirical analysis. In most cases, different models of decision making result in different concepts of risk. The work of Rothchild and Stiglitz (1970) may be used here to illustrate this point. In particular, the authors defined risk in terms of risk aversion within the EUM framework. They conceptualized risk as whatever risk averse

individuals would pay to avoid. Given two alternative frequency distributions with the same mean, implied risks can be directly compared. The one with fatter tails implies more variability (more risk) and will be avoided by risk averse individuals. However, Rothchild and Stiglitz concluded that in the more general case where the frequency distributions have different means, it is impossible to assess which is more risky without knowing the exact shape of the decision maker's utility function. That is, risk cannot be assessed independently from the decision rule of expected utility maximization. Similar arguments can be made for alternative decision rules and concepts of risk.

Alternative approaches to modeling risk include the security models, hybrid models, and decision models with no probability context. In the security models, attention is focused on crucial levels in the lower tails of probability distributions. Unlike the EUM, security models are not derived from a utility function. Instead, security models are founded on the principle of bounded rationality, explicitly acknowledging the limited capacity of individual decision makers to process information (Simon 1959). In the safety-first rule (Telser 1956), the decision maker seeks to maximize his or her expected return subject to the constraint that there be no more than a certain probability that the return will fall below a specified lower limit. Alternative security models have been proposed by Roy (1952) and Kataoka (1962). The lexicographic safety-first model (Roumasset 1976) combines the logical foundation of EUM with the operational simplicity of the security models. Other models of decision making under uncertainty, such as the maximin and minimax rules (Halter and Dean 1971), do not incorporate information on probabilities. However, the maximin decision rule can be considered a special case of the safety-first rule, where the acceptable level of probability is zero.

B. Subjective and Objective Probabilities

Key concepts of risk, such as variance and the chance of loss, are derived from probability distributions. These probability distributions may be either subjective or objective, depending on whether they are elicited directly from the decision maker or computed from historical observations. Theory dictates the use of particular probabilities only in the case of EUM where subjective probabilities are appropriate (Savage 1951). The use of subjective probabilities is justified because decision makers are assumed to behave according to their personal perception of reality.

Subjective probabilities may be defined as the beliefs held by individual decision makers which reflect their degree of uncertainty about various events or propositions. A set of subjective beliefs defined over mutually exclusive events or propositions form a subjective probability distribution. Subjective probabilities tend to vary from one decision maker to another and over time in response to new information. Thus, they must be directly elicited from individual decision makers. Procedures for eliciting subjective probabilities directly from decision makers are detailed in Anderson et al. (1977).

The only criterion of consistency applied to subjective probabilities is that of coherence. The coherence criterion places specific restrictions on subjective probabilities so that fundamental contradictions are avoided (Bessler 1984). Coherence can be described as a condition on a set of

probabilities for which a particular system of bets does not guarantee a winner or loser.

Despite their intuitive appeal, the use of subjective probabilities has not been supported by some decision theorists. The basic argument is that probability calculus is far from intuitive to decision makers (Edwards 1961). Experimental results show that, while decision makers can assign quantitative weights between zero and one to their beliefs, these weights regularly fail the coherence condition (e.g., probabilities assigned to mutually exclusive and exhaustive events do not sum to one as they should). Similarly, Officer and Halter (1968) and O'Mara (1978) observed the misuse of basic probability calculus by decision makers in field studies where the probabilities of a hypothetical gamble were provided before asking them to make a choice.

The process of eliciting subjective probabilities may also be subject to significant biases. Tversky and Kahneman (1974) have identified cognitive rules and heuristics which tend to systematically bias the probabilistic judgments of individuals. Specifically, people tend to believe that the essential characteristics of a population must be present in any sample of that population (Kahneman and Tversky 1972). Given that small sample properties are different from that of the parent population, the characteristics of samples may also be significantly different. Similarly, when an initial value of a probability is provided or calculated by an individual, probabilistic judgements tend to be biased in the sense that they gravitate towards that initial point. Finally, experimental evidence suggests that probabilistic judgements tend to be influenced by the ease with which relevant events come to an individual's mind (Tversky and Kahneman 1974). When ease of recall is associated with the relative frequency of an event, no biases exist. However, a variety of other factors (e.g. intensity of an event and emotional association) may significantly affect the ease of recall of particular events and bias probabilistic judgement.

It appears that experience and motivation are important factors contributing to the consistency of subjective probability assessment. Murphy and Winkler (1977) provide experimental evidence where consistent and effective subjective probabilities are formulated by decision makers with extensive knowledge of particular events. An example of this would be professional weather forecasters' subjective probabilities of temperature and precipitation.

Objective probabilities may be obtained as an approximation to subjective probabilities. In practice, objective probabilities are estimated using experimental or historical data. Biological and physical processes are typically estimated from experimental information. The majority of economic processes, however, are not repeatable and historical data must be used. In deriving objective measures of risk, total variability should be distinguished from the random variability that constitutes risk. Random variability represents the variability remaining after cyclical, seasonal, and other predictable components of total variability have been removed.

A variety of methods have been used to estimate both subjective and objective probabilities following variations in the sources of risk, data availability, and purpose of the study. Lin et al. (1974) estimated subjective probabilities through direct elicitation procedures for a variety of income generating activities. They used objective time series data, however, to estimate the covariances of the different activities. Moscardi and de Janvry (1977) and Brink and McCarl (1978) have estimated risk indices from objective information.

Use of objective probabilities may be pragmatically limited, especially in developing countries. Sufficiently long and dependable time series data required for the estimation of objective distributions may be unavailable. The fact that there are a number of sources of risk compounds the estimation difficulties. Furthermore, as the information content of decision makers decreases, so does the relevance of objective probabilities as proxies to subjective probabilities. Thus, the empirical relevance of objective probabilities in the case of households with limited education and limited access to information is further narrowed.

C. Measurement of Risk Attitudes

In trying to understand the role of risk, we are concerned with its impact on the efficiency of various production and investment activities. Thus, we are interested not only in the degree of uncertainty faced by individual decision makers, but also in their attitudes towards risk and their respective responses. The literature on the measurement of risk attitudes is quite extensive. An eclectic review of this literature is used here to highlight key issues in the measurement of risk attitudes.

A variety of procedures have been proposed in the literature for measuring risk preferences. Most such procedures fall within one of the following two general categories: (1) direct elicitation of risk preferences and (2) indirect elicitation from observed economic behavior. After describing these two types of procedures, we examine the common empirical findings on risk attitudes.

1. Direct elicitation of risk attitudes

The most common approach to measuring risk attitudes is to elicit them through direct contact with the decision maker. Direct elicitation methods can be used to derive attitudes toward risk that are consistent with a variety of decision models (e.g. single-valued utility functions, security type models, or utility functions with multiple goals). Several elicitation procedures are available involving choices about hypothetical gambles with monetary gains and losses. Procedures introduced by Von Neumann and Morgenstern (1947) and Ramsey (1964) are the most commonly used for deriving single-valued utility functions. Both methods depend on the certainty equivalent axiom of the expected utility model. The axiom states that if action A_1 is preferred to action A_2 , which in turn is preferred to action A_3 , then some probability P exists that the decision maker is indifferent between having A_2 for certain or receiving A_1 with probability P and A_3 with probability $(1-P)$. Under such conditions, A_2 is the certainty equivalent of $PA_1+(1-P)A_3$.

It is possible to formulate utility functions through repeated applications of the axiom. Implementation requires values for A_1 , A_2 , A_3 , and P . The interviewer specifies three of these values and the decision maker supplies the fourth. Changing one of the values supplied by the interviewer brings a new value from the decision maker, and so on. The method may be illustrated with a simple example. Assume that the decision maker is confronted with a risky alternative with two potential outcomes: a desirable one (e.g., a monetary gain of 10 units) with probability P and an undesirable outcome (e.g., a monetary loss of 10 units) with probability $(1-P)$. Using an arbitrary scale for the utility function, one may set $U(10)=1$ and $U(-10)=0$. Application of the certainty equivalent axiom then suggests that $U(CE) = P*1+(1-P)*0 = P$.

This simple calculation allows for elicitation of the decision maker's utility function. The decision maker may, for example, specify that he or she is indifferent between a certain payoff of 4 monetary units and the risky alternative when $P=0.6$. On the other hand, the decision maker may specify the certainty equivalent to be -3 monetary units when $P=0.3$. Each such permutation yields points in the utility-income space and a relevant utility function of income may then be traced by connecting such points. The shape of the resulting utility functions then exactly defines risk attitudes for different levels of income.

The Von Neumann-Morgenstern elicitation method requires that the decision maker identify the probability P for the desirable outcome which yields indifference between the risky alternative and a certain outcome whose value is the average of the desirable and the undesirable outcomes. The Ramsey method assigns equal probabilities to desirable and undesirable outcomes and requires the decision maker to identify certainty equivalents over a series of hypothetical gambles.

Elicitation procedures that are consistent with safety-first decision rules have been suggested by Webster and Kennedy (1975). Within their framework, decision makers are asked to assess tradeoffs between various safety levels and expected returns in hypothetical gambles. Indifference curves between expected returns and safety levels are thus constructed and used to measure the decision maker's attitudes towards risk. An alternative procedure for incorporating safety-first considerations was used by Scandizzo and Dillon (1979) with a sample of subsistence farmers. They used a Ramsey-type approach where the undesirable stochastic outcome was equivalent to risking subsistence.

Direct elicitation procedures have been criticized for the absence of realism in the gaming procedures and for the lack of familiarity of the decision makers with the hypothetical choices used. Binswanger (1980) introduced experimental procedures designed to remedy these shortcomings. His procedures were based on repeated gambles in sequential visits with the decision makers over a period of a few weeks. Actual financial compensation added realism to the gaming situations used since the decision makers responded to gambles with real payoffs of a relatively significant size instead of hypothetical ones. Furthermore, conducting the experiments over time allowed the respondents to reflect on their decisions and learn from past experience. The use of financial compensation and the opportunity to learn from past experience would tend to ameliorate some of the measurement flaws present in most direct elicitation procedures but add significantly to the already high costs of carrying out such procedures.

A significant limitation of all direct elicitation procedures is interviewer bias. In particular, alternative interviewers with similar elicitation methods tend to obtain often dramatically different results from the same sample (Roumasset 1979). The sources of such bias appear to be multiple, including the particular way the hypothetical gambles are structured, their realism, the attitudes of decision makers towards gambling, and even implicit preferences of decision makers toward particular values of probabilities.

2. Indirect elicitation from observed economic behavior

A second category of procedures for the measurement of risk attitudes involves indirect elicitation from observed economic behavior. Such procedures draw inferences about risk attitudes based on the relationship between the actual economic behavior of decision makers and the behavior predicted from empirically specified economic models (Antle 1987; Brink and McCarl 1978; Hazell 1982; Moscardi and de Janvry 1977).

The essence of elicitation procedures using observed economic behavior is best illustrated with an example. Moscardi and de Janvry (1977) worked with a sample of peasant farmers who were assumed to behave in a manner consistent with Kataoka's security (safety-fixed) decision rule. The peasants were assumed to face farm production risks but no market risks since prices were assumed known with certainty.¹⁷ Risk attitudes were then inferred from observed fertilizer application rates, a key determinant of production risk. Estimation involved solving various farm models for different levels of risk aversion and choosing the levels that gave the closest fit between the actual and predicted plans.

Most studies that estimate risk attitudes through observed economic behavior follow procedures similar to the example above. Although the exact set of assumptions, decision models, and economic models vary substantially from one study to another, the basic procedure of comparing observed behavior with the behavior predicted by economic models is common to all. A variety of economic performance indicators have been used for such comparisons, including input use, output levels, use of credit, combination of enterprises, and production activities.

Eliciting risk attitudes indirectly from observed economic behavior has significant advantages. It is less costly than direct elicitation, which depends on rather involved interviewing procedures. Furthermore, it avoids measuring risk from hypothetical gaming situations and it is not subject to interviewer bias. However, such procedures are subject to inference problems of their own. By assumption, they attribute all deviations of observed economic behavior from that prescribed by economic models to risk attitudes. A variety of other factors, however, could lead to such deviations, including resource endowments, capital constraints, incomplete information, intertemporal considerations and expectations, market imperfections, alternative goals, and variations in human capital. Furthermore, emphasis on any one indicator of economic behavior can be misleading as decision makers tend to balance risk among different economic activities. For example, a household may be extremely conservative in its production activities to counter risk taking in investment and financial risks from high leverage. Within our example, elicitation of risk attitudes from only observed productive activities would lead to biased estimates. Hence, such procedures require empirical specification of economic models with careful consideration to all goals and attributes of the decision maker. Unfortunately, such realism tends to also increase the complexity of economic modeling making it, in many cases, empirically unworkable.

¹⁷Formally, input-output relationships were modeled by a power production function with a multiplicative term representing production risk.

3. Common findings on risk attitudes

Clearly, measurement of risk and risk attitudes is subject to serious limitations and inference problems. Such problems raise questions about the reliability and validity of empirical risk and risk attitude measures. Despite the many shortcomings, some convergence of empirical evidence exists for a few points. Studies using direct elicitation procedures (Binswanger 1980; Binswanger and Sillers 1983; Grisley and Kellog 1987; Scandizzo and Dillon 1979) as well as studies of observed economic behavior (Antle 1987; Moscardi and de Janvry 1977; Hazell 1982) find decision makers to be characterized by moderate risk aversion, although a minority of decision makers are characterized by risk neutrality and risk loving behavior.

A second, although more tenuous, result is that the poorest of households behave in a more risk averse manner. Rosenzweig and Binswanger (1993) found that peasant households in India with less inherited wealth tended to choose less risky portfolios, while the wealthiest households exhibited risk neutrality. Scandizzo and Dillon (1979) found that peasant households exhibited strong risk aversion in hypothetical gambles where subsistence was at risk.¹⁸ If valid, these empirical results suggest that risk attitudes should be accounted for when significant risks are present, since these are likely to influence the efficiency of a household's production and investment decisions.

¹⁸It should be noted that some studies confirm moderate risk aversion, but choices are not found to vary in a systematic way with the level of wealth. For example, see Binswanger and Sillers (1983).

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