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Discussion Paper 175

Consumption Smoothing and Vulnerability in the Zone Lacustre, Mali

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Many people in developing countries are vulnerable to shocks, which may be idiosyncratic (affecting individuals or households) or covariant (affecting groups of households or communities, regions, or nations). Understanding the nature of this vulnerability and the informal or formal coping mechanisms that may mitigate shocks is a first step in establishing effective social protection programs.

Purpose of This Paper

This paper explores vulnerability issues through the lens of consumption smoothing. It asks which groups or individuals are unable to fully insure—or smooth—their consumption in the face of shocks to their income. Drawing on data from the Zone Lacustre in northern Mali, the authors show that in all cases, covariant shocks lead to changes in consumption but that specific idiosyncratic shocks appear to be fully insured against. The authors also consider a stronger test for consumption smoothing, namely the impact of changes in total household income on consumption with controls for idiosyncratic shocks. Here, however, the hypothesis of complete insurance is rejected.

The authors also explore vulnerability issues by disaggregating the sample along a number of characteristics. In a semiarid country such as Mali, which is heavily reliant on agriculture, one would expect that control over water would emerge as a key correlate of vulnerability. In the Zone Lacustre, this is indeed the case. Households with access to improved water-control infrastructure experience less variability in consumption than those that rely on rainfall or flooding of the Niger River. Households whose occupational base is livestock or fishing, and those of ethnic minorities, appear to be more vulnerable, especially across food consumption.

In the Zone Lacustre, while idiosyncratic shocks appear to have little impact on consumption, households have difficulty in offsetting adverse covariant shocks.

The Data

Situated in the remote northern region of the Niger River valley, the Zone Lacustre is characterized by subsistence agriculture. The area has suffered from deteriorating climatic conditions, poor infrastructure, and some of the poorest health and education attainments in the country. The 10 villages in the survey area are centered around the small town of Niafunké located on the north bank of the Niger River. The survey area is located within the Sahelian climatic zone and suffers from variable and increasingly limited rainfall levels. The rise and fall of the Niger also affects the agricultural potential of the area, as rising waters flood areas for rice and millet cultivation. This irrigation mechanism has been deteriorating in recent decades. Education and health standards are below national levels, with illiteracy high and fewer than 15 percent completing primary school. The ethnically diverse area has benefited from efforts to install cleaner water supplies, but overall, sanitation is poor.

The first survey was fielded in August–September 1997, just prior to the harvest. This was followed by a second round during the postharvest period (November–December 1997), a third in the quiet period in between agricultural seasons (February–March 1998), and the fourth during a second hungry period (August–September 1998). A two-stage sampling procedure was used: (1) the purposive selection of 10 villages and (2) a random selection of one-third of households within each village, yielding a sample of 275 households. These household survey data were supplemented by additional anthropometric surveys, PRA work, and weekly market surveys.

The survey contained questions on household size and composition, agricultural production, sources and levels of nonagricultural incomes, assets, consumption, anthropometry, and health. Although "shock" indices cannot be constructed directly from these data, information on exogenous events, such as crop loss due to insect infestation, loss of labor time due to illness, and theft of livestock, are found in the household questionnaires.

Testing for Consumption Smoothing

Although developing economies have largely been characterized as having incomplete or absent markets for most goods and services, this is not the case with consumption smoothing mechanisms. Households in these areas have a variety of informal mechanisms to help them reduce, mitigate, or cope with the risks they continually face. Two factors differentially affect a given household's ability to smooth consumption and mitigate vulnerability: the types of risks experienced and the types of smoothing mechanisms (or, more accurately, their accessibility within the community overall) affect the degree of consumption smoothing that can be achieved.

The extent of consumption smoothing achieved within a community can be tested by regressing changes in individual household income against the changes in individual consumption, while controlling for the effects of covariate shocks. In situations of perfect consumption smoothing, the coefficient on changes in income will be zero. One can also examine the relative effect specific income shocks have on consumption within an area by testing what effect their occurrence has on consumption. Using these methods, one can explore the implications specific shocks have on consumption and the extent to which households can smooth consumption and mitigate their vulnerability.

Results and Conclusions

This paper explores vulnerability issues in a poor region in one of the world's poorest countries, as viewed through the lens of consumption smoothing. The principal findings were that individual idiosyncratic shocks appear to have little impact on consumption. Although there is no one single result, in general, nonpoor households appear more likely to enter into new income-generating activities, given these shocks, while poor households are more likely to engage in credit or gift exchange or to ration consumption.

A stronger test of consumption smoothing shows that—controlling for covariate shocks—changes in household income lead to modest changes in consumption. Covariant shocks, as measured by village/round dummies, are shown always to lead to changes in consumption—although households with access to improved water-control infrastructure experience less consumption volatility than those that rely on rainfall or flooding of the Niger River. Risk pooling over these covariant shocks, as measured by the relationship between changes in mean village incomes and household consumption, is a characteristic of poorer households.

These results were robust to concerns regarding bias resulting from measurement error or endogeneity of changes in income.

Keywords: consumption smoothing, shocks, vulnerability, Mali

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