Income smoothing, child labor and schooling: a randomized field experiment in the Nampula province of Mozambique.

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Extended Abstract

1 Introduction

This paper uses a cluster randomized control trial (RCT) carried out between 2009 and 2012 in the Nampula province of Mozambique to test whether an income-pooling program (Village Saving and Loan Associations, VSLA), and a labor-pooling program (Ajuda Mutua, AM) are effective at increasing schooling and decreasing child labor. Further, we can identify whether the programs work more effectively in combination or isolation, and how the duration of program participation effects outcomes.

There is a widespread consensus that human capital accumulation is a powerful way out of poverty. However, in circumstances where education has a high opportunity cost in terms of delayed entry into the labor market, child education duration is often cut short. Even with children still in formal education, when short-term costs of sending them to school in terms of lost productivity are high, there is the potential for significant absenteeism. As a consequence, parents from poor households often face a difficult decision as to whether to send their children to school, given the strong trade-off between expected future returns to education and present wages.

Testing the impact of the introduction of VSLA can shed light on how education is affected by the creation of savings and credit markets. The sign of the this effect is unclear in the literature. On the one hand, low or sporadic school attendance can be particularly acute where financial markets are imperfect or incomplete, such that child labor varies with fluctuations in agricultural seasonality or unforeseen shocks (Ljungqvist, 1993, Jacoby, 1994, Jacoby and Skoufias 1997,

Ranjan, 2001, Beegle et al., 2003, Dillon, 2008, Edmonds et al., 2010, Duvendack and Palmer-Jones 2012, Landmann and Frölich, 2013). On the other hand, recent work has shown that increasing household access to financial markets and saving opportunities, does not necessarily lead to an increase in the accumulation of human capital and a reduction of child labour (Wydick 1999, Menon, 2004, Shimamura and Lastarria-Cornhiel 2010, Nelson, 2011, Augsburg et el., 2012). If, for example, improved access to credit helps open a new business, the opportunity cost of schooling increases and child labour becomes more desirable. In addition, if households perceive that new a business is likely to last, child labor can be seen as a form of specific human capital more desirable than general human capital acquired at school (see: Becker, 1962; Acemoglu and Pischke, 1999). Moreover, if saving helps smooth consumption, education becomes less important as an insurance against future income fluctuations.

Testing the impact of AM on schooling permits us to study the effect of an exogenous increase in both the availability and productivity of external labor. The former follows from increased labor supply, and the latter follows from the reciprocity of the program decreasing the incentives for shirking. If child labor was previously hired to cope with labor shortages during emergencies and to avoid moral hazard and shirking, the introduction of the AM should lead to a decrease in child labor and an increase in education.

The programs were tested between 2009 and 2012 in Nampula; a rural, poor and chronically undernourished province in the north east of Mozambique. VSLA provide households with basic financial services by providing a framework to pool incomes into a single saving fund, which can be borrowed at low interest rates. AM is a rotating labor program of mutual help, which allow labor to be pooled across households under the assumption of reciprocity, rather than for a wage.

The programs have been implemented with the aim of providing risk-mitigating strategies enabling households to smooth income and labor supply across fluctuations due to seasonality in agriculture, as well as across health and economic shocks. Specifically, VSLA were expected to provide access to cash through savings, to stop consumption from dropping, particularly during the prolonged annual 'hungry season' from January to March. AM was expected to achieve the same aim by making it possible to rely on constant labor supply to smooth the effects of predicted or unpredicted productivity shocks such as a worker's illness (see also: Krishnan and Sciubba, 2009; Fafchamps, 2011).

Moreover, both programs were expected to provide participants with income-generating and asset-building mechanisms. Mainly through their credit component, VSLA were expected to make it possible for households to expand old business or enter new, more profitable ones, for example by switching from subsistence to high value agriculture. AM was expected to permit households to meet increases in labor demand associated with collective building and construction work (Marsh, 2003), and to increase labor productivity by making problems of

moral hazard less likely.

To date, there is little experimental evidence on the effect VSLA or similar savings groups, although the existing evidence is generally positive. In fact, VSLA and similar schemes are found to be associated with increases in consumption and asset holding, food intake (Deininger and Liu, 2009, Bundervoet, 2012, Ksoll et al., 2012), and preventive health (Dupas and Robinson, 2013). However, no evidence is available on the effects of such programs on education and child labor. This paper fills this important gap in the literature by relying on a novel dataset with detailed information on both schooling (enrollment, attendance and grade repetition) and child labor, and on their substitution in response to exogenous shocks.

The paper has important policy implications given that VLSA are currently been widely implemented across the developing world as credible, less costly, and more flexible alternatives to standard micro-finance programs, which have been shown incapable of reaching the rural poor, since they rely on formal, centrally regulated financial institutions typically located in urbanised areas (see: Amendriz and Murdoch, 2005; 2010, Stewart et al, 2010, Greaney et al., 2013). Crucially, these positive effects are found to be relevant especially for the ultra-poor (Bundervoet, 2012).

We are aware of no evidence on AM, or interactive effects between programs. Thus, whether AM work in isolation or in combination with VSLA is an open question. One can hypothesize that the effectiveness of VSLA and AM will rely on the strength of trust between group members: the greater the trust, the more willing members are to save and work together. Thus, if AM or VSLA generate trust between members, then a virtuous cycle could ensue, whereby members become more and more integrated, save and work more, and so on. This cycle could be stronger in areas where both VSLA and AM are in operation. Alternatively, the two programs could crowd each other out, such that the effect of the programs in combination is less than the sum of the programs in isolation.

2 Program Descriptions

The primary function of VSLA is to allow households to pool incomes, in a secure and manageable fashion. VSLA are typically composed of 15 to 20 self-selecting households, who meet regularly 3 or 4 times a month to pool income into a common fund, which can then be lent out to group members at group agreed interest rates. Typically, credited money is used to invest in existing or new business, or to cope with shortfalls in income due to unforeseen shocks such as illness or death. Interest rates are typically around 10-20%, much lower than commercial alternatives, and interest payments are invested back into the common fund. For security, funds are kept in a lock-box which requires three different members of the group to open (the members are rotated). To limit misuse, money is lent only when all participants

are present to vote on the borrower's stated usage, amount and interest rate. The fund also has an emergency pool, which cannot be lent, and is to be used in case of necessity. The contributions are discretionary, however, contributions are made with a saving cycle end data in mind, at which point all funds are redistributed to the members proportional to the individual's total contribution. Cycles typically last between 8 and 12 months.

Individuals who fail to repay the loan in time are shunned from the group, and often from the community at large. Aside from the start-up costs of providing information, materials and monitoring, VSLA require limited external resources, in terms of time or money, as they rely upon strength on local networks and the transparency and sharing of information (Greaney et al., 2013). VSLA have been developed as a more transparent, structured and democratic version of informal savings groups found in rural villages across many developing countries (for similar, earlier programs, see: Besley et al., 1993; 1994, Banerjee et al., 1994).

The AM's primary function is to allow households to pool labor resources, on the basis of reciprocity rather than wage. The AM groups typically consist of four neighboring households, who meet four times a week, usually for a couple of hours each time. All members of the group work together for the benefit of one household on a given day, for another on the next convenient day, and so on. Activities generally include farming, building and/or repair work of members' houses (for example, building improved toilet facilities). Thus, AM is an alternative to VSLA for coping with temporary shortfalls in labor. As with VSLA, the AM relies on very limited external assistance, but on strength of local networks. Indeed, shirker households can be shunned by the group, and potentially the wider community. To date, there is no experimental evidence on the AM. This is in spite of other forms of non-pecuniary mutual help, similar to the AM, having being practiced for many years in Mozambique, and endorsed by their government, with evidence that they have proven to be extremely resilient (Marsh, 2003). So, again, more AM evidence is of vital importance.

3 Methodology

The programs were introduced in Nampula in 2009 as an RCT. Eight of Nampula's 15 districts were selected and paired into four 'arms', the control and one for each treatment: VSLA in isolation, AM in isolation and VSLA/AM in combination. The pairing was chosen such that a number of important indicators were comparable across arms, including: demographics, market access, food availability, climatic conditions. Since the programs were offered to all households in the treated districts, but not all households ended up participating, our project will primarily estimate the intention to treat (ITT) effect: the program effect on the areas offered the programs. This is an important measure, since programs are often targeted by region rather than by household.

Baseline date were collected in 2009. The sampling followed a two-stage design. In the treated districts households were sampled from the 'enrollment lists', i.e., the lists of households which had signed up for the respective programs. In the control districts the sampling frame was the list of enumeration areas (EAs) defined in the 2007 Mozambique census. The primary sampling units (PSUs) were VSLA and/or AM groups from the enrollment lists in the treated arms, and EAs in the control districts. In both cases, secondary sampling units (SSUs) were households from within each of the PSUs. The final sample size in the baseline survey was approximately 1700. Endline data were collected three years later, in 2012. Significant efforts were made to follow households, the final attrition between waves was approximately 10%.

Since the randomization was carried out at the district level, and given that households were interviewed both pre and post treatment, the natural estimation strategy is to use the difference in difference estimator (DD). For the DD estimator to identify the causal effect, the common trend assumption must hold: in absence of the treatment, the control and treatment arms follow parallel trends. This assumption is likely to fail in the presence of either asymmetric shocks or differences in pre-treatment growth paths across arms. We control for the former by using unique detailed information on exogenous shocks available in our data. The process of selecting arms with comparable indicators should increase the likelihood of the latter, under the assumptions that households with comparable starting points are also more likely to change at comparable rates.

Our randomization ensures that the programs have not been intentionally introduced into regions with the highest expected benefits. However, it does not solve the household selection problem, whereby households that participate in the programs are systematically different from those who do not. Because we use the DD method, household selection will not bias our results if the systematic differences are constant over time. However, household selection causing systematic differences in trends can bias our results. Thus, we combine our DD models with propensity score weighting (PSW), such that households in the treatment arms which are more comparable to those in the control are given a greater weight in the regressions (see, Hirano and Imbens, 2001 and Hirano et al., 2003, Ravallion, 2008 for an overview of the methods and and Deininger and Liu 2009, Van de Walle and Mu., 2008, and Wang et al., 2009 for applications). Further, in the PSW models we are comparing households in the treated with more 'similar' households in the control, thus our estimates move towards the the average treatment effect on the treated (ATT): the program effect on those who participated in the program.

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