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Does 25 cents more per day make a difference? The impact of livestock transfer and development in rural Zambia ☆

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ABSTRACT

Analyses of the impacts of asset transfer programs often find statistically significant effects on consumption expenditures that are large in percentage terms but small in absolute value. This study explores the practical significance of such impacts using the case of a livestock transfer program among impoverished households in Zambia. As in other studies, results show that the asset transfers increased household consumption expenditure and dietary diversity. Extending previous work, this paper examines whether the increase in expenditures has been large enough to trigger changes in consumption patterns or in subjective assessment of poverty status. Changes in composition of expenditures, composition of diet, and subjective self-assessment of poverty all suggest a growing sense of security and a practically significant change in welfare for treated households. As transfers included three different types of animals – dairy cows, meat goats, and draft cattle – we are able to discern that the specific nature of the asset transferred influences food security impacts. Examination of change in the composition of consumption shows substantial effects on poverty and food security starting within six months of livestock transfers. Persistence of the impact through the next 18 months of our study period indicates that livestock transfers can have a sustained effect on poverty and food security.

1. Introduction

Programs to transfer productive assets to poor households often intend to place recipients on a new trajectory of higher productivity and reduced vulnerability. In some rural settings, transfer of assets in the form of livestock may be a particularly effective mechanism toward this end as the introduction of animal production can contribute to income, improved diet, and greater food security at the individual, household, and community levels (Hoddinott and Yohannes, 2002; Ruel, 2003; Sansoucy, 1995; Randolph et al., 2007). Recently, a few empirical studies including Rawlins et al. (2014), Banerjee et al. (2015), and Jodlowski et al. (2016) have applied rigorous field experiments and found positive effects on food security and poverty indicators attributable to livestock transfers embedded in multifaceted programs. While these studies find statistically significant effects, it is not clear that the effects are sufficiently large to be considered transformative. Reported impacts on per capita consumption expenditures show increases of about US$0.25 per day or more, but absolute levels of per capita consumption remain near international poverty lines after the transfer. This study seeks to determine whether impacts of this scale affect the composition of consumption or subjective attitudes about poverty in ways that suggest meaningful change in welfare.

Poverty status is often conceptualized with reference to expenditures needed to secure a minimum requirement of food and essential non-food goods and services (Ravallion, 2015). Observing greater consumption of goods that are locally considered discretionary or luxury items can therefore signal a substantive transition beyond poverty into greater economic security. We identify goods as luxuries or necessities based on income elasticities from our baseline sample and examine whether there are shifts in consumption toward luxuries which would signal a qualitative change in economic status despite low total expenditures. Similarly, we examine the change in composition of household diet to understand whether observed increases in household dietary diversity

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correspond to improved nutritional quality. Finally, we examine whether increased total expenditures and changes in the composition of diet and expenditure correspond to changes in self-perceived poverty and food security status. By looking for variation in these outcomes over three different species of livestock that are transferred (dairy cows, draft cattle, or meat goats) we observe the degree to which specific types of assets influence outcomes for recipients and others in their communities.

As in Jodlowski et al. (2016) we use the rollout of a multifaceted asset transfer program administered by the NGO Heifer International to identify current and future recipients of livestock transfers. Identification of these two groups is the basis of a quasi-experimental approach to impact assessment in which future recipients are the comparison group for current recipients. Other recent work on the impact of asset transfers (Banerjee et al., 2015) uses similar field experiments to assess the impact of multifaceted asset transfer programs. Like other recent studies, this paper also uses the NGO's program rollout to address the selection bias and endogeneity that undermined earlier work. In this paper we first validate the results of Jodlowski et al. (2016), finding that an increase in consumption expenditures of 20–30% (about US $0.25 per capita per day) can be attributed to the livestock donation and capacity building program. Extending Jodlowski et al. (2016) and other studies, we then assess whether the increases in expenditures have been significant enough to qualitatively change consumption patterns. We find evidence of increased consumption of foods that can be considered luxury goods, suggesting qualitatively improved economic status among recipients. We further use subjective self-assessments of poverty and food security to confirm whether an enhanced sense of economic security has emerged. The analysis includes a sample of households that had selected out of participation to indicate the degree to which selection bias could have influenced results had the general population been used as a comparison group, rather than the subset of future livestock recipients.

This paper continues with background on the arguments and evidence concerning livestock transfers in developing countries. We then present our research methods, explaining both the structure of the field experiment and the econometric techniques applied in this impact assessment. This is followed by a presentation of results and conclusions.

2. Background

Livestock may represent a particularly strategic form of asset transfer. In developing countries, livestock provide nutrient-dense animal source foods (ASF) and a stable source of income through sales of milk, meat, manure, draft power or the animals themselves (Randolph et al., 2007; Murphy and Allen, 2003). Moreover, livestock can serve as a store of wealth and as insurance that can be liquidated when needs arise (Sansoucy, 1995; Hoddinott, 2006; Alary et al., 2011). Additionally, increased investment in livestock can diversify income sources, provide continuous employment for men and women, and can serve as an income source for households with very little or no land (Upton, 2004).

Livestock production may represent a pathway to help poor people move out of poverty by providing access to market opportunities, increasing income and improving a household's asset base (ILRI, 2006; Randolph et al., 2007). Animal agriculture may also offer a positive spillover effect on the local community by increasing the availability of nutritious but perishable foods that might not be provided through external markets. As livestock development can affect the local food economy, it could be expected to have a disproportionately strong impact on food security compared to its poverty effect. In addition to the direct provision of ASF, livestock can enhance crop productivity through supply of manure and draft power (Otte et al., 2012). While animal production can divert food crops into feed, livestock may also convert low value, unpalatable and even inedible materials into nutrient dense foods (Smith et al., 2013).

Animal products such as milk, meat, and eggs contribute to enhanced food utilization through their nutrient density. Essential nutrients which are lacking in plant based foods are naturally more bioavailable in animal products (Smith et al., 2013). Six micronutrients that are critical for human physiology -calcium, vitamin A, B12, iron, zinc, and riboflavin- are primarily obtained from ASF. For example, 100 gm of beef is more than enough for the entire day of protein, vitamin B12 and zinc requirement (Murphy and Allen, 2003). Adding a small amount of ASFs to staple based diets can contribute to food security by improving the quality of diet substantially (Murphy and Allen, 2003).

Despite the potential contributions of animal agriculture to development, the livestock sector is often neglected in development policy in Africa. Alary et al. (2011) argued that although some African countries consider livestock as an important sector, cereal crops have received far more attention in policy papers, empirical analysis, and policy initiatives. One reason for limited government commitment to livestock development could be the absence of rigorous analysis to quantitatively measure the contributions livestock make.

In the Copperbelt Province of Zambia, ownership of livestock, aside from poultry, has been rare until recently. Despite the natural potential for crop and livestock production, previous reliance on mine employment had left little livestock development. In this context, Heifer International-Zambia (HI-Zambia), has been sponsoring livestock donation with coordinated training to enhance both human and social capital. The core of the program is to transfer pregnant livestock to selected families who will pass on the first female offspring to other project families. The type of animal transferred depends on the environmental and market context, as well as the capacities of the target families. HI-Zambia emphasizes a multifaceted approach that attempts to build the capacities of the individual families they support and of groups of families that embody social capital to provide services to the members after the formal close of the NGO program. Social capital is developed through a coordinated training on various social issues such as sharing and caring, self-help group formation, benefits of collective action, group self-reliance, and business management. Other support includes regular monitoring and evaluation, continued training, establishment of basic veterinary service providers, establishment of cooperatives, and intermediation with marketing agents. In addition, the requirement that beneficiaries 'pass-on' livestock and knowledge reinforces social capital for sustained impact.

3. Research methods

3.1. Data

This research took advantage of the rollout of a livestock donation program by HI-Zambia to establish a field experiment that enabled the measurement of treatment effects. As in Jodlowski et al. (2016) we use the rollout of asset transfers to identify current recipients of livestock and future recipients. Since both current and future recipients are subject to the same selection processes, we avoid problems of selection bias. Moreover, we are able to identify future recipients who are spatially and socially remote from the current recipients and those that are in close physical and social proximity. This distinction allows for identification of spillover effects.

Prior to this research activity, HI-Zambia identified a number of farmer groups from communities in the Copperbelt Province which were eligible to receive livestock and associated services. However,