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Dynamics of Poverty and Wellbeing in Ethiopia
An Introduction to a Special Issue of the Ethiopian Journal of Economics[1]

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Abstract

Understanding change is critical to policy formulation. Who benefits, who loses from change, and what causes change are core policy questions. Panel data are central to understanding change, and this special issue of the journal is devoted to five papers examining change in wellbeing as measured by two waves of data from the Ethiopia Socioeconomic Survey (ESS). The papers cover changes in consumption poverty, multi-dimensional poverty, food security, malnutrition in the form of wasting and underweight status, and smoothing patterns of nonfarm enterprise activities. The ESS data is freely available for download and immediate use. While the papers in this issue draw from the first two waves of data (2011-12 and 2013-14), the third wave of the ESS (2015-16) is now also publicly available. The ESS is a collaborative effort of the Central Statistical Agency of Ethiopia and the World Bank's Living Standards Measurement Study – Integrated Surveys of Agriculture program.

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1. Introduction

Designing policy is often about how best to induce beneficial change. Policy aimed at reducing poverty and improving wellbeing needs to be informed with the knowledge of what factors are related to changes in individual or household outcomes. Repeated samples of cross-sectional data are highly informative about levels and profiles of poverty and various dimensions of wellbeing, and can provide measures of change at the national or regional level. But, cross-sectional data is largely uninformative about change in outcomes for individuals or households. In contrast, panel data such as the recently released Ethiopia Socio-economic Survey (ESS), monitor households over time with repeat visits and provide detailed information on the changing status of the sample households over time.

Simply in terms of descriptive statistics, panel data offers important information that cannot be unpacked from cross-sectional data. As one example, using cross sectional data, World Bank (2015, Table 1) reports that poverty in Ethiopia declined by 9 percentage points between 2005 and 2011.[5] A naïve interpretation of this might be that 9 percent of the population went from being poor in 2005 to not poor in 2011, but of course this fails to account for households that may have become poor in this period. All we know from the cross-sectional estimates is that (9 percentage points) more people moved out of poverty than became poor. The cross sectional estimates cannot tell us how many people were poor for some part of the two time periods.

Panel data also offers significant value in reducing potential bias from confounding factors in the regression model context. The empiricist may observe that a household has increased income over time, while also observing that the household has changed farming practices. Despite the observed correlation between the two, the estimated effect of the new

[5] This estimate is based on data from the Household Income and Consumption Expenditure survey, which is nationally representative cross-sectional household data. The estimated poverty rate in 2005, based on the national poverty line was 38.7 percent and this dropped to 29.6 percent by 2011.

farming practice may be affected by other confounding factors biasing the estimated parameters. For example, if unobserved ability affects both the likelihood of adopting the new practice and the return to the new practice, then failing to control for ability will result in omitted-variable bias in the estimated return to adopting the new practice. Because a first-difference estimator can essentially sweep away all time-invariant unobservable attributes of the household (or whatever the unit of analysis), panel data significantly reduces the potential for unobservable omitted variables to bias regression inference.

For these reasons, panel data can play a large role in helping the researcher, analyst and policy makers in understanding drivers of change. This special issue presents five papers using the ESS panel data to examine changes in poverty and other dimensions of wellbeing in Ethiopia between 2011/12 (ESS wave 1, ESS1) and 2013-14 (ESS wave 2, ESS2).

2. Overview of papers

The ESS began in 2011 (ESS1), with 3,969 rural and small town households. In 2013, a second wave (ESS2) was administered, revisiting the ESS1 households and an additional 1,500 urban households; the panel sample includes rural and small town households only. Four of the five papers in this issue use these first two waves, while a fifth paper explores change within the year, leveraging the timing of multiple household visits and recall data within the ESS1.

The first two papers in this special issue examine cross-sectional trends and panel dynamics of wellbeing using three different poverty measures. The first paper examines changes in consumption and consumption-based poverty, and compares these to changes in an index of nonmonetary aspects of wellbeing. Poverty can be viewed as taking many different forms, ranging widely over a set of monetary (consumption or income) and nonmonetary dimensions (health and education). While the body of literature on poverty dynamics is extensive, the majority of studies draw conclusions about the dynamics of income- or consumption-based poverty only; there is a growing,

but still relatively young, literature base on the dynamics of the multi-dimensional nonmonetary aspects of poverty.

The authors find that, despite defining both measures of poverty to capture the bottom 30 percent of their underlying distributions (consumption per adult equivalent and a weighted deprivation index), only a fourth of individuals who are poor in either dimension, are poor in both dimensions. In other words, if someone is identified as poor as measured by consumption deprivation, there is only a 25 percent chance that this person will also be identified as poor as measured by deprivation in the nonmonetary index. Similarly, there is little overlap between quintiles of annual consumption per adult equivalent and the deprivation index in both years; again only 25 percent of the rural and small town population fall in the same quintile of both distributions. This illustrates that the choice to use a monetary or non-monetary measure of poverty has a meaningful impact on *who* will be identified as poor at a given point in time.

When comparing the dynamics of the two poverty indicators, separately, similar levels of movement in and out of poverty are observed. However, even though the dynamics of multidimensional and relative consumption-based poverty seem to tell similar stories, the authors find evidence suggesting that changes in the two underlying values of deprivation and consumption are independent of each other; that is, knowing what happens to an individual's deprivation index between waves is not informative of what happens to that individual's consumption over the same period, and vice versa. Approximately 59 percent of individuals whose deprivation index worsened between waves also experienced a decline in consumption; the other 41 percent saw an improvement in their consumption. Similarly, nearly 53 percent of individuals who improved in their multidimensional wellbeing actually experienced a worsening in consumption. Testing the hypothesis of independence with a Pearson's chi-squared statistic, results in failure to reject the null hypothesis that the two distributions are independent ($p=0.267$).

The second paper similarly examines the dynamics of poverty by analyzing changes in poverty status based on annual consumption per adult equivalent and household asset ownership. The authors first assess changes in consumption expenditures; in the aggregate, total and food expenditures decreased between 2012 and 2014, while nonfood expenditures increased. Additionally, the composition of expenditure shifted slightly; on average, households shifted their relative share of consumption to nonfood items. Further, as Bennett's law of food demand predicts, forward movers (that is, those whose expenditures increased over the waves) spent smaller shares on starchy staples, but larger shares on nutritious foods like animal-source foods, vegetables and fruits; conversely, backward movers increased the proportion spent on staples and decreased the relative share spent on more nutritious foods.[6] These results show that movement in and out of poverty is also accompanied by shifts in wellbeing as measured through quality of food consumption.

The authors also compared dynamics of consumption-based measures of poverty to asset-based ones. An interesting distinction with this approach is that both of these measures are typically viewed as capturing a monetary measure of wellbeing, though consumption is viewed as short-run daily wellbeing, while asset indices are often interpreted as long-run proxies for wealth. Approximately equal proportions of the population escape and fall into consumption-based poverty between waves (15 and 16 percent, respectively); while for asset-based poverty measures, 14 percent escaped from poverty while 9 percent of individuals fell into poverty. This suggests that they asset-based measure of poverty is slightly more stable (perhaps due both to greater stability in longer-run measures and to there being less noise in these measures). In contrast to the first paper, when testing for independence in change of these two measures, this paper rejects the hypothesis of independence. That is to say observing that someone has improved in the dimension of asset-based measure of wellbeing does inform us that this person is also more likely to have improved in the dimension of consumption. There appears to be overlap in the signal from observing

[6] For a discussion of Bennett's law, and comparison with Engel's related law, see Timmer, Falcon and Pearson (1983).

change in these two monetary measures of wellbeing despite their conceptual dissimilarity.

Two key findings emerge from the first two papers. First, assessing changes in wellbeing through cross-sectional trends fails to capture the extensive amount of movement in and out of wellbeing at the individual level; and, second, changes in one indicator of wellbeing over time do not necessarily imply changes in another measure. The third paper explores these two themes using yet another measure of wellbeing: food security. The authors of this paper examine four measures of food security – two consumption-based (calories and dietary diversity) and two-experience based (whether food insecurity was experienced in any month, and whether any actions were taken in response). Food insecurity is a critical issue in Ethiopia; considering all four measures in both 2012 and 2014, the share of the food insecure population never fell below 25 percent. Consequently, understanding the complexities of chronic and transitory food insecurity, as well as how consumption- and experience-based measures interact, is important for policy design.

Similar to papers one and two, the authors of this paper find that while insecurity appears to remain stagnant when examining cross-sectional trends, there is actually significant movement in and out of food insecure states. For example, although approximately 30 percent of rural and small-town individuals had inadequate dietary diversity in both 2012 and 2014, the panel data show that 46 percent had inadequately diverse diets at some point over this period. Further, while many individuals demonstrated improvement in several food security indicators over time, a substantial share of the population saw their food security status worsen from 2012 to 2014; 23 percent of the population transitioned from adequate to inadequate calorie consumption and 18 percent of individuals reported facing zero months of food insecurity in wave 1 but at least one month of food insecurity in wave 2.

Comparing the four measures of food insecurity in the cross-section reveals similar patterns of food insecurity in levels and trends; but, analysis of the panel data shows there is very little co-movement of the measures. For most

combinations, observing improvement in a consumption-based measure of food security for an individual tells an observer very little about whether that same individual has also improved in an experiential-based measure.

The fourth paper in this special issue examines the dynamics of under nutrition among children living in rural and small-town Ethiopia. The paper looks specifically at changes in wasting and underweight; wasting, defined by a weight-for height z-score below -2, is a measure of acute and severe malnutrition, while underweight, defined by a weight-for-age z-score below -2, is a broader measure of malnutrition in children 6-59 months. Both forms are associated with negative health, development, and long-term outcomes. While many studies have looked at correlates of underweight and wasting in Ethiopia using cross-sectional analysis, this paper exploits the panel setup of the ESS to estimate fixed-effects models for changes in each outcome. The fixed-effects model improves upon the cross-sectional analysis by controlling for all time-invariant characteristics that may influence the explanatory variables in addition to wasting and underweight.

The ESS data show that underweight prevalence declined slightly from 27 percent in 2012 to 25 percent in 2014, while wasting prevalence stalled at 11 percent. Male children, those with illiterate mothers, male household heads, and older household heads, and those experiencing illness in the last two months were significantly more likely to have negative nutrition outcomes (lower z-scores or higher likelihood of wasting/underweight). Furthermore, having a solid roof, improved toilet, female cow, and laying hen were repeatedly significantly associated with positive outcomes.

While more children recovered from being underweight (16 percent) than became underweight (11 percent), 12 percent of children were underweight in both years, emphasizing the need to better understand what drives *changes* out of undernourishment. After controlling for individual fixed effects, the authors find that illness in the last two months remained significantly associated with changes in both z-scores and underweight status, increasing negative outcomes for each. Additionally, community-level access to main road access, which was not significant in the cross-sectional models, was

associated with positive changes in weight-for-height z-scores. When also controlling for baseline status, they observed that factors driving changes to or from undernourished states vary, and children wasted at baseline were generally more responsive to household level changes than non-wasted children. For example, children wasted at baseline saw improvements in weight-for-height z-scores when they gained an improved toilet or water source; non-wasted children were not statistically significantly affected by such changes.

The final paper included in this special issue uses only the first wave of the ESS data but adds to the literature on wellbeing dynamics in Ethiopia through its findings on seasonal wellbeing and income generation. Specifically, this paper explores the role non-farm enterprises (NFEs) play in seasonal income generation, consumption smoothing, and risk mitigation. Many studies from sub-Saharan Africa show that NFE operation is positively correlated with household welfare and that NFEs present an opportunity for households to smooth their income in the agricultural off-season. Gaining a better understanding of these mechanisms in Ethiopia, where more than 20 percent of rural and small town households operate an NFE, is helpful for developing effective and sustainable policies targeting vulnerable agricultural households. Nearly 54 percent of NFE-operating households report their NFEs operate seasonally. However, the authors do not find evidence suggesting this seasonality complements agricultural activity; the most active months for NFE activity line up with the harvest and crop sale seasons, peaking immediately after the harvest and almost simultaneously with the sale of crops. Furthermore, very few enterprises report high NFE activity during planting season. Rather than using NFEs to supplement periods of low agricultural income, households generate a disproportionately high influx of income from the months of October to January.

Additionally, NFE households do not report lower rates of food insecurity than their non-NFE counterparts. The authors use a negative binomial regression model to estimate the effect of NFE income on food insecurity spells, as measured by the number of months a household reported facing food insecurity in the past year. One might reasonably expect two

households at the same *level* of consumption -- where one is engaged in farming and the other is engaged in farming and has an NFE -- to exhibit different *patterns* of consumption throughout the year. Consequently, if NFEs were helping households to buffer against food insecurity, one would expect each additional 1,000 Birr of NFE income to have a negative impact on months of food insecurity. However, this paper shows that an additional 1,000 Birr of NFE income has no statistically significant differential bearing on months of food insecurity. Further, the authors find no correlation between operating an NFE and facing fewer spells of food insecurity.

3. Facilitating Data Use

In releasing these articles in a special issue of this journal, our aim is both to contribute to the literature on dynamics of wellbeing in Ethiopia and also to highlight the potential scope of the ESS data for research covering a wide array of topics. The ESS consists of five questionnaires. A household questionnaire administered to all households in the sample that collects demographic and socioeconomic details on individuals in the household. A community questionnaire, administered to a selected group of community members, collecting information on the socio-economic indicators of the enumeration areas where the sample households reside.[7]And, there are three agriculture questionnaires -- post-planting, post-harvest, and livestock questionnaires -- administered to all household members who are agriculture holders, that is those engaged in agriculture activities.[8]

The community questionnaire obtains information on community organizations; resource management; changes in the community; key events;

[7]The community data is not necessarily representative of all communities in Ethiopia, but is the community-level data associated with the sample of households with are representative of the population of Ethiopia. The community data represent information that is common to the households.

[8] More specifically, a holder is a person who exercises management control over the operations of the agricultural holdings and makes the major decisions regarding the utilization of the available resources. S/he has technical and economic responsibility for the holding. S/he may operate the holding directly as an owner or as a manager. Hence it is possible to have more than one holder in single sampled households. As a result, the ESS may include more than one agriculture questionnaire in a single sampled household if the household has more than one holder.

community needs, actions and achievements; access to infrastructure; and local retail price information. The post-planting and post-harvest agriculture questionnaires focus on crop farming activities and solicit information on land ownership and use; farm labor; inputs use; GPS land area measurement and coordinates of household fields; agriculture capital; irrigation; and crop harvest and utilization. The livestock questionnaire collects information on animal holdings and costs; and production, cost and sales of livestock by products. In most cases the instruments are largely the same across waves of the ESS – One exception to this is the livestock module which was revised significantly in wave 3 of the ESS.

The household questionnaire provides information on basic demographics; education; health (including anthropometric measurement for children); labor and time use; saving; food and non-food expenditure; household nonfarm income-generating activities; food security and shocks; safety nets; housing conditions; assets; credit; and other sources of household income. Household location is geo-referenced in order to be able to later link the ESS data to other available geographic data sets.

To enhance the value of the ESS data, a set of geospatial variables are included with the ESS release and re linked to the data with the geo-referenced household locations. These variables include measures of distance, climatology, soil and terrain, and other environmental factors. As a specific example, there are geospatial variables measuring distance between field and household, slope and elevation of field, and potential wetness index for field locations. Time-series on rainfall and vegetation that identify the ESS agricultural season relative to normal conditions, are also part of the processed variables. All of these data are intended to provide an understanding of how geophysical characteristics vary at the landscape level.

The Ethiopian Socioeconomic Survey is a collaborative project between the Central Statistics Agency of Ethiopia and the World Bank Living Standards Measurement Study- Integrated Surveys of Agriculture (LSMS-ISA) program. The data, questionnaires, manuals, basic information documents, and data launch reports are all freely available for download at: http://go.worldbank.org/HWKE6FXHJ0

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