

Lecture 5: Microdata for Macro Economists: Agriculture Data

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Q: Do we have causal evidence on whether people in developing countries move out of agriculture because of increase in agriculture productivity or increase in other sector productivity?

A: This is very much an interesting topic, and I'm sure that Julieta will speak to this. Your question is really about whether we should think of labour being pushed out of agriculture by improvements in productivity or pulled by what is happening elsewhere. My own view is that this is probably context-specific. Both mechanisms are relevant, with different force in different situations.

Q: What is your take on the quality of production data on developing countries especially in Africa -FAOSTAT?

A: My own view is that the quality of the macro data (FAOSTAT and USDA) varies widely from country to country. Some countries in Africa have highly effective agricultural data collection systems. Other countries have relatively weaker systems. One potential test is that for a few countries, we have carefully measured data from nationally representative household surveys. These data often match up very poorly with national aggregates. However, the household surveys generally do not capture large commercial farms, and so the two data sources are not strictly comparable. It is possible, in principle, that the nationally representative household survey data may deviate from macro aggregates, but sometimes these deviations raise serious questions about the validity of the macro data.

Q: One major bias in capturing self-employment in developing countries is that most of those who engage in agriculture do not consider it as a form of self-employment. One has to ask this very directly for the participants to think of it as employment.

A: This is true, but many household surveys and labour force surveys do a pretty good job of eliciting this information. We also have data coming from time use surveys that reinforce what we find in labour force and household surveys. What is tricky is that the 'hours worked' are difficult to nail down very well. When a farmer goes to the field all day but takes a break in the heat of noon, should we count that as work? Do we count the time spent planning? Marketing? Interacting with traders? Tight measurement of hours is difficult.

Q: How does the USDA dataset on International Agricultural Productivity rank in terms of data quality against these datasets?

A: This is essentially the Fuglie data that Julieta is referring to. It's high quality, although it is heavily based on macro aggregates from FAO, which do not always coincide with what we measure more carefully in micro studies.

Q: Still struggling to understand why N is salaried labour instead of all those employed in the agriculture sector including subsistence

A: N is definitely not just salaried or wage labour. But sometimes we can use wage data to try to impute a cost to family labour that is used on the farm. There are obviously problems in doing this; we don't think that the opportunity cost ("shadow price") of family labor is necessarily the same as the market wage. But it's sometimes a useful benchmark.

Q: Yes, the measurement is not easy.

A: It's actually a difficult conceptual issue: what is "work"? The same issue applies for academic economists... Does it count as labor if I am "thinking about" my research? Only if I am actually writing code?

Q: Aren't land/labour and capital/labour highly correlated?

A: Probably but not necessarily. The definition of capital here excludes land, since land enters separately into the production function. So capital is distinct from agricultural machines. What is probably true is that most tiny farms tend to have little capital, and most farms with a lot of capital are probably large. But even this relationship breaks down in the East Asian context and in horticulture everywhere, where small farms can often be highly capital-intensive. Think, for instance, of intensive greenhouse production of vegetables, where land per labour may be small but capital per labour is very high.

Q: Can we say that the differences which persist even after adjusting for quality and other factors might be due to differences in implementation of various reforms say land, labour etc ?

A: There is certainly some indication that this might be true. This possibility is explored in a terrific series of papers by Tasso Adamopoulos, Diego Restuccia, Chaoran Chen, and other co-authors. I'd encourage you to look at these.

Q: How much of the relatively higher profits of small farms may be due to measurement error in self-reported survey data?

A: To be clear, this is profits per acre. And there is some good work by researchers at the LSMS team (Talip Kilic's group, from the last lecture!!) documenting measurement error of exactly this kind. Another explanation is that small farms have a tendency to assign a relatively low shadow price (opportunity cost) to household labor, which tends to encourage high use of labor per unit of land. Yet another measurement issue is that *within countries*, farm size generally tends to be larger in places where land quality is lower...

So it's a complicated set of measurement issues.

Q: Does the U shape imply that returns to scale change sign or an underlying talent misallocation?

A: I think neither one, exactly... The argument in the Foster-Rosenzweig paper is that the cost structure drives this relationship -- and especially the cost of labour. Their argument is that

this reflects the high transaction costs of adding labour to small farms. You can't just hire one hour of labour or a fraction of a worker in most tasks in agriculture; so you have to pay relatively high costs for small increments in labour (to go with slight increases in farm size). But beyond a certain scale, labour demand becomes effectively smooth, and machines substitute for labour. Both of these things relate to the U-shape.

A: You might want to look at the Foster-Rosenzweig paper: <https://egc.yale.edu/rosenzweig-foster-2022-are-there-too-many-farms-world-labor-market-transaction-costs-machine>.

Q: On the issue of the gains from worker movements to urban centres being tiny, on what time interval is this based on? On the short-term the gains might be small but on the long-term they could they be larger?

A: Yes, good question. That study looks a few years out. I can't resist plugging my own study that found bigger gains after a few years in other countries.

https://www.dropbox.com/s/i2aayu5f0uc0kv2/LMMVW_submit.pdf?dl=0

There is also the Bryan, Chowdhury, Mobarak, 2014 ECMA experiment that found big gains experimentally over a few months

Q: I am not sure how to think about technology adoption in the current discussion and the decomposition from the beginning. If farmers use different technologies (say modern and traditional), productivity will look higher for some farms but maybe because of the differences in technologies.

A: I know what you mean. Some of it will show up in TFP and some will show up in higher capital, as technologies are often embedded in machines. It could show up elsewhere too if it saves labour say. Do you want to ask Julieta in the Q+A?"

Q: What is the x-axis in the U-shape graph on slide frame title "Productivity differences across farms". I was assuming the number of workers per acre?? or farm? Is that time?

A: It is 'Farm size in Acres'. You might want to look at the original paper: <https://egc.yale.edu/rosenzweig-foster-2022-are-there-too-many-farms-world-labor-market-transaction-costs-machine>.

Q: Is it possible to disentangle the TFP changes across time? What are your thoughts about how to measure aggregate innovation in agriculture in developing countries? Would you recommend any studies related to this?

A: This is a challenging thing to do. Fuglie's work (with various co-authors) is a great place to start. But one of the challenges of the traditional method that is used -- which is essentially regressing output on all inputs, and treating TFP as the residual -- ignores the fact that inputs are endogenous. Higher TFP induces intensification of inputs, and it's difficult to find good empirical strategies for coping with this challenge.

Q: Agriculture in many African countries failing to spur growth.

A: Absolutely true, although this could in fact be a result of improvements in non-agriculture pulling labour and other inputs out of agriculture.

Q: I would like to get a sense of what private data can be used. Can you provide some example of papers that use it?

A: What do you mean by 'private data'? I think essentially all of the data sources that Julieta has been referring to are public.

Q: For the LSMS-ISA data, normally the self-reported farm sizes are extremely different from the GPS sizes. What would be the most appropriate to use in the analysis

A: I think it's probably not right to say that the farm sizes are 'extremely' different. There are, however, systematic differences. A nice paper (<https://www.sciencedirect.com/science/article/pii/S0304387818306588>) shows that in the LSMS countries, the smallest farms overstate their land holdings, while the largest ones tend to understate their holdings, relative to the GPS measures.

My own sense is that the GPS data are probably better, where they are available.

Q: How would applying the Kyriazidou (1997) and Dustmann et al. (2007) model in the context of research on time allocation for work and labour productivity in Ethiopian family farms and non-farm enterprises help to ensure that the estimates of the relationships between variables are as unbiased as possible?

A: I'm not familiar with these specific studies. I can only say that measuring labor inputs -- and hence labour productivity -- is exceptionally difficult, and it's not even straightforward conceptually to define labour use in agriculture. This is especially true in low-income settings. Labor use in **any** household enterprise is difficult to measure (and to define). How do you measure the labour input into the time someone spends running a vegetable stand? How do you think about slack time? Very difficult stuff to do well, with any method.

Q: What do you mean by 'private data'? I think essentially all of the data sources that Julieta has been referring to are public. I think in the end she mentioned people using data from startups.

A: I think there is a working paper (Caunedo and Kala) that uses data on a tractor rental startup in India. I'm not aware of others, but I'm sure there are some.

Q: The moral hazard issues associated with labour productivity are hard to measure. This implies that computing labour productivity is not accurate. What is the best method to take care of moral hazard issues in labour?

A: A huge question... My interpretation of your question relates to the differences between hired labour and family labour. It is striking that hired labour gets used, typically, in a very distinct set of tasks where moral hazard issues can be addressed through monitoring.

My own approach is generally to treat hired labour and family labour as distinct inputs."

Q: Could someone elaborate more on ex-ante vs. ex-post productivity? For example, how are they differently measured?

A: The point is that ex post productivity includes outcomes that are influenced by shocks to production. Since many inputs are applied before shocks are realized, our measures of output in relation to inputs are influenced by shocks (hence ex post). Measuring ex ante productivity would involve some kind of expectation of output... So it requires knowing something about the distribution of shocks.

Q: Thank you for a fascinating presentation. One quick question - what is the status of the literature on the impact of index based insurance on small holder agricultural productivity? Are there published works?

A: Please how much of the cross-country differences in agricultural productivity that can be attributed to weather.

Q: What is the status of the literature on the impact of index based insurance on small holder agricultural productivity? Are there published works?

A:Gosh. Great question. think you might find something on the VoxDev Lit piece on agriculture that Julieta mentioned. I don't have the reference at hand.