Receiving incorrect information is costly: Diffusion and accuracy of market information among farmers in northern Ghana

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Background

The recent adoption of Information Communication Technologies (ICTs, namely mobile phones and radios) in rural areas of Sub-Saharan Africa has brought new evidence that an updated and reliable flow of information can have direct benefits for farmers' welfare. However, if correct market information can benefit the users, incorrect information can be costly.

In this study we explore the diffusion (quantity) and the accuracy (quality) of price information among farmers in northern Ghana, with a focus on the role of ICTs.

Research questions

Two research questions motivate the whole study:

I. How different ICTs and sources of information affect the diffusion of market information?

II. What factors determine the accuracy of market information?

Theoretical framework

Each rural household chooses where to sell the marketable surplus based on three factors: the amount of proportional and fixed transaction costs associated to the transaction, and the expected price in a certain market. Receiving the right price information at the right time allows farmers to sell the surplus where and when the profit is maximized.

Data at transaction level enable us to know the diffusion and quality of market information each seller had at the time of the sale. The first is based on the number of prices of the crop traded known by the seller in different markets, whereas the second is assessed ex-post based on prior expectations. Comparing the price obtained in a transaction with the price expected by the seller allow us to investigate how farmers are well informed on market information.

Empirical models

The diffusion of market information is estimated with a count data model. The number of prices known at the time of a sale (p_k) depends on the quantity to be sold (q_i), the quality of the crop (w_i, for lower quality may be not worth spending time on finding price information), the remoteness of the households and the means and sources used to gather price information (z_i)

$$p_k = f(q_i, w_i, z_i). \qquad \text{Eq. 1}$$

Due to under-dispersion on the data, Eq. 1 is estimated with a Generalized Poisson.

The price received by a farmer can be lower/same/higher than its expectations. The quality of price information ($\bar{p}_i$), meant as the difference between price expectation and price received, depends on the source (s), the technology to gather price information (t), and household characteristics (z_i)

$$\bar{p}_i = f(s, t, z_i). \qquad \text{Eq. 2}$$

A multinomial probit is used to estimate Eq. 2.

The data

We collected primary data in northern Ghana on 343 selling transactions made by 202 households. One of the most interesting aspects of the data is the availability of detailed information for individual selling transaction that is seldom available in other surveys.
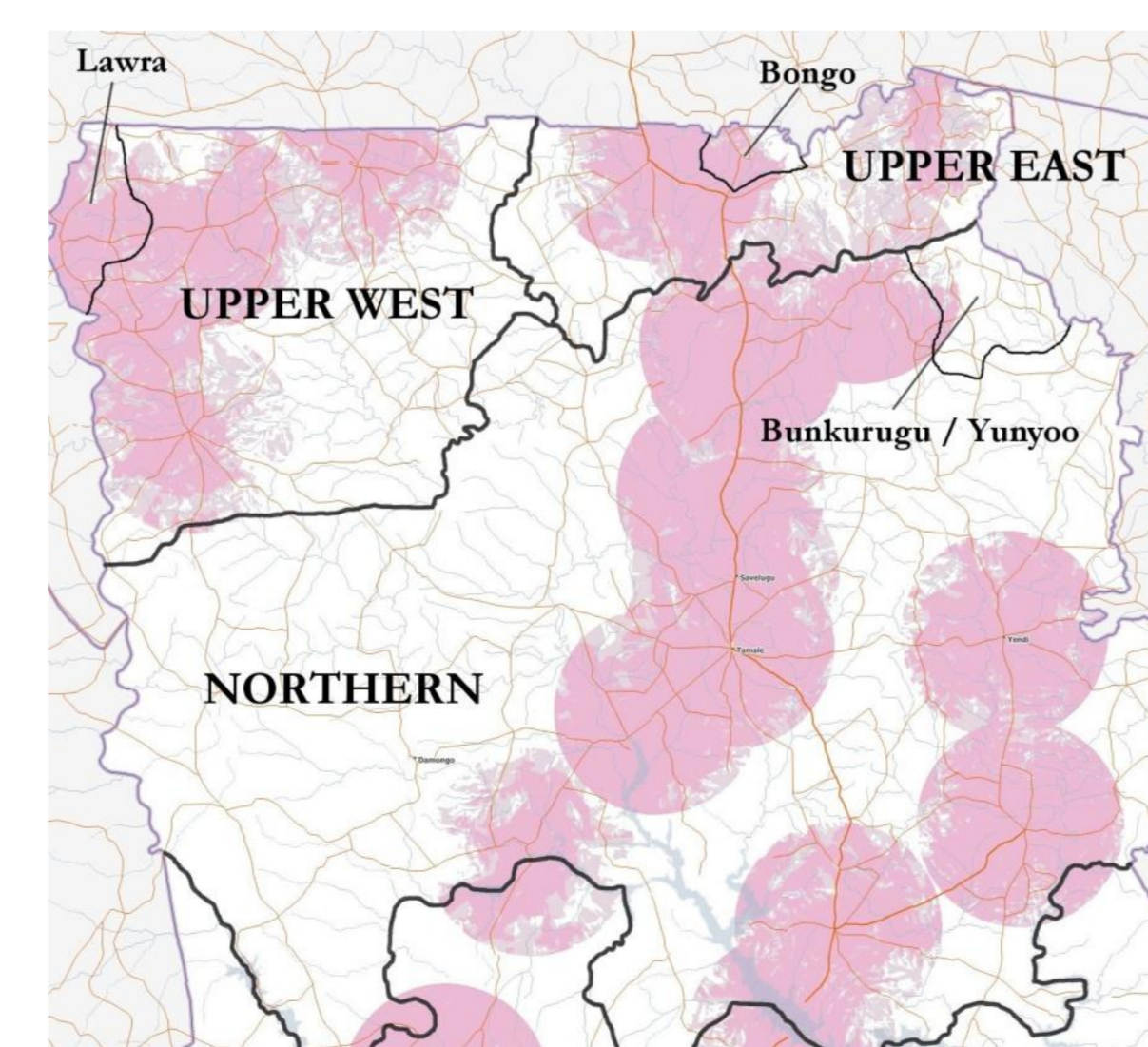

The data include the extension of market information available for each seller, how the information was received (mobile phones, radios, "word of mouth"), the different source of information (neighbours, extension officers), and the characteristics of the transactions (place, duration, etc.).

Fig. 2: Study area and mobile network coverage (in pink)

Preliminary results

Preliminary results show that the use of mobile phones and radios increase by 30% the number of prices received. Obtaining prices from neighbours is a way to gather several market prices, however the accuracy is low and increases by 26% the likelihood the expectations are higher. Prices reported by extension agents, instead, are likely to have a downward bias. Finally, the extent of market information is larger if the spouse of the head of the household bargains the transaction, and in those cases the households are more likely to receive the expected price.

Key points

Determinants of diffusion (quantity) of market information

- Farmers that received information via radios or cell phones know 30% more market prices than those who used "word of mouth".

- Neighbours are more prolific sources of market information than extension agents.

- Women that bargaining the sale are more market informed than men.

Determinants of accuracy (quality) of market information

- Price information reported by neighbours has an upward bias, while prices reported by extension agents are likely to have downward bias.

- No significant differences between ICTs.

- More extensive is the market information received by the households, more they are likely to receive the expected price.

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