

## What is beautiful?

### The inverse relationship between farm size and productivity in maize farming in Southern Rhodesia 1900 – 1965.

Jutta Bolt (University of Groningen; [j.bolt@rug.nl](mailto:j.bolt@rug.nl))

Erik Green (Lund University; [erik.green@ekh.lu.se](mailto:erik.green@ekh.lu.se))

In searching for the best way to improve agricultural productivity, the broad consensus has for decades been that there exists an inverse relationship between farm size and productivity levels. Small-scale farms are found to be more productive than large-scale farms and should thus be supported in order to increase productivity (Lipton, 2009; Griffin et al. 2002; Moyo, 2001; Berry and Cline, 1979; Cornia, 1985). National and international agricultural policies have to a large extent been based on this alleged existence of an inverse relationship (World Bank 1994, Djurfeldt et al. 2005). The main argument for the superior productivity of small-scale farms is that in an environment of labour abundance and low levels of technology, small-scale farmers are able to more efficiently and intensively cultivate all of their land. Small farms employ only family labourers who are all residual claimants to profit. They thus have a greater incentive to put in effort and their work need less monitoring and supervision (Deininger and Feder, 1998). In contrast, large-scale farms cultivate their land more extensively and leave parts fallow. For cultivation they have to rely on hired labourers, whose work needs to be monitored and supervised. This combination raises production costs and lowers efficiency of large-scale farms (Berry and Cline, 1979).

Recently, the inverse relationship between farm size and agricultural productivity has become subject of debate, especially within an African context. First of all, Africa is, and has historically been, a labour scarce economy, thus missing one of the most important pre-conditions for such an inverse relationship. Moreover, the empirical support for the inverse relationship has been found very weak, particularly for Africa (Sender and Johnston, 2004; Dyer, 2004). A fundamental problem with previous research on the inverse relationship in Africa is that they are mainly based on cross-sectional comparisons and thus fail to incorporate the effect of technological and organisational change on the

relationship between scale of production and productivity. Additionally, very recent studies argue that in order to improve agricultural productivity more rapidly in Africa, the scale of production has to increase from family farms to medium and perhaps even large farms (Collier and Dercon, 2009; Gibbon, 2011).

In this paper we aim to contribute to this debate by providing the first systematic longitudinal analysis of farm size and agricultural productivity, by tracing the development of both large, medium and small-scale farms growing maize in Southern Rhodesia between 1900 and 1965. From colonial sources we collected annual information about acres under cultivation and total output for all farm sizes located in various geographical zones. Additionally, we collected information on technology (farm equipment), fertilizer use, and the amount and the timing of rain. As prior to the mid-1940s technology used in maize production was very limited, the availability and timing of rain was the most important factor affecting production (Massel and Johnson, 1966). By comparing agricultural productivity over the long run between small- medium- and large-scale farms after controlling for fertility of the soil, technology, and weather conditions, we aim to shed a new light on the inverse relationship between farm size and agricultural productivity in Africa.

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