

TRANSFORMATION OF AFRICAN FARM HOUSEHOLDS: A SHORT SURVEY OF ECONOMIC CONTRIBUTIONS

CATHERINE GUIRKINGER AND JEAN-PHILIPPE PLATTEAU

University of Namur

Abstract This paper reviews the scant economic literature on the transformations of farming households under the influence of land pressure, market development or technical change. Theoretical as well as empirical contributions are summarized with a special attention to the African context.

Keywords: Africa, family transformation

In rural areas of Africa, households are often not only co-residence units of individuals who share a roof and meals but also productive units: The farm is organized primarily around a household landholding and uses household labor. Households are by definition dynamic units whose composition change with birth, death, and the departure of (young) adults who set up an individual household. The process of individualization of family farms is regulated by rules, in particular who may leave the farm, is he/she entitled to a portion of land, when can he/she leave. . . . While these rules are often taken as given when studying the impacts of public interventions on individual household members, empirical evidence suggests that they respond to changes in the economy, triggering deep transformation of the family [Guirkinger and Platteau (2016)].

The transformation of the farming household in African has been the subject of rather scant economics literature. Yet, some of the contributions, even when they do not deal specifically with Africa, are relevant in that they allow for an understanding of the relationship between (agricultural) household structure and land pressure, market development, or technical change. For example, the emergence of small peasant households in highly densely populated areas such as Rwanda, Burundi, Malawi, and parts of Kenya deserves elucidation. We begin by reviewing the most relevant theories of household transformation and then look at evidence for Africa. Conclusive remarks end the paper.

Address correspondence to: Jean-Philippe Platteau, Center for Research in Economic Development, 8 rempart de la Vierge, B5000 Namur, Belgium; e-mail: jean-philippe.platteau@unamur.be

1. THEORIES ON THE TRANSFORMATION OF THE HOUSEHOLD FARM

Available theoretical contributions concern the shift from the collective farm to the mixed form in which individual and collective fields coexist, the breakup of the collective farms into individual units, or the simultaneous existence of both processes. We review them in that order.

Partial individualization of a household farm occurs when private plots are awarded to individual members of the household for their own private use and coexist with farm plots that are jointly cultivated by all members of the household. This form can be intuitively seen as an intermediate stage between the fully collective household farm and its breakup following land division of family land. Household heads may be actually reluctant to award private plots to members because they allegedly fear that this could be a first step toward an inescapable breakup of the farm. But the intuition must be checked against a rigorous framework and this will be done in the last stage of our presentation of theory.

1.1. Theories of Partial Individualization of Family Farmland

To explain the decision of the household head to allocate individual plots to family members, standard explanations have been suggested by the literature on agricultural producer cooperatives. Emphasis is typically put on the existence of scale economies for certain types of activities and their absence for others, or on the need for insurance and the role of income-pooling [Chayanov (1991); Putterman (1983, 1985, 1987, 1989); Putterman and DiGiorgio (1985); Carter (1987); Meyer (1989)]. The risk-based argument has been recently extended to the family context by Delpierre, Guirkinger and Platteau (2015) with the African context in mind. Like in Carter (1987), the analysis focuses on a trade-off between efficiency and insurance considerations. The trade-off arises because working in common on a collective field and distributing the output equally among participant members insures them against idiosyncratic risks, but joint farming also entails efficiency losses owing to the moral-hazard-in-team problem. Unlike in Carter, however, joint production is not the only way to share risk as family members may make voluntary transfers between themselves for the purpose of smoothing idiosyncratic variations in income. This assumption partly relaxes the classical efficiency-insurance trade-off. In spite of that generous assumption in favor of individualization, Delpierre et al. show that the (second-best) optimum may correspond to the mixed farm regime, where a collective field subsists.¹

In light of the above two strands of explanations, a shift from purely collective to mixed farms results from the reduced importance of risk or of scale economies in certain activities. There is another explanation of mixed farms which relies on efficiency and rent-seeking considerations. It is discussed in the third subsection.

1.2. Theories of Household Splits or Farm Breakups

In Foster and Rosenzweig (2002), co-residence implies collective farming only. The authors use a collective household model and analyze the decision of family members to stay together or to split the household into independent units run by the sons of the original head. Gains from co-residence arise from consuming household public goods and enjoying information sharing regarding farming techniques. Moreover, married daughters who join their husband's household can make insurance transfers for the benefit of their father's household (direct transfers to their brothers' separate households are ruled out). Offsetting these gains, members have a direct preference for autarchic residence and may differ in their preference for the public good. There may also be diseconomies to joint production. Hence, "whether households remain intact depends on the production technology, risk, the taste for privacy, individual preference heterogeneity and the household technology" (p. 842).

An important result is that technical progress may increase the likelihood of splits. This is because it deepens within-household differences in autarchic incomes (due to differences in schooling) and leads to greater conflicts over the level of public good and thus to a higher likelihood of splits. There is an alternative way, however, in which technical change can promote farm division. As first proposed by Boserup (1965), the rise of small peasant farms may result from growing land scarcity and the consequent intensification of agricultural techniques. The underlying argument has been expressed in the language of modern information theory [Binswanger and Rosenzweig (1986); Binswanger and McIntire (1987); Pingali, Bigot and Binswanger (1987); Binswanger, McIntire and Udry (1989)]. As land pressure increases, farmers are induced to shift to more intensive forms of land use, which implies that they adopt increasingly land-saving and labor-using techniques. An essential characteristic of these techniques is that labor quality, which is costly to monitor, assumes growing importance. Given the incentive problems associated with care-intensive activities (sometimes labeled "management diseconomies of scale"), the small family or peasant farm in which a few co-workers (spouses and their children) are residual claimants, appears as the most efficient farm structure.

A different framework to understand farm breakups has been recently advanced by Bardhan, Luca, Mookherjee and Pino (2014), and by Guirkingier and Platteau (2015). The explanation is centered on land scarcity while technical progress of the land-augmenting type (rather than of the labor quality-using type) has the opposite effect of favoring farm consolidation. Since the second contribution is reviewed in the next subsection, we now look at the first one.

The farm household in B-L-M-P model is a collective decision-making unit with transferable utilities. Because of the inability to enter into enforceable binding agreements concerning their respective efforts, and because income is shared equally, a moral-hazard-in-team problem arises in agricultural production. It is nonetheless mitigated by the (imperfect) altruism of household members. In

households that are not land-poor, members work full time on the family farm and there is no free-riding because imperfect altruism is sufficient to cancel the incentive to free ride on other members' efforts: income per member is maximized. In contrast, land-poor households operate their farm inefficiently, because free-riding outweighs altruism.²

Assume a shock in the form of an increase in the number of household members. In land-poor households, which exhibit a decreasing collective per capita income in the number of members, incentives exist for exit or for division. This is not true in households defined as land-rich and land-medium. Which of the two outcomes – exit or division – will happen in land-poor households depends on how tight the participation constraint is in the initial equilibrium. Since every member should earn at least as much as what they would earn on their own working full time on the labor market, there is a minimum landholding size below which members would no more be willing to work on the family farm. If the original household owns less than this minimum, division may be infeasible and the additional member works as a wage laborer. The situation gets more complicated if a local land market is active: Population growth in some households may now prompt land purchases rather than exit or division. The likelihood of buying land appears to be increasing in the number of members per unit of land while the likelihood of selling land is decreasing in the same.

If, following technical progress, the shock takes on the form of a sudden increase in agricultural profitability, both the incentive-compatibility and the participation constraints are relaxed. Exits and land divisions caused by demographic growth are slowed down as a result.

1.3. A Theory of Household Splits and Partial Individualization of Family Farmland

Guirkinger and Platteau (2015) have proposed a theory that accounts for the gradual individualization of agricultural households where individualization is understood as the growing incidence of both private plots within mixed farming units and splits of complex into nuclear households. Like Boserup, they put primary emphasis on the role of changing land/labor ratios yet, unlike her, they do not refer to technological change as the key mechanism through which the influence of land pressure is being felt. Moreover, like in the B-L-M-P model, their explanation does not rely on the diminishing value of joint consumption: Their field observations in West Africa indicate that individualization of complex households in the form of private plots does not end the practice of common kitchens and collective meals.

The principal is the household head, or the patriarch, and the other male adult family members are the agents. The principal maximizes his income obtained from the collective field under the participation constraints of the agents. He chooses the share of the collective output that he keeps for himself, the size of the individual plots allotted to members inside the joint family farm (this size can be set at zero),

and the number of male adults who stay on the paternal farm. Members observe these choices and individually decide how much effort to apply to the collective field and how much to their individual plot. While making this choice, they act non-cooperatively because of the impossibility to enforce binding agreements regarding their respective efforts (on the collective field).

The central mechanism relies on the existence of a strong patriarchal authority inside the extended household. Because the household head acts as a selfish principal, a trade-off arises between efficiency and rent capture considerations.³ When deciding whether to give private plots to members and how large they should be, he weighs down two factors. For one thing, production is more efficient on private plots than on the collective field where cultivation is plagued by the moral hazard-in-team problem. Since he must ensure that family members agree to stay on the family farm while they have outside options available to them, awarding individual plots allows him to more easily satisfy their participation constraints. For another thing, because the head's income entirely comes from the produce obtained on the collective field owing to unenforceable transfers from the private plots, competition between the two types of plots for the allocation of work effort by the members causes a fall in the his income. If transfers from private plots were enforceable by the head, he would earmark the whole family land for private use by individual members and maximize efficiency. The root of efficiency losses is the non-enforceability of transfers from members to the head.

The patriarch must also decide whether to maintain the family and the farm whole (with or without private plots) or to allow a split of the joint household and the concomitant division of the family land. The extent of the split itself is to be decided since the number of (male) members authorized to leave may vary. In the case of a pre-mortem split, the total labor force available for work on the collective field decreases, which harms the patriarch, yet it is no more incumbent on him to provide for the needs of the departed members, which favors him. Depending on the relative importance of the various effects at work, he may prefer a mixed regime with private plots to the collective regime, or he may choose to split the family.

How does the agricultural household evolve when land becomes more scarce, or when outside opportunities improve for the members? The general answer provided by the G-P model is that if a change occurs it will be in the direction of increasing individualization. As land pressure increases (or as outside opportunities improve), the patriarch may decide to transform a collective farm into a mixed farm or into smaller independent units. The initial organizational form is always the collective farm which is optimal when land is sufficiently abundant. Which individualized form will first succeed the collective one is a complex issue. The reason is that there actually exist many possibilities depending upon the number of (male) members authorized to leave, and upon whether private plots are granted to the remaining members when some of them have left with a portion of the family land. Numerical simulations are used to explore this question.

1.4. A Note on Technical Progress

As is evident from our review, the impact of technical progress on household size depends on its specific characteristics. If the main effect of agricultural technical change is to relax the constraint of land scarcity while being neutral with respect to other inputs' use, we expect land divisions to be slowed down whether we use as underlying framework the B-L-M-P or the G-P model. This prediction is inverted when technical change is intensive in labor quality and work conscientiousness. When the latter circumstance is combined with the former, two effects run into opposite directions: Land productivity increases so that the land scarcity constraint is relaxed but the rising importance of labor quality in a context of informational asymmetry calls for a reduction of household group size.

2. TRANSFORMATION OF THE HOUSEHOLD: EVIDENCE FOR AFRICA

The three main theories discussed above have actually been tested empirically. We review their most salient findings, especially when they concern African countries.

The theory of household splits of Foster and Rosenzweig (2002) has been tested using structural econometric techniques against Indian, not African data. The period covered is 1971–82. They find that increased agricultural technical change has a substantially stronger negative effect on division probabilities for the farm households in the top quartiles of the per-capita land endowment. In contrast, it slightly increases division propensity for the bottom two quartiles. To understand this differential result, we must bear in mind that two conflicting forces are at work: the public good effect and the human capital externality effect. For land rich households, increases in agricultural productivity growth raise income and therefore the demand for the household public good more than for land poorer households. Disagreement in preferences for the household public good is therefore comparatively enhanced for the former households. On this count, division should be more likely among them. But this is forgetting “the gains from human capital externalities associated with returns to information sharing that are enhanced when rates of technical change are high” (p. 865). This latter effect outweighs the former. In contrast, for land-poor households, the effect of preference heterogeneity dominates the human capital externality effect. Overall, division of the household becomes more attractive for these land-poor households.

The impacts of technical change and land pressure on household divisions as predicted by Bardhan et al. (2014) have again been assessed for India (West Bengal) over 1967–2004, using again structural econometrics. As expected, population growth significantly raises division rates. Moreover, as a result of the increase in farm profitability induced by the reform, the probability of household division decreases for small farms (those below the land ceiling set by the land reform program).

The theory of household division and private plots of Guirkinger and Platteau (2015) has been brought to West African data, yet, only the part of the theory

dealing with allocation of private plots could be rigorously tested [Guirking and Platteau (2014)]. In accordance with the prediction, the household head is more likely to distribute private plots when the land-man ratio is lower and when the family is larger.⁴ Regarding the latter, the implication of the theory must be borne in mind: When the size of the workforce on the collective field is larger, the scope of the moral-hazard-in-team problem increases, which enhances the relative attractiveness of private plots where no efficiency problem arises. Note that the two key explanatory variables – land availability and size of family workforce – have been instrumented with the help of historical data so that the potential endogeneity of current land availability and household size – residential choices, and therefore household size, are likely to be directly influenced by land allocation – is addressed.⁵

The second key result is much less expected. When the family is decomposed into married men and other members, only the first category appears to have a significant influence on private plot allocation, and the effect is strongly significant. In addition, the magnitude of the effect is far from negligible, suggesting that the standard moral-hazard-in-team argument needs to be refined: The assumption of an undifferentiated impact of group size is not applicable to the context of an extended or complex family.

Why is it that free riding in collective cultivation is observed only when several married men work together? Two different explanations are proposed by the authors. First, being strangers, daughters- or sisters-in-law tend to make the household more heterogeneous: They are not tied to the household by the same emotional and loyalty feelings as their husbands. The weakening of solidarity may also arise from the behavior of the sons or nephews if, once they get married, they tend to identify strongly with their nuclear family. This mechanism is close to that suggested in a paper by Kazianga and Wahhaj (2016) where stronger family ties are associated with more efficient allocation of production and consumption inside the household. Second, when the families of married men are of unequal size, the sharing rule is bound to look arbitrary to at least some couples. If the sharing rule provides for equal incomes to all married adults regardless of the size of their family, parents with more children feel discriminated. On the contrary, if shares are proportional to family size, parents with fewer children feel exploited.

In a companion paper, Guirking and Platteau, together with Goetghebuer, have tested their theory through a different angle: They have compared land productivity levels between collective fields and private plots [Guirking et al. (2015)]. When a variety of possible confounding factors (including variations in land quality, intensity of use of modern inputs, and crop choices) are controlled for, private plots turn out to be more productive than collective plots, and there is strong evidence that productivity differentials can be attributed to substantial variations in labor effort applied to cultivation. A second finding provides indirect support for the incentive-based mechanism behind the theory: The productivity advantage of private plots exists for care-intensive crops yet not for care-saving crops. Because

of the minor role of labor quality in the production process of care-saving crops, these crops are less or not vulnerable to the moral-hazard-in-team problem.

In another contribution devoted to Burkina Faso, Kazianga and Wahhaj (2013) reached a conclusion opposite to the above. Comparing productivity of senior male plots (assumed to be collectively farmed) with junior male private plots and female private plots, they oddly find that plots owned by the household head (common plots) are farmed more intensively and achieve higher yields than plots with similar characteristics owned by other household members. The authors emphasize the public character of the good produced on the family field: Social norms exist that require the head to use the proceeds for the common good so that every member benefits from it. Moreover, junior partners have a particularly strong preference for the public good and hence they are more willing to work on the collective field than on their private plots.

3. CONCLUDING REMARKS

Although the theories and evidence discussed concern rural areas, some insights can be applied to urban contexts. This is the case with comparative static effect of changes in outside options: In the G-P model, an improvement in these options thus has the effect of encouraging household division. The argument is reversible: The occurrence of an economic crisis is expected to delay division or even lead to a re-consolidation of the household. In the context of South Africa, Klasen and Woolard (2009) show that unemployment delays the setting up of an individual household by young adults, sometimes by decades, and may even lead to the dissolution of existing households.

A serious limitation in the available approaches is worth emphasizing at the close of this short survey. In many African countries, the agrarian structure is becoming rapidly modified under the influence of land market development. Well-to-do urban households appear to purchase significant amounts of land in order to build up profitable commercial farms. Resorting to hired laborers, the new farm owners/managers operate within a small household setup and trigger a growing concentration of farmland [Economist (23–29 July 2016) p.26]. This critical aspect is entirely missed by current economics research and needs to be urgently remedied.

NOTES

1 This is because commitment problems plague voluntary transfers. A trade-off therefore subsists between inefficient joint production where income-pooling de-facto obtains and efficient individual production where commitment problems prevail.

2 Because exits and divisions can be accompanied by side-transfers among members, exits and division take place only if the aggregate income of members of the original household increases as a result.

3 Note that the trade-off would persist, albeit in a mitigated manner, if the household head is assumed to be imperfectly altruistic.

4 This result continues to hold if what is explained is not the presence or absence of private plots but the share of the family land that is earmarked for individual cultivation.

5 More precisely, endogeneity would be present if sons are prone to leave the family farm when no individual plots are awarded by their father. The absence of individual plots would then appear, spuriously, to arise from small families and land abundance.

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