

Disentangling the Social and Economic Dimensions of Agricultural Behaviour: What Role for Institutions and Social Capital?

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Disentangling the social and economic dimensions of agricultural behaviour: what role for institutions and social capital?

Philip Kostov and John Lingard¹

Agricultural production is increasingly combined with other economic and non-economic activities. This leads to complex interactions taking place within rural systems. The recent policy shift towards a more holistic approach in terms of integrated and sustainable models of rural development emphasises these developments. In this context the role of 'non-economic' determinants of behaviour is placed to the fore. The orthodox economic approach stresses (almost) instantaneous adjustments to prices and other 'economic' factors. This is at odds with idealised images of the 'efficient' market, which is characterised by a great deal of uncertainty. In such a volatile environment, routines-based behaviour, such as following institutional rules and/or socially acceptable types of behaviour, usually described in term of 'social capital', is advantageous and creates a more stable environment. The stable environment is a pre-requisite for workability of the purely 'economic' arrangements. This intuitive argument is developed using a simple mathematical model, incorporating 'social' and 'economic' factors. The social dimension enhances the impact of economic factors, slowing the speed of adjustment to the equilibrium state. Some conditions under which the social and institutional infrastructure are beneficial or detrimental for economic development are outlined. An important by-product of our model is the conclusion that social and economic factors are closely entangled and their separate influences are purely analytical devices. Ignoring this entanglement may lead to serious biases in quantitative analysis. Some examples of these potential pitfalls are presented.

1. INTRODUCTION

Agricultural production is increasingly combined with other economic and non-economic activities which leads to complex interactions taking place within rural systems. The recent policy shift towards a more holistic approach of integrated and sustainable models of rural development emphasises these developments. In this context the role of 'non-economic' determinants of behaviour is placed to the fore. The orthodox economic approach stresses (almost) instantaneous adjustments to prices and other 'economic' factors. This is at odds with the idealised image of the 'efficient' market, which is characterised by a great deal of uncertainty. Uncertainty has long been viewed as a dominant characteristic of agriculture in developing countries. The strong protectionism of agriculture in developed industrialised nations has to some extent insulated it against uncertainty and the inherent instability of agricultural markets involving biological production processes and nature-based supply systems.

In such a volatile environment, routines-based behaviour, such as following institutional rules and/or socially acceptable types of behaviour, usually described in term of 'social capital', is advantageous and can create a more stable environment. Protectionist policies have a similar emphasis. A stable environment is a pre-requisite for workability of the purely 'economic' arrangements since it fosters socially desirable traits such as trust, reciprocity, and social responsiveness, which enhance social interaction and render the market system workable (Polanyi, 1944, Schumpeter, 1944). Therefore analytically detaching economic factors from the underlying social context may be detrimental to understanding the underlying interactions with the socio-economic systems of agricultural production. Much of the economic literature on the role of social factors in the dynamics of economic process is descriptive. It is now recognised that the social factors (institutions, social capital) have important impacts on economic performance. They are however either taken for granted (i.e. treated as external constraints) or hypothesized to be the outcome of some 'efficiency'

process. In this paper we treat both the social and economic factors as intrinsically endogenous.

2. MODEL FORMULATION

To investigate the joint effects of social and economic factors we use the following simple stylised model:

Let us assume there are n individuals (or farms). The main term of interest is the output variable y (it may be utility). The latter is hypothesised to depend on two variables: an ‘economic’ one, which we denote by e and the ‘social’ variable s .

$$(1) \quad y_i = f^i(s_i, e), \quad i = 1, 2, \dots, n$$

We use a superscript on the function in the notation above with a view to making the further notation more readable. Note that the economic variable is the same across individuals, whilst the social one varies.

The distinction we draw between the ‘economic’ and ‘social’ variable is as follows. The response to the ‘social’ variable is an adjustment to an observed reference level of the output variable. In other words, each individual observes the reference level (i.e. the level of the output variable for the social/reference group he/she identifies with) and adjusts his/her efforts accordingly so that the personal output variables moves together with the one for his/her reference group. For simplicity we further assume that there is a single reference group, although we show later that this assumption is not essential and can be relaxed. The social variable can thus be quantified as the corresponding (probably aspiration) level of the output variable, relevant for the individual.

If the quantified social variable s increases, the individual output variable y will also increase, even if the economic incentive e does not change. This is because the individual views himself as being put into a social role. He tries to meet his perceived obligations (i.e. s). We do not go into possible psychological explanations for such behaviour.

It is also reasonable to assume that when s increases, the corresponding increase in y is smaller. In simple terms this means that the individual has already approached his capability limit and increases in his aspiration level cannot be fully translated into actual increases in the output variable (utility). For the purposes of our model this means that the partial derivative of f with regard to the social variable is less than one. We also assume a positive impact of the economic incentive. Hence:

$$(2) \quad 0 < f_s^i < 1, \quad f_e^i > 0$$

Subject to the assumption of a single reference group, the social variable can be defined as:

$$(3) \quad s_i = \frac{1}{n-1} \sum_{j \neq i} y_j$$

The process of changes in the output variable, we have informally described above, can be formally expressed as a system of differential equations as below:

$$(4) \quad \dot{s}_i = \mu \left(\frac{1}{n-1} \sum_{j \neq i} f^j(s_j, e) - s_i \right), \quad i=1,2, \dots, n$$

In (4), the dot over s represents the time derivative, while $\mu > 0$ is the speed of adjustment. The question is whether model (4) has a stable equilibrium solution. It is however virtually identical to the mathematical representation analysed in Schlicht (1981) and we may directly use his proofs of existence and uniqueness, and omit this technical discussion. Furthermore the impact of the economic incentive e on the output variable (using that the output variable in equilibrium coincides with the aspiration level) can be calculated as:

$$(5) \quad \frac{\partial \bar{y}}{\partial e} = \sum_i a_i f_e^i$$

with

$$(6) \quad a_i = \frac{1}{n} \left(\frac{1}{n + f_s^i - 1} \right) \Bigg/ \left(\sum_j \frac{1}{n + f_s^j - 1} - 1 \right) > \frac{1}{n}$$

One may interpret a_i as coefficients of ‘social interaction’. It is straightforward to ascertain that they are close to $1/n$ when the social interdependence is weak (because then f_s^i is close to zero for all i). With strong social interdependence (i.e. when all f_s^i are close to one) a_i will tend to infinity.

Moreover note that a_i is strictly increasing if f_s^j increases for any j . This means that any increase in the importance of the social dimension will bring about an enhancement in the effect of the ‘economic’ variable. This enhancement may be viewed as a ‘social multiplier’ in that the social interaction enhances the ‘pure’ effect of the economic incentive. This ‘social multiplier’ can be calculated as:

$$(7) \quad s = \frac{\sum_i a_i f_e^i}{\frac{1}{n} \sum_i f_e^i}$$

Since $a_i > \frac{1}{n}$ for all i , then obviously $s > 1$.

Equation (7) expresses the direct increase in the output variable, given a unitary ‘direct’ change due to the pure economic incentive. The other important observation relates to the speed of adjustment. Note that if all f_s^i are equal to one, all eigenvalues of the Jacobian of the system of differential equations (4) will be zero, implying that the speed of adjustment in all directions is zero. This means that strong social interdependence implies a rather slow speed of adjustment, while weak social interdependence increases the speed of adjustment.

3. DISCUSSION AND IMPLICATIONS

We have presented a simple stylised model combining social and economic factors. The two main points of interest are the enhancing effect of the social interaction on economic incentives and the simultaneous slowing down of the speed of adjustment. These are more easily obtained in a simpler model assuming a homogeneous population of individuals. The model is readily generalisable in many directions without affecting the results. The nature of the model is represented by the social interaction quantifiers f_s^i . Instead of a single reference group, a more general structure consisting of many reference groups may be imposed and the results still hold, although their formal description becomes much more complicated.

Different reference groups simply mean several different aspiration level subsets. Setting up different subsets is however equivalent to keeping the same set and alternatively adjusting the interaction quantifiers f_s^i . The latter adjustment would mean adding to the model a set of ‘reference group’ multipliers, which modify the effect of the interaction quantifiers f_s^i (i.e. replacing f_s^i by $b_i f_s^i$ where b_i is the ratio of the corresponding aspiration level within the group and the average aspiration level across groups). Since production may be organized in various ways and each mode of organization will induce a characteristic pattern of interaction on the economic and social actors (Bowles, 1998), further refinements to the simple model may be necessary to reflect a specific problem area. The current model is nevertheless sufficiently general in its present form, since in many empirical applications we are typically only interested in a specific reference group (e.g. subsistence farmers) and it does not involve restrictive assumptions about the specific way of production organisation.

The ‘social multiplier’ effect and the reduction in the speed of adjustment obviously act in different directions. Taking an orthodox economic view, which assumes instantaneous adjustment, one is left with the enhancement of social factor on the impact of the economic incentive. Such a view should therefore conclude that social interaction is favourable. One may see the inconsistency of such a view since it is in principle grounded on the premises of impersonal interaction. When the possibility of an adjustment process extended over time is allowed, however, the effects are more complex. Note that since f_s^i gives a measure of the speed of adjustment in the direction of the i th individual, looking at the structure of the interaction quantifiers gives a good idea about the rates of change within the population. For illustration let us assume there are two clusters, a ‘social’ one with f_s^i close to one, and an ‘economic’ one with f_s^i close to zero. The social cluster will adjust very slowly. The economic one will adjust much quicker. In addition it will benefit from the ‘social multiplier’, created due to the social cluster. This will of course create greater heterogeneity and inequality. The social cluster figuratively speaking subsidises the economic one in this example. The greater response of the economic cluster drives the total group forward. Such an effect can however be short-lived, because in the longer term the slow speed of adjustment of the social cluster may drag down the average aspiration level and negatively impact on the overall output variable. The overall effect of the social interaction is thus an outcome of the balance between ‘social’ and ‘economic’ behaviour.

Let us present an example. Subsistence farming has sometimes been explained as a consequence of extreme risk aversion by poor resource-deficient farmers (Kostov and Lingard, 2004). The effect of the economic factor for such farmers is large. The consequences of fluctuations in the economic factors may be serious even disastrous (hunger, famine, survival). The answer is to increase f_s^i and thus reduce the speed of adjustment. In this way they become, to some extent, insulated against the more serious consequences of unfavourable economic effects.

The model presented is based on intrinsically unobservable, but economically meaningful variables. Let us continue our previous example and consider what an average applied economist will infer from subsistence farming data. After choosing some measurable output variable he/she will statistically estimate the impact of different economic variables and conclude that subsistence farmers are irresponsive to the postulated economic factors. What is he/she actually measuring?

One cannot directly estimate f_e^i . If we assume that the social interaction variables are fixed (and can be approximated in the estimation process) the estimate will be contaminated by the effect of the ‘social multiplier’ and more importantly the speed of adjustment. Irresponsiveness to the economic factors may thus simply mean a very slow pace of adjustment. The estimate will typically be based on an instantaneous adjustment assumption and therefore:

$$(8) \quad EST_i = \mu f_e^i \Big| f_s^i$$

which is the product of the speed of adjustment μ and the pure economic response f_e^i , given (or conditioned on) the social impact f_s^i . Abstracting from the latter conditioning, the econometrically estimated effects will compound the economic effect with the adjustment speed. To be able to distinguish these, one needs to have the equilibrium values, so that the speed of adjustment can be estimated separately. These will not be available in general and would require elaborating an explicit theoretical model.

Making the model useful and operational requires acknowledging that the social effects are also endogenous. So far we have treated them as given. Let us revisit subsistence farming. The ‘commercialisation’ policy recommendations based on the ‘given’ social multipliers, should recommend measures that reduce the social interaction, but to a lesser degree than the targeted increase in the speed of adjustment to the new equilibrium. Such changes may involve changes in the structure of the reference groups (e.g. mass migration to industrialised urban areas). Recognising the endogenous character of the social impacts on the other hand suggests using economic policies, such as restricting the ‘pure effect’ of the economic variable in order to restrict the importance of the ‘social’ behaviour and increase the speed of adjustment. This involves protectionist policies, reminiscent of developed countries’ agricultural policies. Note however that we have three variables: the ‘social’, the ‘economic’ and the speed of adjustment. For analytical purposes we need to ‘exogenise’ two of these. As a result the nice inverse relationship between the strength of the economic incentive and the importance of the social behaviour, gets much more complicated in practice. It is thus possible that protectionist policies could have adverse effects. In a developed country such policies are much more likely to reduce the speed of adjustment, given the smaller scope for changes in social interaction. Similarly, the short-term effects of such a policy in a developing country may further reduce the speed of adjustment (assuming the social interaction patterns are relatively stable) although in a medium to longer term the latter should increase. The effects would also depend on the choice of ‘output’ variable and type of country. If one looks at consumption, changes would be much more drastic in an LDC (many of which currently have very low consumption levels), while with regard to production, larger impacts could be expected in a higher income developing country or a country in transition (due to larger production potential).

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REFERENCES

Bowles, Samuel. 1998. Endogenous Preferences: The Cultural Consequences of Markets and other Economic Institutions. *Journal of Economic Literature* 36(1): 75-111.

Kostov, Philip and Lingard, John. 2004. Subsistence Agriculture in Transition Economies: its Roles and Determinants. *Journal of Agricultural Economics* 55 (3): 565-579.

Polanyi, Karl. 1957 [1944]. *The Great Transformation*, New York: Beacon.

Schlicht, Ekkehart. 1981. Reference group behaviour and economic incentives: a further remark. *Journal of Institutional and Theoretical Economics* 137: 733-736.

Schumpeter, Joseph Alois. 1943. *Capitalism, Socialism, and Democracy*, London: George Allen and Unwin.