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The determinants of livestock prices in Niger

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In the highly risky environment of the Sahel, livestock play an important role as a form of insurance against weather risk in addition to their important contributions to rural incomes, urban meat supply and export earnings. Most Sahelian farmers and pastoralists pursue production strategies that seek to minimise risk associated with adverse climatic conditions. To be effective, traditional strategies of this kind require livestock prices to be relatively stable. This condition has, however, rarely been met in the Sahel under severe crisis conditions like drought or economic disruption where food entitlement failures and collapses in livestock-grain terms of trade have occurred.

An issue which has not received adequate attention in the analysis of drought prone livestock economies of the Sahel is that weather is probably not the only culprit for food entitlement failures. Macro-economic conditions and other factors affecting the livestock sector also play an important role through their effect on urban demand for meat, livestock prices, and thus the value of assets liquidated by farmers and pastoralists in hard times. Knowledge and understanding of livestock price developments and their determinants in a Sahelian context where traditional adjustments to weather risk over time and space coexist with rising urban demand for meat therefore provide a key input to early warning, market and trade policies.

Livestock price developments in Niger

The suggestion made above that weather shocks and other demand-related economic factors contribute to food entitlement failures can be investigated using data from Niger, a representative Sahelian country. Monthly livestock prices collected by the Niger Department of Animal Resources and Hydrology over a period of 21 years serve this end. The data cover 38 districts or *arrondissements* of Niger and apply to 15 animal categories. In spite of their shortcomings (e.g. poor quality, high proportion of missing observations), these data complemented with rainfall, cereal production and mineral exports statistics, provide a reasonably clear picture of the evolution and determinants of livestock prices.

The available data illustrate that livestock prices in Niger are highly variable. Over the 1968–88 period, the computed coefficient of variation for deflated monthly prices of livestock ranged between 0.39 and 0.52 depending on the category of animal considered. Steer prices, for example, tended to rise in the mid-1970s, remained relatively stable until 1984, dropped dramatically for a couple of years and recovered partially in 1986. Furthermore, steer prices increased faster than inflation in the 1970s and their drop after 1984 was compounded by a sharp increase in the price of millet, the main staple food of livestock producers in Niger.

Determinants of livestock prices

Before examining factors that influence the evolution of livestock prices in Niger over time, additional data were sought on rainfall and aggregate meat demand shifters. Country and district level annual rainfall patterns showed two periods of below average rainfall in the early 1970s and 1980s which culminated in the 1973 and 1984 droughts. Rains were relatively stable from 1974 to 1980, and the best years in this respect were 1967, 1978 and 1988.

Aggregate shifters of meat demand were constructed by taking the Franc CFA value of uranium production (this being Niger's main export) as a determinant of urban incomes, and the combined output of sorghum and millet as a measure of rural incomes other than livestock income. Oil revenues in Nigeria, a country to which most of Niger's livestock exports are destined, were also used as a broad measure of Niger's economic prosperity in the period under consideration.

After adjustments were made for inflation and foreign exchange distortions, deflated livestock prices for each of the 15 animal categories were regressed on annual, monthly and district dummies, rainfall and meat demand shifters. The results of the analysis show that aggregate demand factors, together with weather, are important determinants of livestock prices. Consecutive years of drought also have a particularly pernicious effect on livestock prices in Niger.

While rainfall shocks may have dramatic effects on livestock sales and purchases, however, they were not the only force shaping livestock prices. Large non-cyclical shifts, reflected in annual price movements, appeared to have been at work which accounted for some of the livestock price changes that have taken place in recent years in Niger.

What accounted for this evolution were factors that affected not only the net supply of livestock, but the consumption demand for livestock products. Urban meat consumption reflected the varying fortunes of the leading sector of the economy, particularly uranium exports, domestic cereal output, and Nigerian oil revenues which soared during the oil boom and exchange rate distortions between the Nigerian Naira and the CFA used in Niger.

In terms of magnitude of demand shifts, it appears that an increase in cereal output of 10% in the 1988 record harvest year only raised livestock prices by 2%. But drops in cereal output like those experienced in 1973 and 1984 translated into a 6.6% to 7% drop in livestock prices. A 10% increase in Niger's uranium revenue relative to its 1988 value generated a 2.9% average increase in the price of small ruminants and cattle. A boom comparable with that of 1979 raised all livestock prices by about 17 to 18%. A 10% increase in Nigerian oil revenues relative to 1988 raised livestock prices in Niger by 2.1% for small ruminants and 2.5% for cattle. However, a rapid increase in Nigerian oil revenues like that in 1979 and 1986 raised small ruminant and cattle prices by 19% and 22%, respectively. Comparing these values with the effects of weather leads us to conclude that the prosperity of Niger's livestock economy is driven at least as much, if not more, by meat demand considerations than by supply shocks.

Market integration

Livestock markets play an ambiguous role in the Sahel. Regional integration of livestock markets insulates livestock prices from local conditions, thereby enhancing the insurance value of animals and stabilising returns to livestock production. However, regional market integration exposes livestock prices to large shocks affecting urban demand and exports, thereby rendering livestock producers vulnerable to shocks in mineral export revenues and declining economic prosperity.

The results of this analysis confirm that while the influence of drought on livestock prices can be quite large, it does not altogether account for all price changes that occurred in Niger from 1968 to 1988. Indeed, livestock prices are also subject to aggregate shifts in export revenues and urban and rural meat demand that affect Niger and its southern neighbour, Nigeria.

Thus, regional livestock trade, affected by the vagaries of primary commodity cycles and their effect on regional economies, adds an important element of risk to the livelihood of Sahelian farmers and pastoralists. This element of risk is perhaps uncorrelated with weather risk, but it can be devastating if a decrease in demand takes place after several years of drought, as happened in 1984. Although livestock prices *per se* have limited value as indicators of impending famines, the results of the analysis suggest that determinants of aggregate demand for livestock products help predict entitlement failures and should be incorporated in early warning systems. In attempting to formulate effective livestock policies, Sahelian countries should therefore keep an eye on not only weather shocks and adverse climatic patterns but also on macro-economic conditions and other factors affecting the livestock economy.

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For more information on this issue see: Fafchamps M. and Gavian S. 1997. The determinants of livestock prices in Niger. *Journal of African Economies* 6(2):255–295.