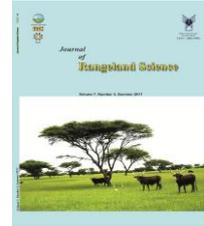Contents available at ISC and SID

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Research and Full Length Article:

Factors Affecting Structure, Conduct and Performance of Livestock Markets in Butana Area, Sudan

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Abstract. Structure, Conduct and Performance (SCP) is used as an analytical framework, to make relations amongst market structure, market conduct and market performance .The objective of this study was to analyze the factors, which affect SCP of livestock markets in the Butana area, Sudan in 2011. A total sample of 222 livestock traders were surveyed using structured questionnaire in seven primary and secondary markets distributed in Butana area. Both descriptive statistics and econometric methods were used to analyze data collected from traders using SPSS19 and STATA10 software. The logit regression model was employed to estimate the variables affecting the SCP of livestock markets in the area under study. Poor infrastructure of livestock markets, prices of livestock and high transaction cost had negative and significant effect (P<0.0) on structure, conduct and performance (SCP) of primary markets. As expected, lack of access to credit had negative effects (P<0.05) on SCP. Policies are required to improve livestock markets facilities, to encourage a higher price for the sale of animals at a younger age and to provide credit services to livestock traders in order to develop the sector and improve the livelihoods of pastoralists in the Butana area.

Key words: Rangeland, Infrastructure, Prices, Middlemen, Transaction cost

Introduction

According to Sudan Ministry of Information (2011), the area of the Sudan is about 1.882 million km^2, with a population of 33.4 million people. The country is characterized by diverse ecological zones resulting from interaction among a number of complex interrelated factors such as climate, soil types and geological formations. The variations in rainfall coupled with differences in soil types are responsible for the diversity of vegetation cover not only in its species composition but also in the size and density of plants (Harrison and Jackson, 1958).

Sudan livestock population is about 104 million heads (MARF, 2011).About 90% of animal production is from rangeland (Fadlalla and Ahmed, 1997). Range condition and trend assessments over the years have often pointed at worsening productivity of natural pastures both in the arid and semi-arid areas of East Africa (McPeak, 2001). The main livestock in Sudan are cattle, sheep, goats and, camels. Livestock are vital to the welfare of a large number of poor Sudanese by serving as a source of food, store of wealth, source of revenue, mode of transport, and aid to crop farming. Livestock are also central to the identities and beliefs of many Sudanese tribes (IGAD, 2007). The Butana area is a major rainy season grazing area in eastern Sudan where pastoral livestock communities arrive with their animals from a number of neighboring states to graze their animals and access markets. Poor market infrastructure and services such as rough roads especially in the wet season, shortage of forage and water, small market space, poor fencing, poor/few slaughter houses, limited credit services for traders, high market transaction costs and fluctuating prices, all affect structure, conduct and performance of the markets in the study area. There is different type of cattle and sheep in the study area (Fig. 1). The objective of this study aims to analyze the structure, conduct and performance of livestock markets in the Butana area, Sudan.

Fig.1. Type of Cattle and sheep in the Eddamar market during field survey 2011

Materials and Methods

Structure, Conduct and Performance (SCP) is used as an analytical framework, to make relations amongst market structure, market conduct and market performance (Bain, 1968). A sample of 222 livestock traders was interviewed through a structured questionnaire and data was collected during the period July to September 2011. The survey covered seven primary and secondary livestock markets distributed in Butana area, Sudan. The primary markets were dominated by small livestock traders and local butchers who buy animals from the pastoralists visiting these markets during

wet season, when they move about in search of forage and water. Large livestock traders dominate secondary markets and usually buy livestock from small traders and livestock producers.

Logit model is a model which uses regression technique for the analysis (Alamin *et al*, 2012). This model estimates the probability that an event occurs or not by predicting a binary dependent outcome from a set of independent variables. Logit model can also be called logistic model. In the logit regression model, parameters are determined through maximum likelihood estimation (ML) procedure (Joseph *et al*, 2006 and Yazan *et al*, 2012). In logistic regression the fitting is carried out by working with the logits. The odds ratio is a measure of effect size, describing the strength of association or non-independence between two binary data values. It is used as a descriptive statistic, and plays an important role in logistic regression. Unlike other measures of association for paired binary data such as the relative risk, the odds ratio treats the two variables being compared symmetrically, and can be estimated using some types of non-random samples (Rebecca, 2007). In the logit regression model SCP Livestock markets was considered as dependent variable and negotiation between buyer and seller through middlemen, transaction cost, supply of livestock to livestock markets, Infrastructure of livestock markets, price of livestock and Lac of access to credit were considered as independent explanatory variables (Table 1).

Table 1. Definition and expected signs for dependent and independent variables incorporated in the econometric analysis (logit model)

Dependent variable	Variable types	Expected sign
SCP Livestock markets (Primary=1, Otherwise=0)	Dummy	
Independent explanatory variables		
Negotiation between buyer and seller through middlemen	Dummy	-
Transaction cost	Dummy	-
Supply of livestock to livestock markets	Dummy	+/-
Infrastructure of livestock markets	Dummy	**+/-**
Price of livestock SDG*	Continuous	+/-
Credit	Dummy	**-**

*SDG= Sudanese pound
SCP= structure, conduct and performance

Results and Discussion

Definition and expected signs for dependent and independent variables incorporated in the econometric analysis (logit model) is presented in Table 1. The descriptive statistics for dependent and independent / explanatory variables is presented in Table 2. The result shown in Table 3 for the logit model presented the estimated coefficients (values), standard error, and significance values and odds ratios of variables in the model. Pastoralists reach Butana from different states to search for forage and water near to primary markets in wet season. The results showed that out of the six explanatory variables which were hypothesized to affect SCP of primary markets in the study area and which in turn affect the outcome, four variables were found to be statistically significant ($P<0.01$). These include transaction cost, infrastructure of livestock markets, prices of livestock and access to credit (Table 3).

Poor infrastructure of livestock markets had negative ($P<0.01$) influence on SCP of primary markets in the study area. Inadequate infrastructure imposes a serious constraint on the marketing of livestock (Mahabile *et al*., 2002).

High transaction cost had negative ($P<0.01$) influence on SCP of livestock markets. This may be due to

distance or bad road especially in the wet season. McPeak, (2001) adds that market access is a critical factor influencing market participation and risk management by pastoralists. Also, due to poverty in many rural areas, few or no community members own a truck or pick up that may transport livestock from too far away markets (Musemwa *et al*., 2007).

Prices of livestock had negative and significant (P<0.01) influence on SCP of primary markets. This may be due to the habit of pastoralists who do not sell their animals at a young age since there is free unrestricted communal grazing. In addition, there is lack of information for pastoralists about prices in the primary markets. Primary markets are located around routes of the movement of pastoralists who almost all of them depend on natural rangeland. The results also show that supply of livestock in the markets had negative influence on SCP of primary markets, but the coefficient was not statistically significant. This supports claims of shortage of supply reported by buyers. Also, fluctuation in numbers of livestock could be dependent on season. Clearly in wet season forage and water are available which would increase supply of livestock for primary markets. This would suggest that in wet season the pastoralists are dependent on natural rangeland. Livestock markets are seen as an important addition or alternative to traditional dependence on livestock mobility as an adaptive strategy to seasonal fluctuations to local forage conditions (Holtzman and Kulibab, 1994).

On the other hand, the coefficient of dummy variable representing negotiation between buyer and seller through middlemen is negative, but was not statistically significant. Lack of access to credit was negative and statistically significant (P<0.05) as predicted. The result may be an indication that lack of access to credit services will influence the households' decision toward livestock marketing.

Table 2. Descriptive statistics for dependent and independent/ explanatory variables

Variables	Description of variables	Frequency	Percent
SCP Livestock markets (dependant variable)	Primary = 1	82	36.9
	Otherwise = 0	140	63.1
Negotiation between buyer and seller through middlemen	Found =1	207	93.2
	Otherwise = 0	15	6.8
Transaction cost	High=1	148	66.7
	Otherwise = 0	74	33.3
Supply of livestock to livestock markets	Fluctuate numbers=1	213	95.9
	Otherwise = 0	9	4.1
Infrastructure of livestock markets	Poor =1	148	66.7
	Otherwise = 0	74	33.3
Credit	Lack of credit=1	196	88.3
	Otherwise = 0	26	11.7
Price of livestock SDG*		Mean=2837.61	

SDG= Sudanese pound
SCP= structure, conduct and performance

Table 3. Logistic regression results for structure and performance of livestock markets

Dependent variable	Coefficient	Odds ratio	Std. Error	Z	P-Value
SCP Livestock markets (Primary = 1, Otherwise = 0)					
Independent variable					
Negotiation between buyer and seller through middlemen (Found =1, Otherwise =0)	-0.940	0.390	0.828	-1.13	0.257
Transaction cost (High=1, Otherwise =0)	-1.817	0.162	0.448	-4.05	0.0001
Supply of livestock (Fluctuate numbers=1, Otherwise =0)	-0.1412	0.868	0.966	-0.15	0.884
Infrastructure of livestock markets (Poor=1, Otherwise =0)	-3.639	0.026	0.468	-7.77	0.0001
Price of livestock (SDG*)	-0.002	0.999	0.00006	-3.33	0.001
Credit (Lack access to credit=1, Otherwise = 0)	-9.600	0.382	0.424	-2.26	0.024
Constant	3.976	53.338	0.574	6.92	0.0001
Prob> chi2 = 0.000					
Log likelihood = -78.84					
Pseudo R2 = 0.4608					
Number of observations = 222					

*SDG= Sudanese pound
SCP= structure, conduct and performance

Conclusion

Poor infrastructure of livestock markets, limited credit services for traders, high market transaction costs and low prices are important factors that affect structure, conduct and performance (SCP) of the markets in the study area. Development and improvement of market infrastructure could improve accessibility to markets, reduce transaction costs, encourage higher prices for the sale of animals at younger age and minimize the high fluctuations in prices. Policies to facilitate credit services could have positive effect on the performance of livestock markets in Butana area in Sudan. Policies to develop and improve marketing facilities of livestock in the Butana would increase the income of pastoralists stimulating them to sell more animals and invest their money in other more stable assets, thus reducing pressure on the natural rangeland and improving their livelihoods.

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عوامل مؤثر بر ساختار، رفتار و عملکرد بازارهای دام در منطقه Butana، سودان

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چکیده. ساختار، رفتار و عملکرد هر بازاری به عنوان چارچوبی برای بررسی روابط تحلیلی میان عرضه و تقاضا استفاده می‌شود. هدف از این مطالعه بررسی روابط میان ساختار، رفتار و عملکرد بازار عرضه دام نسبت به قیمت آن در منطقه Butana در کشور سودان در سال ۱۳۹۰ بود. جامعه آماری شامل ۲۲۲ معامله‌گران دام در هفت بازار اولیه و ثانویه و با استفاده از توزیع پرسشنامه استاندارد در منطقه Butana بود. برای تجزیه و تحلیل داده‌های جمع‌آوری شده از نرم‌افزار SPSS19 و نرم افزار STATA10 و نیز از آمار توصیفی و روش های اقتصاد سنجی استفاده شد. از مدل رگرسیون منطقی برای برآورد متغیرهای موثر بر ساختار، رفتار و عملکرد بازارهای دام در منطقه مورد مطالعه نیز استفاده شد. نتایج نشان داد زیرساخت‌های ضعیف بازار دام، قیمت دام و معامله بالا و با هزینه زیاد، اثر منفی و معنی‌داری (P<0.0) بر ساختار، رفتار و عملکرد (SCP) بازارهای عمده داشته است. همچنین عدم دسترسی به اعتبارات لازم اثرات منفی (P<0.05) بر قیمت دام داشت. نتیجه‌گیری می‌شود که سیاست‌های مورد نیاز جهت عرضه بیشتر دام و حیوانات در زمان حداکثر کارایی توسط معامله‌گران دام به منظور توسعه بخش دامداری و بهبود معیشت مرتعداران در منطقه Butana افزایش امکانات بازارهای عرضه دام است.

کلمات کلیدی: مراتع، زیرساخت، قیمت‌ها، واسطه‌ها، هزینه معامله