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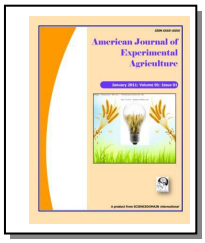

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Measuring of Competitiveness of Sudanese Sheep Export

Abda Abdalla Emam[1]* and Mohammed Hussein Salih[1]

[1]Department of Agricultural Economics, Faculty of Agricultural Studies, Sudan University of Science and Technology, Khartoum North, P.O. Box 71, Sudan

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ABSTRACT

The study aimed to measure the competitiveness of the Sudanese sheep export from 2001/02 to 2006/07. The study depended mainly on primary data which was collected through questionnaire. Also, secondary data was collected from relevant sources related to topics of the study. The data was analyzed using Policy Analysis Matrix Technique. The results showed that there was a competitiveness of Sudanese sheep, but the economic profitability was greater than the financial one. This means that direct and indirect taxes were imposed on sheep. The conclusion of the study summarized that Sudanese sheep appeared to be profitable and competitive but it was suffered from taxes imposed by the Sudanese Government.

Keywords: Sudanese sheep, profitability, taxes, Policy Analysis Matrix technique;

1. INTRODUCTION

Sudan have huge amount of livestock about 136 million heads (Ministry of Animal and Fisheries Resources, 2005). Livestock sector contributes about 18.8% on the Gross Domestic Product (Bank of Sudan, 2005). The livestock subsector in Sudan provides a livelihood for about 14 to 20% of the population. The official estimates of the livestock population put the total animal population at about 40, 49, 42 and 37 million head of cattle, sheep, goats and camels respectively (FMAR, 2005). Sudan began to export livestock to Arabian countries in the beginning of the previous decade (Tomsah, 2006). In spite of the fact that government directed more care toward exports sectors, especially sheep exports, the quantities exported characterized by instability from 1997 to 2007 as shown in Table 1.

**Corresponding author: Email: safarefga@hotmail.com*

The objective of the study is to measure competitiveness of Sudanese sheep export for the period 2001/02 to 2006/07.

Table 1. Quantity of Sudanese Sheeps Exported from 2001 to 2007

Year	Quantities in Head
2001	0.00
2002	1791497
2003	1498454
2004	1765471
2005	1475083
2006	1445889
2007	620412

Source: Bank of Sudan, Annual Report 2008.

2. METHODOLOGY

2.1 METHOD OF DATA COLLECTION

The study depended mainly on primary data. The secondary data were also collected. The former was collected through questionnaire which was directed towards exporters, while the latter was collected from relevant sources related to topics of the study.

2.2 METHOD OF ANALYSIS

The data was analyzed using Policy Analysis Matrix (PAM). It is designed to measure the divergence between actual market prices and efficiency prices. Efficiency prices are those prices that would have existed if all markets were perfectly competitive and the economy was in a state of general equilibrium.

The PAM is based on the following simple equation:

Profits = Revenues – Costs

2.2.1 CONSTRUCTION OF THE PAM

In PAM, cost was broken down into tradable and non-tradable inputs. Profit, revenue and the two types of costs were then calculated using both the actual and efficiency prices (Table 2).

Table 2. The general structure of PAM

Prices	Revenue	Cost		Profit
		Tradable input	Non-tradable Factor	
Private prices	A	B	C	D
Social Prices	E	F	G	H
Divergences	I	J	K	L

Source: Pearson and Monke (1987).

The measures of social, private profitability and the net policy impact on output and input are shown in Table 3.

Table 3. Primary Measures of Profitability

Economic indicator	Formula	Description
Private profitability	D= A-B-C	Actual net benefits.
Social profitability	H= E-F-G	Net benefit in terms of opportunity costs
Net transfers	L= D-H Also = I-J-K	Net-effects of government intervention
Output transfers	I= A-E	Transfers generated by domestic price/ border price difference
Input transfers	J= B-F	Transfers generated by domestic price/ border price difference
Factor transfers	K= C-G	Transfers generated by actual price/ shadow prices differences

The PAM frame defines a commodity system to include four activities: farm production, delivery from farm to processor, processing and delivery from processor to the wholesale market (Pearson and Monke, 1987).

Measurement of shadow prices

In order to correct for the distortions caused by monopolistic practices, lack of information, institutional rigidities, tax levies etc, market prices are replaced by efficiency accounting or shadow prices.

Prices of all inputs and outputs are measured at their international price (when available), or in terms of equivalents for goods for which international price can be identified.

Tradable goods

Tradable goods have border prices and an international price for them can be identified and measured at the border price (taking into account the quality if there are differences in quality). If the final price has to be expressed at different levels, for example, at the farm-gate, the local cost of handling, transport, marketing, etc must be deducted from border price. The local costs of handling, marketing etc. are usually non-traded, and have to be adjusted through some conversion factors into their shadow price. A conversion factor is the ratio of the alternative output value at border price to the actual output value at market prices.

Non-tradable goods

Non-tradable goods have no readily available border prices by which social value can be measured. Non-tradable goods can be broken down into tradable and primary factors of production. Primary factors refer basically to labor and land, the essential domestic resources.

Economic Wage Rate & Shadow Wage Rate

Labor cost is obtained by multiplying the number of man-day by the average wage paid. The labor market evaluation involves recognition of the many types of labor and the choices of the market prices to represent the difference in sex, age and skill levels. The market wage rate often differs from the opportunity cost, because of the minimum wage legislation, powerful trade unions and other elements of imperfect competition in the society (Brown, 1983).
The economic wage rate (EWR) is estimated as follows:

EWR = M *ARM

Where, M is the marginal output in domestic prices; and ARM is the accounting ratio which converts M into foreign exchange equivalent.

Marginal productivity can be calculated by dividing the value of total agricultural output at economic prices, by the total agricultural labor force. The problem here is that the output from the withdrawal of a unit of labor may be less than the average productivity of labor because the remaining labor may work harder (Little and Mirlees, 1980). The other defect is that the output from the other method for estimating marginal productivity is to estimate the number of days in which labor is more or less fully employed in the year, multiplied by the per-day marginal productivity. Any payments in kind should be added to the cost of labor. Estimation of (M) is difficult, for the unavailability of information. The shadow wage rate (SWR) can be estimated for each category of labor by multiplying the market wage by the appropriate conversion factor (Gittinger, 1982).

SWR = market wage rate of a particular category multiplied by the conversion factor of that category.

Skilled labor is short in supply and expected to be fully employed. So, skilled labor will be assigned a conversion factor equal to one. For unskilled labor, the situation is more complicated due to seasonal and regional employment variation. So, the conversion factor will be taken a 0.6 (Jansen, 1986).

Shadow Exchange Rate (SER)

The shadow price of land is calculated by its opportunity cost. The opportunity cost of land is the output by using land for producing the commodity.

The shadow exchange rate is estimated according to the World Bank methodology as a weighted average of official and black market exchange rates. In case where exchange rates implies an overvaluation of the domestic currency, the free market rate implies an under-valuation, since it bears a risk premium. The shadow exchange rate is estimated by the formula:

SER = AOER (X) + ABMER (1-X)

Where,

SER = Shadow exchange rate
AOER = Weighted average of official exchange rate.
ABMER = Weighted average of black market exchange rate
X = the share of foreign exchange transacted through the official exchange rate.
1-X = is the share of foreign transactions priced at the weighted average of the black market exchange rate.

Financial analysis equation

For local commercial inputs (which are having no international prices) financial price can be calculated by transferring it into local currency by using official exchange rate using the following equation:

$$FP_{ti} = Fx_i \times \text{total cost (pound//ton)} \times AOER$$

Whereas:

FP_{ti} = The financial price of the ith tradable input
Fx_i = foreign component of the ith tradable inputs.
AOER = Average official exchange rate

For non-commercial inputs the following equation is used to calculate the financial price:

$$FP_{ni} = (1- Fx_i) \times \text{total cost (SDG/ton)} \times AOER$$

FP_{ni} = financial price of the ith non-tradable input.

Economic analysis equation

For transferring the financial prices into economic prices the following equations are used:

For tradable inputs:

$$EP_{ti} = FP_{ti} \times SER \div AOER$$

Where:

EP_{ti} = economic price of the ith tradabe input.
FP_{ti} = financial price of the same input
SER = shadow exchange rate.

For non-tradable inputs:

$$EP_{ni} = FP_{ni} \times O_i$$

Where:

FP_{ni} = economic price of ith non-tradable input.
O_i = conversion factor of ith non-tradable input.

2.2.2 INTERPRETATION OF POLICY ANALYSIS MATRIX RESULTS

PAM is used to measure profitability, international competitiveness and incentives.

2.2.2A MEASURES OF ABSOLUTE COMPETITIVENESS

Private, economic profitability and international value-added (IVA) are represented as measures of absolute competitiveness.

Private profitability

In the PAM, the term private refers to observed data on revenue and costs, reflecting actual market prices received or paid by farmers, merchants, or processors in the agricultural system (Pearson and Monke, 1987).

Private profitability (D) = A-B-C

Revenue (A) and non-tradable inputs (C) are priced by the actual market prices paid, while tradable inputs (B) are converted into local currency, using the weighted average official exchange rate.

The private profitability, from producer's point of view, is the farm gate price less the production cost, while the private profitability, from the government's point of view is the border value of the product, minus production and marketing costs, all taxes and subsidies are excluded in computing public profitability, as they are merely transfer payments. The results of private profitability calculations show the extent of actual profitability of the agricultural system, given current technologies, output values, input costs, and policy transfers. If private profitability is negative it indicates that producers are losing and thus can be expected to quit production. If private profitability is positive (D is greater than zero), an indication of earning profit, and should lead to future increases of investment in the system

The economic or social profitability

The term social refers to valuation that attempt to measure the comparative advantage, or overall efficiency, in the agricultural production system. Efficient outcomes are achieved when an economy's resources are used in an activity that creates the highest levels of output and income (Pearson and Monke, 1987). The economic profitability obtained is the economic value of the product, less production and marketing costs valued at shadow prices.

Economic profitability is computed as: $H = E - F\text{-}G$

A divergence between private and economic valuation of revenues, costs and profits reveal the deviations of the actual allocation of resources from the optimum one.

Divergence between the observed private price and the estimated social price is explained by the effects of policy or by the existence of market failure (Pearson and Monke, 1987). Market failures occur whenever monopolies or monopolies (seller or buyer control over market prices), externalities, or factor market imperfection, (or inadequate development of institutions to provide complete services and full information) prevent a market from creating an efficient allocation of products or factors.

International value-added (IVA)

$$IVA = E - F$$

Positive IVA implies a net foreign exchange earnings and vice-versa. The main defect of such a measure is that it neglects the role of domestic factor (Sattar, 1982).

2.2.2B MEASURES OF RELATIVE COMPETITIVENESS

Domestic Resource Cost Ratio and the Coefficient of International Competitiveness are represented as measures of relative competitiveness.

Domestic Resource Cost Ratio (DRC) can be calculated by the following equation

$$DRC = G \div (E\text{-}F)$$

If the DRC ratio is greater than one, then the opportunity cost of using domestic resources exceeds the value-added at world prices, which means that the production of export or import substitute is economically not profitable; since its production would produce less than enough

international value-added to compensate for the domestic factor used i.e. opportunity cost of domestic inputs used in production, measured at economic prices, are more than foreign exchange earned.

The Coefficient of International Competitiveness (CIC)

$$CIC = G \div (E- F)$$

CIC is the ratio of domestic resource cost, expressed in domestic currency economic prices, to international value- added, expressed in foreign currency. It measures the ratio of domestic resources cost necessary to earn a unit of foreign exchange. If the value of the CIC is less than the prevailing exchange rate, the product is economically profitable. The merit of DRC and CIC is that they take into account domestic factor costs as well as tradable inputs and outputs (Jansen, 1986).

2.2.2C MEASURES OF INCENTIVES

Nominal Protection Coefficient and Effective Protection Coefficient are represented as measures of incentives.

Nominal Protection Coefficient (NPC)

The nominal protection coefficient (NPC) criterion provides a measure of the disparity between market prices and international prices. The discrepancy between domestic prices and border prices is measured by the ratio of the two prices in the units of the respective currencies. The ratio A/ E would represent the exchange rate prevailing for the ith goods. Even in the absence of direct intervention on the market of the ith goods, the ratio A/E will not equal the official exchange rate if this over (under)- states the value of the currency. The NPC, in this case, will be a measure to the equivalent tariff (subsidy) implicitly levied against the ith goods as a consequence of over (under)- valuation. If direct distortions affect domestic markets and / or trade of the ith goods, NPC will thus reflect both the effects of the under and over valuation of the currency and of the direct intervention. If NPC is less than unity, this would means that the government is taxing the product. A basic defect of the NPC is that no account is taken of the subsidies or levies on imported inputs.

Effective Protection Coefficient (EPC)

The effective protection coefficient (EPC) provides a fuller measure of the impact of market distortion on the incentives offered to producers of the good. EPC is used to correct the main defect of the nominal protection efficient (NPC) of neglecting taxes/ subsidy elements on inputs. The EPC, however, takes the effect of taxes and subsidies on traded inputs only, while domestic inputs are excluded.

$$EPC = (A – B) \div (E –F)$$

EPC measures the protection according to the value- added rather than to finished products. A value of EPC greater than unity indicates a positive incentive on the combination of product sales and inputs purchases. A value less than unity, implies the opposite.

3 RESULTS AND DISCUSSION

3.1 ABSOLUTE COMPETITIVENESS

3.1.1 PRIVATE AND ECONOMIC PROFITABILITY

Table 4 shows that sheep 2005/06 was the lowest private profitability with a profitability coefficient equal to 0.325 indicating a large divergence between private and economic profitability. The same indicator showed improvement in the rest seasons. The seasons 2003/04 and 2004/05 showed slightly better than the other seasons. In general terms the commodity system is profitable.

Table 4. Profitability indicators for a commodity system (SDG/Ton)

Crop season	Private profitability	Economic profitability	Profitability coefficient
2001/02	543.65	879.9	0.618
2002/03	543.65	879.9	0.618
2003/04	905.25	1241.5	0.729
2004/05	905.25	1241.5	0.729
2005/06	162.24	498.49	0.325
2006/07	182.25	525.5	0.347

Source: Author survey, 2008.

3.1.2 INTERNATIONAL VALUE ADDED

The absolute competitiveness of sheep which is measured by the international value added per ton reflect the foreign exchange saving. It is clear that the season 2006/07 is the highest among the other seasons (Table 5). The IVA for the all seasons was increasing with increasing years. From these results, the period under study is highly competitive and profitable at the official exchange rate prevailing at the same crop seasons.

Table 5. International value added for the season 2001/02-2006/07

Season	IVA ($/ton)
2001/02	1766.0057
2002/03	1766.0057
2003/04	2219.8651
2004/05	2219.8651
2005/06	2404.3911
2006/07	2404.3936

Source: Author survey, 2008.

3.2 RELATIVE COMPETITIVENESS

Domestic Resource Cost Ratio (DRC) and the Coefficient of International Competitiveness (CIC)

Table 6 is summarizing competitiveness measures for sheep from 2001/02 to 2006/07. The DRC for sheep as an import substitute gives amount of foreign saved when a unit of domestic resources is used for its production. A DRC less than one indicate that a dollar worth domestic resources produces more than one dollar of foreign exchange. The results showed that sheep

was highly competitive because its production would produces more than enough international value added to compensate for the domestic used. In relative terms, it is more competitive in season 2003/04 and 2004/05 than others.

More over the coefficient of international competitiveness (CIC) for 2006/07 showed highly competitive more than other seasons. This proves that the sheep was internationally competitive at the prevailing international prices. This result was assured with previous studies (Tomsah, 2006, Bushara, 2006 and Ibrahiem, 2003). The studies showed that sheep are internationally competitive.

Table 6. Relative competitiveness indicator (2001/02 – 2006/07)

Season	DRC	CIC
2001/02	0.80	2.302158 (SG)*
2002/03	0.80	2.302158 (SG)
2003/04	0.76	1.850733 (SG)
2004/05	0.76	1.850733 (SG)
2005/06	0.90	1.812675 (SG)
2006/07	0.89	1.801442 (SG)

*Source: Author survey, 2008; *SG: means Sudanese Pound (currency)*

3.3 MEASURES OF INCENTIVES

Nominal Protection Coefficient (NPC) and Effective Protection Coefficient (EPC)

Nominal Protection Coefficient (NPC) is used to measure the taxes level. If NPC value is less than one indicating that the Sudan government is taxing the sheep. Table 7 shows that NPC equal one which means that producer received price equal to world price.

The effective protection coefficient (EPC) got the same value of the NPC that means in all the seasons under study from 2001/02 to 2006/7. EPC equal to one means that exchange rate was constant or stable.

Table 7. NPC and EPC for period 2001/02-2006/07

Season	NPC	EPC
2001/02	1.00	1.00
2002/03	1.00	1.00
2003/04	1.00	1.00
2004/05	1.00	1.00
2005/06	1.00	1.00
2006/07	1.00	1.00

Source: Author survey, 2008.

4. CONCLUSION

The conclusion of the study summarized that; Sudanese sheep appeared to be profitable and competitive but it was suffered from taxes imposed by the Sudanese Government.

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