THE IMPACT OF OVERVALUED EXCHANGE RATE POLICY ON THE AGRICULTURAL TRADE OF SUDAN

Mohamed B. ELGALI,

Department of Agricultural Economics, University of Gezira, Sudan

Rajaa H. MUSTAFA

Department of Agricultural Economics, University of Gezira, Sudan

ABSTRACT

Since political situation has indicated that South Sudan would separate from the Sudan and the expectations of the country to lose its major source of foreign exchange from oil exports, the exchange rate of the Sudanese pound has deteriorated sharply. The main objectives of the study were to assess the responses of some economic variables (supply and demand) of agricultural commodities to exchange rate overvaluation policy adopted by the Central Bank of Sudan and the consequences on agricultural trade of the country. A multi-market model used as a main tool to assess the macro policy impact on the agricultural crop markets of the Sudan. The study results demonstrated that the overvalued exchange rate has a negative effect on the Sudanese agriculture trade sector, however, the expected more overvaluation of the currency entails more decrease in producer and consumer prices and, hence, a general decrease in agriculture exports as a result of the joint effect of decreasing supply and increasing demand. On one stream, the supplies of all crops show various levels of decrease under the overvaluation scenarios. On the other, all consumers markets tend to have an increasing demand because of the overvalued low consumer prices which will enhance consumer’s accessibility to food markets.

Keywords: Sudan, Overvaluation, Exchange rate, Multimarket model.
1. INTRODUCTION

Since the political situation has indicated that South Sudan would separate from the Sudan and the expectations of the country to lose its major source of foreign exchange of oil exports, the exchange rate of the Sudanese pound has deteriorated sharply. The Sudanese Ministry of Finance and Economic Planning (SMFEP) estimates shows that long-term fiscal adjustment may need to accommodate a revenue loss as high as 36.5 percent of total revenues (World Bank, 2011). As a result, Sudan faces the challenge of balancing fiscal consolidation against the pressing needs for the development agenda. The Central Bank of Sudan (CBOS) has adopted an administrative price policy for exchange rate which is well below the parallel market price (Figure 1).

The continuous pressure on the exchange rate has prompted CBOS to undertake a depreciation of the Sudanese pound of about 19 percent. The central bank introduced a daily premium for purchases of the Sudanese pound on top of the official exchange rate, in a bid to close the gap with the parallel market rate. Gross international reserves continued to decline, as a result of shortfalls in external financing as well as the authorities’ exchange rate and intervention policies in the run-up to the depreciation (IMF, 2010).

Many developing countries choose explicitly or implicitly to maintain overvalued exchange rates. Such rates keep the cost of foreign exchange low and hence imports cheap. They cannot be maintained with free markets for foreign exchange; however, there would be excess demand for foreign currency to pay for imported goods. Countries with over-valued currencies fail to match demand for foreign exchange with adequate supply. Therefore, they allocate foreign currency and impose controls on importers and exporters, as well as on capital account transactions. Exporters are required to surrender their export proceeds to the government within a specified period of time after appropriation. Importers are required to acquire import licenses, granted to individuals selected by government officials. An import license usually but not always entitles the bearer to access foreign currency at the cheap official rate (Nkurunziza, 2002).
If a country's exchange rate is overvalued, commodities such as food crops that normally are traded internationally either as imports or as exports are undervalued. Producers receive less for their crops than they would if the price of foreign exchange were market-determined. Hence overvalued exchange rates act as an implicit tax on agriculture. All consumers of food and other traded goods are thus subsidized indirectly because of the low prices for these items. The government budget is also relieved of part of the direct burden of providing any food subsidies since these are shifted to food producers through lower prices, as a result, the tendency toward overvalued exchange rates has a strong biasing effect on the food system. Favoring urban food consumers and penalizing rural food producers. When a country begins with a fixed exchange rate that correctly prices its currency relative to foreign currencies, then the demand for foreign exchange is matched by its supply. Domestic inflation, places pressure on the country's fixed exchange rate because import demand will increase in the face of lower relative prices for imported goods, export earnings will decline because of decreased demand for the goods the
country sells, and the market for foreign exchange will not clear at the fixed exchange rate without capital inflows (Timmer, et. al, 1983).

Agriculture is the most important sector in Sudan's economy. It contributed an average of about 43% of the country's Gross Domestic Product (GDP) during the period 2000-2008. The sector provides employment for about 70 percent of the country’s population, and provides inputs to many major manufacturing industries.

Agriculture historically generated the bulk of Sudan’s foreign exchange earnings through a diversified basket of exports which can be broadly classified into three categories that include field crops, animal and forest exports. The main field crops exports include sorghum, millet, cotton, sesame and ground nut, while animal exports include sheep, camels and cattle, and, gum arabic represents the major forest exports. The share of agricultural exports in total country’s exports is declining because of the growing exports of oil sector; this share has declined to only 4.4% in 2008 compared to 14.6% in 2001. Sudan enjoys the preconditions for a strategy of boosting its agricultural exports, which started to decline in terms of value each year since its peak in 2004 of $569 million to an estimated $508.9 million in 2008 (table 1). The major import food in Sudan is wheat. Due to low and variable domestic production, imports of wheat and wheat flour in terms of wheat equivalent have been escalating, reaching about 1.183 million tons in 2008 compared to about 0.52 million tons in 2001. The value of imported wheat has increased from US$ 109.6 million in 2001 to US$ 715.3 million in 2008 (table 1). Total cereal production in the country has ranged over the last five years between 4 and 6 million tones. It accounts for about 65% to total annual grain requirements (El-Dukheri 2007).

Table 1: Agricultural Exports and Wheat Imports in Sudan 2001-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture Exports (Million US$)</th>
<th>Share of Agriculture Exports in Total Exports (%)</th>
<th>Wheat Imports Quantity (million tons)</th>
<th>Wheat Imports Value (Million US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>240.6</td>
<td>14.9</td>
<td>0.52</td>
<td>109.7</td>
</tr>
<tr>
<td>2002</td>
<td>356.2</td>
<td>18.8</td>
<td>1.03</td>
<td>199.3</td>
</tr>
<tr>
<td>2003</td>
<td>410.3</td>
<td>16.1</td>
<td>0.90</td>
<td>190.5</td>
</tr>
<tr>
<td>2004</td>
<td>590.7</td>
<td>16.5</td>
<td>1.06</td>
<td>255.6</td>
</tr>
<tr>
<td>2005</td>
<td>578.8</td>
<td>12.0</td>
<td>1.45</td>
<td>373.9</td>
</tr>
</tbody>
</table>
Sudan government inability to meet the demand for foreign currency and its interference in the operation of the market has resulted in the creation of parallel markets for foreign exchange. The main objective of the study is to: Assess the responses of economic variables (Supply and demand) of the main agricultural commodities to the overvalued exchange rate and their consequences on agricultural trade of the country.

The paper is organized as follows. In the next Section a multi-market model is laid out with the main two scenarios used in the model. Section 3 represents the model results for agricultural supply and demand and trade under the two scenarios. In section 4 conclusions and policy implication are presented.

2. MATERIALS AND METHODS

2.1 A Multi-market Model for Sudan Agricultural Crop Markets: General Features and Equations

In this paper a multi-market, partial equilibrium model is used as a main tool to assess macro policy impact on the agricultural crop markets of the Sudan. Partial equilibrium models are the most widely used models to assess the effect of various policy interventions in agricultural sector. Multi-market analysis is a tool for simulating the effects of agricultural price policies on outcomes considered of interest to policy makers (Braverman and Hammer 1986).

The strength of partial equilibrium modeling as a way of understanding the Sudanese agricultural market rests in several reasons. Firstly, using partial equilibrium analysis is empirically not complicated and the analysis thereof reasonably approximates the general effects of macro-policy changes (Perali, 2003). Secondly, partial equilibrium analysis provides useful information on the impact of trade and policy changes at very detailed product and sectoral levels, hence allowing for the utilization of widely available policy data (Lang, 2006; Thurlow et al., 2005; Wubehen, 2006).
In this study, Sudan economy is modeled as a small open economy on both the import and export sides of the agricultural commodities. The model under consideration takes the normal specification of a standard partial equilibrium model; it is static and consists of a set of demand and supply equations for each commodity with level of supply and demand determined by factors including prices, income demand and supply shift variables and various other assumptions about policies (Jechlitschka et al, 2007). In specifying supply and demand functions for each product market, domestic prices for one market help to determine the quantity supplied and demanded not only in that market but also in the other markets through cross-market price linkages. Price transmission equations in the model establish links between producer price (for producers of exportable products and of import-substitute products) and the consumer price and the world market price.

Ten key agricultural crop markets of the Sudanese agriculture are considered in the model. The major export crop markets are sorghum, millet, sesame, ground nut, cotton, gum arabic and livestock, while, wheat and rice are the main import substitutes.

### 2.2 The Supply Component Equations

The supply of each commodity is represented by the quantity produced which is function of its own price and the prices of the competing commodities. The product supply equations are represented as follows:

\[
q^s_i = c_i \times (p^s_i)^{\epsilon_{iu}} \times \prod_{j \neq i} (p^s_j)^{\epsilon_{ij}}, \quad i, j = 1, \ldots, 10 \tag{1}
\]

Where

- \(q_i^s\) denotes the amount of the \(i^{th}\) commodity supplied
- \(c_i\) is the supply calibration coefficient of the \(i^{th}\) commodity
- \(p_i^s\) is the supply price of the \(i^{th}\) commodity
- \(p_j^s\) is the supply price of the \(j^{th}\) commodity
- \(\epsilon_{iu}\) is the supply price elasticity of the \(i^{th}\) commodity
- \(\epsilon_{ij}\) is the supply cross price elasticity of the products \(j^{th}\) that are
Competing with the $i^{th}$ commodity

$j$ is the set of relevant competing substitutes of the $i^{th}$ commodity

### 2.3 The Demand Component Equation

On the other hand, the demand (consumption) quantity of a commodity is set to depend on its own price, the prices of close consumption substitutes or complementary commodities and the consumer per capita income. So, the system of the demand function can be expressed as follows:

$$q_i^d = b_i \cdot (p_i^c)^{\eta_i} \cdot \prod_{j \neq i} (p_j^c)^{\eta_{ij}} \cdot I^{\mu_i}, \quad i, j = 1, ..., 10$$  \hspace{1cm} (2)

Where,

$q_i^d$ denotes the amount of the $i^{th}$ commodity demanded

$b_i$ is the demand calibration coefficient of the $i^{th}$ commodity

$p_i^c$ is the demand price of the $i^{th}$ commodity

$I$ is per capita income

$\eta_i$ is the demand price elasticity

$\eta_{ij}$ is the cross price elasticity of the $i^{th}$ commodities that are complementary or substitutes for the $j^{th}$ commodities.

$\mu_i$ is the income elasticity of the $i^{th}$ commodity.

### 2.4 Price Transmission in the Model

The illustration of price-linkage equations assumes that the government could control the domestic price through price policy measures. Also, it assumes that the movements of producer and consumer prices are connected to the world price movements (for exportable products and import-substitute products). Overvalued exchange rate provides price subsidies to the crop markets producers that use intensive imported inputs of fertilizers like wheat rice, sugar and cotton. Following Tocarick (2003), the input subsidies are introduced as follows, define $\beta$ as total expenditure on input divided by the quantity of output $X$ as shown by the following equation:
\[
\beta = \frac{bP_i K}{X} = bP_i a
\]  

Where \((a)\) is the amount of input \((i)\) used in the production of the final output, \((b)\) is the subsidy rate on inputs, and \((K)\) is the quantity of the intermediate input used in the production of \(X\). Thus, the price to producer’s inclusive input subsidies is represented in the following equations. Producer and consumer prices of the export and import-substitute commodities are shown by the following equations:

(i) **Producer price**

**Export products**

\[
p_i^e = P_i^w (1 + r_i) \times R (1 - O) + \beta
\]  

**Import products**

\[
p_i^i = P_i^w (1 + r_i) \times R (1 + O) + \beta
\]

(ii) **Consumer price**

**Import products**

\[
p_i^c = P_i^w (1 + r_i) \times R (1 - O)
\]

**Export products**

\[
p_i^e = P_i^w (1 + r_i) \times R (1 + O)
\]

Where,

- \(P_i^e\) is the producer price for commodity \(i\)
- \(P_i^c\) is the consumer price for commodity \(i\)
- \(P_i^w\) is the world price of commodity \(i\)
- \(r_i\) is the protection rate of the commodity
- \(R\) is the exchange rate
In order to assess the effect of the overvalued exchange rate on the major agricultural crop markets of the Sudan, selected trade indicators used by the United Nations are implemented. Simple and composite indices are established as recognized approaches in monitoring progress in achieving various policy goals or in benchmarking various policy options. The indicators include Growth Rate of Exports, Export Propensity, Import Penetration, Marginal Propensity to Import and Export/Import Coverage.

### 2.5.1 Growth Rate of Exports

The growth rate of exports is one of the most common indicators used when assessing the progress of an economy in any area of economic activity. Often the rate is calculated at level of product groups to identify ‘dynamic sectors.’ The growth rate calculates the annual compound percentage change in the value of exports between two periods. The growth rate is a percentage, and can take a value between -100 per cent (if trade ceases) and $+\infty$. A value of zero indicates that the value of trade has remained constant.

\[
\text{Growth Rate of Exports} = \left[ \frac{\sum X^1_{jt}}{\sum X^0_{jt}} \right]^{\frac{1}{n}} - 1 \times 100 \quad j = 1, \ldots, 8 \quad (8)
\]

Where,

$\sum X^0_{jt}$ is the bilateral total export flow of the commodities in the start period,

$\sum X^1_{jt}$ is the bilateral total export flow of the commodities in the end period, and $n$ is the number of periods (not including the start).

### 2.5.2 Export Propensity

The index shows the overall degree of reliance of domestic producers on foreign markets. The index provides an indicator of vulnerability to certain types of external shocks (e.g., increase or falls in export prices or changes in exchange rates). The ratio is expressed as a percentage and it ranges from zero (with no exports) to 100 (with all domestic production exported).
Export Propensity = \[ \frac{\sum X_j}{GDP} \times 100 \quad j = 1,\ldots, 8 \] (9)

Where,

\[ \sum X_j \] are total bilateral exports of (Cotton, sorghum, sesame and ground nut and millet) the markets under study, and

\[ GDP \] is agricultural gross domestic product of the country (the covered commodities in the model).

2.5.3 Import Penetration

The import penetration rate shows to what degree domestic demand (the difference between GDP and net exports) is satisfied by imports. Calculated at the sectoral level it is termed the self-sufficiency ratio. The ratio ranges from zero (with no imports) to 100 percent when whole domestic demand is satisfied by imports only (no domestic production and no exports).

Import Penetration = \[ \frac{\sum M_i}{GDP - \sum X_j + \sum M_i} \times 100 \quad j = 1,\ldots, 8 \text{ and } i=1,2 \] (10)

Where,

\[ \sum X_j \] is total bilateral exports of the country under study,

\[ \sum M_i \] is total bilateral imports of wheat and

\[ GDP \] is agricultural gross domestic product of the country (the covered commodities in the model).

2.5.4 Marginal Propensity to Import

The marginal propensity to import (MPM) measure the extent to which imports are induced by a change in incomes. Moreover, higher MPM reduces the multiplier effect of an increase in GDP. The ratio ranges between 0 (with no part of extra GDP spent on additional imports) to 1 when the whole extra GDP created is spent on imports.
Marginal Propensity to Import = \frac{\Delta \sum M_i}{\Delta GDP} \quad (11)

Where,

\Delta \sum M_i \text{ is the change in imports (wheat and rice) of the country under study, and}

\Delta \sum GDP \text{ is the change in agricultural gross domestic product of the country (for the covered commodity markets in the study).}

2.5.5 Export/Import Coverage

This index is an alternative to the normalized trade balance. It tells whether or not a country’s imports are fully paid for by exports in a given year. The values for this index range from 0 when there are no exports to +\infty when there are no imports. A ratio of 1 signals full coverage of imports with exports (trade balance).

\text{Export/Import Coverage} = \frac{\sum X_j}{\sum M_i} \quad (12)

Where,

\sum X_j \text{ is the bilateral total export flow, and}

\sum M_i \text{ is the bilateral total import flow in the end period.}

2.5.6 Scenarios

In addition to the basic scenario, two policy scenarios are formulated to analyze the impact of overvalued exchange rate policy on Sudan's agricultural markets and agricultural trade sector. The basic scenario simulates the markets under prices of 2006. The first scenario simulates a 20% overvalued exchange rate, and, the second scenario simulates a 40% overvalued exchange rate.
3. RESULTS AND DISCUSSION

3.1 The Supply Response

Table (2) lays out a summary of the supply responses of the major Sudanese commodity markets to the world market prices under the scenarios of overvalued exchange rate by 20% (first scenario) and 40% (second scenario) respectively.

The supplies of all crops markets show a various levels of decrease under the overvaluation scenarios. First, import substitute crops markets of wheat and rice show a significant supply decrease in response to the overvalued exchange rate under the prevailing system of taxes, thus, wheat supply could decrease by 6.3% relative to the basic model in the first scenario which represents the supply under the 2006 world prices. However, this decrease could go further to reach 13.9% under the second scenario of 40% overvalued exchange rate. Similarly, rice supply decreases by 6.5% and 14.2% in the two scenarios respectively. This fall in supply is attributed the noticeable fall in producer prices in the first scenario and second scenarios in comparison to 2006 prices.

Secondly, the supply of exported cereals of sorghum and millet reveal different responses, under the first scenario sorghum supply is expected to decrease by only 1.3%. This is down to the competitiveness between other competing crops such as sesame and ground nut, while its supply could decrease by 3% in the second scenario. In the same direction the supply of millet responded; showing slight differences between the two scenarios. Third, the supply of exported oil crops of sesame and ground nuts expose in general a decreasing trend in supply in the two scenarios this attributed to their strong linkages to the external markets.

Fourth, Sugar supply would decrease by 4.3% and 7.5% in the two scenarios respectively affected by its low supply elasticity. However, Livestock supply would response negatively by 6.5% and 14.3%, which will have negative impacts on exports.

Finally, the changes in the supply quantities of non-food agricultural commodities of gum arabic and cotton reveal also a negative supply responses, gum arabic shows an immense negative response of 21.2% and 31.2% in the two scenarios respectively. The considerable decrease of the supplies of gum arabic is down to the high supply elasticities and low producer prices which
discourage its exports since it is mainly an export crop. Cotton supply has reflected a negative supply response in all scenarios because of its low supply elasticity relative to its competitive crops, especially, wheat.

Table 2: Changes in Supply, Effect of Exchange rate

<table>
<thead>
<tr>
<th>Market</th>
<th>Basic scenario</th>
<th>First Scenario</th>
<th>Second Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply 1000 ton</td>
<td>Supply ton</td>
<td>% Change</td>
</tr>
<tr>
<td>Wheat</td>
<td>416</td>
<td>3897.15</td>
<td>-6.3</td>
</tr>
<tr>
<td>Rice</td>
<td>1</td>
<td>935</td>
<td>-6.5</td>
</tr>
<tr>
<td>Sorghum</td>
<td>4327</td>
<td>4270</td>
<td>-1.3</td>
</tr>
<tr>
<td>Millet</td>
<td>675</td>
<td>651.7</td>
<td>-3.5</td>
</tr>
<tr>
<td>Sesame</td>
<td>400</td>
<td>391.4</td>
<td>-2.2</td>
</tr>
<tr>
<td>GN</td>
<td>555</td>
<td>553.1</td>
<td>-0.3</td>
</tr>
<tr>
<td>Sugar</td>
<td>728.1</td>
<td>696.9</td>
<td>-4.3</td>
</tr>
<tr>
<td>Livestock</td>
<td>50390</td>
<td>47110.7</td>
<td>-6.5</td>
</tr>
<tr>
<td>Gum arabic</td>
<td>11.6</td>
<td>9.1</td>
<td>-21.2</td>
</tr>
<tr>
<td>Cotton</td>
<td>394</td>
<td>372.2</td>
<td>-5.5</td>
</tr>
</tbody>
</table>

Cotton in thousand Bale, livestock in thousand head

Source: Author own results

3.2 The Demand Effect

Table (3) illustrates the simulation results of demand responses under the two scenarios. All consumers markets tend to have an increasing demand because of the overvalued low consumer prices which will enhance consumer’s accessibility to food markets. Starting with the demand for import substitutes, according to the decreasing overvalued consumer price, wheat demand will increase by 6% and 14.6 % in the two scenarios, which is slightly more than rice demand because wheat is the major staple food in urban areas and the relatively higher substation elasticity of wheat to rice. Second, the export cereals of millet and sorghum will show an increasing demand; this will affect negatively their exports since they are the major staple food in the country especially in rural areas.
In the markets of oil seeds, the low consumer price will drive up demand for sesame by 2.4% and 5.8% and GN to 2.5% and 5.8%. This will affect negatively their exports.

Sugar demand projections show an increase of 2.5 and 5.8% in the two overvalued scenarios respectively. The increase in demand will remove sugar from the exports map, since the country exports about only 176,856 tons in 2006 (Bank of Sudan, 2006). livestock demand market will increase by 6% and 16% in the two scenarios respectively, as the demand for livestock rises, the demand for grain grows proportionally more quickly, since livestock depends on sorghum in their feed.

Finally, non-food agricultural commodities of gum arabic and cotton, the demand for gum arabic show the largest increase among the considered commodities to reach 26.9% and 46.5% in the two scenarios respectively. That is the overvalued exchange prices works as a disincentive for gum arabic exports and hence more of it is available for local markets. Cotton shows a remarkable increase in its demand because consumer’s prices decrease in all scenarios compared to the baseline scenario.

**Table 3: Changes in Demand, Effect of Exchange rate**

<table>
<thead>
<tr>
<th>Market</th>
<th>Basic scenario</th>
<th>First Scenario</th>
<th>Second Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Demand 1000 ton</td>
<td>Demand ton</td>
<td>% Change</td>
</tr>
<tr>
<td>Wheat</td>
<td>1785.0</td>
<td>1893.2</td>
<td>6.0</td>
</tr>
<tr>
<td>Rice</td>
<td>49.1</td>
<td>514</td>
<td>4.8</td>
</tr>
<tr>
<td>Sorghum</td>
<td>4322.5</td>
<td>4596.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Millet</td>
<td>674.0</td>
<td>720.667</td>
<td>6.9</td>
</tr>
<tr>
<td>Sesame</td>
<td>180.9</td>
<td>185.4</td>
<td>2.4</td>
</tr>
<tr>
<td>GN</td>
<td>554.7</td>
<td>568.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Sugar</td>
<td>710.2</td>
<td>782.1</td>
<td>10.1</td>
</tr>
<tr>
<td>Gum arabic</td>
<td>0.182</td>
<td>0.230</td>
<td>26.9</td>
</tr>
<tr>
<td>Cotton</td>
<td>10.0</td>
<td>11.1</td>
<td>11.1</td>
</tr>
<tr>
<td>Livestock</td>
<td>49068.5</td>
<td>52484.0</td>
<td>6.9</td>
</tr>
</tbody>
</table>

Cotton in thousand bale, livestock in thousand head

Source: Author own results
3.3 The Trade Effect

In general, the overvalued exchange rate has a negative effect on the Sudanese agriculture trade sector, however, the expected more overvaluation of the currency entails more decrease in producer and consumer prices and, hence, a decrease in agricultural exports is a result of the joint effect of decreasing supply and increasing demand.

Table (4) demonstrates the simulation results of trade indicators for the three scenario models. With regard to export indicators, total exports of the agricultural crops covered in the model would decrease considerably in response to the overvaluation of 20% and 40% in the first and second scenarios. The growth rate of exports shows a decrease by 16% of agricultural exports growth. The decrease in total exports is attributed to the remarkable decrease of exports of sorghum, millet, sesame, ground nut, cotton, and livestock. Further overvaluation in the second scenario would result in a more decrease in export growth rate to reach 59%.

Export propensity index shows that domestic farmers earn about 6.7% of their income from foreign trade in 2006; this ratio would decrease to 4.9% in response to a 20% decrease in the value of foreign currency in the first scenario. However, because of the more expected overvaluation a decrease in exports, this index will fall to 2.5% in the second scenario.

On the side of import indicators, the import penetration index is used as the basis of specific policy objectives targeting self-sufficiency. It provides an indication of the degree of vulnerability to certain types of external shocks. The index shows that 77.5% of domestic demand of wheat and rice is satisfied by imports at the 2006 world prices, while, this ratio could increase at 20% overvalued simulated prices to reach 80.3% because of the increase in imports of wheat and rice as a consequence of low consumer prices. In the second scenario, the index will reach 83.2% reflecting the increase in imports as a result of the low prices of import substituting crop markets. The marginal propensity to import index explains that relative changes in imports at the 20% overvalued prices which represents about 0.249 of the GDP changes in compare to 2006 prices of only 0.157. This index would increase under the scenarios of more devaluation of 40% to reach 0.483 of the GDP changes.

Finally, the export-import coverage index show that exports could cover 1.3 folds of imports at the normal free trade prices of 2006 in the baseline model. However, this index will be reduced to 0.8 at the overvalued exchange rate of 20%, because at this level of producer prices this sector
might lose exports markets of sorghum, millet, sugar and livestock. The coverage in the second scenario of 40% overvaluation would entail more exports reductions to reach 0.6, that is result of the more increase in the amount traditional imports and the reduction of exports.

Table 4: The Effect of overvalued exchange rate on Trade

<table>
<thead>
<tr>
<th>Trade Indicators</th>
<th>Basic Scenario</th>
<th>First Scenario</th>
<th>Second Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Rate of Exports (%)</td>
<td>45.1</td>
<td>-16</td>
<td>-59</td>
</tr>
<tr>
<td>Export Propensity</td>
<td>6.7</td>
<td>4.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Import Penetration</td>
<td>77.5</td>
<td>80.3</td>
<td>83.2</td>
</tr>
<tr>
<td>Marginal Propensity to Import</td>
<td>0.157</td>
<td>0.249</td>
<td>0.483</td>
</tr>
<tr>
<td>Export /import Coverage</td>
<td>1.342</td>
<td>0.8</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Source: Author own calculations

4. CONCLUSION AND POLICY IMPLICATIONS

The overvaluation policy of the Sudanese pound which has been undertaken by the central bank of Sudan is expected to have substantial impact on the agricultural sector, particularly the supply and demand of the traded crops. The positive economic theory suggests that, when a country's exchange rate is overvalued, commodities such as food crops that normally are traded internationally either as imports or as exports are undervalued. Farmers receive less for their crops than they would if the price of foreign exchange were market-determined. Hence overvalued exchange rates act as an implicit tax on agriculture.

The responses of the major Sudanese commodity markets to the world market prices have been examined under the scenarios of overvalued exchange rate of 20% (first scenario) and 40% (second scenario) respectively using a multi-market model. The results explain that; supplies of all crops markets show a various levels of decrease range from 0.3% to 31.7% from the base scenario due to the low producer prices. Consumers markets tend to have an increasing demand range between 5.8% to 46.5% from the base scenario, because of the overvalued low consumer prices which will enhance consumer’s accessibility to food markets. The overvalued exchange rate has a negative effect on the Sudanese agriculture trade sector, however, the expected more overvaluation of the currency entails a more decrease in producer prices, on the other hand, a
decrease in consumer prices and, hence, an overall decrease in agriculture exports is a result of the joint effect of decreasing supply and increasing demand.

REFERENCES


4. International Monetary Fund Sudan, (2011). Second Review Under the 2009–10 Staff-Monitored Program —Staff Report; Staff Supplement; and Statement by the Executive Director for Sudan.


The main objectives of the study were to assess the responses of some economic variables (supply and demand) of agricultural commodities to exchange rate overvaluation policy adopted by the Central Bank of Sudan and their consequences on agricultural trade of the country. A multi-market model used as a main tool to assess the macro policy impact on the agricultural crop markets of the Sudan. The study results demonstrated that the overvalued exchange rate has a negative effect on the Sudanese agriculture trade sector, however, the expected more overvaluation of the currency entails more decrea Thus, exchange rate devaluation is not always the suitable policy to improve the compe1itiveness of Sudanese crops and 10 correct Sudan's external imbalance. Discover the world's research. 15+ million members. The elTece of exchange rale regimes on competivenes of agricultural crops in Sudan: The case of medium suIple collon. Jan 1989. A B Mohammed. Mohammed, A. B. (2004). The elTece of exchange rale regimes on competivenes of agricultural crops in Sudan: The case of medium suIple collon (1989-2000). Unpublished M. Sc. Dissertation, Department of Economics, University ofGezirll, Sudan. TRADE RULES AND EXCHANGE RATE MISALIGNMENTS : in search for a WTO solution1. Vera Thorstensen, Emerson MarÅ§al, Lucas Ferraz2 FGV â€œ Observatory on Exchange Rate First Draft â€œ please do not quote March 2013. ABSTRACT. This analysis now also includes the impacts of each exchange rate policy to the international economic system as a whole. A significant result is the publication of the Pilot External Sector Report (6/2012) that presents IMF estimates of exchange rate misalignments by bands. Graphic 2 - IMF Pilot External Sector Report. 5. Its purpose is to allow an objective and transparent protection for agricultural and non-agricultural goods, and to be reduced over time, as a result of trade liberalization.