

PDPE Market Analysis Tool: Terms of Trade

Commodity prices vary over time, especially due to seasonal fluctuations and in response to shocks. If households rely on selling and buying commodities for their income and food consumption, respectively, price fluctuations can have severe consequences on these households. An important measure that provides information on the purchasing power of households are the terms of trade. Terms of trade (ToT)¹ are defined as the ratio of two prices. Examples are the ratio of the price of livestock to the price of a food staple, the ratio of the cash crop price to the price of a food staple, or the ratio of daily wage for unskilled labour to the price of a food staple.

What insights can this tool provide?

The ToT indicator puts the income source of the household or individual in relation to the amount of food (staple) that the household or individual can gain access to through its labour. The ratio of these two prices, followed over time, provides information on the purchasing capacity of a household to buy food and on the variation of this capacity over time. Consequently, the ToT is useful both for monitoring and alert on current or forthcoming food access problems.

When the ToT decline, households are less capable of buying food with their traditional income sources. For example, if households growing a cash crop face a declining ToT, it means that they obtain less staple food for the same amount of cash crop. They are, therefore, able to access a smaller amount of food per amount of cash crop produced.

In conclusion, ToT provides information on the variation of the purchasing power of households and thus contributes to the identification of appropriate crisis-response strategies. The ToT should be an integral part of food security monitoring systems since a decline in could be an integral an important warning about a possible deterioration in the food security situation of households.

How to analyse, interpret and use the data

The choice of the two items included in the ToT depends on the country being considered, the type of food security-related crisis (e.g. drop or rise in certain prices) and the livelihood group(s) of interest. For example, if the issue of concern is the vulnerability of livestock owners in a country where the poorer segments heavily depend on the sale of livestock to buy food, the most relevant ToT is between livestock and the main staple. In the case of unskilled wage earners, the ToT is the ratio of the hourly or daily wage to the price of the main staple. This ToT indicates the amount of staple that can be purchased with an hour or day of labour. Another example may be that of households dependent on cash crops. In this case, the ToT will be given by the ratio of the price of the cash crop and the price of the food staple. It is important though to clearly state which items are being used and why.

¹ Traditionally, ToT have been used in International Economics to analyze a country's trade position. In this context, the ToT would be the ratio of a country's export prices to its import prices.

The most commonly used terms of trade is the commodity or net barter terms of trade. The net barter terms of trade are the ratio of two prices (or price indices). For example, it can be the ratio of the price of livestock (or of a livestock price index) to the price of a staple (or a staple price index).

The ToT indicator is not a static single value in time, but a dynamic indicator that needs to be monitored over time. For example, knowing that the ToT for unskilled labourers in India, defined as the ratio of the hourly wage to the price of rice, was 1.3 in 2005 will not tell us much. But realizing that this value was 3.5 in 2002 and then declined to 1.3 in 2005 will be very informative about the loss of purchasing capability of this group of the population. In 2002, unskilled labourers in India were able to purchase 3.5 kg of rice for every hour they worked. In 2005, the ToT declined to about one third, therefore the unskilled labourer had to work three times as much to obtain the same amount of rice.

The ToT is particularly useful if the prices used in the ToT move in the same direction when it is not immediately obvious whether the ratio of the two prices increases or decreases.

Example: Guinea Bissau and the Cashew Nut Market²

Guinea Bissau is one of the emerging African producers of raw cashew nuts, along with Benin and the Ivory Coast. Raw cashew nut production offered the opportunity of higher income revenues compared to rice, the main staple crop in Guinea Bissau. Therefore, over recent years, many farmers in Guinea Bissau switched from rice to cashew nut production. Currently raw cashew nut exports amount to 98 percent of total exports for Guinea Bissau and approximately 80 to 90 percent of Guinean households are involved in the raw cashew nut business, while 60 percent of households produce cashew nuts.

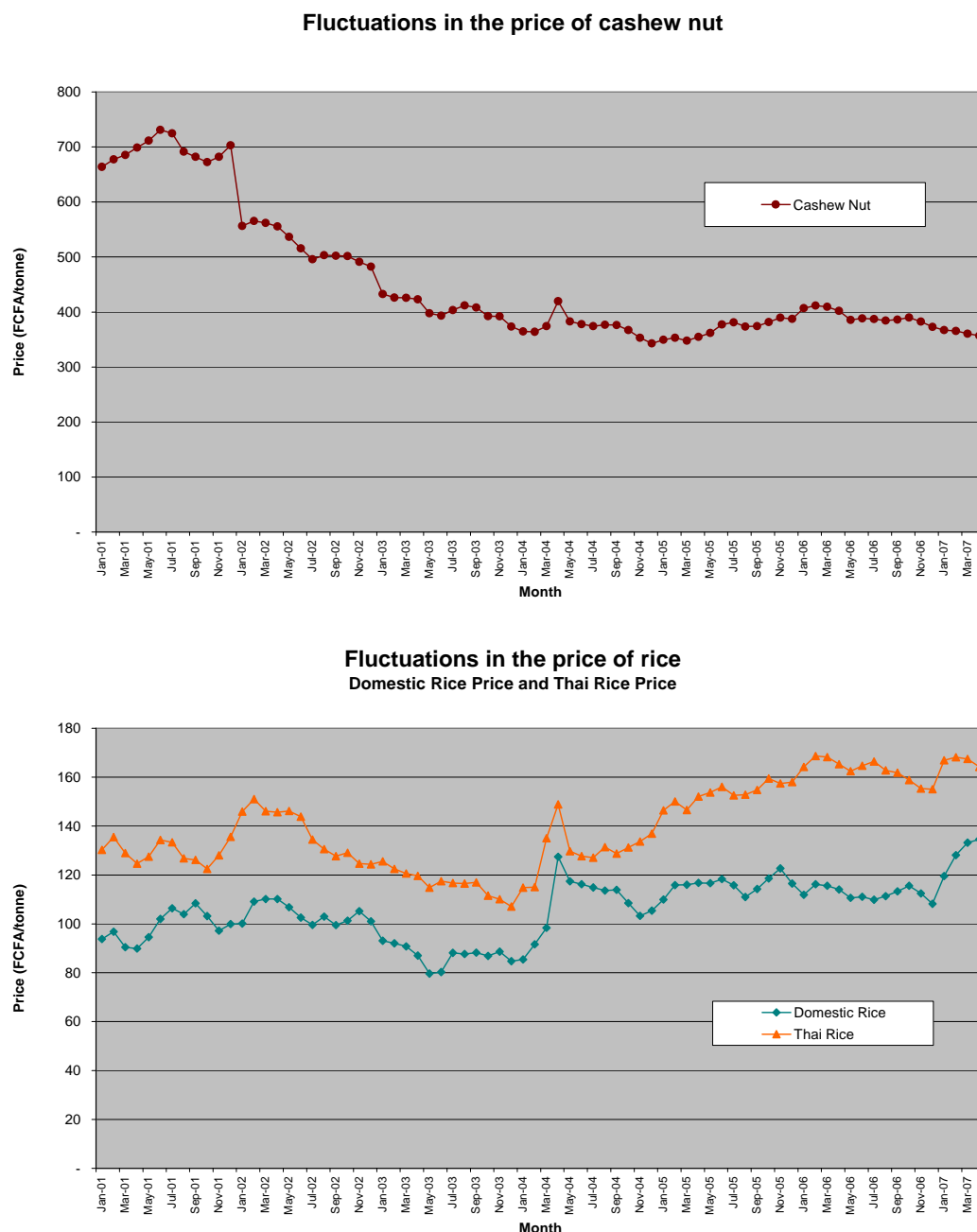
Guinea Bissau does not process the raw cashew nuts and is a very small producer. Consequently the price is set by the major players in the market, namely India, the main processor, and the US, the main importer of cashew kernels.

In parallel, rice production in Guinea Bissau has started to suffer as more farmers have moved out of rice production and into cashew nut production over the last 20 years. This has turned Guinea Bissau into a net rice importer, running an annual rice deficit of 70,000 tons. Currently, on average, rice imports account for approximately 30 percent of Guinean rice consumption. Farmers have become very dependent on cashew nut production and the cashew nut price for their livelihood, and are heavily constrained by very little diversification in their production. This makes the farmers very vulnerable to any variation in either or both the raw cashew nut and rice prices. These variations immediately determine the households' access to food. The indicator that can jointly capture the changes in the rice and raw cashew nut markets is the ToT.

² See also EFSA report: Guinée Bissau : Commerce de cajou et de riz: Implications pour la sécurité alimentaire, PAM, 2007

Figure 1 shows price trends from 2001 to 2007 for cashew nut and rice. Over recent years, the world price of rice has been rising. This has also been the case for the domestic rice price since 2006. Consequently households have been facing an increasing price for their main staple, be it the national produced or imported variety. On the other hand, the price fetched by the raw cashew nut has generally been falling since 2001.

Figure 1: Trends in raw cashew nut and rice prices for Guinea Bissau between 2001 and 2007



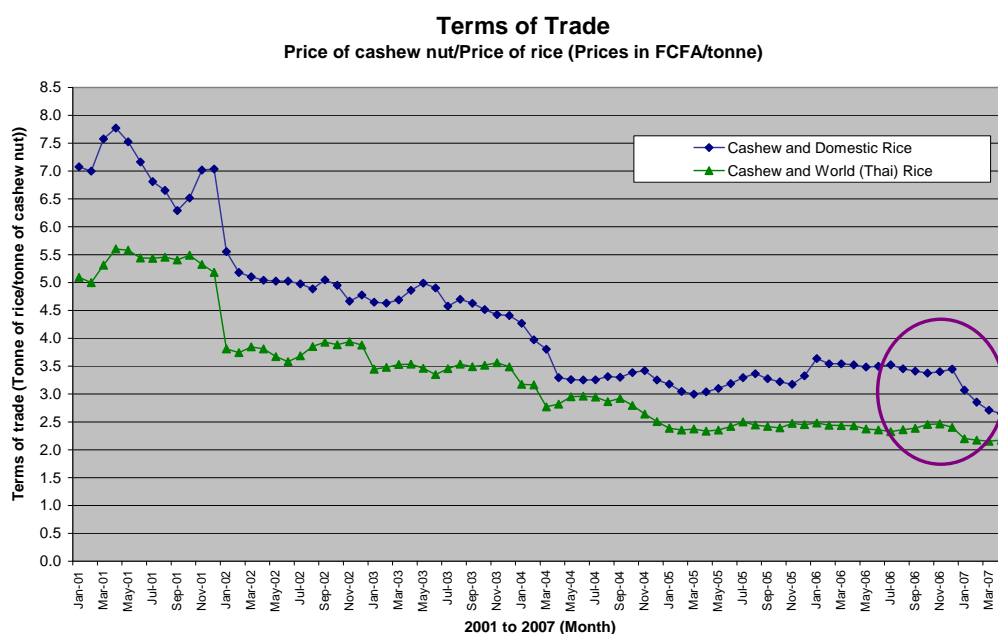
Source: EFSA report: Guinée Bissau : Commerce de cajou et de riz: Implications pour la sécurité alimentaire, PAM, 2007

The information outlined above is captured by the decline in the ToT as shown in Figure 2. Since 2001, the ToT between the price of cashew nut and the price of rice have been generally declining, with a period of relative stability during

2005 and 2006. This implies a continuous decrease in the capability of cashew nut producers to purchase rice, with resulting increasing food security risks.

Two ToT values are given, one for cashew nut with respect to imported rice³ and the other for cashew nut with respect to the domestic price of rice. With regard to domestic rice, Figure 2 shows that in 2001 approximately 7 kg of rice could be obtained per kilo of cashew nut. In 2006, the amount of rice per kilo of raw cashew nut sold was approximately 3.5 and then plummeted to a low of 2.6 kilos in April 2007. This is a tremendous drop with very hefty implications for access to food and food security.

Figure 2: Terms of trade cashew nut to rice in Guinea Bissau from 2001 to 2007



Example: The Ethiopian Famine from 1982 to 1985⁴

An illustration of the usefulness and application of the ToT tool can be found in the tragic famine that occurred in Ethiopia between 1982 and 1985. In the period from 1982 to 1985 Ethiopia was hit by one of the worst famine outbreaks in its history, which followed from a previous decade of intermittent poor food supplies and internal conflicts.

The northern regions of the country (including Wollo, Eritrea and the Tigray) had suffered most severely from the internal conflicts and by 1980-1981 conditions were rapidly deteriorating.

³ The import price in this example is the FOB price. This does not include transportation costs, which are generally assumed to be constant. Consequently, when adding the transportation costs to the international price of rice, the price curve in figure 1 will shift upward. The international rice price terms of trade curve will move closer to the other terms of trade line. See also the Import Parity Price (IPP) tool for further discussion on transportation costs.

⁴ Extracted from B. G. Kumar, *Ethiopian Famines 1973-1985: A Case Study*, in Drèze, J. & Sen, A.K. (eds.) *The Political Economy of Hunger*, Vol. II, 1990.

The situation was aggravated by the failure of the Belg⁵ season in 1982, following five consecutive bad harvests. Rains continued to be erratic in 1983 and 1984, leading to a disastrous food availability situation. Political difficulties and lack of infrastructure severely constrained international relief and only by 1985 partial relief started reaching some areas of Ethiopia, although deliveries were largely below requirements.

Table 1: Livestock grain-barter terms of trade per market for Ethiopia (1982-1985)

Terms of trade per market	Sept 1982	Oct 1982	Nov 1982	Jan 1983	July 1983	Oct 1983	May 1985
Korem							
Oxen-teff		2.6		3.3	1.0	2.5	0.6
Oxen-sorghum		4.3		5.0	1.3	3.2	0.9
Goat-teff		0.5		0.5	0.3	0.3	0.1
Goat-sorghum		0.8		0.8	0.4	0.4	0.2
Kombolcha							
Oxen-teff	3.1		3.5	2.7			0.9
Oxen-sorghum	4.1		4.0	2.6			1.0
Goat-teff	2.4		2.2	1.8			-
Goat-teff	3.1		2.5	1.8			-

Source: B. G. Kumar, Ethiopian Famines 1973-1985: A Case Study, in Drèze, J. & Sen, A.K. (eds.) *The Political Economy of Hunger*, Vol. II, 1990

One vulnerable group in this context were the livestock owners. As a coping strategy, livestock owners started selling off their cattle in reaction both to increasing food prices and to adverse living conditions. On the one hand, deteriorating household conditions, purchasing power and availability made it more difficult for households to purchase feed for the animals. On the other hand, livestock owners needed to sell more animals to buy the same amount of grain as prices increased. In fact, to prevent emaciation, livestock owners preemptively sold their animals and thus flooded the market with excess supply. This further reduced the price of livestock.

ToT represented a key indicator for the vulnerable communities that relied on the sale of agricultural commodities (including animals) for food access and income. The numbers reported in Table 1 illustrate this. Livestock-grain terms of trade are reported for two markets in the Wollo region (which was severely hit by the famine from the onset). In the northern provinces of Ethiopia conditions started to severely deteriorate during 1982. During this period households began to employ coping strategies, namely selling of their livestock and consuming alternative foods as wild fruits and wild grass seeds. By January 1983, the ToTs had already declined, especially in Kombolcha. By May 1985, the ToT had fallen to a fourth or a fifth of the levels reached in 1982.

How to calculate the indicator

When calculating the terms of trade consider the following steps:

⁵ Ethiopia has two main rainy seasons: the Belg season which runs from February to May and the Meher season which runs from June to September.

First determine:

1. Who are the target groups or livelihood groups of interest?
2. What is/are the main cash income sources of these groups, such as the sale of a cash crop, livestock or daily labour?
3. What is/are the main staple foods consumed by these groups?
4. Which data is required and/or available?

Terms of trade are then calculated as follows:

Terms of trade for good i and j

$$TOT_{ij} = (\text{Price of good i}) / (\text{Price of good j})$$

If the prices of the two commodities under consideration are expressed as indices the formula can still be applied by taking the ratio of the indices.

Limitations of the tool

- This tool offers a rather mechanical approach. The ToT show changes in prices, often at an early stage. Yet, the ToT do not say anything on the causes behind these changes, which could include policy measures, shocks such as droughts and market manipulation by major players, such as traders. This would have to be investigated.
- The possibility of computing ToT depends on the data available and can be problematic when the data for the target groups of concern are not available.
- The regional ToT has been observed to differ from the national average in the field (for example in the case of Guinea Bissau).

Data needs, data sources

Terms of trade

Data needs	Data sources
Livestock prices	• Ministry of agriculture, WFP, FAO
Staple prices	• Ministry of agriculture, WFP, FAO
Labour wages	• Bureau of statistics, Ministry of labour
Cash crop prices	• Ministry of agriculture, Ministry of trade, WFP, FAO

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