THE POLITICAL ECONOMY OF FOOD PRICE INFLATION IN SOUTH AFRICA

J.F. Kirsten, N. Vink, D. Scheepers, F. Meyer, M. Calcaterra and L. Jenkins

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Department of Agricultural Economics,
Extension and Rural Development
University of Pretoria
Pretoria, 0002
South Africa

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Corresponding author:

J.F. Kirsten
Department of Agricultural Economics, Extension and Rural Development
University of Pretoria
Pretoria
0002

Tel: 012-420 3248
Fax: 012-420 3247
E-mail: jkirsten@postino.up.ac.za

Abstract:

This paper reports on a study that investigated the increase in food prices in South Africa. It is set against the scenario of an increasing inflation rate since September 2001. The June 2002 STATSSA figures estimated the annual inflation rate (CPIX) at 8.8% with food inflation being the major contributor with an annual increase of 14%. The high unemployment and poverty rate in South Africa has already lead to concerns about the negative impact of these increases on the cost of living for the poorest. In this paper we show that the sharp depreciation of the exchange rate towards the end of 2001 had a major impact on the producer price of maize – one of the key agricultural commodities because of its role as a staple food and as an input in the production of white and red meat and other animal products.

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1. Introduction

South Africa's inflation rate has been increasing since September 2001. The June 2002 STATSSA figures estimated the annual inflation rate (CPIX) at 8.8% with food inflation being the major contributor with an annual increase of 14%. In light of the high unemployment and poverty in South Africa any increases in food prices would lead to some concern.

In this paper we show that the sharp depreciation of the exchange rate towards the end of 2001 had a major impact on the producer price of maize – one of the key agricultural commodities because of its role as a staple food and as an input in the production of white and red meat and other animal products.

However, it also seems as if this inflation in food prices – mainly the sharp rise in maize producer prices - was also seen by some participants in the supply chain as an opportunity to deflect attention from their own actions. Thus for example the millers and the poultry producers (and in some cases the retailers) were the first to draw the public's attention to the impact of this on expected higher prices for maize meal, poultry meat and eggs. Whether this was a ploy to improve their bargaining position during price negotiations with the retail chains or to justify increases in prices is an open question to many. While the price of maize as raw material has been increasing rapidly most millers and feed manufacturers do have sound procurement policies and good hedging strategies to account for this type of price risk. Some even managed to negotiate fixed price contracts with farmers far below the SAFEX delivery month contract price. The fact that retail prices have not increased at the same rate as producer prices (SAFEX spot prices) confirms this position.

On the other hand we witnessed a number of statements from the labour and consumer movements asking government to take action. Research done for COSATU has been especially critical of price behaviour in the agricultural and food markets and argued that there is evidence of price manipulation of maize prices and that the practice of "import parity pricing" is unfair (Weekly Mail and Guardian, 2002). Here again it is clear that a lack of understanding of the working of the market for agricultural commodities has resulted in such statements.

The various positions/statements reflected here illustrate well how different participants in the food chain protect their own interests and lobby for government action. Under these circumstances there is clearly a need for unbiased analysis. This paper endeavours to do this by providing a detail analysis of the causes of the recent price increase in the producer price for maize. The paper starts with an analysis of inflation and food price inflation trends and shows the impact of food prices on the overall inflation rate. Then a detailed analysis of the maize price is provided, followed by some concluding comments.

2. Inflation and food price inflation

It has become apparent in recent months that the increasing inflation rate in South Africa is largely the result of an increase in food price inflation. However, it is necessary, first, to take a longer-term perspective on food price inflation. The trends are shown in Figures 1 and 2 below, which show the trends in food price inflation in conjunction with the process of deregulation of agriculture. These data show that deregulation was characterised by a lowering in the rate of food inflation (i.e. during the period when the general rate of inflation in the country was brought to below double digit figures for the first time in two decades), and by a reduction in the variability of food price changes. This is a key finding that serves as a warning against attempts to reintroduce the control measures that existed prior to the promulgation of the Marketing of Agricultural Products Act in 1996.

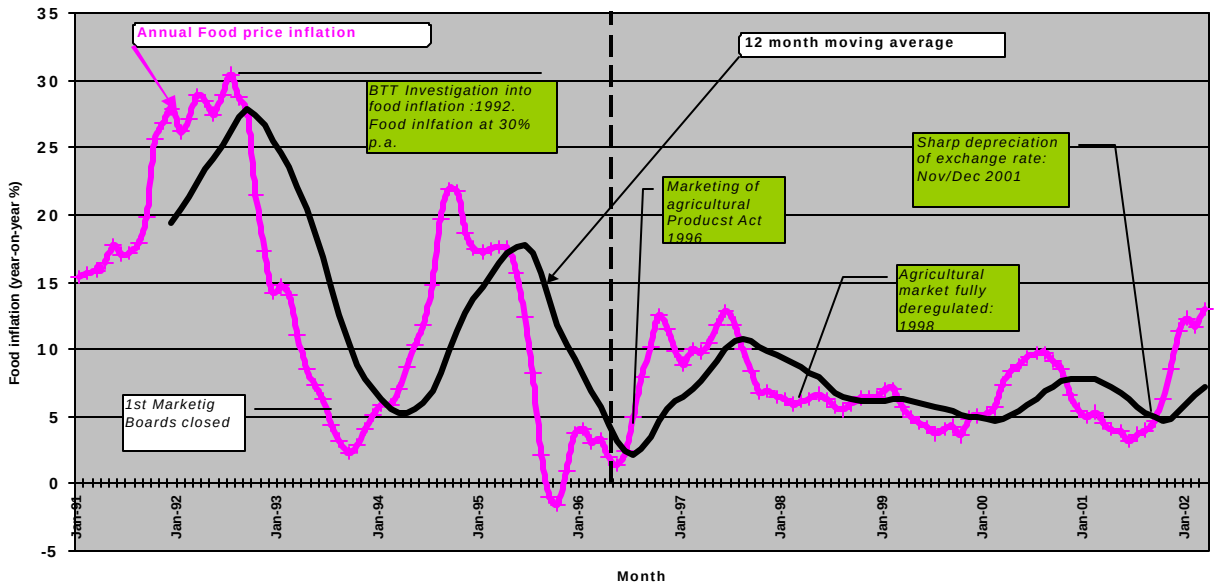


Figure 1: Food price inflation and deregulation

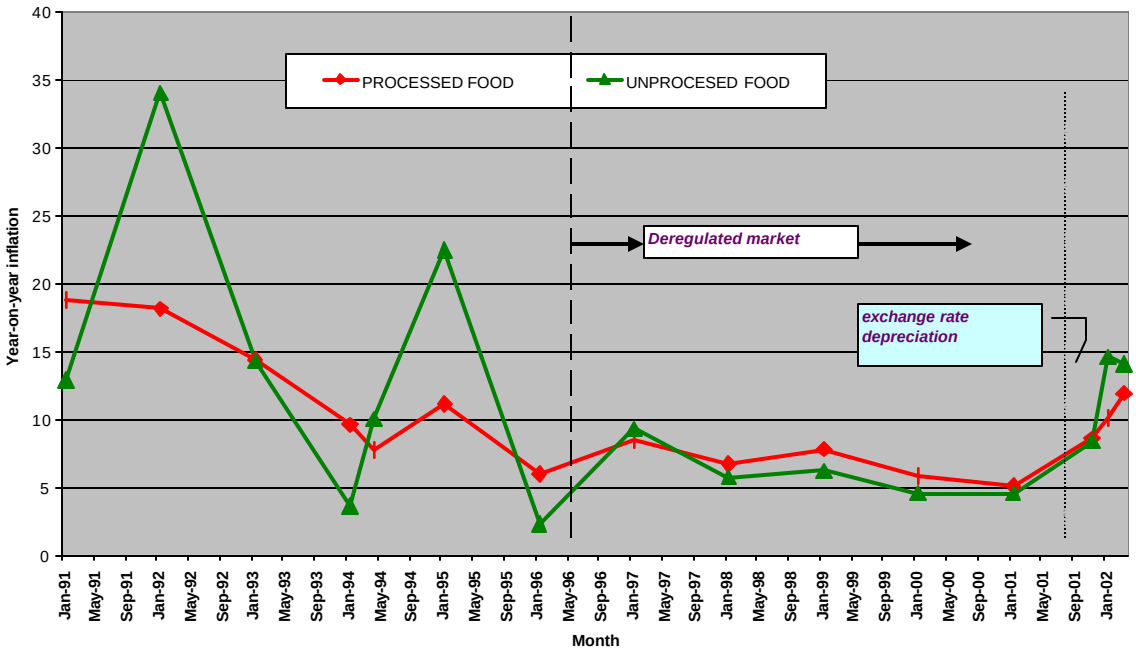


Figure 2: Inflation in the prices of processed and unprocessed agricultural products

As far as the short-term situation is concerned, the April Statistical Release of StatsSa states the position clearly:

> "The headline inflation rate at April 2002 … is 8,0%. This rate is the highest since February 1999 when the rate was 8,6% … The official inflation rate … is 1,4 percentage points higher than the corresponding annual rate of 6,6% at March 2002 …, mainly due to larger annual contributions … in the price indices for food (with a contribution of 2,9 percentage points to the 8,0% official inflation rate) …

The trend since 1998 is shown in Figure 3 below. Here it is evident that when CPI-food was growing at a relatively constant rate (up to the end of 1999), the overall inflation rate was declining. However, between the end of 1999 and the middle of 2000, and again from the middle of July 2001 it is clear that the increase in CPI-food has preceded an increase in the overall rate of inflation. The interpretation is emphasised by Figure 4, which shows the difference between the CPI and CPI-exFood thus illustrating the important contribution of food inflation to total inflation over the last few months. The reason for the relatively large increase in the price of food is shown in Table 1 below.

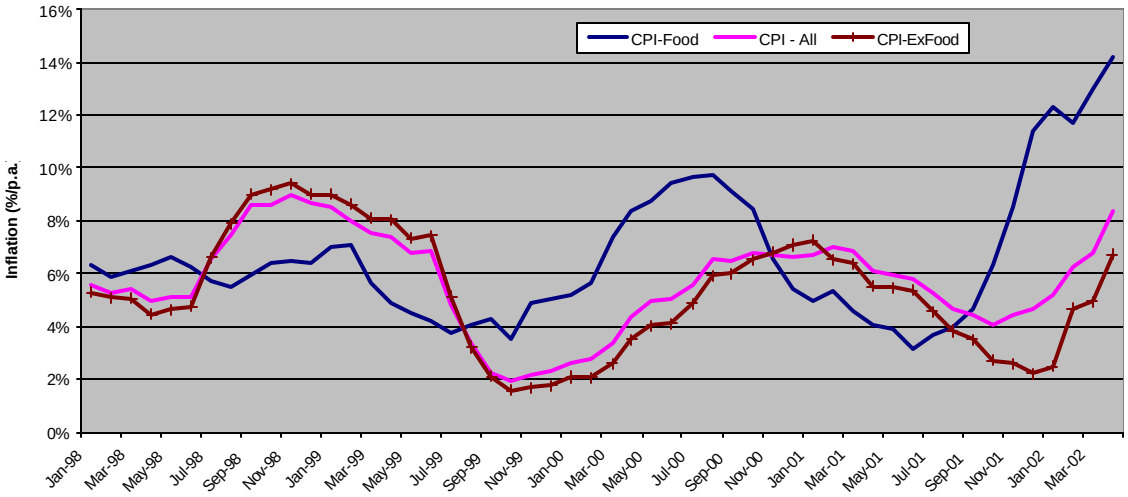


Figure 3: Annual increase in the CPI for food, Jan 1998 to April 2002

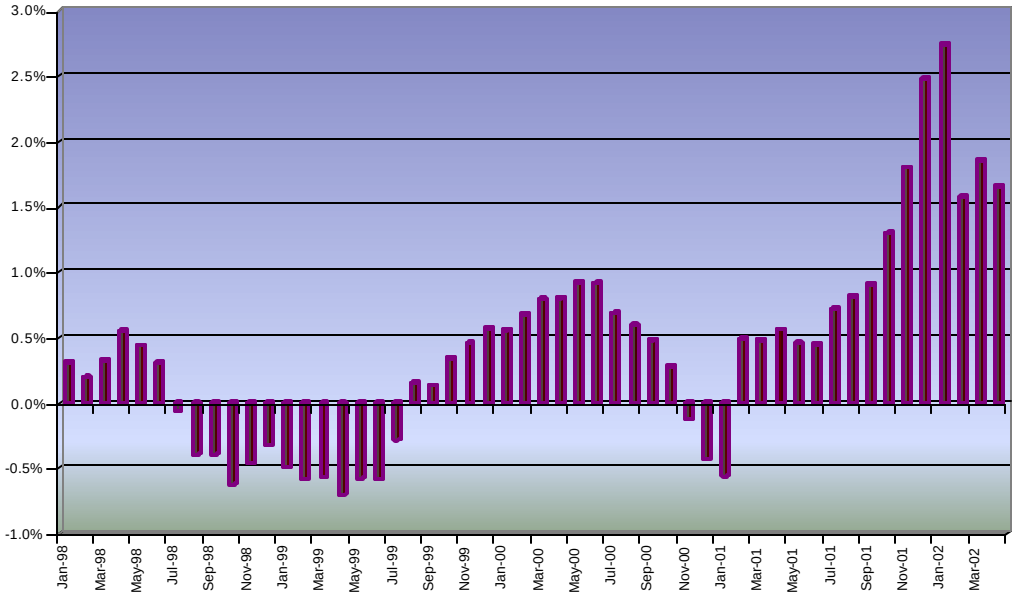


Figure 4: Difference between annual increase in CPI-all and CPIex-food, 1998 – 2002 (percentage points)

The data in Table 1 show that the main reason for the increase in the Consumer Price index for Food over the period March to April 2002 was the increase in the price of grain products, of milk, cheese and eggs, and of fats and oils, fruit and nuts, and coffee, tea and cocoa, which all increased at a rate higher than the average for all food products.

Table 1: The contribution to CPI Food, April 2001 to April 2002

		Percentage change between	
Product	**Weight**	**March 2002 to April 2002**	**April 2001 to April 2002**
CPI		1,8	8,0
CPI Excluding food	79,01	1,8	6,3
Food (total)	20,99	1,5	14,2
Grain products	3,81	2,4	14,3
Meat	5,66	0,9	15,1
Fish and other seafood	0,69	1,3	12,9
Milk, cheese and eggs	1,96	2,0	16,0
Fats and oils	0,76	2,6	19,1
Fruit and nuts	1,09	1,7	6,2
Vegetables	2,00	0,6	23,5
Sugar	0,50	1,1	8,8
Coffee, tea and cocoa	1,07	2,3	11,3
Other	3,45	0,5	7,6

Source: StatsSa

The food products that had larger than average increases for the period April 2001 to April 2002 are vegetables, grain products, meat, milk, cheese and eggs, and fats and oils. The hypothesis is that these price increases are related to the weakening of the exchange rate in the last six months of 2001. As will be shown below, the exchange rate directly influences the price of products that have to compete with imported goods, hence the increase in the price of grain products. Grain products are also the single largest input in the production of meat, and of milk, cheese and eggs, hence the increases in the prices of these products. The exchange rate will also directly influence the price of imported products such as fats and oils, and coffee, tea and cocoa. Increases in the price of fruits and nuts, and of vegetables, are expected to be unrelated to the exchange rate and mainly influenced by the normal seasonal effects.

3. The maize price increase of 2001/2002

The motivation for this study came largely from concerns raised over the steep increase in the producer price of maize at the end of 2001. The public outcry was unsurprising, as white maize is the staple food in the country, and yellow maize is the single most important input in the dairy, pig, beef, and poultry industries. Thus, an increase in the price of maize implies that the price of maize meal as well as of all the major sources of proteins such as milk, milk powder, butter, cheese, eggs, poultry and pork will increase. This interaction is illustrated in Figure 5.

The analysis of pricing behaviour in the market for grains is, therefore, the key focus of this study, following from the hypothesis that the sharp increase in the price of maize has been the most important driving force behind the recent increase in food price inflation. Thus, the first question to be addressed is why did the price of maize increase?

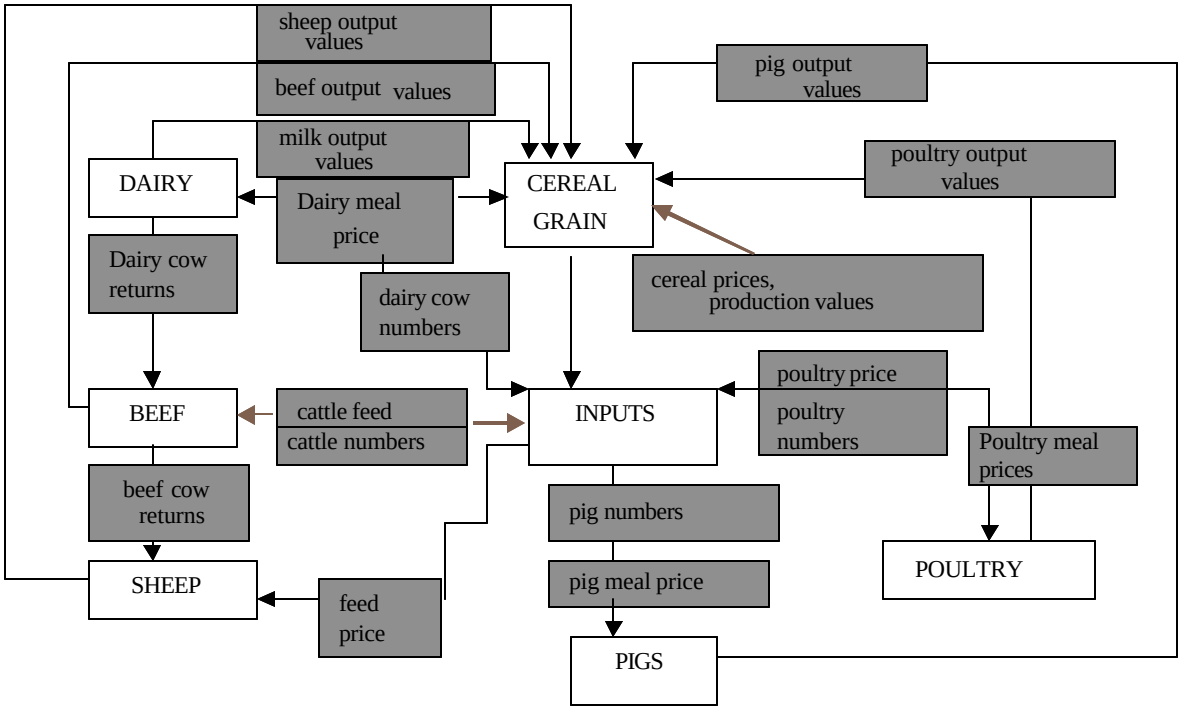
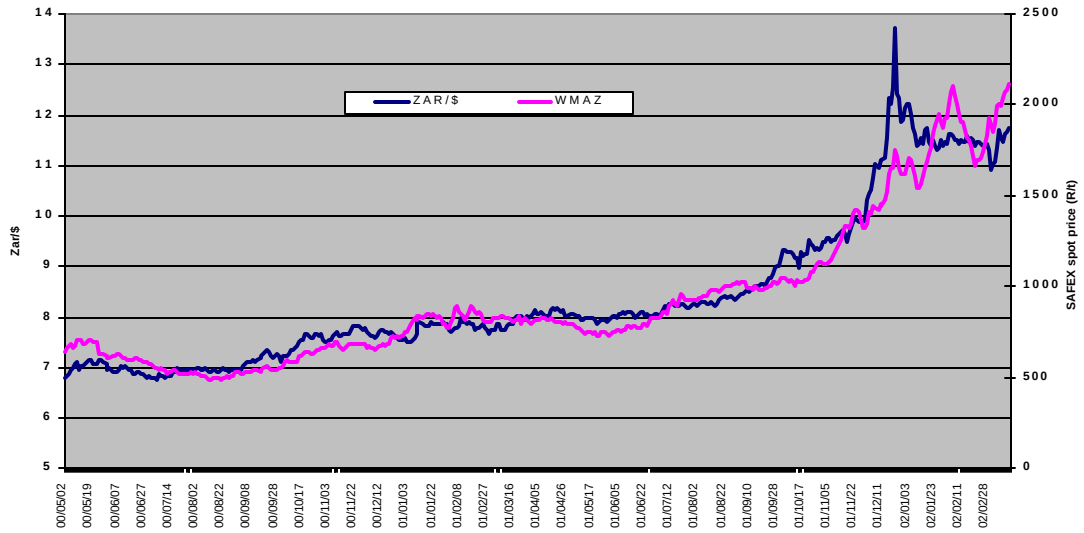


Figure 5: The interaction between maize and the animal sector

3.1 Trends in maize producer prices

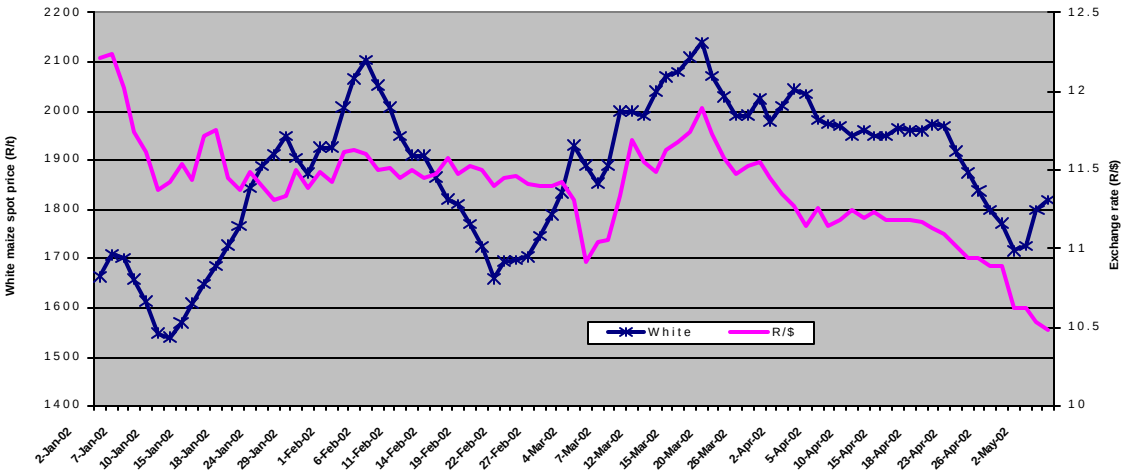
Figure 6 depicts the trend in the producer price of white maize plotted against the trend for the R/$ exchange rate since May 2000. The data show a remarkably strong correlation between the two variables. In the years prior to 2000 a weaker correlation was found. This is largely the result of other factors, such as the large crop and low prices in 1999/00, leading to lower plantings in 2000.



Source: SAFEX/AMD and Reuters

Figure 6: White maize producer price vs. the R/$ exchange rate, May 2000 to March 2002

Further evidence that the short-term movements in the spot price for maize are driven largely by the exchange rate is provided in Figure 7, which shows that the post-February improvement in the exchange rate has led to a drop in white maize prices. Higher world prices and increasing regional shortages in SADC have however contributed to the break in this trend during May 2002.



Source: SAFEX/AMD and Reuters

Figure 7: Short term movement in the spot price for white maize, January to May 2002

The discussion thus far has reflected trends in nominal prices, largely to show the correlation between the nominal price and the exchange rate. However, any sensible interpretation requires consideration of the real producer prices. These calculation show that the real farm gate price of maize was more than 40% lower in 1996 than its level in 1975-1985 – declining on average by 7% per annum between 1985 and 1990 and 10% between 1990 and 1995. The introduction of the tariff started a trend of increasing real prices that has continued since, and that accelerated at the end of 2001 with the sharp weakening in the exchange rate (Between 1995 and 2000 real prices increased by 9.7% per annum but since 2000 by 35% per annum on average).

However annual averages distort reality somewhat and when one considers weekly prices we find that it is only since September 2001 that producers could earn more in real terms relative to 1975. This is reflected in the following real weighted average prices:

Year	Maize producer price: (R/ton in constant 2000 prices)
1975	R1 016
1984	R1 220
1987	R1 108
1995	R 419
2000	R 668
September 2001	R1 200
January 2002	R2 500

3.2 The determinants of the domestic price for maize

The main influences on the price of maize that a South African buyer pays is the world price for maize, the exchange rate[1] and the relative size of the domestic (Southern African) maize crop. The mechanism for reaching the domestic price of white maize can be illustrated with reference to actual prices ruling in the South African market between 2000 and 2002 (Ferris, 1998). The data are provided in Table 2 below.

[1] The other costs (foreign currency costs of freight, insurance, etc; as well as the domestic costs) are important, too. Evidence shows, however, that they are more stable than the world price and the exchange rate.

Table 2: Calculation of import parity prices for white maize

Year	Area Planted	Crop	Fob Gulf Price	CIF Randfontein price (import parity price)	Exchange Rate	Safex
	Mil Ha	Mil Tons	$/t	R/t	ZAR/$	R/t
1999	3.227	6.71				750
2000	2.708	8.97	79.980	1239.992	6.960	519
2001	2.84	7.225	94.170	1559.563	8.450	1022
2002		??	90.720	2000.56	11.610	2008

Note: *All data for 1st of September except for 2002, which is at 1 February 2002*

Maize that is physically located in the United States does not have the same value to a South African buyer as does maize that is physically in the EU or in South Africa. Hence, the price of maize in different markets must be adjusted to take account of the differences in transport costs, exchange rates, etc. in order to make comparisons possible. Such an adjusted price is called a **reference price,** and must be calculated with respect to a **reference point** (Tomek and Robinson, 1992). In the case of grains in South Africa the commonly used reference point is Randfontein.

In order to adjust all prices to this reference price, the international commodity price ('free on board' or fob Gulf price[2]) has to be adjusted to take account of all the costs incurred in bringing the maize to Durban. This price, called the CIF price[3], is adjusted into local currency using the current exchange rate. Once this is done all local Rand based costs (off-loading, losses, interest, local transport costs) can be added to result in a final landed (local) price per ton at the point of consumption or the reference point. This is the import parity price. Domestic prices will approach import parity when supply and demand is virtually in balance or where there is a likely shortage in the market is emerging. In should however be emphasised that the South African market is affected by events in SADC. The regional shortage as a result of the drought and instability in several countries implied that South Africa has become the major supplier to a number of our neighbouring countries. This export demand effectively puts the South African market in a short situation pushing prices to their import parity levels. This is illustrated in Figure 7. Also evident here is that producer prices for maize will always move between export parity (the lower line) and import parity (the top line) depending on the balance of supply and demand in the market (Ferris, 1998).

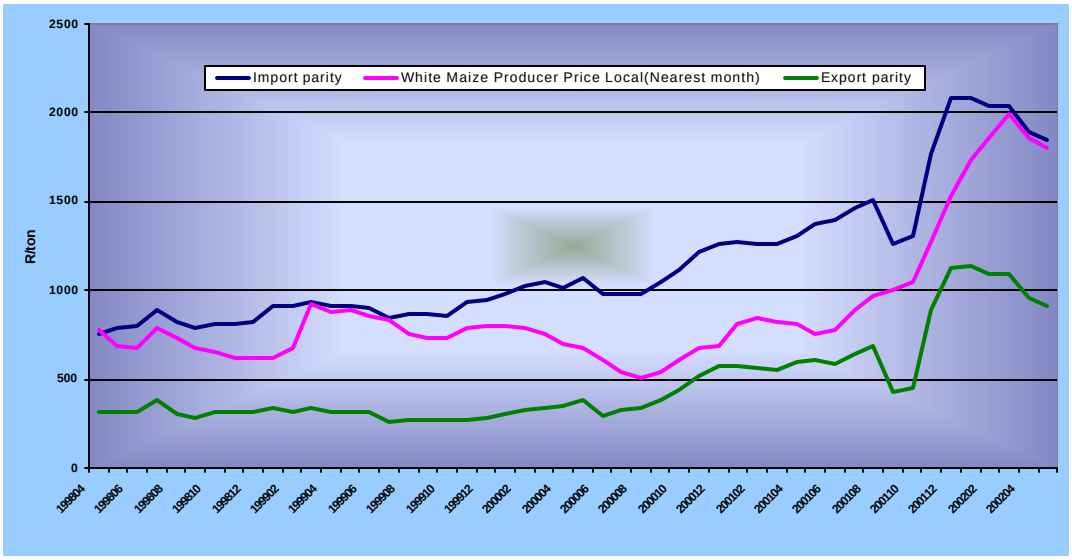


Figure 7: Illustration of how SAFEX spot prices fluctuate between import parity and export parity (April 1998 to May 2002)

[2] This means that the supplier delivers the maize at a price that is equivalent to loading the maize onto a ship in the Gulf, i.e. the buyer will pay for the transport, insurance, etc. to get it to where they need it. The world price for maize is conventionally quoted as fob Gulf.

[3] Cost, insurance, freight.

4. Testing for the causes of the maize price increase

The discussion so far and the analysis of price trends suggest strong arguments and evidence for showing that there is a close correlation between farm gate prices and the R/$ exchange rate in the case of every commodity analysed. However, these results should be interpreted with care and need to be **tested statistically** to prove beyond reasonable doubt that the exchange rate has been one of the major factors contributing to the producer price increases.

Although the evidence suggests a strong correlation between the movements in the exchange rate and the SAFEX spot price, correlation does not necessarily imply causation in any meaningful sense of that word. The econometric graveyard is full of magnificent correlations, which are simply spurious or meaningless. As a result, the analyst has to test for causality to answer the question whether the exchange rate depreciation **caused** an increase in grain prices.

The Granger (1987) approach to the question of whether x (e.g. the R/$ exchange rate) causes y (e.g. the spot price of maize) is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. Y is said to be Granger-caused by x if x helps in the prediction of y, or equivalently if the coefficients on the lagged x's are statistically significant[4].

The Granger test for the white maize producer price shows that we can say with 99% confidence that changes in white maize prices were preceded by changes in the R/$ exchange rate, with a lag that is usually not more than 10 days or 2 working weeks. In the case of yellow maize a similar result was found, but the lag was much shorter at as little as one working week or 5 days.

In the case of sunflower and wheat the results of the test were not that clear and no conclusive evidence could be found that prices were affected by the exchange rate changes. In the case of these commodities, there could have been other factors that influenced the prices.

Apart from the Granger test we used a regression model to determine the effect of exchange rate fluctuations and import costs on the SAFEX white maize spot price. In this model the SAFEX spot price for white maize was modelled as a function of the exchange rate, exchange rate lagged one month, c.i.f white maize price Durban port in U.S. dollars, and the cost of discharge, tariff, and transport of the maize to Randfontein as a single variable, namely import costs.

All the variables, with exception of the import costs, were statistically significant at the 90% level. The R-squared of the model indicates that 96% of the variation in the real SAFEX white maize price was explained by the independent variables. The elasticities of the different variables are as follows:

Variable	Elasticity with real SAFEX white maize price
Nominal exchange rate	1.05
Exchange rate lagged 1 month	0.51
Nominal c.i.f white maize price Durban port	0.54
Import costs	0.25

The elasticity results show that a 1% increase in the current exchange rate will cause a 1.05% increase in the white maize SAFEX price, while a similar increase in a 1-month lagged exchange rate will cause a 0.51% increase. It should however be noted that the high elasticity for the exchange rate probably also reflects the fact that the market is much more sensitive to an exchange rate depreciation when the crop is short and when stocks are low or when the regional market is short as is the case in 2001/2002. The high exchange rate elasticity (and thus the large change in price levels) is also a consequence of the fact that the market had some ground to make up from far below import parity levels. This explains the large response in terms of the SAFEX price when reports of the short crop in the region became known. A 1% increase in the c.i.f. Durban

[4] Note that two-way causation is frequently the case; x Granger causes y and y Granger causes x. It is also important to note that the statement 'x Granger causes y' only means that x comes before y, and not that y is the effect or the result of x. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term. Nevertheless, it provides stronger evidence of causality than a simple correlation.

port white maize price in U.S. dollars will cause a 0.54% increase in the SAFEX price. Similarly a 1% increase in import costs will cause a 0.25% increase in the SAFEX price. This shows that world prices and the exchange rate make a statistically significant contribution towards the level of producer prices quoted as the price of the near month SAFEX contract.

In this model Ordinary Least Squares (OLS) was used to solve a simple structural equation. Although simple structural equations provide some empirical measurement for the relationship between the exogenous and endogenous variables, far more advanced formulations and specifications of equations, like for instance the Error Correction form of dynamic specification, can be used to estimate these relationships, especially over a longer period of time. The Error Correction form has been used extensively in macroeconomic modelling since its appearance in 1978 (Hallam and Zanoli, 1992). Error correction models can also be estimated using OLS, and offer a means of reincorporating levels of variables alongside their differences and hence of modelling long-run as well as short-run relationships between integrated series. The formulation of such models goes beyond the scope of this article and needs to be included in following studies.

5. Conclusions

The analysis presented in this paper has shown that the domestic price of maize reacted in a predictable fashion to the change in the exchange rate and the international price of maize, to market perceptions of the relative scarcity of maize in Southern Africa and to the food crisis in Zimbabwe at the end of 2001. There is, therefore, clearly no evidence of price manipulation or of unfair price policies in determining the price of the basic commodity.

The paper has once more confirmed that South African agriculture is now, following the process of deregulation, part of the global economy. Consequently external factors such as exchange rate fluctuations, international commodity prices have a much more direct impact on the South African agricultural markets. In the years immediately following deregulation South African producers faced low real prices and pressures on profit margins. The depreciation in the exchange rate has made imported food commodities much more expensive, putting real producer prices back at levels only experienced in 1975. The 2001/2002 season provided a welcome windfall for producers but the impact of the exchange rate on higher input costs will certainly be felt in the near future.

The statements by several interest groups about rising food prices reflect the general level of concern in South Africa about this trend. Inflation targets will be difficult to meet, interest rates will rise and all of this is the indirect effect of the exchange rate. Obviously one can debate about the factors influencing the exchange rate but intuitively it can be argued that the instability in Zimbabwe contributed to the continuous depreciation of the South African currency and at the same time contributed to the regional shortages. Consequently it is possible to argue that the events in Zimbabwe created a double blow to South African consumers – through the exchange rate and creating the regional shortage in staple food.

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