

REQUIREMENTS TO ENSURE ECONOMIC SURVIVAL OF AN EXPANDING SUGAR INDUSTRY INTO THE 21ST CENTURY

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Abstract

The trends in the cost-competitiveness of leading producers of cane sugar, beet sugar and High Fructose Corn Syrup (HFCS) during the course of the 1980s are reviewed. The paper discusses the reasons for the success achieved by a number of producers in holding their costs in check are discussed, and which forms of cost reduction have been crucial in their success are suggested. The paper singles out for special consideration the contrast between factors that are under the control of an industry itself – such as the gains from higher utilisation of capacity; the achievement of economies of scale; and technical advances in agricultural and processing operations, and those factors that are in the lap of the Gods, notably favourable exchange rate changes. In the light of this analysis, it outlines the main elements of a strategy for an industry seeking to expand over the next decade. The discussion is not confined to a consideration of cost competitiveness; it also examines the importance of changes in the export market for a progressive sugar producer and focuses, in particular, upon the implications of the expansion of the share of white sugar in international trade.

Introduction

Production costs are the most important single determinant of any producer's ability to survive. As the prices at which producers sell their output are determined by factors that usually lie beyond their control, the only respect in which they can try to determine their destiny is by working hard to pull their production costs below their revenues.

This paper examines some of the lessons that can be learnt from studying the trend in production costs during the course of the 1980s, during which Landell Mills Commodities Studies has been undertaking a series of annual surveys of the costs of production of sugar and of High Fructose Corn Syrup (HFCS). In particular, it focuses upon just four questions:

- Is there a systematic relationship between the trend in sugar output and the trend in production costs?
- How important are exchange rate changes in determining the pattern of costs of production?
- How do cane sugar, beet sugar and HFCS producers worldwide contrast with one another in terms of production costs?
- How do sugar refining costs compare among the leading sugar importing and exporting countries?

The relationship between the trend in sugar output and the trend in production costs

It is not absolutely clear how increases in sugar production affect the average level of production costs. Sometimes expansion of an industry implies that new cane or beet areas

have to be developed in which the economics of sugar production are less attractive than in those regions in which production was established earlier. This is not a surprising occurrence; indeed it would be very odd if the opposite were true and a country chose to develop its sugar industry in the past by overlooking those areas in which sugar was best located in terms of yields and production costs. Therefore, an expansion in sugar output might seem to imply that production costs would rise.

Against this, however, one can list several convincing reasons why a growing industry may be able to lower its costs. The question is whether an expanding producer is more successful than other producers in reducing its costs.

What are the benefits from expansion? One is the ability to use existing investment in the sugar industry more fully, thereby lowering average fixed costs. For example, farmers may use beet harvesters or cane loaders more fully; and factories can extend their crushing season by a few days.

Another advantage of expansion is the scope for boosting the research and development (R&D) programme of the industry. A bigger industry can spend more money on R & D without having to raise the proportion of industry revenues devoted to research. The more spent on research, the more likely it is that new varieties or new technologies will be developed, which lower the costs of the industry as a whole. Possibly the best example of the gains from an expanded R & D programme is provided by Brazil. Thanks largely to major investment in research by Copersucar, a co-operative encompassing the majority of sugar producers in Sao Paulo state, the Centre/South region of Brazil has raised its productivity and efficiency faster than any other sugar industry in the world.

A third benefit from expansion is harder to quantify, and is more impressionistic. This is the way in which the quality of new staff entering the sugar sector is affected by the trend in its output. A declining industry is typically depressing for new entrants, who fear a future in which cutbacks, rather than increasing responsibilities, will be the order of the day. A growing sector, by contrast, has high morale and offers the prospect of broadening career opportunities. Eventually the quality of new staff will influence industry performance, including the trend in production costs.

In the light of these remarks, it is not surprising to see the results depicted in Figure 1. This compares the performance of five cane sugar producers – the Philippines, the Dominican Republic, South Africa, India and Thailand – in two consecutive five year periods – the 1979/80 to 1983/84 crop years and the 1984/85 to 1988/89 crop years. Percentage changes are calculated for average sugar production costs and sugar output between these two periods. The Philippines and the Dominican Republic both suffered a sharp drop in production during this time. South African output appeared to rise significantly, but this was not a structural change, it was rather a reflection of two drought-stricken crops in the first period; and Indian and Thai production soared.

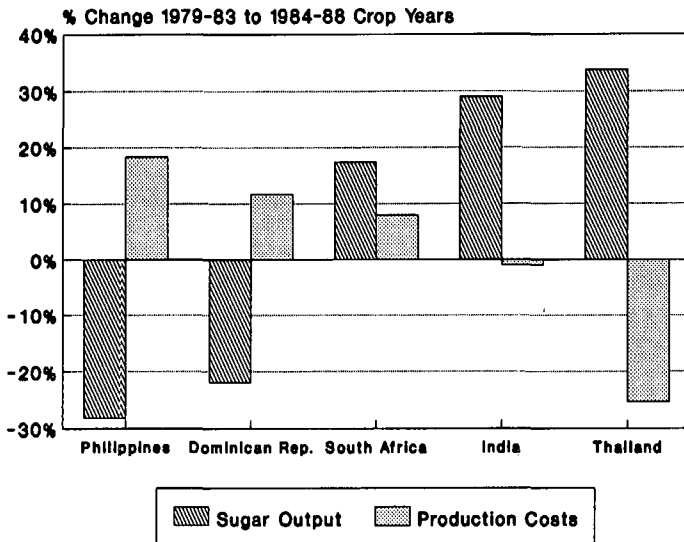


FIGURE 1 Percent change in sugar output and production for 1979-83 to 1984-88 crop years

It is evident from Figure 1 that the two countries the output of which slumped both saw their average production costs rise considerably. At the other end of the spectrum, India and Thailand were the best placed of all: their production costs fell (most markedly for the Thai industry) while their production moved ahead sharply. Although the increase in South African output was not accompanied by a fall in nominal production costs, the increase in costs between the two periods was only about half that of sugar output.

In terms of a sugar industry's survival strategy, the main conclusion from this diagram is fairly clear: there is a dynamic at work which rewards expansion. Expansion proves to be both a cause and a consequence of cost competitiveness.

The importance of exchange rate changes

The past few years have witnessed unusually sharp swings in international exchange rates. Some of the movements have been the result of differences in national inflation rates. Thus countries, like Argentina or Brazil, which have experienced inflation rates of hundreds of per cent per annum, have had to devalue rapidly, merely in order to prevent their exports from becoming totally uncompetitive. Many of the changes in exchange rates have occurred for other reasons. Governments have been persuaded to liberalise their foreign exchange regimes and to allow the forces of supply and demand on the foreign exchange market to determine the value of their currency. Other governments have deliberately engineered a devaluation or a revaluation of their currencies, either to enhance their export competitiveness – in the case of a devaluation, or to reduce the pressure of imported inflation – in the case of a revaluation.

Figure 2 contrasts the impact of exchange rate shifts between the early and late 1980s on three sugar producing countries: Brazil (for which the situation in the main sugar exporting region – the North/North East – is plotted), South Africa and Italy. For each producer, two different ways have been applied to the measurement of production costs. Firstly, their costs have been expressed in local currency, and have then been computed in real (inflation-adjusted) terms by taking account of local inflation; then their costs have been converted into US dollars, and have been translated into real US dollar terms by eliminating the effect of inflation from the value of the dollar.

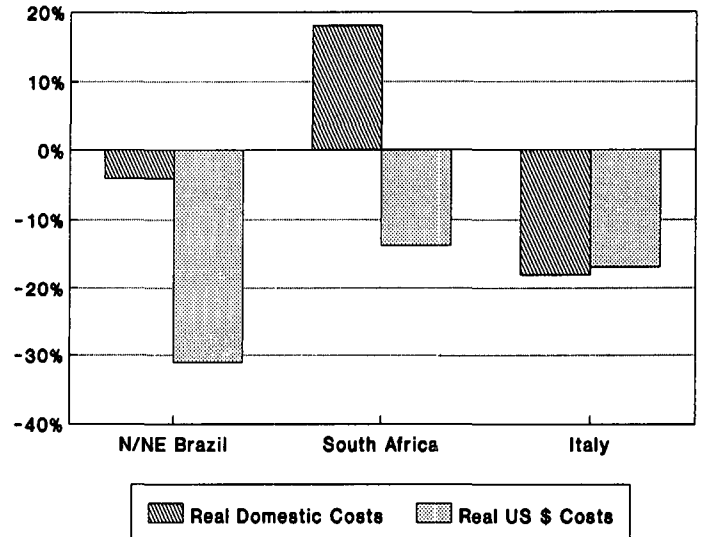


FIGURE 2 Percent change in real production costs from 1979-83 to 1984-88 crop years

Going from left to right in the diagram, it can be seen that North/North East Brazil recorded only a small reduction in its production costs in real local terms (in other words, its costs in Cruzeiros rose almost exactly as fast as local inflation). However, thanks to a massive real devaluation of the Cruzeiro against the US dollar, as a result of the government using maxi-devaluations deliberately to boost the competitiveness of Brazilian exports, the real cost of producing sugar in the North/North East fell by roughly 30% in dollars.

The contrast between the two alternative measures of costs is equally large for South Africa. In terms of real, inflation-adjusted Rands, the costs of producing sugar in South Africa rose by 18% from the early to the late 1980s. Thanks to a real devaluation of the Rand against the dollar, the reduction in costs in real US dollars was more than 10%.

The third example is that of Italy. In real Lira, i.e., its production costs in Lira deflated by the Italian inflation rate, Italy had the best performance of the three countries, managing to reduce its costs by almost 20% between the two five year periods. Yet, when everything is expressed in real US dollars, Italy achieved the smallest cost reduction of all three. As a result of a slight real appreciation of the Lira against the dollar, Italian costs in real dollars declined by little more than 15% from 1979-83 to 1984-88.

Thus, it must be concluded that government exchange rate policy is very important in helping or hindering a sugar industry. Expansion is much easier when a government uses its influence to hold down the real value of its currency than when the currency is allowed to strengthen (as can happen, for example, as part of an anti-inflation programme).

Comparing production costs of cane and beet sugar with HFCS

In the next three figures (Figures 3 to 5) the broad results of production costs can be compared (in actual dollars, without any correction for inflation) from the perspective of the three major competing sources of supply of the world's nutritive sweeteners: cane sugar, beet sugar and HFCS. In each diagram, the 100% level is to be interpreted as the average level of South African costs over the entire ten years from 1979/80 to 1988/89. Another point to note is that the costs are all expressed per tonne, white value.

To start with the agricultural aspects of production, figure 3 illustrates the way in which the worldwide average pro-

duction costs of sugar cane and sugar beet for the early 1980s and late 1980s (expressed per tonne of recovered white sugar) compared with South African field costs over the entire ten years. For HFCS, the nearest equivalent to beet or cane is the cost of maize to the processor.

It is evident that all three forms of sweetener have succeeded in lowering their agricultural production costs during the 1980s. This is very commendable when it is recalled that the costs have not been adjusted so as to remove the effects of inflation. However, the decrease in the production costs of cane and of beet have been very small, whereas the cost of maize per tonne of HFCS in white sugar equivalents has fallen by approximately one quarter, and stood just below the costs of cane in the latter half of the 1980s.

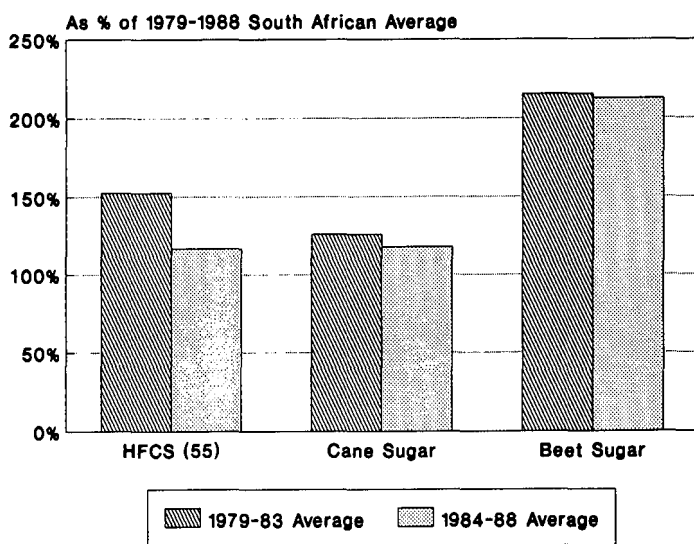


FIGURE 3 Production costs for sugar and HFCS(55) for 1979-83 to 1984-88 crop years: Agriculture

Figure 4 examines the costs of processing, and subtracts the value of by-product credits from the overall figure. These by-product credits are very important in practice. For HFCS manufacturers, the credits from corn wet milling by-products – notably corn gluten and corn oil – are considerable, typically being in the region of \$100 per tonne, sugar equivalent. For beet sugar, there are credits from beet pulp as well as from molasses, which have exceeded \$70 per tonne of sugar in recent years. Cane sugar mills tend to sell only one by-product, molasses, which earns them up to \$25 per tonne of sugar in some years, but they also benefit from the use of bagasse as a free source of fuel, which helps to reduce their production costs. In South Africa, of course, bagasse is a significant source of income to millers, via the manufacture of products such as furfural or pulp.

Figure 4 reveals that, on balance, beet sugar factories are more cost competitive than cane mills and both groups of processors have seen their costs move slightly upward during the 1980s. Even though beet processors suffer from shorter campaigns than cane mills, and these short campaigns push up average beet factory costs, four factors favour beet processors. The first has already been referred to, namely the higher value of beet by-product credits. The second is the success of beet factories in cutting their fuel use to a minimum. The third factor reinforces the fuel advantage enjoyed by beet processors, in that they use raw material with a higher sugar content than cane. The final boost to beet factories arises in the production of white sugar. Whereas the cane industry has to remelt raws and put them through a refinery, the beet sector is fortunate in that it is technically simple – and cheap – to go directly from beets to white sugar.

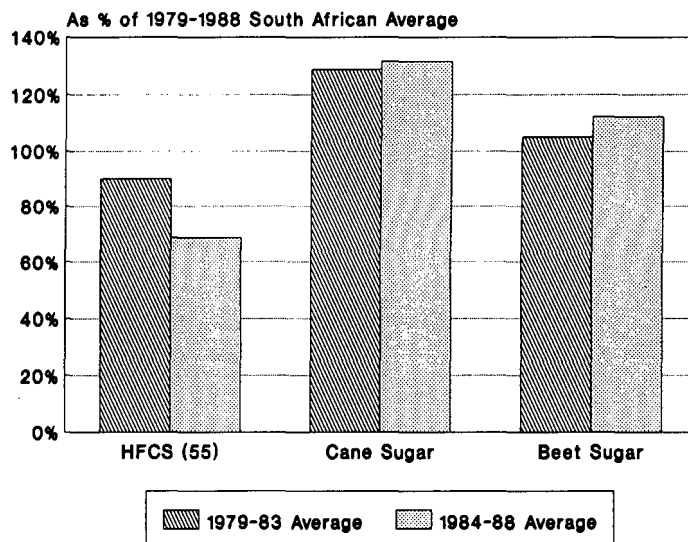


FIGURE 4 Production costs for sugar and HFCS(55) for 1979-83 to 1984-88 crop years: Processing to whites

The exception to the upward trend in processing costs is the producers of HFCS. Their benefit from by-product credits actually decreased between the first and second five year periods, but the advances in corn wet milling technology and the gains from economies of scale ensured that HFCS processing costs fell from approximately 70% of world cane milling costs in the early 1980s to barely half of worldwide cane milling costs in the late 1980s.

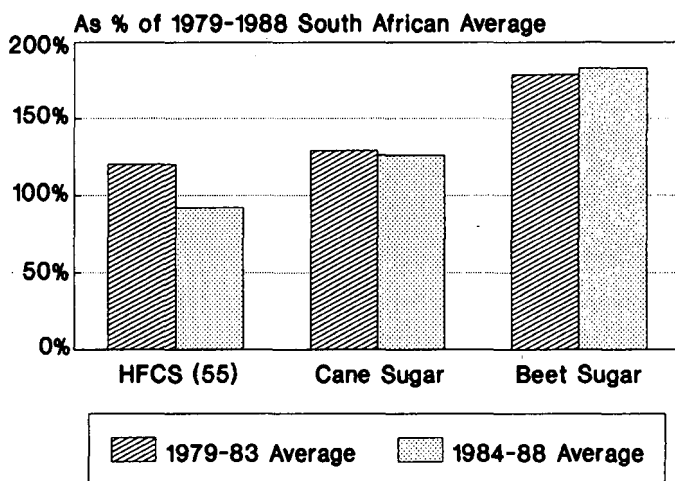


FIGURE 5 Production costs for sugar and HFCS(55) for 1979-83 to 1984-88 crop years

Figure 5 pulls together both the agricultural and the processing costs. The most striking feature of the overall picture is the sharp improvement in the competitive position of the HFCS industry. In the early 1980s, total HFCS production costs were fairly similar to those for cane sugar whereas in the late 1980s, the advantage enjoyed by HFCS was almost 30%. The other point to note is the gap between beet and cane sugar production costs. During the 1980s, beet sugar had been produced at an average cost that was almost 50% higher than the cost of cane sugar. Moreover, the gap widened very slightly during the course of the 1980s.

What lessons does this comparison hold for an expanding cane industry? The most obvious one is the need to enhance the competitiveness of factory operations, notably through better fuel efficiencies, so that the commercial potential of bagasse can be exploited to the full, and through measures to cut the costs of upgrading raws into whites.

Raws versus whites

The review of production costs has focused on the cost of producing a tonne of white sugar, but there has been no discussion on the relative merits of producing raw and white sugars. Although the greater part of world sugar is produced directly as white sugar, only about 40% of all internationally traded sugar is white. However, the share of white sugar in world trade has doubled since the early 1970s and this upward trend is continuing. Furthermore, there is growing evidence that there is insufficient capacity to meet rising import demand. It has become necessary, therefore, for traditional raws exporters to process a greater part of their raws into whites for export. Thus, in recent years, the premium of white sugar prices over raw sugar prices (which is known as the white premium) has strengthened to provide an attractive margin for refiners to upgrade raws to whites.

Like the sugar price, the white premium is subject to market forces and varies over time. Refining costs are, therefore, the most important determinant of a refiner's ability to survive. Since the level of the white premium is determined by factors which lie beyond the control of individual refiners, the only way in which they can improve the profitability of their operations is to lower their refining costs. Thus, it is possible to apply the preceding analysis of production costs to refining costs.

It should be pointed out, however, that an analysis of refining costs covers only those countries which actually upgrade raw sugar to white sugar. No comparable analysis is possible for those countries which process their sugar directly into white sugar, i.e. for those countries in which white sugar is an integral part of the production process where sugar is not crystallised as a raw sugar before being upgraded. Integrated white sugar production processes are a feature common to all beet sugar producers and some of the world's largest cane sugar producers, notably India, Pakistan and China. In addition, there are many countries, like Brazil, Colombia and Guatemala, in which most sugar is processed directly into white sugar at the mill.

The sugars which are produced by these integrated white sugar production processes are referred to variously as direct mill whites, plantation whites or blanco directo. Thus, beet whites are not strictly speaking a refined sugar, although the quality can be very high, as it is in the European Community (EC), for example.

The final two diagrams (Figures 6 and 7), concentrate upon the costs of bringing lower grade cane based sugars up to a refined standard in either autonomous or annexed refineries. In a final refined form, cane sugar is directly competitive with beet white sugar from the EC.

In the preceding analysis of the production costs of cane sugar, beet sugar and HFCS, costs were expressed per tonne of white sugar. In the case of cane sugar producers which upgrade raws to whites in refineries, the average value of refining costs worldwide was added to the cost of producing raws to make the costs comparable to those in the competing beet and HFCS sectors. However, refining costs, like production costs, vary from country to country. Figure 6 compares these for five countries for two periods: 1979-84 and 1985-90, which covers two years more than the production costs presented above. The costs are presented as a per-

centage of South Africa's average sugar refining costs for the entire period from 1979-1990.

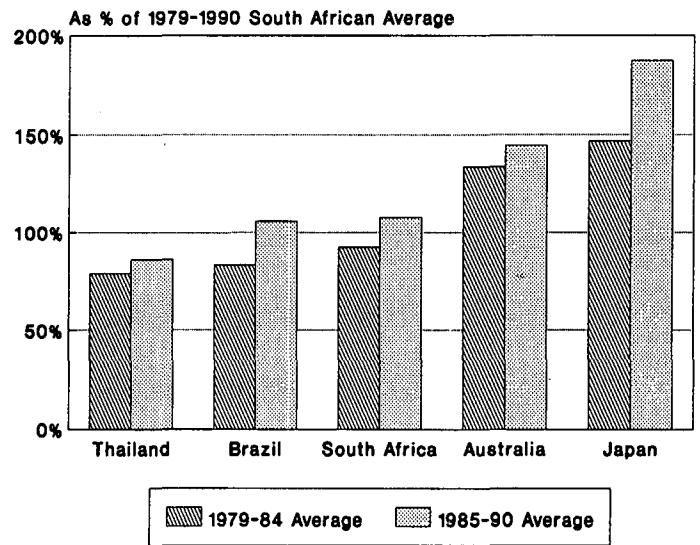


FIGURE 6 Sugar refining costs for 1979-84 to 1985-90

This wide range of refining costs, which shows Japanese costs to be double those in Thailand, reflects, in part, the different costs incurred by autonomous and annexed refineries. In countries with annexed refineries, like Thailand and to a large extent Brazil and South Africa, many overheads can be shared with the cane mill. The most important of these is energy; the energy intensive process of remelting and crystallisation can be fuelled by the steam and the electricity generated by the bagasse driven boilers in the cane mill.

By contrast, autonomous refineries cannot share any costs. This is the case in Japan and in Australia, where some major refineries are not part of sugar mill complexes. Although autonomous refineries do exist in some sugar exporting countries - indeed, South Africa has an autonomous refinery in Durban - exporters typically refine sugar in annexed refineries; while importers typically upgrade raws in autonomous refineries. Figure 7 provides a rough comparison of

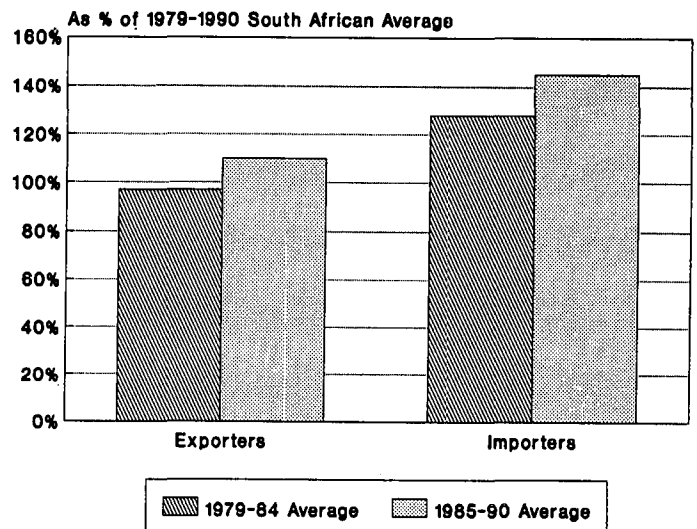


FIGURE 7 Sugar refining costs (Exporters v Importers) for 1979-84 to 1985-90

the relative costs of refining in annexed and autonomous refineries. Once again, South Africa's refining costs are the benchmark for the comparison.

There are two things to note from Figure 7. Firstly, average refining costs in importing countries are significantly higher than those in exporting countries where the majority of cane exporters' refineries are annexed to sugar mills. Secondly, South Africa's refining costs are competitive amongst sugar exporters (despite the Durban refinery being autonomous) with its competitive strength explained partly by its access to cheap coal as a fuel.

Conclusions

The lessons to be learnt from this brief review of refining costs and of production costs in general are complicated, and the conclusions that should be drawn are not always entirely clear cut. Nevertheless, five main points emerge.

- The longer term trends in costs favour the producers who are already low cost and who are expanding. If one singles out the four most significant beneficiaries from this pattern, the future is bright for Australia, Thailand, Centre/South Brazil and South Africa.
- The longer term trends in costs will reinforce the difficulties already affecting high cost producers whose output has been declining. The English-speaking Caribbean includes several countries in this category.
- Governments can do a great deal to affect the competitiveness of their domestic sugar industries through exchange rate policies. During the 1980s, developing countries tended to gain from real devaluations against the currencies of the major industrialised nations. Looking ahead to the 1990s, exchange rate swings are likely to transform the situation of some Eastern European beet sugar producers, enabling them to compete much more effectively than in the past.
- At a global level, HFCS is a considerably greater competitive threat than many sugar producers appreciate. In terms of the competition between cane and beet sugar, the agricultural sector gives cane its overall cost advantage over beets. However, beet factories are able to match their cane counterparts. This suggests that, whereas field cost reductions should receive priority from the beet industry, cane producers should try to learn from the experience of beet factories and force down their processing costs, and boost their fuel efficiencies.

- Among the countries which upgrade sugar in refineries, those with refineries annexed to sugar mills typically have lower refining costs than those which operate autonomous refineries.

In the long term, sugar exporters with low production costs will be best placed to survive in the international sugar market. These currently include Australia, Brazil, South Africa and Thailand. With the exception of Brazil, which has for a long time exported a large share of its sugar as whites, the others have traditionally been raw sugar exporters. However, this has changed in recent years. Thailand now exports approximately one third of its sugar as whites, while South Africa has exported as much as one quarter of its exports as whites. Only Australia, which has much higher refining costs than its main competitors in the raws market, has so far not exported whites in significant quantities. However, even Australia is considering building a "super refinery" which could produce whites for export.

The long term attractions of exporting whites rather than raws will depend on the relationship between refining costs and the white premium. In recent years, the white premium has offered an attractive margin for most refiners and this has stimulated considerable interest in investment in new refining capacity. However, there is a danger that if many raws exporters simultaneously decide to invest in new, or expanded, refineries, the white premium will narrow and the net value added from refining could again be negative, as it was for much of the 1970s and 1980s.

In this respect, South Africa suffers one major drawback. Like Australia, South Africa's main refinery is autonomous and therefore does not have the flexibility of its competitors in Brazil and Thailand to vary the share of whites in total output depending on the attractiveness of the white premium.

However, as it is impossible to second guess the behaviour of other sugar producers and refiners, it is also impossible to predict the comparative returns from raw and white sugar exports. For this reason, one can only conclude with the point which was made at the beginning of this paper, namely that production costs are the most important determinant of a country's ability to survive. The prices at which producers sell their output are determined by factors that usually lie beyond their control; therefore, the only respect in which they can try to determine their destiny is by working hard to pull their production costs below their revenues.

In this respect, South Africa is well placed. It fulfils the major criteria for lowering its costs: it is beginning with low costs and it is expanding output.