

Serbia

# Sugar sector review



FAO INVESTMENT CENTRE

COUNTRY HIGHLIGHTS





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## Sugar sector review

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### COUNTRY HIGHLIGHTS

prepared under the FAO/EBRD Cooperation



**European Bank**  
for Reconstruction and Development



**Food and Agriculture Organization**  
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## ACRONYMS AND ABBREVIATIONS

ACP	African, Caribbean and Pacific
CAP	Common Agricultural Policy
CEFTA	Central European Free Trade Area
EBRD	European Bank for Reconstruction and Development
EBA	Everything But Arms
EPA	Economic Partnership Agreement
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
F.O.B.	Free on Board
FFV	Flexible Fuel Vehicles
GDP	Gross Domestic Product
LDCs	Least Developed Countries
MFN	Most Favored Nations
RoW	Rest of World
SAA	Stabilisation and Association Agreement
TBD	Capacity to Process Sugar Beets Daily
VHP	Very High Pol
WTO	World Trade Organization
WV	White Value



## EXECUTIVE SUMMARY

Sugar beet is grown and processed in the Vojvodina province in the north of Serbia. Sugar production has increased dramatically over the last ten years and reached almost 500 000 tonnes in the 2010/11 crop year. The main reasons for this recovery are the privatization of the sugar sector and gaining preferential access to the European Union (EU) market, both of which occurred early in the last decade. Since then, the Serbian sugar industry has gained preferential access to markets in neighboring countries through the Central European Free Trade Area (CEFTA).

The stimulus that these developments provided the sugar sector resulted in consolidation and efficiency gains in both beet production and beet processing. As a result, the sector now has a strong foundation upon which to build further. However, the fortunes of the sugar industry will depend largely on three factors: (i) the future level of world sugar prices (which will influence price levels in the Serbia's main markets), (ii) the price at which farmers will be willing to grow beets and (iii) its level of access to the EU.

### Outlook for sugar prices

The world sugar market has undergone a profound structural change that resulted in a significant increase in sugar prices. Underpinning this price increase is the steep rise in the cost of producing sugar in Brazil, the world's leading sugar producer and exporter. These developments mean that world raw sugar prices are currently supported at above 20 cents/lb, free on board (f.o.b.) This translates into world white sugar prices of USD 500–600 per tonne, f.o.b. (EUR 380–410<sup>1</sup>).

This structural change has increased greatly the competitiveness of sugar producing countries around the world vis-à-vis Brazil and can be expected to result in a period of renewed investment in the sugar industries of many countries, as they look to supply more of domestic consumption, thus reducing reliance on imports.

The higher sugar prices will also be reflected in Serbia's principal sugar markets, including the local market and the regional markets, i.e. the EU and the CEFTA markets.

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1 Bases on the prevailing exchange rate of USD 1.45: EUR 1 at June 2011.



### **The EU sugar market**

The EU recently completed major reforms of its sugar sector. These reforms were designed to reduce domestic beet sugar output to allow more imports from the EU's preferential suppliers. Sugar production ceased or fell dramatically in the Central and Southeast Europe, a region of Europe, leaving Serbia to be the largest beet sugar producer in this region.

However, imports of sugar to the EU from countries of preferred origin have increased more slowly than anticipated (Serbia's current quota to the EU is 18 000 tonnes) and it now seems that future imports from the EU's preferred suppliers will not be sufficient to meet internal needs in the next few years. Against this background, the European Commission will soon formulate a new sugar regime that will come into force in October 2015.

- Until 2015, prices in the EU will have to reflect world market prices to ensure that the EU attracts imports from its preferred suppliers. Based on current world price dynamics, this implies a price of EUR 470–570 per tonne, depending on whether the European Commission chooses to levy the duty on preferential imports under the CXL quota arrangement;<sup>2</sup>
- From 2015, the level and dynamics of sugar prices in the EU will depend on the nature of the reforms. If EU domestic sugar production quotas are retained, even in a “relaxed” form, it is likely that sugar prices in the EU will reflect developments in the world market. We believe that this will be the most likely outcome of the reforms. If they are abandoned, we estimate that sugar prices will likely fall to around the cost of duty free imports (EUR 470 per tonne).

### **The CEFTA sugar market**

The price of sugar in the CEFTA market, which has an import requirement of approximately 150 000–200 000 tonnes of sugar per year, reflects the cost of importing sugar from the world market. Based on the current outlook for world sugar prices, we expect that sales of sugar to the CEFTA market will generate ex-factory returns of approximately EUR 480 per tonne.

### **The domestic sugar market**

In the long-run, the domestic price of sugar should reflect the prices

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<sup>2</sup> Under the CXL arrangement, Brazil (along with a handful of other world market exporters) supplies around 0.7 million tonnes of sugar per year to the EU. CXL sugar imports are subject to a preferential duty of EUR 98 per tonne.

offered in the CEFTA market, which acts as the marginal buyer of Serbian sugar in most years. We therefore expect that the domestic ex-factory price will also be in the region of EUR 480 per tonne of sugar. However, prices will, in practice, vary over time, reflecting fluctuations in world market values. Moreover, there may be years when Serbia does not have a production surplus. In that case, local prices would reflect values prevailing in the EU.

### **Outlook for the average sugar price**

In addition to the price that Serbian processors can expect or sugar in each of their markets, the other determinant of the average selling price will be the amount of sugar they sell in each market. Beet processing capacity in Serbian factories is currently greater than is needed to supply the local market, the EU quota and the CEFTA countries. Faced with this situation, the sugar industry has three main options:

- Status quo: Continue to operate at the current production capacity, with access to the EU sugar market limited to 180 000 tonnes per year;
- Factory rationalization: Reduce production capacity by closing one or more of the factories that are least well placed to secure beets and/or are small;
- Larger EU quota: Maintain production capacity on the expectation that access to the EU sugar market will be enhanced as a result of an increase in the current quota or, in the longer term, as a result of Serbia's accession to the EU. In the event of a quota increase, we assume that access to the EU will increase by 50 000 tonnes per year and exports to the CEFTA will increase to 100 000 tonnes per year, which are the levels that would be needed if the industry were to utilize its capacity fully.

Our analysis suggests similar average ex-factory prices for each of the three options. However, prices would be higher, around EUR 500 per tonne, if the EU were to retain a system of quotas rather than around EUR 460 per tonne if quotas were abolished.

### **Price of sugar beet**

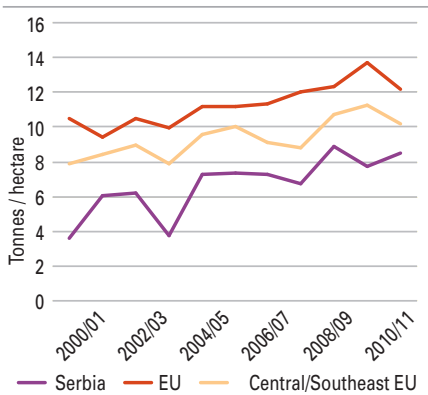
In the future, beet prices will depend in large part on the future course of maize prices. In addition, prices of each crop are influenced by the relative costs of growing each crop and by their yields. Sugar beet yields in Serbia are modest by EU standards and so is the quality of beet (measured by its sucrose content). The reason for this is the agro-climate in the Vojvodina province, where

hot summers and the absence of irrigation limit the crop’s potential. Diagram 1 shows beet sucrose yields per hectare (measured as the sucrose content of beets multiplied by the beet yield) in Serbia compared with yields in Central and Southeast Europe and with the EU-27 average yield.

Maize prices in the Vojvodina province have been very volatile in recent years and have followed the movement of prices in the EU (Diagram 2). Within the last five years, prices per tonne have gone from EUR 100 to EUR 200, then back down to EUR 100 and finally back up to EUR 200.

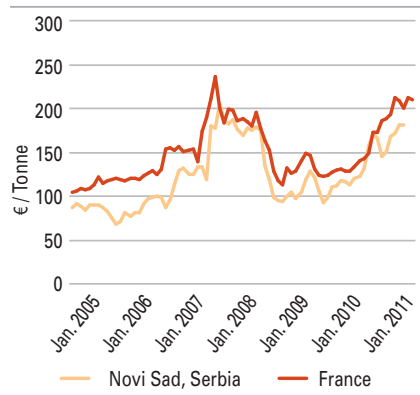
Table 1 presents our estimates of the supply prices per tonne of beet across a range of maize prices from EUR 100 to EUR 200 per tonne. The resulting beet supply prices ranging from EUR 23 to EUR 36 per tonne are the prices that farmers must receive in order to maintain beet in their crop rotation.

**Diagram 1: Beet sucrose yields in Serbia, the EU and Central/Southeast Europe**



Source: Author/LMC International.

**Diagram 2: Serbian and EU maize prices**



Source: Author/LMC International; SeedeV.

These calculations take account of the returns that farmers can expect to receive from maize as well as the costs of growing sugar beet relative to maize. Assuming an average maize price of EUR 130 per tonne in the Vojvodina province, processors would have to pay farmers approximately EUR 30 per tonne to secure beets.

**Table 1: Derivation of beet supply prices across a range of maize prices**

	Low	Average	High
A. Maize price in France (EUR/tonne)	100	150	200
B. Serbian price differential (EUR/tonne)	(20)	(20)	(20)
C. Serbian maize price (EUR/tonne) [A – B]	80	130	180
D. Yield (tonnes/hectare)	6.6	6.6	6.6
E. Revenue (EUR/hectare) [C x D]	528	857	1 187
F. Direct costs (EUR/hectare)	280	280	280
<b>G. Gross margin of maize (EUR per hectare) [E – F]</b>	<b>248</b>	<b>577</b>	<b>907</b>
H. Direct cost of beet (EUR/hctare)	640	640	640
I. Beet yield @16% sucrose content (tonnes/hectare)	50	50	50
<b>J. Gross margin-based profit-equalizing price (EUR per tonne beet) [(G + H)/I]</b>	<b>18</b>	<b>24</b>	<b>31</b>
K. Additional capital and labour costs of sugar beet vs. maize (EUR/hectare)	260	260	260
<b>L. Profit-equalizing price (EUR per tonne beet) [(G + H + K)/I]</b>	<b>23</b>	<b>30</b>	<b>36</b>

Source: Author/LMC International, based on calculations and estimates.

## Beet processing costs

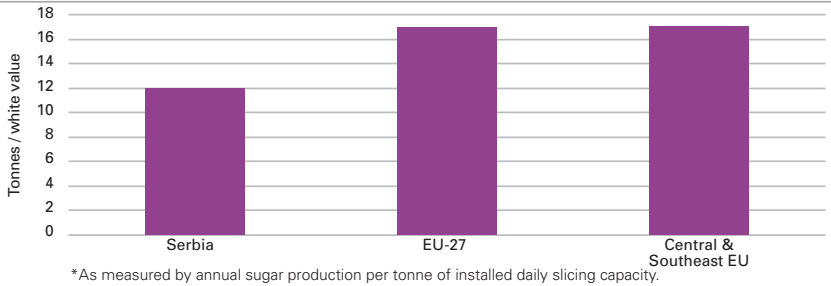
The Serbian beet processing sector has closed factories and made investments in the remaining factories to expand capacity. Nevertheless, capacity utilization of factories in Serbia (measured as annual sugar production per tonne of installed daily slicing capacity) is relatively low (Diagram 3). This is partly because the low sucrose content in beets (compared with the EU average) means that each tonne of beet processing capacity produces less sugar.

A major cost for Serbian sugar factories is the energy source they use. Factories that use gas to produce sugar currently have an energy cost around EUR 100 a tonne, roughly three times higher than the energy cost of factories that burn coal. However, these factories are investing to lower their energy consumption and are also looking at the possibility of producing biogas from beet pulp.

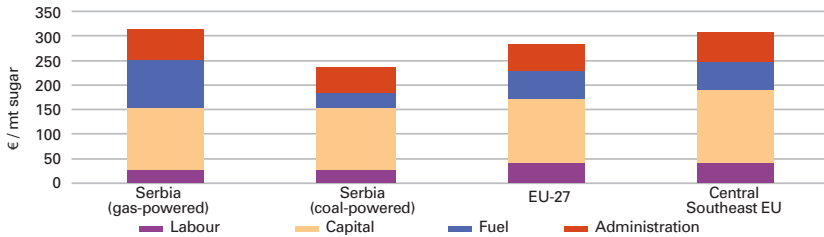
Our estimates of processing costs in Serbia are summarized in Diagram 4, which presents a breakdown of costs into their main

components and compares them with those of other industries in Central and Southeast Europe and with the average for the EU-27. For this analysis, we assume that the processing capacities of the factories are more fully utilized than they are currently, either because of further factory rationalization or because greater access has been gained to the EU market. In the case of factory rationalization, we estimate that factories could produce approximately 14 tonnes of sugar per tonne of installed capacity. The diagram shows the industry's costs to be broadly aligned with those of the rest of the EU, with the coal-powered plants operating at lower cost and the gas-powered plants operating at higher cost.

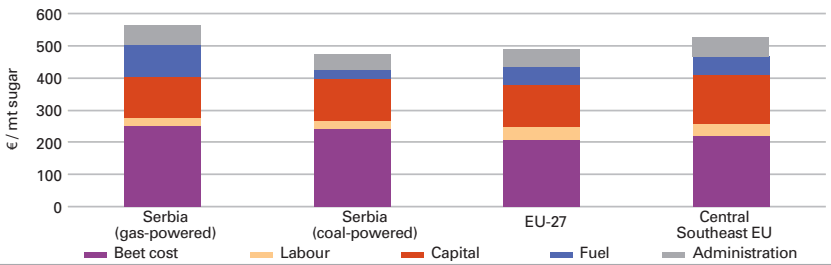
**Diagram 3: Capacity utilization of beet processing factories\* in Serbia, EU-27 and Central/Southeast Europe**



**Diagram 4: Beet processing costs in Serbia, EU-27 and Central/Southeast Europe**



**Diagram 5: Processing costs including the cost of beets in Serbia, EU-27 and Central/Southeast Europe**



Source: Author/LMC International.

Diagram 5 brings together our estimates of beet supply prices and processing costs to compare the overall cost of producing sugar in Serbia relative to the EU. The costs of gas-powered plants are shown to be higher than those of other producers, while coal-powered plants have lower costs.

Even though the Vojvodina province in Serbia is now the largest sugar producer in the region of Central and Southeast Europe, the region has a large sugar supply deficit. In such a situation, prices in

the region should command a premium over prices in other parts of the EU. Austria is the only other country with a sugar industry the size of that in Serbia. Elsewhere in Central and Southeast Europe, sugar production has either stopped (Bulgaria) or declined sharply (Hungary and Romania).

### **Profitability of the sugar industry**

The future profitability of the industry will depend on its size and where it sells its sugar. Tables 2 and 3 present our estimates of industry profitability, assuming processors pay a beet price of EUR 30 per tonne, have the processing costs shown in Diagram 4 and receive the average prices discussed in the section Outlook for the average sugar price. Table 2 shows the selling price of Serbian sugar assuming EU market quotas are retained, while Table 3 shows the selling price assuming the quotas are abolished, the two possible outcomes of EU sugar reform.

In the future, the unit fixed costs of processing will depend on the level of factory throughput and installed capacity. To derive these costs, we assume the following:

- Status quo: The sugar sector continues to operate at its current capacity (40 000 tonnes of beets per day at six factories), access to the EU remains at 180 000 tonnes per year and production averages 450 000 tonnes per year;
- Factory rationalization: One factory closes, reducing capacity to 32 000–35 000 tonnes per day, access to the EU remains at 180 000 tonnes per year and production averages 450 000 tonnes per year;
- Greater EU access: The sector continues to operate at its current capacity (40 000 tonnes per day at six factories), access to the EU increases to 230 000 tonnes per year and exports to CEFTA rise to 100 000 tonnes per year, and production averages 550 000 tonnes per year, thereby allowing current capacity to be utilized fully.

**Table 2:** Estimate of the future average selling price of Serbian sugar assuming quotas are retained in the EU market

	Gas-powered factories				Coal-powered factories			
	Factory		Greater EU		Factory		Greater EU	
	Status quo	Rationalization	Access	Status quo	Rationalization	Access	Status quo	
<b>Average selling price</b>	EUR/tonne sugar	<b>501</b>	<b>501</b>	<b>502</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>502</b>
Delivered beet cost	EUR/tonne sugar	251	248	251	240	240	240	240
Cash processing cost	EUR/tonne sugar	156	144	146	89	77	79	79
By-product credit	EUR/tonne sugar	(88)	(88)	(88)	(88)	(88)	(88)	(88)
<b>Total costs</b>	EUR/tonne sugar	<b>319</b>	<b>304</b>	<b>309</b>	<b>241</b>	<b>230</b>	<b>231</b>	<b>231</b>
<b>Operating profit</b>	EUR/tonne sugar	<b>181</b>	<b>197</b>	<b>192</b>	<b>259</b>	<b>271</b>	<b>270</b>	<b>270</b>
Operating margin	%	19	25	24	34	40	40	40
Depreciation	EUR/tonne sugar	88	69	72	88	69	72	72
<b>Profit after depreciation</b>	EUR/tonne sugar	<b>94</b>	<b>128</b>	<b>121</b>	<b>172</b>	<b>202</b>	<b>199</b>	<b>199</b>

*Source: Author/LMC International, based on calculations and estimates.*



**Table 3:** Estimate of the future average selling price of Serbian sugar assuming quotas are abolished in the EU market

	Coal-powered factories						
	Gas-powered factories			Greater EU			
	Status quo	Factory	Rationalization	Access	Status quo	Factory	Greater EU
<b>Average selling price</b>	EUR/tonne sugar	<b>461</b>	<b>461</b>	<b>460</b>	<b>461</b>	<b>461</b>	<b>460</b>
Delivered beet cost	EUR/tonne sugar	251	248	251	240	240	240
Cash processing cost	EUR/tonne sugar	156	144	146	89	77	79
By-product credit	EUR/tonne sugar	(88)	(88)	(88)	(88)	(88)	(88)
<b>Total costs</b>	EUR/tonne sugar	<b>319</b>	<b>304</b>	<b>309</b>	<b>241</b>	<b>230</b>	<b>231</b>
<b>Operating profit</b>	EUR/tonne sugar	<b>141</b>	<b>157</b>	<b>150</b>	<b>219</b>	<b>231</b>	<b>228</b>
Operating margin	%	12	19	17	29	35	34
Depreciation	EUR/tonne sugar	88	69	72	88	69	72
<b>Profit after depreciation</b>	EUR/tonne sugar	<b>54</b>	<b>88</b>	<b>79</b>	<b>132</b>	<b>162</b>	<b>157</b>

Source: Author/LMC International, based on calculations and estimates.

The tables reveal that the industry has a profitable future, although profitability would be lower if the EU were to abolish its quota system. In addition, the industry will also continue to face the risks of higher beet prices in years when alternative crop prices are high. However, it should be stressed that Serbia would not be alone in this situation. Beet processors in the EU would face similar pressures and these would be reflected in sugar prices in Europe. Moreover, other sugar producers around the world would also face similar pressures, so the problem would be felt not only in the European beet industry. However, to the extent that changes in alternative crop prices do not pass directly through to world and regional sugar prices, high alternative crop prices present a risk that processors will continue to face in some years.

### **Competitiveness in a free market**

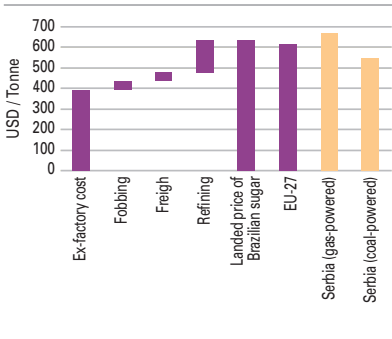
Historically, beet sugar has not been cost competitive against cane sugar. As a result, beet-based sugar industries, such as those in the EU, have relied on a high level of tariff protection and subsidies on sugar in order to shield them from competition from low-cost cane sugar imports. How competitive would the Serbian sugar industry be in a hypothetical situation where all tariff barriers were removed and the industry was exposed to free trade? In order to answer this question, we analyze how the future cost of producing beet white sugar in Serbia would compare with:

- The cost of refining duty-free imported raw sugar from Brazil based on the cost of producing sugar in Brazil (Diagram 6);
- The cost of refining duty-free imported raw sugar from the world market based on our estimate of the long-run price of sugar (Diagram 7).

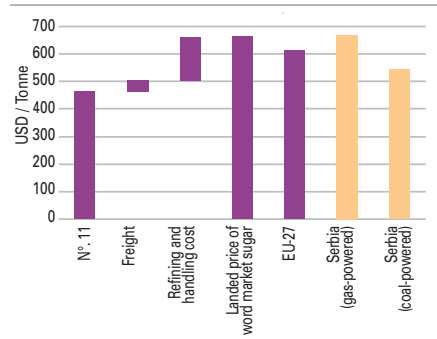
The analysis reveals that, once transport and refining costs are taken into account, beet white sugar produced in the EU could compete on a cost basis with refined sugar produced from using imported raw sugar. If the Serbian industry were able to lower its costs further (as a result of improved capacity utilization and lower energy consumption), local sugar output would also be able to compete with imported sugar. In fact, Serbian factories that use coal already have a significant cost advantage over refined sugar produced from imported raw sugar.

The improved situation in Serbia for the beet sugar industry reflects the increased costs of sugar production in Brazil and higher world prices. At the same time, EU reforms and privatization of the Serbian industry resulted in rationalization and efficiency improvements that have brought down the costs of producing beet sugar in Europe.

**Diagram 6:** The competitiveness of Serbian beet sugar in a free market, based on Brazil's cost of production



**Diagram 7:** The competitiveness of Serbian beet sugar in a free market, based on long-run No.11 raw sugar prices



Source: Author/LMC International.

### Summary

The Serbian sugar industry has become much more efficient in recent years and there are still measures the industry can take to improve further its efficiency and competitiveness. At the same time, the industry's market opportunities have also improved. Higher world sugar prices, duty-free access to the CEFTA and a structural supply shortage of sugar in the EU all enable Serbian sugar industry to sell more sugar at a better price.

Despite the continuing competition for land between sugar beet and alternative crops, which is a challenge for beet (and cane) processors around the world, the Serbian industry has the scope to expand sugar output. Based on existing installed factory capacity, an average production of around 550 000 tonnes per year is realistic. However, to achieve this, the industry and government will have to address three main issues:

- Continued improvements in agriculture, through gains in beet yields and sucrose content, as well as lowering of costs through further modernization of the agriculture sector. Such actions would allow the sector to maximize its potential on soils that are

best suited for beet cultivation;

- Continued investment in factories to improve efficiency, especially in energy use;
- Lobbying for greater access to the EU market to provide outlets for the additional sugar the industry is able to produce.

If the sector can succeed in these areas, it will have the opportunity to sustain a larger, profitable sugar industry.

# Prospects for the world and EU sugar markets

The future of the Serbian sugar sector will depend in large part on the prospects for the world and EU sugar markets. These prospects are the subject of this chapter.

## Summary

The world sugar market underwent a profound structural change in recent years that resulted in a significant increase in sugar prices. Underpinning this price increase was the steep rise in the cost of producing sugar in Brazil, the world's leading producer and exporter:

- These developments mean that world raw sugar prices are currently supported at above 20 cents/lb, f.o.b. This translates into world white sugar prices of USD 500–600 per tonne, f.o.b. (EUR 380-410<sup>3</sup>);
- This change in prices has increased greatly the competitiveness of sugar producers around the world vis-à-vis Brazil. This can be expected to result in a period of renewed investment in many sugar industries, as countries look to supply more of their own consumption needs and to rely less on imports;
- The higher sugar prices will be reflected in Serbia's principal sugar markets, including the local market and its regional markets, i.e. the EU and the CEFTA;
- The EU has recently completed major reforms of its sugar sector. These reforms were designed to reduce domestic beet sugar output to make room for greater imports from the EU's preferential suppliers. Production ceased or fell dramatically in Central and Southeast Europe. Serbia is now by far the largest beet sugar producer in this region of Europe;
- The level of imports of sugar to the EU from its preferred origin countries has increased more slowly than anticipated. In 2011, the European Commission took exceptional measures to boost supplies to mitigate shortages in the internal market. Moreover, it is not clear whether the future level of imports from the EU's preferential suppliers will be sufficient to meet internal needs in the next few years;

<sup>3</sup> Based on the prevailing exchange rate of USD 1.45:EUR 1 at June 2011.

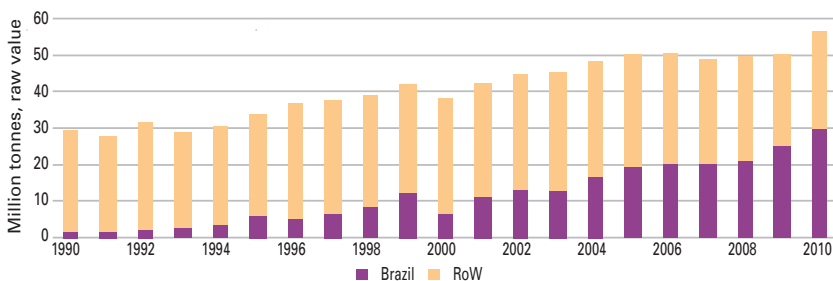
- Against this background, the European Commission will soon formulate a new sugar regime that will come into force in October 2015:
  - Until 2015, sugar prices in the EU will have to reflect prices in the world market to ensure that the EU attracts imports from its preferred suppliers. Based on current world market price dynamics, this implies a price of EUR 470–570 per tonne, depending on whether the European Commission chooses to levy the duty on sugar imports under the CXL quota arrangement;
  - From 2015, the level and dynamics of sugar prices in the EU will depend on the nature of the EU reforms. If sugar production quotas are retained, even in a “relaxed” form, it is likely that sugar prices in the EU will reflect developments in the world market. We believe this is the most likely outcome of the reforms. If sugar production quotas are abandoned, we estimate that sugar prices will likely fall to around the cost of duty-free imports (EUR 470 per tonne).

### Prospects for the world sugar market

The last 20 years have unquestionably been the “Brazil years” for sugar production. During those years, Brazil has contributed to half of the expansion in world sugar production and all of the growth in world sugar trade. At the same time, it has expanded massively its ethanol output to supply a surging demand from its fast-growing fleet of flexible fuel vehicles (FFVs).

Today, Brazil accounts for roughly 25 percent of global sugar production and 50 percent of world sugar trade (Diagram 8). Three reasons explain why Brazil has been able to crowd out other producers:

**Diagram 8: Percentage of Brazilian sugar exports to total world exports**



Source: Author/LMC International.

- It has huge amounts of land that it has been able to convert to sugar cane production;
- It has very favourable agro-climatic conditions for low-cost cane and sugar production;
- The huge depreciation of its currency at the beginning of the last decade lowered dramatically its production costs in USD.

Diagram 9 illustrates the huge impact that Brazil has had on the global sugar sector. Over the last 20 years, Brazilian sugar production increased by around 30–35 million tonnes, raw value. This compares with an increase of around 10–15 million tonnes in India, and a similar amount in the rest of the world (RoW). This means that Brazil has expanded production by more than the rest of the world put together, and by more than twice as much as the rest of the world excluding India.

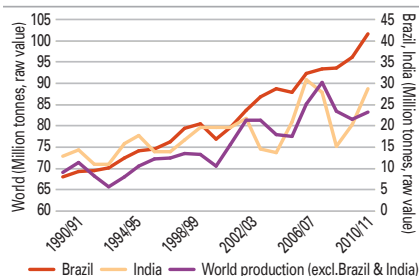
The limited contribution to global sugar trade that has been made by the other major sugar exporting countries and the EU is illustrated in Diagram 10, which shows that exports overall declined although the exports of Australia increased over the period 1990/91–2010/11.

The overall decline was the result principally of a decline in the exports of Cuba and the EU, which, for different reasons, experienced a contraction in output;

There has been only a slight increase in the sugar exports of Australia, Guatemala, South Africa and Thailand from 1990/91 to 2010/11, which reflects the difficulties that these countries experienced when competing with Brazil in the global marketplace.

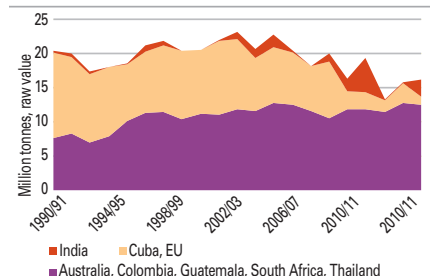
However, over the last few years, a number of developments altered dramatically the market environment facing the Brazilian sugar industry. As we shall discuss, each of these developments acted to raise world sugar prices.

**Diagram 9: Evolution of global output of sugar**

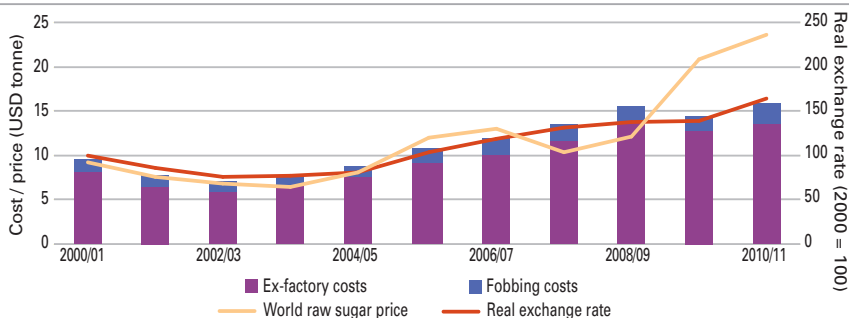


Source: Author/LMC International.

**Diagram 10: Sugar exports of the EU and seven major sugar exporting countries Brazil, India and the rest of the world**



**Diagram 11: Brazil's raw sugar production costs and world raw sugar prices**



Source: Author/LMC International.

The most important developments have been the appreciation of the Brazilian real, which significantly increased Brazil's cost of production; the growing popularity of FFVs, which have transformed the domestic ethanol market and the way that ethanol prices are determined; and a dramatic slowdown in the pace of expansion of the Brazilian sugar industry.

Between 2001/02 and 2003/04, the weakness of the Brazilian real meant that sugar producers in Brazil were able to export profitably at world prices of 6–8 cents/lb, giving Brazil a huge cost advantage over its competitors.

However, the recovering investment climate in Brazil resulted in a strong appreciation of the real over the last five years. This together with domestic inflation pushed up significantly the cost of producing sugar in Brazil when measured in USD.

### **Brazil's rising costs of production**

Brazil's rise to prominence during the 1990s propelled it into an influential position in the world sugar market, making it an important driver of world sugar prices. As a result, the relationship between Brazil's costs of production and global sugar prices gradually grew stronger: Brazil became the marginal supplier of sugar to the world market and world prices reflect its costs of production.

This relationship is demonstrated in Diagram 11, which compares the cost of sugar production in Central/South Brazil with the global raw sugar price during the last decade. The diagram illustrates that, because of Brazil's importance, the world sugar market has effectively had to "pay" Brazil to continually expand to meet growing global demand. Therefore, world sugar prices have largely followed Brazil's



dollar-denominated production costs in the long term. As the diagram suggests, these costs were strongly influenced by the R\$:USD exchange rate. Brazil's production costs rose sharply in US dollar terms as its currency appreciated over the last few years.

Although Brazil is still one of the world's lowest cost sugar producers, because of its favorable agro climatic conditions for growing sugar cane and the scale of its milling operations, the appreciation of its currency has reduced its competitive advantage over the rest of the world.

In 2010/11, the cost of producing sugar in the heartland of Brazil's cane industry – São Paulo – was around 16 cents/lb on an ICE No.11 equivalent basis. However, in order to encourage further expansion of the industry in the new frontiers of Brazil (Goiás and Mato Grosso do Sul), a price of around 25 cents/lb is required.

### The growing importance of ethanol

Brazil's production costs are not the only factor that is influencing global sugar prices. The other factor is the increasing demand for domestically produced ethanol, which is co-produced with sugar. Until a few years ago, demand for ethanol was determined overwhelmingly by a government mandate requiring that gasoline sold in Brazil be blended with 18–25 percent ethanol. However, the situation today is very different. The introduction and rapid up-take of FFVs has created a new dynamic in the market. Because FFVs can run on ethanol or gasoline (or any combination of the two), ethanol prices now compete with gasoline prices. As ethanol has a lower energy value, it has to trade at 70 percent or less of the gasoline price to be competitive. Now that the FFV market has grown to be the main market for ethanol, gasoline is the peg on which ethanol prices now hang. Moreover, co-production of sugar and ethanol means that sugar prices are now linked to gasoline prices via ethanol prices and both sugar and gasoline prices cannot be out of line with each other in the long run.

**Diagram 12:** The relationship between the prices of oil, gasoline, ethanol and sugar



Source: Author/LMC International.

The sugar-ethanol linkage means that, in addition to being influenced by Brazil's production costs, sugar prices are now influenced by fuel prices. This is because, if the sugar price falls below the equivalent ethanol price, Brazilian millers are able to divert cane away from sugar production, creating a support price for sugar in the long run. The interaction between Brazil's ethanol market, the government's gasoline pricing policy and world oil prices has now become the key driver of global ethanol and sugar prices. This relationship is summarized in Diagram 12.

The retail price of gasoline in Brazil is around R\$ 2.4–2.5 (USD 1.50–1.60) per litre and has remained at this level since 2006. After adjusting for taxes and for blenders' and distributors' margins, this gasoline price equates to a world oil price of around USD 90 per barrel (about 10 percent below the current prevailing oil price).

Based on the gasoline price, and the fact that ethanol now trades at around 65–70 percent of this price, Brazilian millers are assured a market for ethanol at an equivalent world raw sugar price of 20–22 cents/lb. In other words, Brazil's ethanol market provides a floor for world sugar prices in the long run because of millers' ability to alter their product mix thereby arbitraging price differentials between sugar and ethanol prices.

### **The slowdown in the expansion of Brazil's sugar sector**

At the same time as the market for ethanol is increasing at an extremely fast rate, the rate of expansion of the sugar sector in Brazil is slowing dramatically. Brazil's cane sector grew rapidly over the last decade, averaging 9 percent annually; however, most of this growth took place prior to 2008. Since then, the sector has witnessed a dramatic slowdown in the rate of expansion. This has been for two reasons:

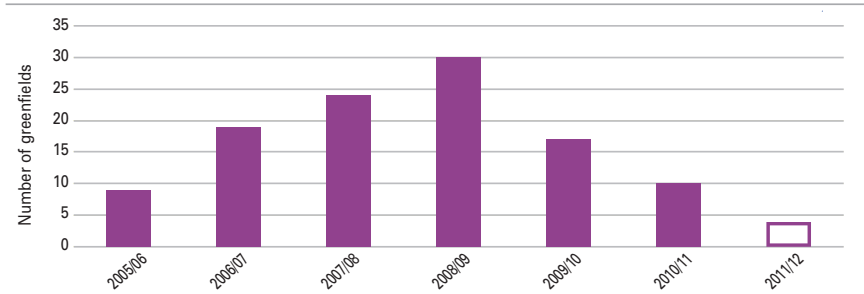
**The government's gasoline policy.** With ethanol now having to be priced competitively with gasoline, the government's policy of controlling gasoline prices had a major impact on the sugar industry. This was a particular issue in 2008, when rising oil prices pushed up the cost of producing ethanol to the point where millers were unable to make a profit. Moreover, large-scale sugar exports from India to the world market kept sugar prices depressed, creating a very challenging environment for Brazilian millers.

**The financial crisis.** Rising oil prices and ethanol production costs, and depressed sugar prices were then compounded by the global financial crisis, which severely limited the sugar industry's access to credit. This resulted in low replanting rates (which increased

significantly the average age of cane) and sub-optimal crop care, both of which are depressing cane yields.

The combination of these two factors meant that many expansion plans were shelved, with the smaller milling companies, in particular, unable to implement their plans. Meanwhile, millers who were looking to expand have chosen to focus on brown field acquisitions rather than the building of new mills.

**Diagram 13: Number of Greenfields projects in Brazil**



Source: Author/LMC International.

The impact of these problems is shown clearly in Diagram 13. The number of Greenfield projects<sup>4</sup> expected to come on stream over the next few years has slowed to a trickle. With very few new projects in the pipeline, significant time will pass before the number of projects will return to previous levels, as it takes at least three years to go from the design stage to the first year of production.

## The challenge over this decade

These developments have altered dramatically the outlook for the global sugar market: will Brazil continue to meet all the growth in global sugar import demand, or will other sugar producers now expand faster? The challenge ahead is to meet the growth in global sugar consumption, which is expected to increase by around 3.5 million tonnes, raw value, per year, requiring an additional 35 million tonnes of sugar to be produced over the next ten years.

The slowdown in cane production in Brazil over the next three to five years, owing to the decline in new investments in the sector, will be supportive of global sugar prices. As we have discussed above, the threshold world price of raw sugar that encourages new investment in the sugar sector in Brazil and the floor that is set by the domestic ethanol market currently exceed 20 cents/lb.

<sup>4</sup> A Greenfield project refers to a project on land that has not yet been built on, or on land that has never been used.

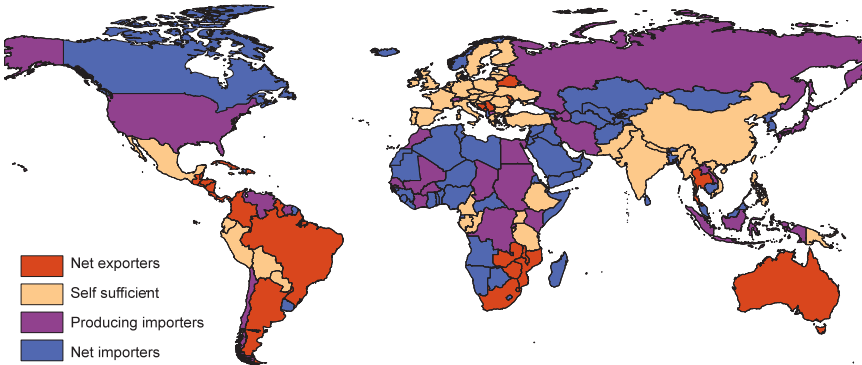
### Opportunities for the rest of the world

With the rate of expansion in Brazil slowing down, and the limited potential for expansion by many of the world's leading sugar exporters, an opportunity is created for other industries to expand, particularly those that are supplying protected local markets.

A huge number of countries could respond to the need for sugar, as more than 100 countries produce sugar. However, the vast majority of countries are net importers that rely heavily on a small group of net exporters to meet their needs. To illustrate this point, on Diagram 14 we have categorized the countries of the world into four main groups:

- Structural exporters;<sup>5</sup>
- Self-sufficient, producing between 75 percent and 125 percent of their domestic requirements;
- Producing importers, producing between 25 percent and 75 percent of their domestic requirements;
- Structural importers,<sup>6</sup> producing less than 25 percent of their domestic requirements.

**Diagram 14:** Location of the world's sugar exporters and importers



Source: Author/LMC International.

From this grouping, a number of observations can be made:

- While the structural exporters generate a large sugar surplus, the vast majority of this surplus is produced by Brazil;

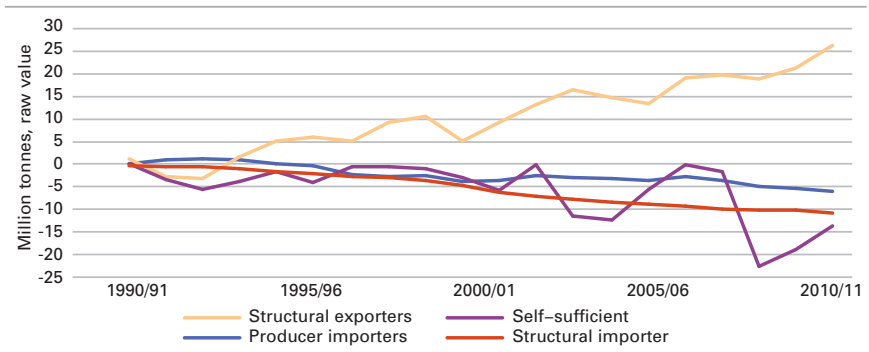
<sup>5</sup> A structural exporter refers to a country that is an annual net exporter of sugar.

<sup>6</sup> A structural importer refers to a country that is an annual net importer of sugar.

- This surplus has to meet all the import demands of the countries in the other groups. These include demands of countries that produce little or no sugar as well as a portion of the demands of countries that fall into the ‘producing importers’ group. Very importantly, the exporters also have to adapt to the swings in imports/exports from those countries in the “self-sufficient” group.

Some observations can be made about Diagram 15, which shows the cumulative sugar surplus/ deficit by group over time. The deficit has grown in the countries that are structural importers as well as producing importers and self-sufficient. In other words, these countries have been relying more and more heavily on imports, putting more and more pressure on the exporters, notably Brazil, to meet their needs. Going forward, it is these countries in particular, along with several structural exporters, that will have a greater opportunity to expand.

**Diagram 15: Cumulative changes in supply/demand balances by group of countries**



Source: Author/LMC International.

Table 4 highlights some of the major countries that fall into the groups of self-sufficient and producing importers. Countries are grouped according to their status over the last few years. However, the situation is changing for some. For example, China, currently self-sufficient, is struggling to keep up with the growth in domestic consumption and is likely to increase its import demand in the future.

**Table 4: Major self-sufficient/producing importing countries/regions**

Self-sufficient	Producing importers
China	EU
India	Indonesia
Pakistan	Common Market for Eastern and Southern Africa (COMESA)
Philippines	Russian Federation
Viet Nam	Ukraine
North American Free Trade Agreement (NAFTA)	

Source: Author/LMC International.

### Price risk

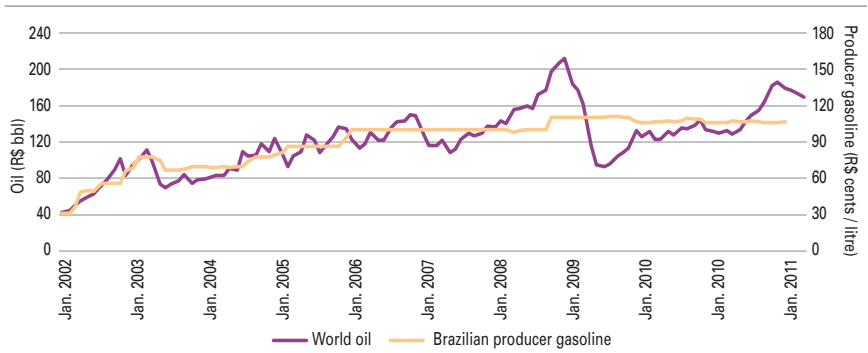
While the above developments in Brazil are likely to support world sugar prices above 20 cents/lb, this level of price support hinges critically on two factors:

**R\$/USD exchange rate.** If the real were to depreciate significantly, this would (i) lower Brazil's production costs denominated in US dollar terms and (ii) reduce the US dollar price at which sugar is competitive with domestic ethanol. Both these factors would push the long-term prospects for sugar prices downward.

**Brazilian gasoline price.** While the Brazilian gasoline price broadly follows the world oil price over time, it is managed by the government to control domestic inflation (Diagram 16). The gasoline price as of January 2011 was set at an oil equivalent price of around USD 90/bbl. If world oil prices were to fall below this level for a sustained period of time, this would be bearish for sugar prices.

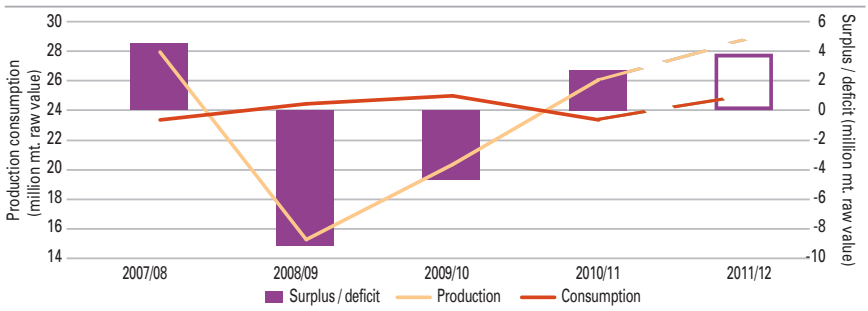
It should also be kept in mind that, although in the long run prices will reflect the above discussed developments in Brazil, in the short run world sugar prices are susceptible to fluctuations caused by the cyclical nature of sugar production in India and other Asian countries.

**Diagram 16: World oil prices and Brazilian producer gasoline prices**



Source: Author/LMC International.

**Diagram 17: India's supply/demand balance for sugar cane**



Source: Author/LMC International.

In India, as sugar cane is produced by a very large number of small-scale farmers, the collective decisions of these farmers whether or not to plant cane has a significant effect on India's production. During times of high sugar prices, Indian farmers dramatically increase the area planted in cane, which puts downward pressure on sugar prices. As a result, margins at mills become squeezed and the millers delay payments to the farmers. As they begin to face delays in receiving cane payments, farmers return to growing alternative crops, and cane production falls, which leads to high sugar prices once more. In Diagram 17, we can see the resulting wild swings in India's cane production and, as India is the largest consumer of sugar in the world, its surplus/deficit situation often determines whether sugar trades at a premium or discount to ethanol in the short run.

## EU sugar market

In 2006, the European Commission implemented a programme of significant reforms of the EU sugar sector. This resulted in a sharp decline in beet sugar production and increased reliance on imports from countries with preferential trade access. At the same time, the EU was forced to comply with a WTO ruling that limited EU exports. The net effect of the reforms was to transform the EU into one of the world's biggest sugar importers, a far cry from its previous status as the world's biggest refined sugar exporter.

### Pressures for Reform

A number of factors combined to make it extremely difficult for the previous sugar regime to continue. The most important of these factors were:

**The Everything But Arms (EBA) initiative.** This initiative granted to all Least Developed Countries (LDCs) unlimited duty-free access for sugar to the EU from 2009. If prices had remained at historical levels, there was a risk that LDCs would supply large quantities of sugar to the EU market, thereby disrupting the EU supply/demand balance.

**WTO ruling on EU sugar exports.** In February 2004, Brazil, Australia and Thailand (the "complainants") lodged formal complaints with the WTO against the EU sugar regime. The complaints in substance were directed against the subsidization of sugar exports. In May 2005, the WTO ruled in favor of the complainants, and the EU was obliged to limit its exports to a WTO quota of 1.4 million tonnes. This meant that EU domestic sugar production plus any preferential imports had to be brought broadly into line with sugar consumption via a reduction in domestic sugar production quotas.

**Common Agricultural Policy (CAP) reform.** Added to these external pressures was the more general desire within the EU to bring sugar into line with other agricultural commodities, where support would be provided in the form of decoupled farm payments rather than through price.

### The current EU sugar regime

In response to the challenges discussed above, the EU agriculture ministers agreed on a radical programme of reforms in November 2005. The stated goals of the reforms are to enhance the competitiveness and market orientation of the EU sugar sector to



secure its long-term future and attain a sustainable market balance in relation to domestic consumption levels and the EU's international commitments. The key features of the EU sugar regime are as follows:

**Sugar production quotas.** Each Member State is allocated a production quota that specifies how much sugar it can supply to the EU food market. Any sugar produced over this quota must either be used for non-food use (for example, in the pharmaceutical or ethanol industries) or be exported. However, as explained above, the total quantity of EU exports is limited to 1.4 million tonnes per year by the WTO. As part of the 2005 reforms, the European Commission set a quota reduction target of around 6 million tonnes (equivalent to a target quota of around 13 million tonnes). This target was to be achieved within the reform period, which ran from the 2006/07 to the 2009/10 marketing years.

**Isoglucose production quotas.** Similarly, the EU production of starch-based sweeteners, known as isoglucose, is severely restricted to a total quota of 0.7 million tonnes. This is important because isoglucose can be used as a direct substitute for sugar in a number of processed foods and, in particular, in beverages. Therefore, the quota restricts competition from isoglucose.

**Table 5: Evolution of the prices of white sugar and sugar beet (EUR/tonne of white sugar unless otherwise specified)**

	2006/07	2007/08	2008/09	2009/10
Reference price (consumer level)	631.9	631.9	541.5	404.4
Reference price (producer level)	505.5	458.1	428.2	404.4
Cumulative reduction		0 %	14 %	36 %
Minimum beet sugar price (EUR/tonne of beet)	32.9	29.8	27.8	26.3
Restructuring levy	126.4	173.8	113.3	0

*Source: Council Regulation (EC) No. 318/2006 of 20 February 2006 on the common organization of the markets of the sugar sector.*

*Note: The reference price at the producer level is net of the restructuring levy, which was paid by producers during the restructuring period (2006/07 to 2008/09).*

**Sugar prices.** Before the reforms, the EU set a white sugar intervention price that set a floor price for sugar but since the reforms, the EU sets a reference price. The reference price was reduced in stages to EUR 404 per tonne in 2009/10. However, in practice, the actual price of sugar is now driven by supply/demand factors and in 2011; for example, the spot price of sugar in the EU was much higher than the reference price.

**Sugar-beet prices.** The EU sets a minimum beet price that processors must pay to farmers. As a result of the reforms, the minimum beet price was cut to EUR 26,30 per tonne. As compensation, beet growers received direct payments representing 60 percent of the estimated revenue loss resulting from the price cuts.

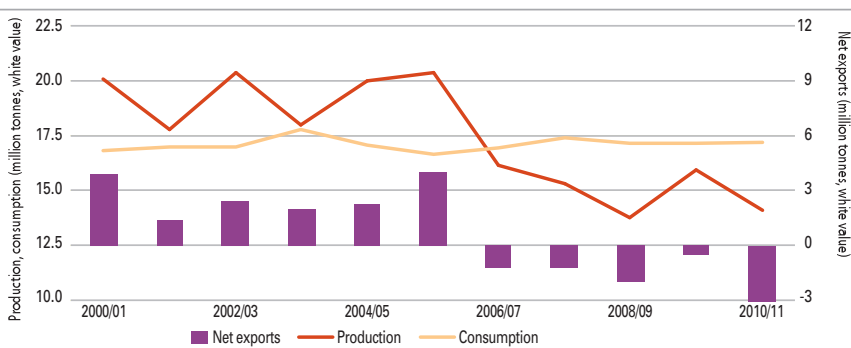
**Exit strategy.** For those sugar producers wishing to leave the industry, a buyout scheme was created that allowed them to sell their quota back to the European Commission. To encourage (higher cost) producers to leave the market early, the amount received under this scheme was highly digressive, falling from EUR 730 per tonne in 2006/07 to EUR 420 per tonne in 2009/10. The funds for the buy-out scheme were raised via a restructuring levy, which was defined by the difference between the reference prices for consumers and producers (see Table 5).

### EU sugar market balance

The consequences of the reforms for the EU market balance are summarized in Diagram 18, which depicts the EU's production, consumption and net trade in all sugar (quota and out-of-quota). This diagram illustrates the steep decline in sugar production that transformed the EU from a large net exporter to a large net importer.

The changes in EU sugar production that underpinned this decline are summarized in Table 6, which lists each Member State's production quota before and after the reforms. The table shows that the total decline in quota amounted to almost 4.5 million tonnes (net of the increases to sugar and isoglucose quotas). It also indicates that several countries abandoned sugar production altogether (e.g. Bulgaria, Ireland,

**Diagram 18: EU sugar market balance before and after the 2006 reforms**



Source: Author/LMC International.

**Table 6:** Changes in EU production quotas following the 2006 reforms

	Initial quota '000 tonnes	Quota retirements '000 tonnes	New quotas '000 tonnes	Quota reduction percent
	2006/07		2010/11	
Austria	387	-44	344	11
Belgium	820	-155	665	19
Bulgaria	5	-5	0	100
Czech Republic	455	-89	366	20
Denmark	421	-55	365	13
Finland	146	-66	80	45
France (Metropolitan)	3 289	-389	2 899	12
France (DOMs)	480	-9	471	2
Germany	3 417	-570	2 847	17
Greece	318	-160	158	50
Hungary	402	-296	105	74
Ireland	199	-199	0	100
Italy	1 557	-1 049	508	67
Latvia	67	-67	0	100
Lithuania	103	-14	89	14
Netherlands	865	-77	788	9
Poland	1 672	-291	1 381	17
Portugal	70	-70	0	100
Romania	109	-7	102	7
Slovakia	207	-96	112	46
Slovenia	53	-53	0	100
Spain	997	-501	496	50
Sweden	368	-80	288	22
United Kingdom	1 139	-105	1 034	9
Portugal (Azores)	10	0	10	0
Total/average percentage	17 555	-4 445	13 110	25

Source: Author/LMC International.

Latvia, Portugal and Slovenia), while several others cut production by 50 percent or more (Greece, Italy, Hungary and Spain). Since the 2005 reforms, Greece has virtually ceased production.

The significance of these changes for Serbia is that a large number of countries that ceased production or reduced their output substantially are located in Central and Southeast Europe. There is currently very little sugar production in the region, and Serbia is by far the largest producer there. Consumption in this region of the EU now has to be met by inflows from other regions of the EU or by imports.

## EU sugar imports

The EU imports sugar from a wide range of countries under several preferential access arrangements:

**The Balkans and the Republic of Moldova.** Together, these countries have access to the EU market for around 0.4 million tonnes per year. Serbia has a quota of 180 000 tonnes per year under the access arrangement.

**CXL sugar.** Brazil (along with a handful of other world market exporters) supplies around 0.7 million tonnes per year to the EU under this arrangement. CXL sugar imports are subject to a preferential duty of EUR 98 per tonne.

**ACP/LDC sugar.** The remainder of the EU's import requirement is supplied by the African, Caribbean and Pacific countries (ACP) and the LDC under the EU's Economic Partnership Agreement (EPA) and the EBA.

Imports under these arrangements however have been insufficient to bridge the gap between domestic consumption and locally-produced beet sugar. There are two main reasons for this:

- Sugar production in some countries with preferential access to the EU has fallen below expectations. This means that these countries' surpluses are currently insufficient to fill the gap in the EU;
- Sugar prices in the EU have failed to track the world market, which has deterred some overseas suppliers from selling sugar to the EU. Diagram 19 compares white sugar prices in the EU<sup>7</sup> with prices on the world market. (To encourage shipments from these suppliers, the European Commission waived the duty on all imports of raw sugar from its preferential suppliers from 1 December 2010 to 30 September 2011).

The result is that sugar stocks in the EU have fallen substantially and have reached an uncomfortably low level. In response, the European Commission has introduced two measures to boost supplies in the EU:

- It has allowed 0.5 million tonnes of out-of-quota sugar to be converted to quota sugar for food use in the EU;

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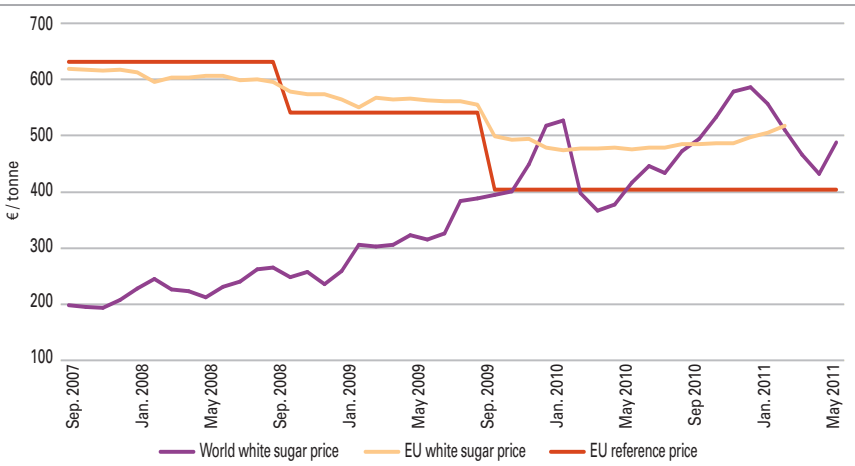
<sup>7</sup> The EU white sugar prices shown in Diagram 19 are those reported by the European Commission under its price reporting scheme. The reported price represents the value of invoices raised in each month, not the spot market price. Given that the vast majority of sugar in the EU is sold under annual fixed price contracts, the reported price can differ greatly from the spot price. This has been the situation during 2011, when spot prices traded in a range of EUR 700–1 000 per tonne.

- It has opened up a duty-free import quota for 0.5 million tonnes from the world market.

These developments highlight two very important points (which are discussed in more detail below):

- The need for a new dynamic for sugar prices in the EU: returns from the EU market must reflect developments in the world market;
- Unless there is a strong recovery in sugar production in some of the EU's preferred supplier countries, the EU sugar market may become structurally short of sugar. If this were to happen, the EU would be required to intervene regularly to increase supplies, as it has had to do in 2011. Such a situation would also influence the European Commission as it formulates the new sugar regime that will replace the current one in October 2015.

**Diagram 19: EU and world white sugar prices**



Source: Author/LMC International.

**Price dynamics of the EU sugar market with production quotas**

At the current level of sugar production quotas, the EU must import around 3.5–4.0 million tonnes of sugar per year to bridge the gap between domestic consumption and beet sugar production. Of this amount, up to 1 million tonnes enters the EU as white sugar. The remainder is imported as raw sugar to be refined. To ensure that it is viable to import and refine this sugar, sugar prices in the EU must reflect several elements:

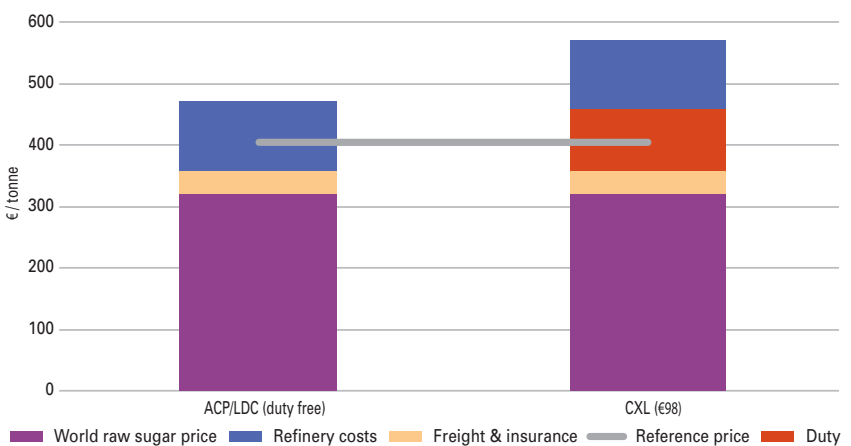
- The world (No.11) raw sugar price, which the EU's suppliers could earn by selling their sugar on the world market rather than to the EU. For the purpose of this analysis, we assume a trend world price of 21 cents/lb. At the current exchange rate of USD 1.45:EUR 1, this equates to a price of EUR 319 per tonne;
- The cost of freight and insurance to the EU. We assume a value of close to EUR 40 per tonne.
- The cost of discharging and transporting the sugar to refineries, refining it and marketing it. This cost, which includes an allowance for the process loss of raw sugar during refining, is approximately EUR 110–115 per tonne;
- The CXL import duty (EUR 98 per tonne).

Diagram 20 illustrates the costs of importing raw sugar and refining it in the EU, differentiating between the duty statuses of raw sugar imports:

- EPA/EBA sugar, which enters the EU duty-free;
- CXL sugar, which normally enters the EU with a duty of EUR 98 per tonne.

This diagram shows that the long-run average price of sugar in the EU should be between EUR 470 and EUR 570, depending on whether the CVXL duty is applied, and assuming a world raw sugar price of 21 cents/lb and the current USD:EUR exchange rate of USD 1.45:EUR 1. In practice, prices will vary with fluctuations in the world sugar prices.

**Diagram 20: Cost of importing, refining and marketing raw sugar based on a world raw sugar price of 21 cents/lb**



Source: Author/LMC International.

### **Price dynamics of the EU sugar market in the absence of production quotas**

After October 2015, the EU may choose to relax or eliminate quotas so that there is no longer an effective limit on the production of sugar (and possibly also isoglucose). In this situation, the EU market is likely to face an oversupply of sweeteners. This means that prices would no longer be set by the cost of making imports. Instead, they would be set through competition among producers, and prices would reflect the supply price (or cost price) of these sweeteners.

To determine the implications of this for EU sugar prices, we have evaluated the supply prices of producers in the EU:

- For beet sugar, they comprise the following elements: the minimum price that processors have to pay farmers to retain beet within their crop rotation plus the cost of beet transport to factories plus the cost of beet processing;
- For sugar refined from imported raw sugar, supply prices are derived as shown in Diagram 21;
- For imported white sugar, we calculate the supply price as the opportunity cost of the sugar (world white sugar price) plus transport;
- For isoglucose, it is the net cost of wheat or maize plus processing costs.

These supply prices differ between the sweetener categories as well as across the EU. They also differ according to the level of grain prices, as these in turn influence farmers' planting decisions and isoglucose producers' raw material costs. Diagram 21 summarizes our estimate of these supply prices for the EU, assuming: (i) a maize price of EUR 145 per tonne, (ii) a wheat price of EUR 155 per tonne, and (iii) world raw and white sugar prices of EUR 310 and EUR 370 per tonne, respectively.

The results are presented in the form of a cumulative cost (or supply) curve, which we have estimated on a regional basis<sup>8</sup>. The potential output<sup>9</sup> of each region is presented on the horizontal axis, while the

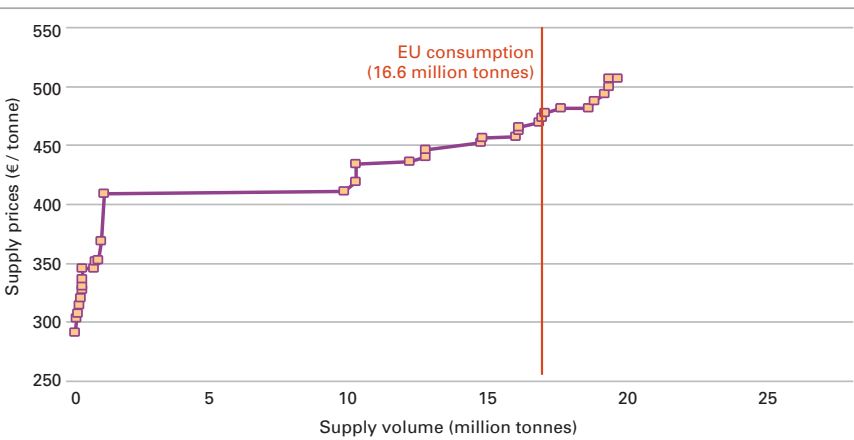
<sup>8</sup> The regions are: north-west, centre-north, centre-south, the Baltics, south-east and the Mediterranean.

<sup>9</sup> Potential output is defined as follows. For beet sugar, it is the average of total (quota and out-of-quota) sugar production over the last three seasons. For isoglucose, we differentiate between current production capacity and additional output that could be produced to supply the market potential (for which new investments would have to be made). For imported sugar, it is defined by current access quotas or, where these are unlimited, by current production capacity.

supply price of each region is shown on the vertical axis. The diagram also indicates the current level of consumption in the EU, which is estimated at approximately 16.6 million tonnes per year.

The analysis suggests that the price of sugar in the EU would be around EUR 470–480 per tonne, similar to the cost of supplying the EU market with sugar refined from imports of duty-free raw sugar. This price would be sufficiently high for most of the cost-competitive EU beet sugar producers to continue production as well as some isoglucose production.

**Diagram 21: Estimated supply curve of the sweetener supply in the EU in the absence of production quotas**



Source: Author/LMC International.

Note: The squares represent different types of sweetener products by region (e.g. beet sugar in the north-west, beet sugar in the Baltics, isoglucose production in the north-west, white sugar imports from Balkans, CXL sugar imports, etc.).



## ||||| Introduction to the Serbian sugar sector

In this chapter, we provide an introduction to the Serbian sugar sector, outlining government policy towards both the wider agricultural sector and the specific the sugar sector. We also present an overview of Serbia's supply/demand balance, the structure of the beet processing sector and the relationship between beet growers and processors.

### Summary

- In recent years, government policies helped to create an enabling environment to support the sugar industry expansion. The opening up of markets for inputs and machinery supported farmer specialization. At the same time, privatization of, and great competition among, sugar factories drove the processing sector to rationalize and improve efficiency;
- Trade policy also helped to boost export markets. Serbia enjoys a duty-free quota of 180 000 tonnes per year of exports to the EU, and unrestricted duty-free access to the CEFTA market. Since 2004, Serbia has been a net exporter of between 150 000 and 250 000 tonnes of sugar annually;
- There are no official industry standards that define the relationship between beet growers and processors in Serbia. The most common relationship is one in which the factory processors directly contract with individual farmers for beets. In such a situation, the factory provides farmers with inputs (or loans to buy inputs) in return for a guaranteed supply of beets. Often, but not always, larger farmers and organized farming cooperatives act as a focal point between factories and smaller farmers. However, relationships are evolving, and some larger farmers are now able to access credit to source their own inputs. A number of farmers are also growing "free-beet" (beet that is grown independently of a contract with a factory and so the grower is free to negotiate prices for his/her beet closer to the harvest).

### Importance of the sugar sector

Agriculture in Serbia is an activity that carries great economic, social and political significance. From an economic point of view, primary agriculture accounts for around 10 percent of the country's overall

gross domestic product (GDP). In addition to this, agriculture is a highly regarded activity in Serbian society because of tradition and high expectations from the sugar sector. Consequently, agriculture is recognized as a basic strategic driver of development in all municipal and regional government strategies.

The sugar industry in Serbia is based in the Vojvodina province. The importance of the sugar sector was first recognized in socialist Yugoslavia. During the period from 1974 to 1988, the provincial authorities in the Vojvodina province promoted industrialization of the province through huge investments in the sugar processing industry. This included reconstruction and renovation of sugar factories in Vrbas, Senta, Kovin, Zrenjanin, Crvenka and Sremska Mitrovica. In addition, new sugar factories were built in Pecinci, Kovacica, Nova Crnja, Zabalj and Bac. The role of the sugar industry was prioritized in this period as a way of supporting the development of other industrial products, such as processed fruit, vegetables and confectionery.

After the period of economic collapse and sanctions in the 1990s, the new democratic government of Serbia decided to privatize the sugar industry. Privatization of the sugar sector was, in contrast to other sectors during the transition period, very successful and a driver of many of the sector's achievements over the last decade.

In 2003, a ban on exports of Serbian sugar to the EU was lifted and, in the ensuing period, the Ministry of Agriculture took a number of measures that allowed the sector to stabilize and consolidate. These measures are presented in more detail below but in short they established an environment balanced between protectionism and free trade in which the sugar industry could operate. The market for quality seeds, pesticides and machinery was opened up. This led to increased farmer specialization and cooperation with sugar factories.

Taking into account beet production, transportation and processing, the overall value chain in the industry involves more than 10 000 producers, cooperatives and individuals. Total land cultivated exceeded 70 000 hectares in 2010. Four million tonnes of sugar beet are produced annually and transported in over 150 000 trucks to six sugar factories. Factories employ over 2 700 people on a permanent basis and produce about 450 000 tonnes of white sugar annually. With more than 35 percent of production being exported, the sector is further contributing to the national economy by lowering Serbia's foreign trade deficit.

## Government policy towards agriculture

In the past eight years, three distinct phases of government policy towards agriculture can be identified:

- 2001–2003: Policy during this period was oriented towards price support for certain crops. These crops were soybeans, sunflower, sugar beet and wheat. Other than the price supports, there were no policy measures;
- 2004–2006: During this phase, price supports were abolished and there was a move towards promoting investment and rural development;
- 2007–2011: This most recent period has been characterized by the establishment of decoupled area payments for land cultivated, and the adoption of numerous ad hoc non-market measures such as export bans and interventions in state commodity reserves.

However, the present agricultural budget is small by international standards and its share of the total budget has declined over recent years. The biggest part of the budget (39 percent in 2008, 61 percent in 2009 and 74 percent in 2010) is used for area payments. Criteria for area payments are based on the possession of agricultural land and the submission of receipts of input purchases. However, due to restrictions on eligibility, only a portion of farmers in the country are eligible. In 2009, 74 901 farmers were granted area payments per hectare that amounted to a total of RSD 160 000 (EUR 1 600) per farm. However, as statistics show that there are 778 000 farmers in Serbia, only 450 000 of whom are registered, this meant that only one-sixth of registered farmers, and one-tenth of all farmers, received payments.

### Trade policy

Serbia made significant effort to increase trade with other countries by signing two important multilateral agreements – the Stabilisation and Association Agreement (SAA) with the EU, and the CEFTA agreement. In addition to these, bilateral agreements with the Russian Federation, Turkey and Belarus were also recently concluded and Serbia is on the road to achieving membership in the World Trade Organization (WTO).

Increased access to EU and regional markets through these trade agreements created the conditions necessary for Serbia to become a net exporter of food. This happened for the first time in 2005, when a food surplus worth about USD 255 million was achieved

and, by 2010, agri-food exports amounted to over USD 1 billion. However, Serbia's export value per hectare of farmland is still lower than almost every other country in Europe, and Serbia is still far from exploiting the full potential created by its natural environment, geographic position and trade access.

Table 7 presents the duties paid on imports of sugar into Serbia under the SSA and CEFTA agreements. On the export front, these agreements grant a duty-free annual quota of 180 000 tons of sugar to the EU and unrestricted duty-free access to the CEFTA market (with the exception of Croatia). The full implications of these agreements for the industry are analyzed in more detail in Chapter 5.

**Table 7: Duties on sugar imports into Serbia**

	<b>Current tariff</b>	<b>Additional duty</b>	<b>Additional duty</b>
	Rate (%)	Rate (RSD/tonne)	Rate (EUR/tonne)
CEFTA	0	0	0
EU	20	12	116
Customs Union of the Russian Federation, Belarus and Kazakhstan	0	0	0
Rest of WTO	20	18	174

*Source: Ministry of Agriculture, Forestry and Water Management.*

### **Government policy towards sugar**

As with overall government policy towards agriculture, the changes in policy towards the sugar sector can be divided into three distinct periods. Table 8 summarizes the main policies that prevailed during these periods, along with what the outcomes of these policies were.

**Table 8: Government policy towards sugar, from 2001 to 2011**

Period	Main characteristics	Achievements/outcomes
2001–2004	Privatization of sugar refineries	Privatization of main sugar factories
	Price support to sugar beet production of RSD0.20/kg (around 10 percent of production)	Increased farmer interest for cropping sugar beet
	Unregulated system of exports to the EU, which lead to re-exporting of non-Serbian sugar to the EU	Investment throughout the sugar value chain
2004–2007	Establishment of an annual quota of 180 000 tonnes for exports to the EU	Consolidation of sugar beet production to around 70 000 ha, annual sugar production to 450 000 tonnes and annual exports to 180 000 tonnes
	Removal of price support for sugar beet production	Closure of three factories (Nova Crnja, Sremska Mitrovica and Zrenjanin)
	Fuel subsidies for producers: around 30 percent for a maximum of 100 litres	Continued investment in the sector
	Setting up of the tariff structure on imports of 20 percent + RSD18/kg for Most Favoured Nations (MFNs) and 20 percent + RSD12/kg for the EU	
	Through investment support, the possibility of receiving a grant for a sugar digester at the farm level was introduced	
2007–2011	Establishment of area payments linked with the purchase of inputs worth RSD10 000 (2008 and 2009), RSD12 000 (2009) and RSD14 000 (2010 and 2011)	Only 30 percent of the sugar beet producers receive area payments
	Increased tariff on sugar under the 1702 tariff line	Significant decline in imports of sugar under tariff line 1702

It should be noted that the system of area payments, which is the major pillar of current agricultural policy, excludes much of the sugar beet sector. This is owing to the eligibility criteria for the subsidies. First, companies that are legal entities are not eligible for the subsidies. Second, subsidies are only available to farmers who pay agricultural pension insurance and to those having less than 100 hectares of land. As the majority of legally registered companies involved in agriculture are producing sugar beet, and often cultivating many more hectares than 100, it is estimated that out of the 75 000 hectares planted in sugar beet, only 30 percent qualify for area payments.

## Sugar supply/demand balance

Table 9 and Diagram 22 present the evolution of Serbia's supply/demand balance for sugar in recent years.

Serbia's production and, subsequently, its surplus have been steadily expanding. As a result, imports have fallen and Serbia has become a consistent net exporter.

Serbia benefits from preferential access to the EU market via an annual quota of 180 000 tonnes. In the last two years, increased production has also led to an increase in exports to neighboring countries. Under the CEFTA agreement, Serbia has duty-free access to these markets.

**Table 9:** Supply/demand balance for sugar, from 2008/09 to 2010/11 ('000 tonnes, white value)

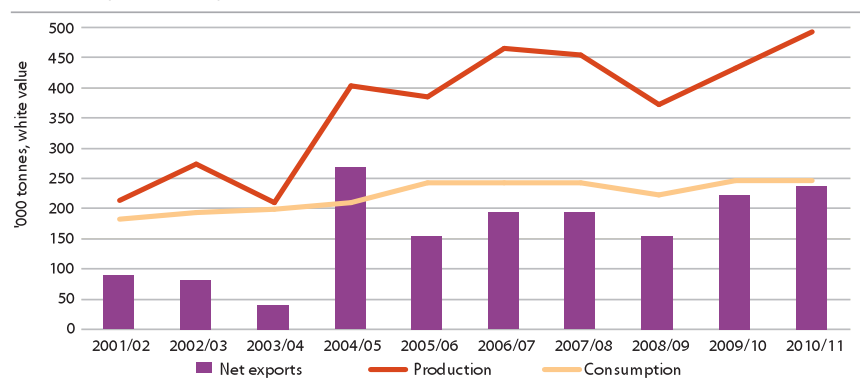
	2008/09	2009/10	2010/11
			Estimate
<b>Production</b>	372	433	493
<b>Consumption</b>	223	247	247
<b>Imports – total</b>	28	13	12
<b>Exports – total</b>	183	235	250
<b>EU</b>	183	180	180
<b>CEFTA</b>	0	55	70
<b>Apparent stock change</b>	(6)	(36)	8
<b>Closing stocks</b>	50	14	22

Source: Author/LMC International; Ministry of Agriculture, Forestry and Water Management.

## The beet processing sector

The processing sector in Serbia underwent a process of privatization and rationalization over the last decade. Ownership of the factories is currently divided among three companies. Table 10 presents the breakdown of the beet processing sector according to company ownership, while Diagram 23 allows us to see the rationalization that took place.

**Diagram 22:** Serbia's sugar production, consumption and net exports, from 2001/02 to 2010/11



Source: Author/LMC International; Ministry of Agriculture, Forestry and Water Management.

**Table 10:** Factory ownership, capacity and production of the beet processing sector in Serbia

<b>Factory</b>	<b>No. of</b>	<b>Capacity</b>	<b>2009/10 Sugar</b>	<b>2010/11 Sugar</b>
<b>Ownership</b>	<b>Factories</b>	<b>(Tonnes beet/ day)</b>	<b>Production (tonnes)</b>	<b>Production (tonnes)</b>
MK Commerce	3	20 000	191 031	246 569
Hellenic Sugar	2	11 500	149 147	145 248
SFIR	1	8 500	93 313	100 655
Total	6	40 000	433 491	492 472

Source: SeedeV.

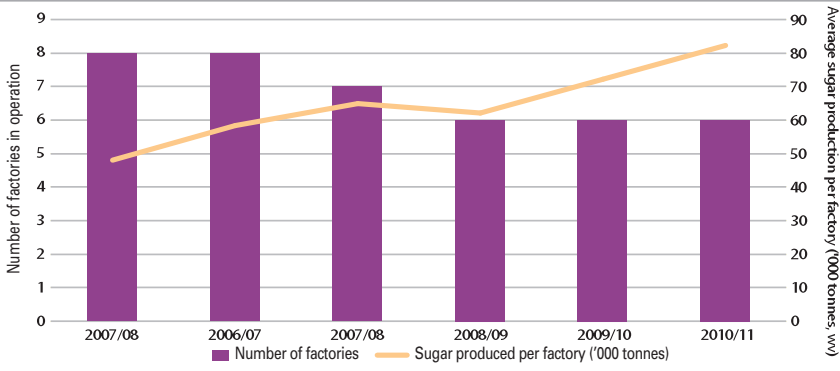
The largest player in the sector is MK Commerce, which owns three factories and produces close to half the country's sugar. The overall number of factories in the sector fell to six from the eight that were in operation as recently as the 2007/08 crop year. However, the remaining factories have invested heavily to expand their capacities and, as a result, increased their average annual production by over 20 000 tonnes since 2007/08 to more than 80 000 tonnes in 2010/11.

### The beet grower-processor relationship

There are no official industry standards that define the relationship between beet growers and processors in Serbia. Each factory carries out its own contracting directly with the farmers who supply beets. However, due to competition between factories, certain norms developed and are widely practiced. In the 2009/10 season, beet prices of around RSD 3.00 per kg were being paid to farmers for beets with a 16 percent sucrose content. In 2011, the price offered is close to RSD 4.00 per kg (EUR 37 per tonne).

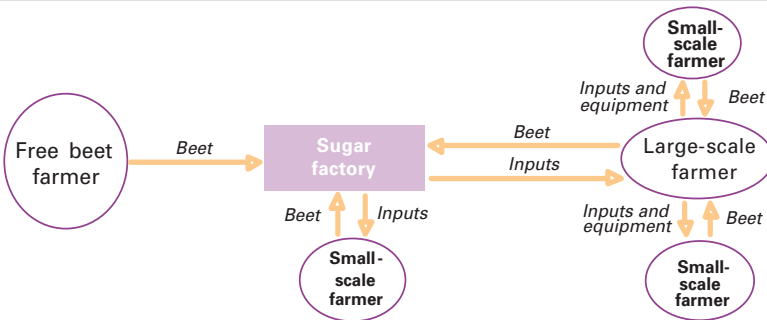
The nature of the contract between processor and grower often depends on a farmer's scale of operation. There has been an increasing level of specialization in the beet sector in recent years and, thanks to a land tenure system that lets private (usually large-scale) farmers lease state-owned land through an auction, there has emerged a cadre of large-scale farmers and private farming 'cooperatives' that often cultivate 400–500 hectares of land. At the same time, there remain many farmers of smaller-scale operations who supply beet directly to the factories as well as via the farmers of larger-scale operations. Diagram 24 summarizes the relationship.

**Diagram 23: Rationalization of the beet processing sector in Serbia**



Source: Author/LMC International.

**Diagram 24: The relationship between factories and farmers in Serbia**



Source: LMC International field research.

The most common contract between factories and farmers is one whereby the factory provides inputs such as fertilizers and seeds to farmers on credit. In return, the farmers owe the factories a certain tonnage of beet at the end of the season. The amount of beet owed is calculated by the factory using a base price they set at the start of the season (in theory, the amount of beets will be equal to the value of the inputs provided). Anything the farmers provide in excess of the beets owed is then sold to the factories for a monetary value. If a farmer does not produce enough beets to supply the factory with what he or she owes, the debt is carried over into the next season.

Larger-scale farmers and farming cooperatives tend to act as a focal point for factories. Often they will contract directly with the factories and, in addition to cultivating their own acreages, will support smaller-scale farmers in their dealings with the factories



and help them to grow beet (for example, by hiring out the use of mechanized equipment). However some small-scale farmers may also contract directly with the factories.

Increasingly, larger-scale farmers are able to access finance in order to source their own inputs, which may be sourced more cheaply than if they are sourced via the factories. Factories often act as a guarantor to the farmers in such arrangements.

There are also a number of farmers who produce “free-beets”. These farmers do not have a contract with any specific factory and so are free to negotiate the sale of their beets to different factories during the course of the season. As these farmers are able to produce beets independent of any support from the factories, it can be assumed they are relatively large-scale and well-off. Anecdotal evidence points to the planting of between 3 000–5 000 hectares worth of free-beet this season, and this is the first time such a large area has been planted.

## ||||| Performance of the Serbian agriculture sector

In this chapter we consider the performance and competitiveness of sugar beet production in Serbia. We begin by assessing the sector's technical performance in comparison with countries in the EU. Second, we compare the cost of producing beets in Serbia with these countries. We then analyze the returns to beet producers in relation to alternative crop returns, and derive the minimum supply price that factories need to pay farmers in order to incentivize them to grow beets.

### Summary

- In contrast to the trend in EU countries, where the area planted with beets has declined dramatically over the last decade, Serbia has increased its beet area. Improved specialization in the agriculture sector has also increased beet yields and quality. However, largely as a result of climatic factors, yields and sucrose content remain below the average in the EU and in the beet growing areas of Central and Southeast Europe;
- Although Serbia's beet sector incurs lower costs per hectare, its lower yields mean that costs per tonne of beets are slightly higher than in the EU as a whole, but lower than in Central and Southeast Europe;
- Maize is the principal alternative crop to sugar beet, and beet area in Serbia struggles to maintain its size when maize prices are high. This was the situation in 2011, with area estimated to have declined to around 50 000 hectares (from 70 000 hectares in 2010/11);
- The price that processors have to pay farmers for beets to match their returns from maize depends on many factors, including farmers' expectations for maize prices. Based on a maize price of EUR 130 per tonne (which corresponds to the average of prices in recent years), farmers would need to obtain a beet price of approximately EUR 30 per tonne (RSD 3 per kg at the exchange rate in June 2011) to match the returns from maize.

### Field technical performance

Beet in Serbia is grown both by large-scale farmers and organized farming cooperatives, as well as by small-scale farmers. In recent years, a high level of specialization took place in the beet sector: farms became

larger, there was been a great deal of mechanization, more fertilizers were used and, importantly, higher quality seeds were introduced.

On the other hand, high summer temperatures in the Vojvodina province and the absence of irrigation place a limit on beet yields and also beet quality (sucrose content).

Table 11 presents indicators of Serbia's technical performance at the field level in comparison with that of the EU as a whole, as well as with a selection of beet industries in Central and Southeast Europe. We chose beet industries in Austria, Hungary, Slovakia and Romania, all of which grow beets under predominantly rain fed conditions. Diagrams 25 to 27 chart trends in beet area size, yield and sucrose content over the last decade in Serbia, the EU and the regional industries (a weighted average).

In stark contrast to the EU, where beet area has declined by about 40 percent, Serbia has actually seen a marked increase in beet area. It is particularly noteworthy that, whereas at the start of the last decade Serbia's beet area was equivalent to only about 25 percent of the total area of our selected industries in Central and Southeast Europe, this figure has now risen to 70 percent. In other words, following the reforms of the EU, Serbia now has the largest beet industry in this region of Europe.

Of this area, however, around 5 000 hectares are planted with beet for sale to sugar factories in Croatia. Beet farmers in Croatia receive a beet-specific subsidy, which was EUR 530 per hectare in 2010. This allows Croatian factories to purchase domestic beet at a reduced price and offer Serbian farmers a more competitive price for their beet than Serbian factories can offer.

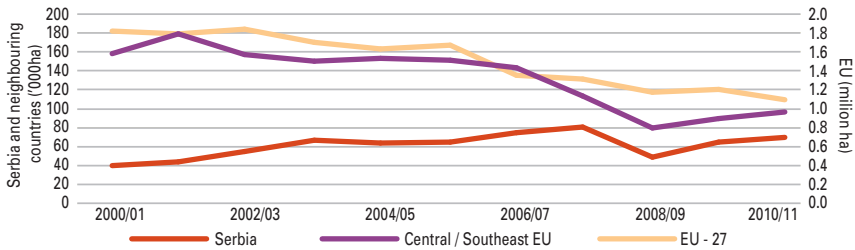
**Table 11:** Field performance indicators in Serbia, EU-27 and Central/Southeast Europe, average from 2009/10 to 2010/11

	Beet Area (ha)	Beet Production (tonnes)	Beet Yield (tonnes/ha/ year)	Sucrose Content (% beet)	Sucrose Yield (tonnes/ha/ year)	TB:TS	Sugar Production
<b>Serbia</b>	67 447	3 416 500	50.5	16.1	8.1	7.4	463 000
<b>EU-27</b>	1 451 744	98 309 928	67.6	18.0	12.2	6.3	15 667 172
<b>Austria</b>	43 771	3 028 926	69.2	17.0	11.8	6.8	446 900
<b>Hungary</b>	11 569	822 761	72.7	16.3	11.9	7.2	114 045
<b>Romania</b>	21 450	944 572	42.3	16.6	7.1	7.0	134 938
<b>Slovakia</b>	15 933	896 872	56.3	17.5	9.7	6.7	132 617

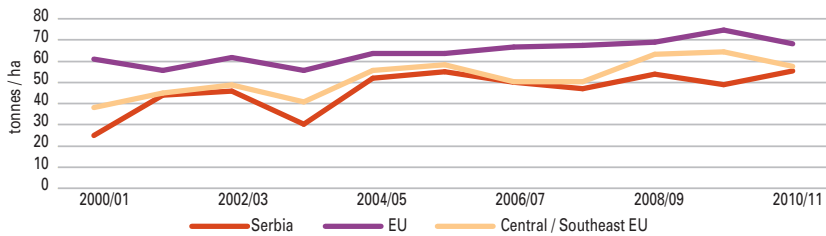
Note: TB:TS = tonnes beet : tonnes sugar.

Source: Author/LMC International.

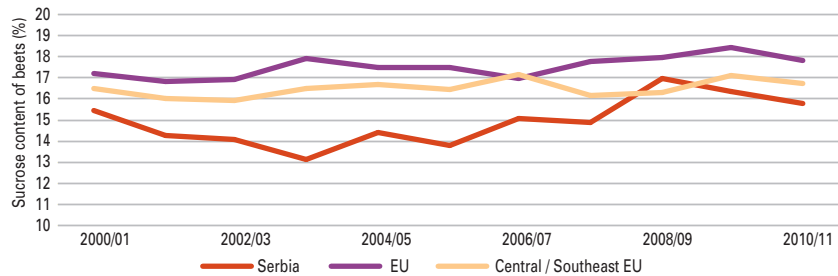
**Diagram 25: Beet area in Serbia, EU-27 and Central/Southeast Europe**



**Diagram 26: Sugar beet yields in Serbia**



**Diagram 27: Sucrose content of beets in Serbia, the EU and Central/Southeast Europe and Central/Southeast Europe**



Source: Author/LMC International.

The specialization in the beet sector mentioned above has helped to boost yields. Currently, average annual yields of 50–55 tonnes per hectare are being achieved and some larger-scale farmers, who use a greater level of inputs and mechanization, report achieving annual yields of 60–80 tonnes per hectare. However, yields have also been improving in other countries and those in Serbia remain well below the EU average, in part because of the limitations imposed by hot summers.

A notable feature of Serbia's recent technical performance has been the improved sucrose content of its beets. Although sucrose content is largely determined by weather conditions, it is noteworthy that Serbia has managed to close the gap with the EU and regional industries, whose sucrose contents have remained relatively stable over the course of the last ten years.

### Cost of beet production

Table 12 presents the cost of producing beet in Serbia, in the EU as a whole, and in Central and Southeast Europe. Diagrams 28 and 29 compare costs per hectare and also per tonne of beet. Costs are summarized for each of three categories:

- Direct costs, which include seed, fertilizer and chemicals;
- Machinery, which includes allowances for depreciation of farm equipment and a return on capital employed as well as fuel used in machine operations;
- Labour, which is associated primarily with the use of machine operations.

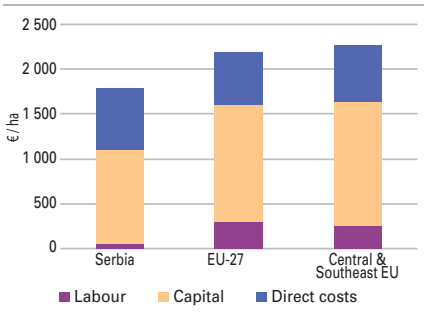
The table and diagrams reveal that, although Serbian farmers incur lower costs per hectare, largely because of low labour costs and efficient use of machinery on large farms, costs per tonne of beet are slightly higher than those in the EU, owing to modest beet yields.

**Table 12: Cost of producing sugar beet in Serbia, EU-27 and Central/Southeast Europe, average from 2009/10 to 2010/11 (EUR/tonne)**

	Labour	Capital	Direct costs	Total field
<b>Serbia</b>	1	21	14	35
<b>EU-27</b>	4	20	8	32
<b>Austria</b>	5	20	11	36
<b>Hungary</b>	2	24	12	38
<b>Romania</b>	5	31	7	43
<b>Slovakia</b>	2	24	12	38

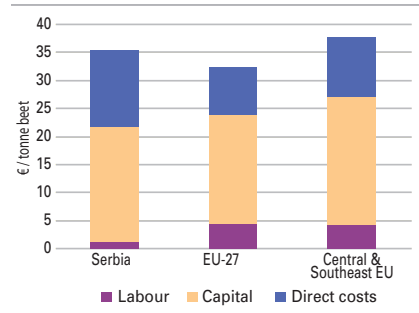
Source: Author/LMC International.

**Diagram 28:** Cost of producing sugar beet per ha in Serbia, EU-27 and Central/Southeast Europe, average from 2009/10 to 2010/11



Source: Author/LMC International.

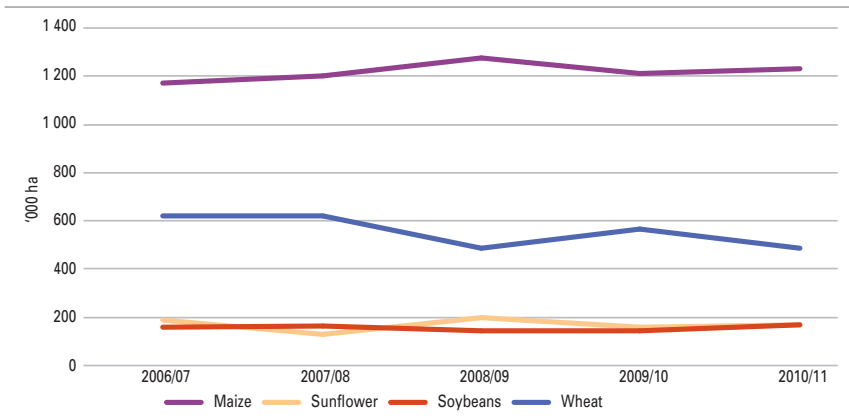
**Diagram 29:** Cost of producing sugar beet per tonne in Serbia, EU-27 and Central/Southeast Europe, average from 2009/10 to 2010/11



## Field competitiveness of beet

An important determinant of the success of a sugar industry is the competitiveness of the return that farmers can expect from beets compared with the return from alternative crops. In an environment where the returns offered by beet are relatively uncompetitive, farmers are likely to grow alternative crops and, therefore, threaten the supply of beets needed by factories to produce sugar. In such a situation, factories would have to offer higher beet prices to provide sufficient incentives for farmers to grow beets. Conversely, in an environment where beet production is relatively competitive, factories are likely to have access to a relatively cheap and plentiful supply of raw material.

Diagram 30 charts the area planted with major alternative crops in Serbia in the recent past. Maize is the most widely grown crop in the country and in the Vojvodina province. Furthermore, while the size of wheat area has been decreasing, and that of sunflower and soybean has remained relatively stable, the area planted with maize has been gradually increasing. Moreover, maize is the crop that competes most directly with beets. This is because these two crops are most similar in terms of the areas in which they grow best. Both crops have to be grown in low lying areas and on soils with high moisture retention, because they grow through the summer months when there is a moisture deficit.

**Diagram 30: Area planted with various crops other than beet in Serbia**

Source: Serbian Ministry of Agriculture, Forestry and Water Management.

From the farmer's point of view, when comparing the two crops, they have to consider a number of issues when choosing which crop to grow. First, maize is an easier crop to grow than sugar beet and requires fewer inputs. In recent years, Serbia became a net exporter of maize and, in the last three seasons, 20–30 percent of domestic maize production was exported. As a result, maize growers stand to benefit from the recent boom in world maize prices. However, the system of contracting with sugar factories means that beet producers benefit from a guaranteed market and prearranged prices. By contracting forward with factories, this also provides farmers with access to credit with which to finance the purchase of inputs and machinery. By contrast, the revenue from maize is much less predictable and varies with fluctuations in the market price. In addition to requiring a high level of inputs (i.e. fertilizer and chemicals), sugar beet also demands the use of specialized machinery, principally harvesters. The large investment that is required for such machines provides some inertia in planting decisions.

To better understand the financial incentives available to farmers when making their planting decisions, we analyze the farm margins for beet and maize crops. Then, we estimate the supply price of beets (which we refer to as the profit-equalizing price). In theory, this price represents the minimum beet price that factories are likely to have to offer farmers in order to ensure that farmers grow beets.

### Analysis of farm margins

In order to determine the margins available to farmers, we analyze both the gross and net margins associated with growing beet and maize:

- Gross margin = total revenue from crop – direct costs of growing crop
- Net margin = gross margin – capital and labour costs

In addition to sales revenue, small-scale farmers in Serbia also benefit from an area payment, which was equivalent to approximately EUR 140 per hectare in 2010. However, as the payment is the same for whatever crop is planted, it does not influence farmers' choice of crop and we do not include it in our comparison of beet and maize margins. Table 13 presents our analysis of farm margins in 2009/10 and 2010/11, as well as estimates for 2011/12.

**Table 13: Farm margins in Vojvodina province, from 2009/10 to 2011/12 (EUR/hectare, unless stated)**

	2009/10		2010/11		2011/12	
	Achieved		Achieved		Anticipated	
	Sugar beet	Maize	Sugar beet	Maize	Sugar beet	Maize
<b>Revenue</b>						
- A. Price (EUR/tonne)	34	107	28	157	38	186
- B. Yield (tonnes/ha)	47	6.4	54	7.1	50	6.6
C. Sales revenue (A x B)	1 599	690	1 514	1 114	1 877	1 225
D. Direct costs	558	276	640	280	640	280
<b>E. Gross margin (C – D)</b>	<b>1 042</b>	<b>414</b>	<b>874</b>	<b>834</b>	<b>1 237</b>	<b>945</b>
F. Capital and labour costs	392	196	474	213	474	213
<b>E. Net margin (E – F)</b>	<b>650</b>	<b>218</b>	<b>400</b>	<b>621</b>	<b>763</b>	<b>732</b>

Sources: Field interviews; the Ministry of Agriculture, Forestry and Water Management; the Institute of Field and Vegetable Crop; Seedev.

For the 2009/10 and 2010/11 crops, we use the average yields achieved these seasons as well as prevailing prices during the harvest period of each year (i.e. in the fourth quarters of 2009 and 2010, respectively). For 2011/12, we estimate prices farmers expect to receive. We assume that farmers achieve trend yields of 50 tonnes per hectare and 6.6 tonnes per hectare for beet and maize, respectively. The prices we use are those during the first quarter of 2011, when planting decisions were made.

The table reveals that sugar beet offered farmers a much more attractive return than maize in 2009/10, when maize prices were low. The result was a major increase in beet planting for the 2010/11



season, which resulted in a record level of sugar production. However, the sharp rise in maize prices during 2010 meant that, once the high additional capital and labour costs of beet production were taken into account, maize was more profitable in 2010. Maize prices remained high during the period when planting decisions were made in 2011 and, as a result, there was a sharp decline in the area planted to beets as many farmers switched area back to maize.

### Supply (or profit-equalizing) beet prices

In order to ensure that farmers grow beet, factories must, in theory, offer them a price that not only covers their costs of production, but also compensates them for the profit they could have earned by growing an alternative crop (generally maize). We refer to this supply price as the profit-equalizing price and this price is derived for the 2010/11 and 2011/12 seasons as shown in Table 14. Diagram 31 compares the actual beet price offered in these seasons with a breakdown of the profit-equalizing price on a per-tonne-of-beet basis.

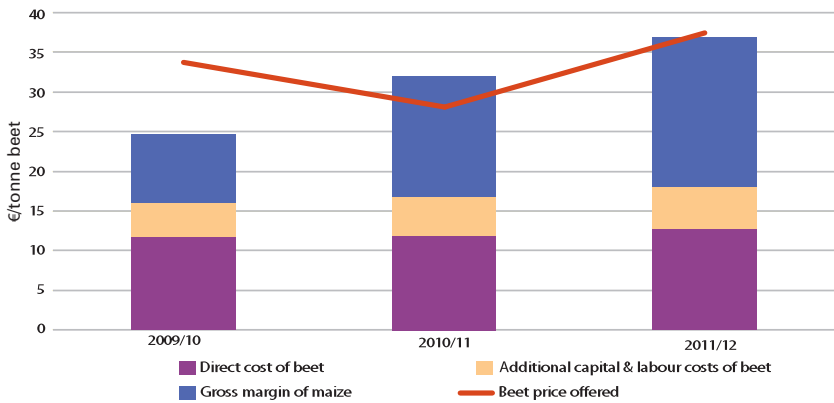
**Table 14 Profit-equalizing price of beets, from 2009/10 to 2011/12 (EUR/hectare, unless stated)**

	2009/10	2010/11	2011/12
A. Gross margin of maize	414	834	945
B. Direct cost of beets	558	640	640
C. Beet yield @16 percent sucrose content (tonnes/hectare)	47	54	50
<b>D. Gross margin-based profit-equalizing price (EUR/tonne beet) [(A + B)/C]</b>	<b>21</b>	<b>27</b>	<b>32</b>
E. Additional capital & labour costs of sugar beets vs. maize	200	260	260
<b>G. Profit-equalizing price (EUR/tonne beet) [(A + B + E)/C]</b>	<b>25</b>	<b>32</b>	<b>37</b>

Sources: Field interviews: the Ministry of Agriculture, Forestry and Water Management; Institute of Field and Vegetable Crops; Seedev.

We see that in the 2009/10 season beet prices were very attractive and encouraged farmers to plant beet in a near record area in the following 2010/11 season. However, in 2010/11, although beet prices were sufficient to cover farmers' costs of production, they were not high enough to compensate them for the profit they would have made had they planted maize. As a result, farmers switched back to planting maize for the current season and processors have increased beet prices significantly in an attempt to limit this response.

**Diagram 31: Actual beet prices in relation to the profit-equalizing price in Serbia**



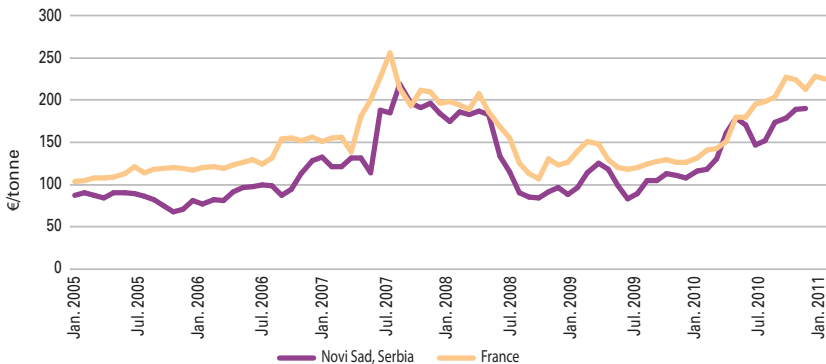
Source: LMC International field research.

### Outlook for beet prices in the future

The future level of beet prices will depend largely on the future course of maize prices. As Diagram 32 reveals, maize prices in the Vojvodina province were very volatile in recent years and followed the movement in maize prices in the EU (France). Within the last five years, prices have gone from EUR 100 to EUR 200 per tonne, down to EUR 100 per tonne and back up to EUR 200 per tonne.

Based on the methodology described above and using 2010/11 costs, Table 15 presents our estimates of the supply price of beets across a range of maize prices from EUR 100 to EUR 200 per tonne. The results show beet supply prices ranging from EUR 23 to EUR 36 per tonne.

**Diagram 32: Maize prices in the EU and Serbia**



Source: Author/LMC International; Seedev.

**Table 28:** Derivation of beet supply prices across a range of maize prices for Serbia

	Low	Average	High
A. Maize price in France (EUR/tonne)	100	150	200
B. Serbian price differential (EUR/tonne)	(20)	(20)	(20)
C. Serbian maize price (EUR/tonne) [A – B]	80	130	180
D. Yield (tonnes/hectare)	6.6	6.6	6.6
E. Revenue (EUR/hectare) [C x D]	528	857	1 187
F. Direct costs (EUR/hectare)	280	280	280
<b>G. Gross margin of maize (EUR/hectare) [E – F]</b>	<b>248</b>	<b>577</b>	<b>907</b>
H. Direct cost of beet (EUR/hectare)	640	640	640
I. Beet yield @16 percent sucrose content (tonnes/hectare)	50	50	50
<b>J. Gross margin-based profit-equalizing price (EUR/tonne beet) [(G + H)/I]</b>	<b>18</b>	<b>24</b>	<b>31</b>
K. Additional capital & labour costs of sugar beet vs. maize (EUR/hectare)	260	260	260
<b>L. Profit-equalizing price (EUR/tonne beet) [(G + H + K)/I]</b>	<b>23</b>	<b>30</b>	<b>36</b>

Source: Author/LMC International calculations and estimates.

## ||||| Performance of the Serbian processing sector

In this chapter, we analyze the performance of Serbia's beet processing sector. We begin with a review of the technical performance of the sector and compare it with the average performance for the EU as a whole and with industries in Central and Southeast Europe. We then compare processing costs in Serbia in relation to these countries. We also look at the cost of refining sugar from imported raw sugar.

### Summary

- The Serbian beet processing sector has gone through a process of rationalization during which a number of factories closed, and the remaining factories invested heavily to expand capacity. As a result, there are currently six factories operating in the country and the average annual sugar output has increased to over 80 000 tonnes per factory, compared with around 60 000 tonnes per factory in 2006/07;
- However, the average length of the slicing campaign in Serbia, as well as the sugar recovery rate (rendement), remain below the average of both the EU and of other industries in Central and Southeast Europe. As a result, the capacity utilization of factories in Serbia (measured as annual sugar production per tonne of installed daily slicing capacity) is relatively low;
- A major factor in the costs of production of Serbian sugar factories is the type of fuel that they use. Factories that use gas to produce sugar have a cost of around EUR 100 a tonne of sugar, roughly three times as high as those factories that burn coal. However, these factories are investing to lower their fuel consumption and are also looking at the possibility of producing biogas from beet pulp;
- The competitiveness of the Serbian factories is also hindered by low capacity utilization and rendement, which raises unit fixed costs and beet costs;
- The potential for refining imported raw sugar is currently held back by prohibitive import duties on raw sugar and an inadequate supply of beets in most years to supply Serbia's core markets. We estimate the cost of producing white sugar from imported raws as 25 percent higher than producing domestic beet sugar in

gas-powered factories, and almost 50 percent higher than in coal-powered factories. However, in the absence of the import duty on raw sugar, the cost would be competitive against the cost of producing beet sugar at gas-powered factories and only about 12 percent higher at coal-powered factories.

## Overview

Serbia's beet processing sector was privatized in 2002 and, after a period of rationalization, there are now six factories in operation and they are owned by three companies. The largest of these companies is Sunoko (owned by a local company, MK Commerce), which produced close to half of Serbia's sugar output in 2010/11. Hellenic Sugar (the state-owned sugar company in Greece) and SFIR (an Italian company with sugar assets in Italy and Portugal) own the remaining three factories. In addition to the six factories, the Bač factory, also owned by MK Commerce, is said to be able to re-start operations if required, although it has not been in operation since the 2007/08 season. Table 16 contains a list of the factories along with their ownership, capacity and output in the 2010/11 season.

One of the striking features of the processing sector in the Vojvodina province is that two of the factories are poorly located in terms of their sugar beet supply. The best beet growing areas (i.e. where sugar beet has its greatest comparative advantage relative to alternative crops) are Srem (southern Vojvodina province), central/southern Bačka and southern Banat.

**Table 16: Ownership and capacities of factories in Serbia, 2010/11**

Ownership/Name	Capacity (tbd)	Production (tonnes, wv)
MK Commerce		
Kovačica	5 500	62 598
Pečinci	8 500	94 797
Vrbas	6 000	62 598
Hellenic Sugar		
Crvenka	6 500	89 758
Žabalj	5 000	55 490
SFIR		
Senta	8 500	100 655
Total installed capacity	40 000	465 896

Source: *Seedev*.

All of MK Commerce's factories lie within these areas. SFIR's factory is poorly located in relation to these areas, while one of

Hellenic Sugar's factories (Zabalj) is situated on the fringes of these areas. As a result, SFIR and Zabalj have to haul sugar beets (at their expense) over relatively long distances. Thus, the geographic location of MK Commerce's factories gives the company a competitive advantage over its competitors.

## Factory technical performance

Since privatization, there has been a degree of rationalization in the Serbian beet processing sector. A number of factories have closed and there has been considerable investment in the remaining factories to increase capacity and improve efficiency.

Table 17 demonstrates how key indicators of factory performance have changed from 2006/7 to 2010/11. Table 18, as well as Diagrams 33 to 4.4, demonstrates how the sector compares with the EU average and other industries in Central and Southeast Europe (a weighted average of the countries in this region is used in the diagrams).

Although two factories have ceased operations since the 2005/06 season, the capacity of the remaining factories was expanded and average capacity now stands at close to 7 000 tonnes of beet a day. As a result, sugar output per factory rose to more than 80 000 tonnes in 2010/11. Average capacity of Serbia's factories is now close to that of the EU as a whole, and greater than that of the other industries in the region, with the exception of Austria. In the last two years, however, the average length of slicing season and the sugar recovery rates (rendement) in Serbia were well below the EU average and also lower than in other industries in the region. As a result, the capacity utilization of factories in Serbia (measured as annual sugar production per tonne of installed daily slicing capacity) is relatively low.

**Table 17: Key factory performance indicators in Serbia, from 2006/07 to 2010/11**

Crop Season	Number of factories	Average factory capacity (tbd)	Average factory throughput per day (tbd)	Duration of slicing season (days)	Sugar produced (mt, wv)	Average sugar produced per factory (mt, wv)
2006/07	7	5 214	4 239	100	466 000	66 571
2007/08	7	5 214	4 302	98	454 000	64 857
2008/09	6	5 667	4 824	66	372 000	62 000
2009/10	6	6 167	5 858	75	433 000	72 167
2010/11	6	6 667	5 667	101	493 000	82 67

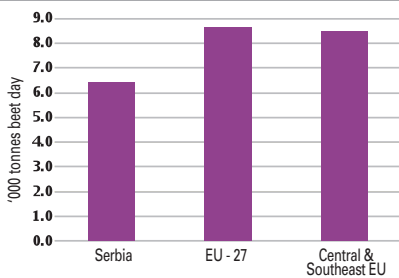
Source: Author/LMC International; Ministry of Agriculture, Forestry and Water Management; Seedev.

**Table 18:** Factory performance indicators in Serbia, EU-27 and selected countries in Central/Southeast Europe, average 2009/10– 2010/11

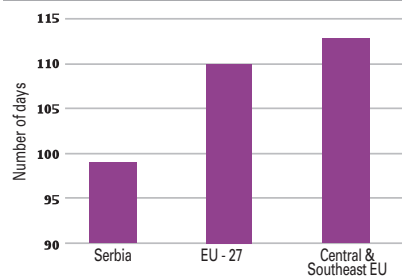
Country/ Region	Number of factories	Average factory capacity (tbd)	Slicing season (days)	Average factory throughput (tonnes/year)	Average factory throughput (tonnes/day)	Rendement (%)	Sugar produced (tonnes, vv)	Sugar per tonne of slicing capacity (tonnes)
Serbia	6	6 417	99	569 417	5 763	13.6	463 000	12
EU-27	107	8 639	110	918 784	8 353	15.9	15 667 172	17
Austria	2	12 145	126	1 514 463	12 073	14.8	446 900	18
Hungary	1	6 260	119	822 761	6 939	13.9	114 045	18
Romania	5	1 882	80	188 914	2 357	14.3	134 938	14
Slovakia	2	4 800	98	448 436	4 581	14.8	132 617	14

Source: Author/LMC International.

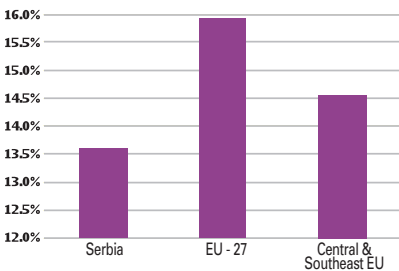
**Diagram 33:** Average factory capacity in Serbia, EU-27 and selected countries in Central/Southeast Europe average 2009/10– 2010/11



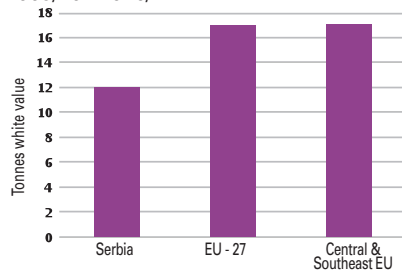
**Diagram 34:** Length of slicing campaign in Serbia, EU-27 and selected countries in Central/Southeast Europe, average 2009/10– 2010/11



**Diagram 35:** Rendement in Serbia, EU-27 and selected countries in Central/Southeast Europe, average 2009/10 – 2010/11



**Diagram 36:** Sugar production per tonne slicing capacity in Serbia, EU-27 and selected countries in Central/Southeast Europe, average 2009/10– 2010/11



Source: Author/LMC International

## Cost of beet processing

A number of factors affect the cost of processing beet into sugar at the factory. As well as the technical performance of the factory, the costs of procuring beets, beet haulage and inputs, such as labour and fuel, are also significant. In addition to these costs, factories benefit from the revenue gained through sales of beet pulp and molasses, which are produced as by-products of the sugar production process.

Table 19 presents a breakdown of our estimates of the factory costs of producing sugar in Serbia, the EU as a whole and in Central and Southeast Europe. For this analysis, we take the beet cost to be the cost of producing beets and transporting them to the factory. In practice, the actual beet cost would refer to the cost of buying the beets from farmers, not the cost of producing them, plus the cost of transport. This approach, therefore, compares costs across the whole of the production chain.

However, at the prevailing beet price of around RSD 3 per kg (EUR 28 per tonne) in 2010/11, and average haulage cost of about EUR 5 per tonne, the cost of procuring beet was in the region of EUR 250 (assuming 7.4 tonnes of beet are required per tonne of sugar, as implied by Serbia's rendement). This figure is close to the total beet cost of EUR 261 that we estimate in our analysis. Revenues from by-products are treated as a credit against the cost of producing sugar.

**Table 19: Cost of producing sugar in Serbia, EU-27 and selected countries of Central/Southeast Europe, average from 2009/10 to 2010/11 (EUR/tonne)**

Country/						By-product	Total
Region	Beet cost	Labour	Capital	Fuel	Credit	Administration	Cost
Serbia (gas-powered)	261	33	141	112	(83.9)	69	533
Serbia (coal-powered)	261	33	141	28	(83.9)	57	436
EU-27	204	42	130	57	(75.2)	54	412
Austria	243	31	119	47	(72.2)	55	425
Slovakia	260	47	174	68	(69.1)	72	551
Hungary	220	30	115	98	(64.5)	60	458
Romania	282	75	131	50	(81.8)	68	524

*Note: Administration costs are assumed to be 15 percent of the sum of all other costs.*

*Source: Author/LMC International.*



The most important additional factor in factory costs is the energy source used. In Serbia, there is a major difference in the cost structure of those factories that use gas and those that use coal. Coal is a much cheaper form of energy than imported gas. Only the factories that are owned by Sunoko use coal. In the analysis below, we differentiate between factories that use gas and those that use coal.

Diagram 37 compares the breakdown of the factory costs of producing one tonne of sugar (excluding by-product credit) in Serbia, the EU and a weighted average of the industries in Central and Southeast Europe. Diagram 38 compares the total cost of producing 1 tonne of sugar, taking into account revenues from the sale of by-products. The analysis reveals that fuel source is critical to the competitiveness of Serbia's factories. The costs of factories that use gas are over EUR 100 per tonne of sugar more than the EU average cost. Once revenues from by-products are taken into account, the coal-based factories in Serbia are competitive with those in the EU as a whole and in Central and Southeast Europe.

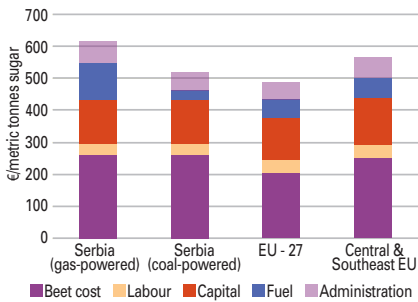
It should be noted, however, that factories in Serbia are investing heavily to improve their energy efficiency following the steep rise in gas prices in 2010. The three gas-powered plants aim to reduce their fuel consumption by 20 percent within the next one to two seasons. Based on fuel prices in 2010, this will lower their costs of production by around EUR 25 per tonne of sugar. Moreover, all three plants are looking to produce biogas from beet pulp to reduce their reliance on purchased fuel. The viability of this will depend on the future price of gas in Serbia relative to the price of the beet pulp that the factory would no longer have available to sell.

In 2011, in particular, Serbian factories benefited from the high price of by-products. Because of the high price of maize, Serbian factories received prices of around EUR 150 per tonne for beet pulp. Molasses prices were also high, at EUR 120 per tonne. However, low capacity utilization means that the unit fixed costs of capital at Serbian factories are relatively high, as these costs are spread over a lower sugar output. For this reason, unit labour costs, although overall relatively low because of lower salaries than in the EU and other regional industries, are higher than they would be if better capacity utilization were achieved.

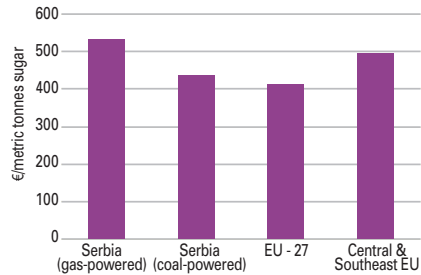
The low rendement of beets in Serbia also brings up the cost of beets as it means that more beets need to be processed in order to produce each tonne of sugar. For the 2011/12 season, it should be noted that beet costs in Serbia will be higher than those in 2009/10

and 2010/11, because factories are having to pay a much higher beet price, around EUR 40 per tonne, to compensate farmers for the high cost of maize.

**Diagram 37:** Breakdown of factory costs in Serbia, EU-27 and selected countries in Central/Southeast Europe, average 2009/10– 2010/11



**Diagram 38:** Total cost of producing sugar in Serbia, EU-27 and selected countries in Central/Southeast Europe average 2009/10– 2010/11



Source: Author/LMC International calculations and estimates.

## Cost of refining imported raw sugar

At present, Serbia does not refine imported raw sugar. However, it is an option pursued by a number of countries in the region. For example, the industry in Croatia refines imported raw sugar for its domestic market, and thus frees up its own domestically produced beet sugar for export to the EU (refined raw sugar is not eligible for export under EU quotas).

From the point of view of the Serbian industry, investment in refining capacity could prove fruitful in years when there is a reduced beet crop. Such a situation could occur if there were weather-related problems or if farmers were to switch to more profitable alternative crops. This could put Serbia in a position whereby it could not produce sufficient beet sugar to meet domestic consumption requirements as well as export commitments to the EU. This is likely to be the situation in 2011/12.

In such a scenario, the industry could fill the domestic deficit through refining imported raw sugar during its off-crop season. However, a major drawback would be that in seasons of good beet crops, capital investments in refining facilities would be underutilized, unless it was viable also to use the capacity to free up domestic beet sugar to supply the CEFTA market.

One scenario where investments in refining capacity would be more attractive would be if the industry had a larger quota to export to the EU. However, even in this case, the cost of producing white sugar from imported raws would have to be assessed relative to the cost of simply producing more domestic beet sugar. Tables 20 and 21 present our estimates of the cost of producing white sugar (with and without the current raw sugar import tariffs) at refineries that are attached to existing beet processing factories. Our calculations use the following assumptions:

### **Cost of raw sugar**

We assume a long-run projected world raw sugar price of 21 cents/lb (EUR 320 per tonne). We also assume that the sugar imported would be high quality (very high pol [VHP]) sugar from Brazil, which would command a quality (pol) premium of EUR 13 per tonne (4.05 percent) above the world raw sugar price. There is also a cost associated with the fact that approximately 1.02 tonnes of VHP raw sugar are needed to produce 1.00 tonne of refined sugar (owing to the pol loss). We estimate this cost on the basis of the delivered cost of raw sugar, and it stands at approximately EUR 12 and EUR 9 per tonne, depending on whether or not the special duty charge is applied, and based on our assumed raw sugar price, and transport costs.

### **Tariffs and duties**

Imported raw sugar for refining is subject to a 20 percent tariff and a special duty charge of RSD16 per kg (EUR 161 per tonne, using the exchange rate of RSD 99: EUR 1 that prevailed in June 2011). However, as it is possible that the duty could be reduced or waived, we also estimate the cost of refining raw sugar assuming that imports are subject to the 20 percent tariff but the RSD 16 per kg duty is waived (see Table 21).

### **Freight cost**

We add the cost of shipping raw sugar from Brazil to the Balkans, as well as the cost of transporting sugar by road, assuming the sugar is imported at the port of Bar in the former Yugoslav Republic of Macedonia.

### **Labour, capital and fuel costs**

We estimate each of these costs assuming that a refinery uses its current sugar production capacity (which averages 900 tonnes in Serbia) for 50 days per year. Based on recent estimates for the EU, we assume the cost of modifying a beet factory to handle and refine imported raw sugar would be EUR 15 million and that energy

consumption would be 2.6 GJ per tonne of sugar. As well as the cost of gas or coal, we include in our fuel cost category, allowances for the cost of chemicals for refining.

### By-product credit

The refining process produces a very small quantity of molasses, the sale of which acts as a credit to the overall cost of refining.

**Table 20:** Estimated cost of producing white sugar by refining imported raw sugar in Serbia (EUR/tonne, white value)

	Raw Sugar	Tariff and Duties	Pol Premium/ Loss	Freight	Labour	Capital	Fuel	By- product Credit	<b>Total</b>
Serbia (gas-powered)	320	225	25	65	4	9	22	-1	<b>669</b>
Serbia (coal-powered)	320	225	25	65	4	9	7	-1	<b>654</b>

Source: Author/LMC International calculations and estimates.

Based on these assumptions, we estimate the cost of producing white sugar from imported raws to be in the range of EUR 650–700 per tonne. Even if a longer refining season of 100 days is taken, costs would only be reduced by about EUR 10 per tonne, owing to the high variable cost component of total refining costs. This cost of EUR 650–700 is about 25 percent more than gas-powered factories' cost of producing beet sugar and almost 50 percent more than coal-powered factories.

However, in the absence of the RSD 16 per kg duty, costs would be closer to EUR 500 per tonne, which would be competitive against costs of producing beet sugar at gas-powered factories (around EUR 530 per tonne as estimated above), and about 12 percent higher than at coal-powered factories.

**Table 21:** Estimated cost of producing white sugar by refining imported raw sugar in Serbia, excluding special duty charge (EUR/tonne, white value)

	Raw Sugar	Tariff and Duties	Pol Premium/ Loss	Freight	Labour	Capital	Fuel	By- product Credit	<b>Total</b>
Serbia (gas-powered)	320	64	22	65	4	9	22	-1	<b>505</b>
Serbia (coal-powered)	320	64	22	65	4	9	7	-1	<b>490</b>

Source: Author/LMC International calculations and estimates.

# ||||| Markets, prices and revenues for Serbian sugar

The Serbian sugar industry sells its sugar in three main markets: the domestic market, the EU market and, more recently, the CEFTA market. In this chapter, we outline the size of these markets and explain the dynamics of sugar prices in each market as well as the prices the industry can expect to earn in each market in the foreseeable future.

## Summary

- Until 2010, Serbia sold all of its sugar in two well-protected markets, the domestic market (200 000–240 000 tonnes annually) and the EU (to which it has duty-free access for 180 000 tonnes annually). The industry has the potential to sell approximately 380 000–420 000 tonnes in these two markets, and local production has been slightly higher than 420 000 in most years;
- Although Serbia has had duty-free access to the CEFTA market since 2006, sugar prices in that market were initially very low. The Serbian industry had to export to CEFTA (at much lower prices) any sugar that it produced in excess of the amount it sold to the domestic and EU markets. This prospect meant that sugar in the local market traded below the full cost of imports from the world market (import parity) as producers sought to dispose of their sugar in the local market and in the EU. As a result, producers earned similar prices from sales in the local market and in the EU;
- In the last two years, higher prices in the CEFTA market coincided with the Serbian industry producing larger surpluses. The higher price of sugar in the CEFTA market reflected the cost of importing sugar from the world market, and very high world prices allowed Serbian producers to dispose of their surplus production at favorable prices. The result was that higher CEFTA prices began to support the domestic price above EU prices.
- In the 2010/11 crop year, a serious sugar shortage in the EU resulted in a steep rise in EU prices. This in turn led to a corresponding increase in domestic prices, which averaged close to EUR 700 per tonne in 2010/11;
- In the future, the price received in the EU market will be dependent upon whether or not the current system of quotas is retained. We estimate the ex-factory price of sales to the EU will be around EUR 530 per tonne if quotas are retained and

EUR 430 per tonne if they are removed (or relaxed significantly). In the CEFTA market, based on our projections of the long-term world sugar price, we expect the Serbian industry to obtain an ex-factory price of about EUR 480 per tonne;

- In the long run, the domestic price should reflect the prices offered in the CEFTA market, which acts as the marginal buyer of Serbian sugar in most years. Therefore, we expect that the domestic ex-factory price will also be in the region of EUR 480 per tonne. However, prices will, in practice, vary over time, reflecting fluctuations in world market values. Moreover, there may be years when Serbia does not have a production surplus. In this situation, local prices would not have to be discounted by the cost of selling sugar in CEFTA market.

### Level of sales and destination of sugar

With imports contributing 10 000–30 000 tonnes towards domestic consumption in most years, annual sales by the Serbian industry to the domestic market ranged between 200 000 and 240 000 tonnes. About 40 percent of the sugar sold in the local market is for household use and the rest goes to industrial users, such as food and beverage manufacturers.

Serbia has preferential access to the EU market. Under this arrangement, Serbia has an annual quota to export duty-free 180 000 tonnes of sugar. Within the EU, the main importers of Serbian sugar are Greece, Hungary, Italy and Romania.

**Table 22:** Distribution of sales of Serbian sugar, from 2006/07 to 2010/11 ('000 tonnes, white value)

	2006/07	2007/08	2008/09	2009/10	2010/11
					Estimate
Domestic consumption	243	243	223	247	247
Household	99	99	93	100	100
Industrial	144	144	130	147	147
Imports	28	31	28	13	12
Domestic sales	215	212	195	234	235
Exports	222	224	183	235	250
EU	180	180	183	180	180
CEFTA	42	44	0	55	70
<b>Total sales</b>	<b>437</b>	<b>436</b>	<b>378</b>	<b>469</b>	<b>485</b>

Source: Author/LMC International; Ministry of Agriculture, Forestry and Water Management.

Increased domestic production in 2009/10 and 2010/11 led to a surplus over and above domestic consumption and Serbia's EU quota. This surplus was sold in regional markets under the CEFTA agreement, which grants Serbia duty-free access to Albania, Bosnia, the former Yugoslav Republic of Macedonia, the Republic of Moldova, Montenegro and Kosovo.

## Sugar prices

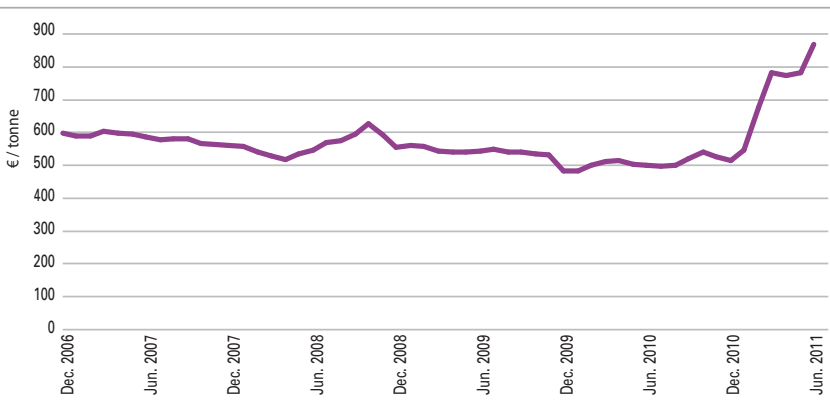
Diagram 39 charts the evolution of the domestic ex-factory prices offered for Serbian sugar. We can see that for much of the recent past, factories received prices in the range of EUR 500–600 per tonne of sugar. However, in the 2010/11 crop year, prices dramatically increased and, by May 2011, they were about 65 percent higher than they were in October 2010.

In the remainder of this chapter, we analyze the factors that drove this trend of increasing prices. We do this by evaluating the dynamics of sugar prices in each of Serbia's main markets, and also consider the prospects of prices in the future.

### The EU market

The dynamics of EU sugar prices are discussed in detail in Chapter 1. As we explain in that chapter, prices in the EU were depressed below world market values in some months of 2010 and 2011. However, these exceptional conditions were short-lived and prices have since risen sharply. Projecting future price values in the EU is complicated by the uncertain role that the European Commission will play over the coming

**Diagram 39:** Ex-factory wholesale prices of Serbian sugar (EUR/tonne, white value)



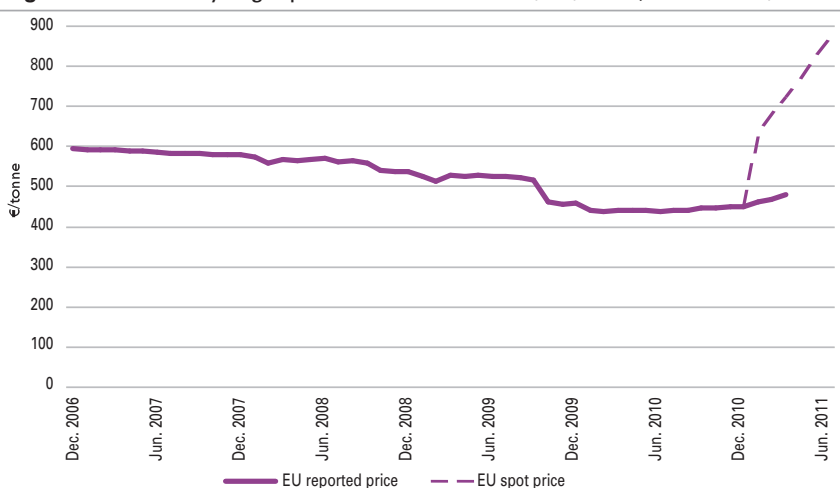
Source: SeedeV.

years to ensure that the EU is adequately supplied with sugar in the face of insufficient imports of preferential (duty-free and reduced-duty) sugars. Moreover, the EU sugar regime is to be renewed in October 2015, after which local price dynamics could change.

Diagram 40 charts the estimated ex-factory prices of sugar sold to the EU market since 2006. The prices that Serbian producers earn from sales to the EU traced the same path as EU market prices, net of a small allowance for the cost of transport. The diagram reveals that the reported market price of sugar in the EU fell gradually until the start of 2011. At the beginning of 2011, the spot market price in the EU exploded and as of June 2011, prices as high as EUR 900–1 000 per tonne were being offered for sugar in parts of the EU. This situation reflects the acute sugar shortage that has developed. Therefore, the Serbian industry currently is able to obtain much higher prices in the EU.

Table 23 presents our estimate of the ex-factory price that Serbian producers earned from sales to the EU. It also contains our estimates of the future level of prices in two situations: (i) quotas continue to restrict sales of domestic sugar such that prices reflect the cost of making imports; and (ii) quotas are relaxed significantly, or abandoned altogether, so that prices are determined by competition among different sources of supply, including domestic beet sugar, domestic isoglucose (starch-based sweetener) and sugar imports.

**Diagram 40: Ex-factory sugar prices to the EU market (EUR/tonne, white value)**



Source: Author/LMC International calculations and estimates.



**Table 23:** Derivation of export sugar prices to the EU market, from 2006/07 to 2010/11 (EUR/tonne, white value)

	2006/07	2007/08	2008/09	2009/10	2010/11	Projected price	
						Quotas	No quotas
EU market price	626	606	565	483	567	570	470
Transport and transaction costs (Serbia to EU)	37	37	37	37	37	37	37
<b>Ex-factory price</b>	<b>589</b>	<b>569</b>	<b>528</b>	<b>445</b>	<b>529</b>	<b>533</b>	<b>433</b>

Source: Author/LMC International; Seedevo.

The table reveals that, as the EU countries that predominantly import Serbian sugar are located geographically close to Serbia, transport and transaction costs are relatively low. As a result, Serbian producers received close to the market price of sugar within the EU. In 2010/11, we estimate that this price was on average around EUR 529 per tonne of sugar.

**Outlook for EU prices.** We estimate that the price that the Serbian industry will receive in the future for exports to the EU will be around EUR 530 per tonne, assuming production quotas are retained, and EUR 430 per tonne if they are removed (or relaxed significantly).

### The CEFTA market

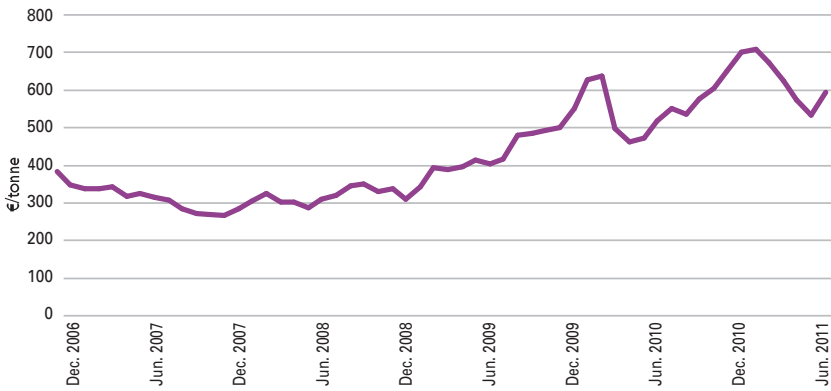
Although the CEFTA market has historically offered relatively low prices, in the last two years prices rose dramatically in that area and it now offers an attractive opportunity for Serbian sugar (Diagram 41). In Table 24, we estimate the ex-factory price that producers in Serbia have been offered when exporting to CEFTA markets and the prices that we expect they will receive from these markets in the future.

As the countries in the CEFTA are predominantly deficit in sugar, the regional price of sugar reflects the cost of importing sugar from the world market. Each member country of the CEFTA has its own policies on imported sugar and, at current world prices, the average duties paid on imports from the EU average about EUR 60 per tonne. Taking this into account, and the logistical cost of importing sugar from the world market, we estimate the price in the CEFTA markets to be around EUR 130 above the prevailing world price.

Allowing for transport and transaction costs of selling Serbian sugar in the CEFTA market, we estimate ex-factory prices in Serbia to be around EUR 20 per tonne below prices in the CEFTA.

In the future, based on a world raw sugar price of USD 460 per tonne (21 cents/lb, which is justified in Chapter 1) and a premium for white sugar over raw sugar of USD 90 per tonne, we estimate that the return from the CEFTA market will be around EUR 480 per tonne.

**Diagram 41:** Ex-factory sugar prices to the CEFTA market (EUR/tonne, white value)



Source: Author/LMC International calculations and estimates.

**Table 24:** Derivation of export sugar prices to the CEFTA market, from 2006/07 to 2010/11 (EUR/tonne, white value)

	2006/07	2007/08	2008/09	2009/10	2010/11	Projected price
World white sugar price	250	227	304	432	516	382
Average CEFTA duties on EU imports	30	27	37	52	62	46
Transport and transaction costs (Brazil to CEFTA)	70	70	70	70	70	70
<b>Implied CEFTA price</b>	<b>350</b>	<b>325</b>	<b>411</b>	<b>554</b>	<b>648</b>	<b>498</b>
Transport and transaction costs (Serbia to CEFTA)	19	19	19	19	19	19
<b>Ex-factory price</b>	<b>331</b>	<b>306</b>	<b>392</b>	<b>535</b>	<b>629</b>	<b>479</b>

Source: Author/LMC International; Seedev.

### The domestic market

Table 25 compares wholesale sugar prices in Serbia with the full duty-paid cost of importing sugar into the country (the import parity price) since the 2006/07 season. Diagram 42 charts the monthly relationship between the import parity prices and actual wholesale prices over the period from 2006 to 2007.

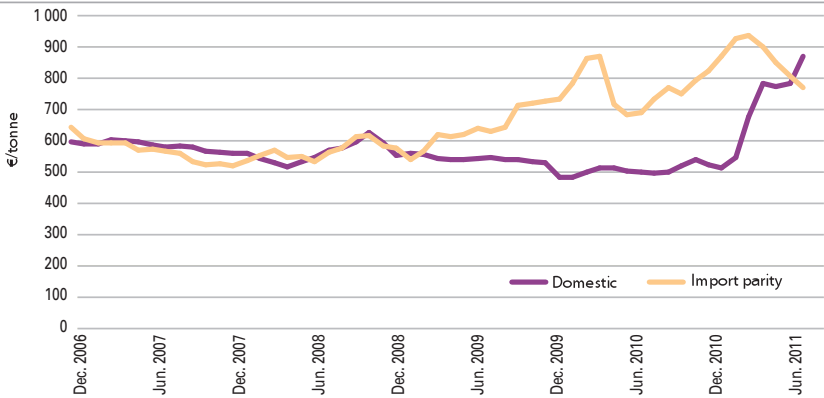
In order to calculate the import parity price, we assume that import parity is set by the cost of importing white sugar from the world market. Prior to 2006, it was set by the cost of importing sugar from the EU. However, the steep decline in EU exports from that date (following a WTO ruling that limited exports), coupled with a large decline in sugar production in Central and Southeast Europe, means that the threat of imports from the EU shifted to a threat of imports from the world market.

**Table 25:** Derivation of domestic market sugar prices, from 2006/07 to 2010/11 and projected values (EUR/tonne, white value)

	2006/07	2007/08	2008/09	2009/10	2010/11	Projected
	price					
<b>Import parity price</b>						
World white sugar price	250	227	304	432	516	382
Tariff on imports (@ 20 %)	50	45	61	86	103	76
Additional duty on world imports (@ RSD18/kg)	225	225	197	180	174	174
Transport and transaction costs (Brazil to Serbia)	70	70	70	70	70	70
<b>Implied import parity price</b>	<b>595</b>	<b>568</b>	<b>632</b>	<b>769</b>	<b>864</b>	<b>703</b>
Transport from the Vojvodina province to Belgrade	10	10	10	10	10	10
<b>Ex-factory wholesale price</b>	<b>585</b>	<b>558</b>	<b>622</b>	<b>759</b>	<b>854</b>	<b>693</b>
<b>Actual wholesale price</b>	<b>588</b>	<b>560</b>	<b>550</b>	<b>507</b>	<b>684</b>	<b>479</b>

Source: Source: Author/LMC International calculations and estimates; SeedeV.

**Diagram 42: Import parity and domestic wholesale ex-factory sugar prices, from 2006 to 2010**



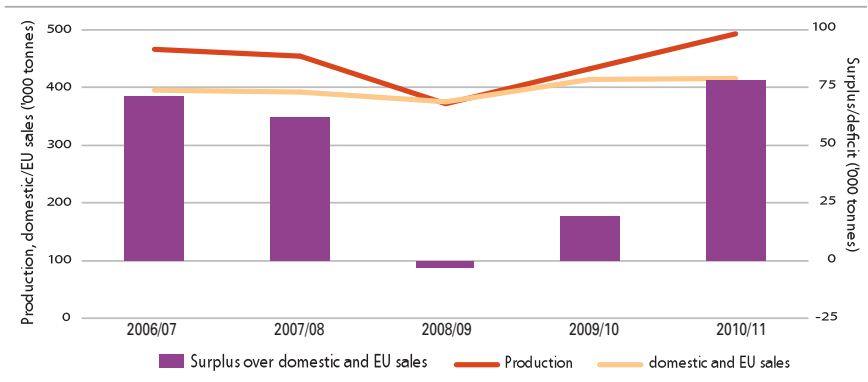
Source: Author/LMC International; Seedev.

Imported sugar from the world market is subject to a 20 percent tariff and an additional duty of RSD18/kg (EUR 174 per tonne); imports from the EU have a lower duty of RSD 12/kg (EUR 116 per tonne) on top of the 20 percent tariff. Although imports can now be made duty-free from other members of CEFTA, as well as from the customs union of the Russian Federation, Belarus and Kazakhstan, in practice, most of these countries are sugar deficit. Moreover, only locally-produced sugar in these countries can be sold duty-free to Serbia. The Serbian domestic market is, therefore, well protected.

Diagram 42 illustrates that domestic wholesale prices tended to trade at or below import parity. The reason behind this lies in the price for which Serbia was able to sell its excess sugar. As Diagram 43 demonstrates, since 2006/07, the country consistently produced more sugar than it was been able to sell in the local and EU markets. This surplus was sold in the CEFTA market, to which Serbia has had duty-free access since 2006. The low prices offered by CEFTA meant that, until very recently, Serbia’s surplus acted as a weight on domestic prices and prevented them from trading up to the full cost of imports from the world market.

Diagram 44 provides further insight into what drives the domestic price in Serbia. There was a close relationship between the prices the industry earned in the local and EU markets until mid-2009. This was the result of the low prices offered in the CEFTA for Serbia’s surplus sugar. Producers, therefore, sought to dispose of their sugar in the domestic and EU markets. As discussed above, recent high world prices pushed up the prices in the CEFTA market. By mid-

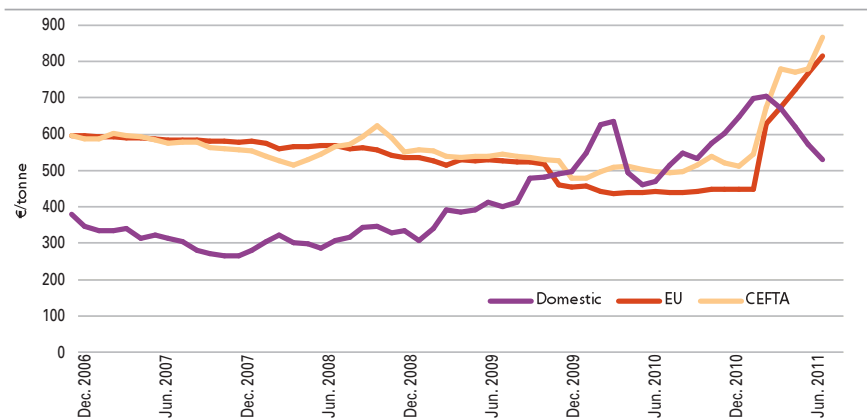
**Diagram 43: Serbian sugar production and sales in the local and EU markets**



Source: Ministry of Agriculture, Forestry and Water Management.

2009, sugar began to trade at higher prices in the CEFTA than in the EU. This helped to support domestic prices in Serbia above the level of prices in the EU. Since October 2010, however, there has been an unprecedented, steep increase in EU spot market prices, which subsequently translated into a corresponding, dramatic increase in domestic prices. We can, therefore, see from this analysis that the price received in the domestic market is closely related to the higher price received from the two export markets.

**Diagram 44: Ex-factory prices of Serbian sugar to various markets**



Source: Author/LMC International calculations and estimates; Seedev.

**Outlook for local sugar prices.** The CEFTA has altered the dynamics of the Serbian sugar market. Now the industry is able to dispose of its production surpluses (above domestic and EU sales) at much higher prices than previously prevailed on the world market. However, the CEFTA market can realistically absorb up to 150 000 tonnes per year of sugar from Serbia. This means that the support that the CEFTA provides the Serbian sugar industry is limited. If the industry were to expand so that its surplus exceeded this amount, local and CEFTA prices would again come under pressure.

Assuming this will not be the case, domestic prices should trade closer to import parity than in the past. Table 25 presents an estimate of the domestic price, assuming a world white sugar price of USD 550 per tonne. This price is based on a raw sugar price of USD 460 per tonne (21 cents/lb, as explained in Chapter 1) and a premium for white sugar over raw sugar of USD 90 per tonne. Assuming the current exchange rate of USD 1.45/ EUR 1 and allowing for all the costs associated with making imports, the price would be almost EUR 700 per tonne.

In practice, prices are likely to be below EUR 700 to reflect the return on sales in the CEFTA market, which, as explained above, acts as the marginal buyer of Serbian sugar. However, prices will, in practice, vary over time, reflecting fluctuations in world market values. Moreover, there may be years, such as the 2011/12 season, when Serbia will not have a production surplus, owing to strong competition for land between beets and alternative crops. In this situation, local prices will not have to be discounted by the cost of selling sugar in the CEFTA market.

## **Potential for adding value to by-products**

Two by-products are created from the sugar production process: beet pulp and molasses. Currently, sugar factories sell these to users in the feed and fermentation sectors. In this section, we discuss the potential for sugar factories to engage in the processing of these by-products to add value.

### **Beet pulp for biogas production**

The sugar production process produces wet pulp, which after being dried in the factories is then sold for use as animal feed. Operators of sugar mills that use gas as an energy source are currently looking into making investments that would allow them to use the wet pulp to produce biogas. Such an investment stands to make cost savings in two ways. First, it would result in energy savings, as factories

would not have to bear the cost of drying the wet pulp. Second, the biogas produced would provide factories with an in-house source of energy so that they would not have to purchase gas from third parties. However, it also means that, as they would no longer be producing beet dry pulp, they would have to forego revenue from pulp sales.

The attractiveness of such an investment ultimately depends on the relative prices of gas and beet pulp. Gas prices are currently high, but investments in a gas distribution network are likely to bring down prices in the future. Furthermore, as pulp prices are linked to maize prices, factories are currently obtaining considerable revenue from the sale of pulp. It remains to be seen whether investors choose to pursue the production of biogas as a means to lower further the fuel costs.

### **Molasses for ethanol production**

There is a growing trend in the global sugar industry of using molasses to produce ethanol. Increasingly, cane mills and beet factories have ethanol distilleries attached to them, and the attractiveness of investments in such facilities has been enhanced by the increasing use of ethanol as a motor fuel. In Serbia, sugar factories are currently not engaged in the production of ethanol or alcohol. However, there are distilleries in Hungary and the former Yugoslav Republic of Macedonia, and also on a small scale in Serbia, that source molasses from Serbia to produce alcohol. Molasses is also sold to producers of yeast.

When considering the potential for sugar factories to engage in ethanol production in Serbia, three factors need to be taken into account.

First, there are no plans for the government to introduce policies to promote the use of ethanol as a motor fuel. Therefore, domestic demand in this regard is limited.

Second, with sugar production declining in Central and Southeast Europe, the supply of molasses is also decreasing. With demand from existing producers of alcohol and yeast holding strong, molasses is in short supply in this same region and prices have, therefore, risen. As a result, there is a significant opportunity cost for factories to refrain from selling their molasses.

Finally, there is a surplus of grains, i.e. maize and wheat, in the region, both of which can be used to produce ethanol. Moreover,

because grains are in plentiful supply, ethanol could be produced on a much larger scale from these feed stocks rather than from molasses.

Given the lack of domestic demand for ethanol fuel, and the high prices that can be obtained by selling molasses to various users, investment in ethanol production is unlikely to be an attractive proposition for Serbian sugar factories. Moreover, such investment would further limit the local availability of molasses, placing further upward pressure on its price. Although ethanol blending mandates in the EU do provide a market in the EU, the opportunity cost of factories having to forgo lucrative revenues from molasses sales, and the fact that the ethanol would have to be transported considerable distances to find markets, would likely make Serbian molasses a relatively expensive source of ethanol fuel.



## |||| Profitability of the Serbian sugar sector

The future profitability of the Serbian sugar sector will depend on several factors. In addition to the industry's costs of production and the prices at which it can sell its sugar, a critical issue is the level of the Serbia's access to the EU sugar market. In this chapter, we focus on the profitability of the processing sector and its prospects for the future, taking into account its ability to pay farmers a price that allows them to match the returns they could earn from alternative crops. In our assessment of future profitability, we take into account a number of different outcomes. These outcomes include whether or not Serbia receives a larger quota to export to the EU, or whether or not EU domestic production quotas are maintained.

### Summary

- In Serbia, there is currently a difference in profitability between those sugar factories that are gas-powered and those that are coal-powered. As well as benefiting from lower fuel costs, coal-powered factories also benefit from lower beet haulage costs, as they are located near their beet suppliers. The profitability of coal-powered plants is, therefore, significantly higher than that of gas-powered plants. However, the profitability of all factories was expected to improve greatly in 2011 owing to the increase in sugar prices;
- In our assessment of future profitability, we looked at three different outcomes: (i) the status quo is maintained; (ii) factory rationalization takes place and (iii) Serbia is granted a larger export quota to the EU. For each outcome, we project two scenarios: one whereby EU domestic production quotas are retained and one whereby they are abolished;
- For all three outcomes, the sugar industry has a profitable future. However, profitability would be lower if the EU were to abolish its quota system. Although the industry will continue to face the risk of higher beet prices in years when alternative crop prices are high, similar pressure will be felt by processors throughout the European and global sugar industries;
- In a hypothetical situation where trade in sugar were free, beet white sugar in Serbia would have the potential to

compete with refined sugar processed from imported raw sugar, as reflected in recent developments that have brought up the cost and price of raw sugar in the world market and made it easier for beet-based industries to compete.

## Current profitability

As we discuss in Chapter 5, the Serbian sugar industry sells the vast majority of its sugar in the local and EU sugar markets. However, since 2010, sales to the CEFTA market increased substantially. This was possible because the Serbian industry produced a surplus over the requirements of its core markets and because prices in the CEFTA markets were very attractive. Table 26 presents estimates of the average sugar selling prices over the last three seasons, based on the distribution of sales and prevailing prices in each market.

**Table 26:** Estimate of the average selling price of Serbian sugar in the domestic, EU and CEFTA markets, from 2008/09 to 2010/11 (EUR/tonne)

		2008/09	2009/10	2010/11
<b>Distribution of sales</b>				
Domestic	'000 tonnes	195	234	235
EU	'000 tonnes	183	180	180
CEFTA	'000 tonnes	0	55	70
<b>Total</b>	<b>'000 tonnes</b>	<b>378</b>	<b>469</b>	<b>485</b>
<b>Market price</b>				
Domestic	EUR/tonne	550	507	684
EU	EUR/tonne	528	445	529
CEFTA	EUR/tonne	392	535	629
<b>Average price</b>	<b>EUR/tonne</b>	<b>539</b>	<b>487</b>	<b>619</b>

Source: Author/LMC International calculations and estimates; Seedeve.

Using these prices, together with our estimate of industry costs, we derive industry profitability as shown in Table 27.

## Methodology

There are several methodological issues that need to be addressed when preparing estimates of costs.

**Cost of beets.** Beet prices are based on prevailing prices in each of the last three seasons. We added to these prices an allowance for the cost of beet transport. However, distances differ greatly between

factories, because some are poorly located in relation to their beet supply. Sunoko's three factories and the Crvenka factory haul beets over a shorter distance than the Zabalj factory and the Senta factory, in particular, which are located on the fringes of beet production in the Vojvodina province.

**Energy prices.** As we explain in Chapter 4, there is a huge difference in the cost of fuel between the three factories that burn coal (all of which are owned by Sunoko) and those that use gas. For this reason, we present separate estimates of profitability for coal-powered and gas-powered plants. Moreover, because all three coal-powered factories also transport beets over relatively short distances, we use the lower estimate of haulage costs (EUR 4 per tonne) for these factories. For the others, we apply a higher estimate of EUR 5.5 per tonne, although it is important to note that haulage costs vary greatly within this group, with the Crvenka factory having the shortest hauling distances and the Senta factory the longest.

**Factory operating costs and depreciation.** Table 6.2 shows profits before and after depreciation. Profits before depreciation are based on the cost of beets plus operating costs, which include the following elements: (i) fuel, (ii) labour, (iii) chemical and other inputs, (iv) repairs and maintenance, and (v) an allowance for working capital. Depreciation is calculated as the full replacement cost of capital and we assume an average depreciation period for all equipment of 22.5 years. In practice, each factory's depreciation allowance will differ according to the book value of its assets.

**Interest and taxes.** Our estimate of profitability makes no allowances for interest on debt (other than on short-term working capital) or taxes.

**By-product values.** In our analysis, we treat the revenue from the sale of by-products (molasses and beet pulp) as a credit against costs. In the case of beet pulp, the revenue is based on the sale of pulp pellets, and the cost of producing these (principally energy) is included in our estimate of factory fuel costs.

The table shows that the profitability of coal-powered plants is significantly higher than that of gas-powered plants, but the profitability of all factories is expected to improve considerably in 2011 owing to the increase in sugar prices.

**Table 27:** Estimated profitability of sugar production, from 2008/09 to 2010/11 (EUR/tonne)

		Gas-powered factories			Coal-powered factories		
		2008/09	2009/10	2010/11	2008/09	2009/10	2010/11
<b>REVENUES</b>							
Average sugar price		539	487	619	539	487	619
<b>COSTS</b>							
Price of beets	EUR/tonne beet	39	34	28	39	34	28
Transport costs	EUR/tonne beet	6	6	6	4	4	4
Delivered beet costs	EUR/tonne beet	44	39	34	43	38	32
Rendement	%	14.6	14.1	13.1	14.6	14.1	13.1
Delivered beet costs	EUR/tonne sugar	300	278	257	290	268	246
Cash processing costs	EUR/tonne sugar	205	166	174	110	86	83
By-product credit	EUR/tonne sugar	(96)	(62)	(106)	(96)	(62)	(106)
Total costs	EUR/tonne sugar	410	382	326	305	292	223
<b>PROFITS</b>							
Operating profit	EUR/tonne sugar	129	104	293	234	195	396
Operating margin	%	6	4	34	25	23	51
Depreciation	EUR/tonne sugar	98	83	80	98	83	80
Profit after depreciation	EUR/tonne sugar	31	22	213	136	112	316

Source: Author/LMC International calculations and estimates.

### Future profitability

Beet processing capacity in Serbia is currently greater than is needed to supply the country's main markets, i.e. the local market plus the EU (quota) and the CEFTA countries (assuming a CEFTA market potential of up to 150 000 tonnes per year). This is reflected in the relatively low utilization of installed factory capacity in most years when compared with factories in the EU. Faced with this situation, the industry has two options:

- Rationalize capacity further by closing one or more of the factories that are least well placed to secure beets and/or are small;
- Maintain capacity in the expectation of enhanced access to the EU sugar market in the future. If Serbia's accession to the EU is not expected to happen until much later in this decade, then this option is less feasible, in light of the long delay. However, given that the EU is currently short of sugar, owing to a lower-than-expected supply from other beneficiaries of the EU's preferential access

arrangements, it is possible that Serbia may be able to negotiate an increase in its current annual EU quota of 180 000 tonnes.

In the next section of this chapter, we evaluate the profitability of the sector under three possible outcomes:

- Status quo: The sugar industry continues to operate with its current production capacity but access to the EU remains limited to 180 000 tonnes per year;
- Factory rationalization: The industry's access to the EU remains at 180 000 tonnes per year and the industry rationalizes capacity further;
- Larger EU quota: Access to the EU is enhanced, thereby allowing the sugar industry to make greater use of its existing capacity. In this outcome, we assume that access is increased by 50 000 tonnes per year and exports to the CEFTA rise to 100 000 tonnes per year, which are the levels that would be needed in order for the industry to utilize its capacity fully.

### Methodology

In addition to the methodological issues discussed above, we have had to take other factors into consideration where preparing our projections of industry profitability.

**Cost of beets.** The price that factories will have to pay for beets is determined in large part by the returns that farmers would expect to earn from alternative crops. For the purpose of this analysis, we derive estimates of the beet supply price assuming a maize price of EUR 130 per tonne.<sup>10</sup> Based on the analysis presented in Chapter 3, this implies a farm-gate beet supply price of approximately EUR 30 per tonne.

To this price of EUR 30, we add an allowance for the cost of beet transport. In the outcome where the industry were to rationalize capacity, and one of the two factories that are least well located for beet production were to close, then beet transport costs would decline. In this scenario, we use an average haulage cost of EUR 5 per tonne for the remaining two gas-powered factories.

**Energy prices.** There has been a huge increase in gas prices in Serbia in recent years and processors are responding to this by investing to

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<sup>10</sup> This assumes a long-run average price of maize in Northwest Europe of approximately EUR 150 per tonne, and that maize in Serbia trades at a discount of EUR 20 per tonne to this price.

realize large cuts in energy consumption. For this part of the analysis, we use fuel prices prevailing in 2010, but assume that the factories burning gas will achieve their planned 20 percent energy savings.

**Fixed costs (capital and labour).** Unit fixed costs of processing at Serbia's beet factories will depend on the factory's level of throughput and installed capacity. To derive these costs, we assume the following:

- Status quo: The sugar sector continues to operate at its current capacity (40 000 at six factories), access to the EU remains at 180 000 tonnes per year and production averages 450 000 tonnes per year;
- Factory rationalization: One factory closes, reducing capacity to 32 000–35 000 tbd, access to the EU remains at 180 000 tonnes per year and production averages 450 000 tonnes per year;
- Larger EU access: The sugar sector continues to operate at its current capacity (40 000 tbd at six factories), access to the EU increases to 230 000 tonnes per year and exports to the CEFTA rise to 100 000 tonnes per year, and production averages 550 000 tonnes per year, thereby allowing current capacity to be utilized fully.

## Results

Tables 28 and 29 contain our projections of the average price of sugar that the industry could expect to earn in each of the three outcomes described above. The only difference between them is that, in Table 28, our price estimates for the EU assume quotas are retained, whereas we assume quotas are abolished in Table 29. The rationale for these prices is discussed in Chapters 1 and 5.

Based on these prices of sugar and our estimates of costs for each outcome, our estimates of industry profitability are summarized in Tables 6.5 and 6.6. These estimates reveal that the industry will have a profitable future, although profitability would be lower if the EU were to abolish its quota system.

In addition, the sugar industry will also continue to face the risk of higher beet prices in years when alternative crop prices are high. However, it should be stressed that Serbia would not be alone in such a situation. Beet processors in the EU would face similar pressures and these would be reflected in sugar prices in the EU. Moreover, other sugar producers around the world would also face similar pressures, so the problem would not be felt only in the European beet industry. However, to the extent that changes in

**Table 28:** Estimate of the future average selling price of Serbian sugar to the domestic, EU and CEFTA markets, assuming quotas are retained in the EU market

			Factory	Larger EU
		Status quo	rationalization	access
Distribution of sales				
Domestic	'000 tonnes	220	220	220
EU	'000 tonnes	180	180	230
CEFTA	'000 tonnes	50	50	100
Total	'000 tonnes	450	450	550
Market price				
Domestic	EUR/tonne	479	479	479
EU	EUR/tonne	533	533	533
CEFTA	EUR/tonne	479	479	479
Average price	EUR/tonne	501	501	502

Source: Author/LMC International calculations and estimates.

**Table 29:** Estimate of the future average selling price of Serbian sugar to the domestic, EU and CEFTA markets, assuming quotas are abolished in the EU market

			Factory	Larger EU
		Status quo	rationalization	access
Distribution of sales				
Domestic	'000 tonnes	220	220	220
EU	'000 tonnes	180	180	230
CEFTA	'000 tonnes	50	50	100
Total	'000 tonnes	450	450	550
Market price				
Domestic	EUR/tonne	479	479	479
EU	EUR/tonne	433	433	433
CEFTA	EUR/tonne	479	479	479
Average price	EUR/tonne	461	461	460

Source: Author/LMC International calculations and estimates.

alternative crop prices do not pass directly through to world and regional sugar prices, the risk to processors of higher beet prices will continue in some years.

**Table 30:** Estimated profitability of sugar production assuming quotas are retained in the EU market

	Gas-powered factories						Coal-powered factories			
	Factory		Larger EU		Larger EU		Factory		Larger EU	
	Status quo	Rationalization	Rationalization	Access	Status quo	Access	Status quo	Rationalization	Access	
<b>REVENUES</b>										
<b>Average sugar price</b>	<b>501</b>	<b>501</b>	<b>501</b>	<b>502</b>	<b>501</b>	<b>502</b>	<b>501</b>	<b>501</b>	<b>502</b>	<b>502</b>
<b>COSTS</b>										
Price of beets	EUR/tonne beet	30	30	30	30	30	30	30	30	30
Transport costs	EUR/tonne beet	6	5	6	6	6	4	4	4	4
<b>Delivered beet costs</b>	<b>EUR/tonne beet</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>34</b>	<b>34</b>	<b>34</b>	<b>34</b>
Rendement	%	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Delivered beet costs	EUR/tonne sugar	251	248	251	251	251	240	240	240	240
Cash processing costs	EUR/tonne sugar	156	144	146	146	146	89	77	79	79
By-product credit	EUR/tonne sugar	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)
<b>Total costs</b>	<b>EUR/tonne sugar</b>	<b>319</b>	<b>304</b>	<b>309</b>	<b>309</b>	<b>309</b>	<b>241</b>	<b>230</b>	<b>231</b>	<b>231</b>
<b>PROFITS</b>										
<b>Operating profit</b>	<b>EUR/tonne sugar</b>	<b>181</b>	<b>197</b>	<b>192</b>	<b>192</b>	<b>192</b>	<b>259</b>	<b>271</b>	<b>270</b>	<b>270</b>
Operating margin	%	19	25	24	24	24	34	40	40	40
Depreciation	EUR/tonne sugar	88	69	72	72	72	88	69	72	72
<b>Profit after depreciation</b>	<b>EUR/tonne sugar</b>	<b>94</b>	<b>128</b>	<b>121</b>	<b>121</b>	<b>121</b>	<b>172</b>	<b>202</b>	<b>199</b>	<b>199</b>

Source: Author/LMC International calculations and estimates.



**Table 31:** Estimated profitability of sugar production assuming quotas are abolished in the EU market

	Gas-powered factories				Coal-powered factories				
	Larger EU		Factory		Larger EU		Factory		
	Status quo	Rationalization	Access	Rationalization	Status quo	Rationalization	Access	Rationalization	
<b>REVENUES</b>									
<b>Average sugar price</b>	<b>461</b>	<b>461</b>	<b>460</b>	<b>461</b>	<b>461</b>	<b>461</b>	<b>460</b>	<b>461</b>	<b>460</b>
<b>COSTS</b>									
Price of beets	EUR/tonne beet	30	30	30	30	30	30	30	30
Transport costs	EUR/tonne beet	6	5	6	4	4	4	4	4
Delivered beet costs	EUR/tonne beet	35	35	35	34	34	34	34	34
Rendement	%	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Delivered beet costs	EUR/tonne sugar	251	248	251	240	240	240	240	240
Cash processing costs	EUR/tonne sugar	156	144	146	89	89	77	79	79
By-product credit	EUR/tonne sugar	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)
<b>Total costs</b>	<b>EUR/tonne sugar</b>	<b>319</b>	<b>304</b>	<b>309</b>	<b>241</b>	<b>230</b>	<b>231</b>	<b>231</b>	<b>231</b>
<b>PROFITS</b>									
<b>Operating profit</b>	<b>EUR/tonne sugar</b>	<b>141</b>	<b>157</b>	<b>150</b>	<b>219</b>	<b>231</b>	<b>228</b>	<b>228</b>	<b>228</b>
Operating margin	%	12	19	17	29	35	34	34	34
Depreciation	EUR/tonne sugar	88	69	72	88	69	72	69	72
<b>Profit after depreciation</b>	<b>EUR/tonne sugar</b>	<b>54</b>	<b>88</b>	<b>79</b>	<b>132</b>	<b>162</b>	<b>157</b>	<b>157</b>	<b>157</b>

Source: Author/LMC International calculations and estimates.

## Competitiveness in a free market

Historically, beet sugar has not been cost competitive against cane sugar. As a result, beet-based sugar industries, such as those in the EU, have relied on a high level of tariff protection and subsidies in order to shield them from competition from low-cost cane sugar imports. How competitive would the Serbian sugar industry be in a hypothetical situation whereby all tariff barriers were removed and the industry was exposed to free trade? To answer this question, we analyze how the future cost of producing beet white sugar in Serbia matches up against the cost of refining duty-free imported raw sugar from Brazil based on the cost of producing sugar there (Diagram 45) and the cost of refining duty-free imported raw sugar from the world market based on our estimate of the long-run price of sugar (Diagram 46).

In order to carry out this analysis, we make the following assumptions:

- Brazil's cost of production: In Diagram 45, we show our estimate of the ex-mill cost of producing raw sugar in Brazil in 2011;
- Long-run sugar price: In Diagram 46, we assume the long-run price of No.11 raw sugar to be 21 cents/lb (USD 460/tonne), as we expect developments in Brazil to support world sugar prices above the 20 cents/lb level in the future. For further details on this subject, see Chapter 1;
- Fobbing costs: It cost around USD 35–50 a tonne to transport raw sugar from a mill in São Paulo state to the port in Brazil in 2011. In Diagram 46, we do not include this cost, as it is included in the No.11 raw sugar contract, which refers to raw sugar on an f.o.b. basis;
- Freight costs: We take the average cost in 2011 of transporting bulk raw sugar from Brazil to Europe of around USD 40 per tonne;
- Refining and handling costs: We estimate that it costs close to USD 160 per tonne to refine imported raw sugar in the EU. This figure also allows for raw sugar discharge, refining, marketing and an allowance for a return on capital;
- EU-27 cost of production: We estimate that it costs just over USD 600 to produce one tonne of beet white sugar in the EU. This assumes beets are procured at EUR 30 per tonne and the rendement<sup>11</sup> is 13 percent. To this calculation, we add our estimates of beet haulage and processing costs in the EU;

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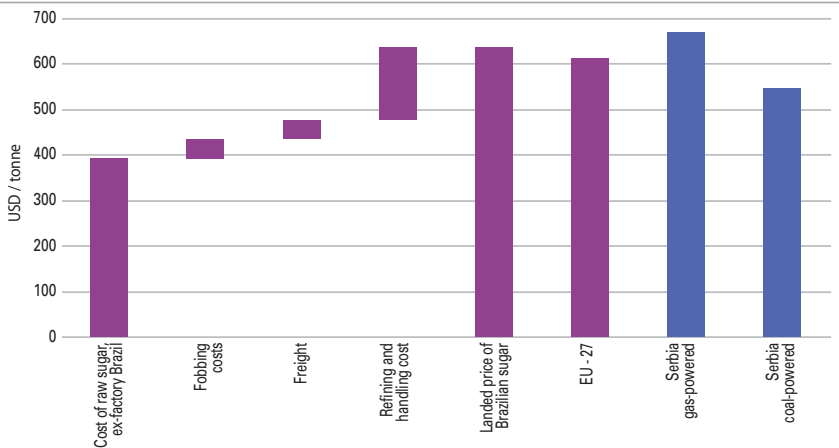
<sup>11</sup> The amount of sugar recovered per tonne of beets.

- Future Serbian cost of production: For this analysis, we assume that the sugar industry operates at a higher level of utilization than it does currently, either because of further rationalization or because it gains greater access to the EU market. In this situation, we estimate that factories could produce approximately 14 tonnes of sugar per tonne of installed capacity.

The analysis reveals that, once transport and refining costs are taken into account, beet white sugar produced in the EU can compete on a cost basis with refined sugar produced from imports. If the potential improvements in the Serbian industry materialize, local sugar output would also be able to compete with imported sugar. In fact, Serbian factories that use coal actually have a significant cost advantage over refined sugar produced from imported raw sugar.

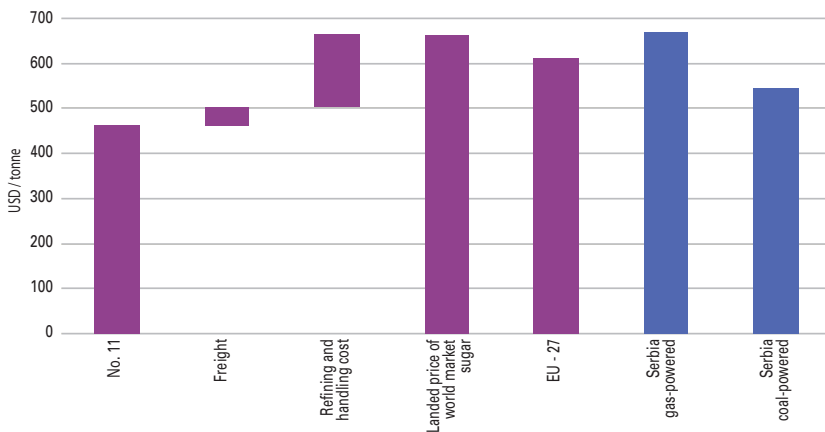
The improved situation for beet sugar reflects the developments in Brazil and in the EU outlined in Chapter 1. The increased costs of sugar production in Brazil, and the need to offer raw sugar suppliers an attractive enough price for them to favor sugar production over ethanol production, has made it easier for beet sugar to compete with imported cane sugar. At the same time, EU reforms and privatization of the Serbian sugar industry resulted in factory capacity rationalization and efficiency improvements that brought down the costs of producing beet sugar in Europe.

**Diagram 45:** The competitiveness of beet sugar in a free market, relative to Brazil's cost of production



Source: Author/LMC International.

**Diagram 46:** The competitiveness of beet sugar in a free market, relative to long-run No.11 raw sugar prices



Source: Author/LMC International.

## ||||| Conclusions and recommendations

### A more efficient Serbian sugar industry

The Serbian sugar industry in recent years underwent many changes that improved the efficiency and competitiveness of the sugar sector.

There has been considerable specialization of the production of beets, with around half of all beets now grown by large-scale farming entities. This segment of production is as efficient, or more efficient, than that in many other countries in the EU. This increased efficiency represents an important development, especially as farmers in the sugar sector now receive low (decoupled) area payments, for which the larger farms are not eligible.

Beet area and production have increased in Serbia. The difference between Serbia and the EU is striking with regard to beet area size, which in the EU decreased sharply, owing to the recent EU reforms. The decrease was especially marked in Southeast Europe, where producers either reduced output dramatically or ceased production altogether. Serbia is now the largest sugar producer in Southeast Europe.

Beet yields and sucrose content increased with improved farm management and the adoption of modern inputs. However, the climate in the Vojvodina province is not ideal for beet production and, even with modern farming practices; the yields of the beet areas there do not match those of the best beet areas in North West Europe. However, there is no reason why the beet producers in Serbia cannot match the technical performance of other producers in Southeast Europe.

The beet processing industry also underwent considerable change, resulting in improvements in factory efficiency. Factory rationalization allowed the industry to make much greater use of its fixed assets, although capacity is still greater than is currently needed to produce the 450 000 to 500 000 tonnes of sugar that the industry produces in most years.

There are two areas of weakness in the sugar industry operations:

- The high level of energy use, which has been most apparent for factories that use gas, owing to the steep rise in fuel prices in the last few seasons. However, this problem is being addressed, with all three gas-powered plants in Serbia currently investing to lower substantially their fuel consumption. These factories are also investigating the possibility of producing biogas from beet pulp as an alternative to buying gas;
- Beet haulage distances are long for two factories. This problem is more structural in nature and reflects the fact that the factories are located on the fringes of the prime beet growing areas in the Vojvodina province. However, if the Senta factory were to gain access to beets grown in Hungary, it would be able to lower its beet transport costs.

### **Competition from alternative crops**

Without a doubt, the Vojvodina province has a profitable beet sugar industry. Moreover, the efficiency of the sector can be improved further. However, the future size of the industry is limited by the size of the area that is suitable for beet cultivation, which means improving performance in agriculture is key to enabling the sector to maximize its output.

High alternative crop prices also pose a threat to the beet supply. However, this is true of all beet industries in Europe. Moreover, world sugar prices are also structurally higher, in part because of the need for sugar crops to compete for land with other crops. At the same time, reforms in the EU mean that the EU is now structurally short of sugar and sugar prices there will have to command a premium over world prices to attract the supplies that are needed to meet demand.

Each of the above factors means that, while the size of the beet area will continue to vary over time in response to movements in alternative crop prices, sugar prices will have to track the overall trend in global commodity prices, thereby ensuring that beet processors will be able to offer competitive beet prices in the long term.

### **Opportunities in the EU and the CEFTA sugar markets**

In retrospect, the reform of the EU sugar sector resulted in the closure of too many sugar factories and too great a reduction in beet processing capacity. Subsequently, the EU's preferred overseas

suppliers have not expanded production and export to the EU as had been expected. As a result, the EU will have to take measures to increase its sugar supply. This situation forms the backdrop against which it will formulate the new sugar regime, which will come into force in October 2015.

While it is uncertain what measures the European Commission will take in the medium and long terms, it is clear that they will be designed to increase supply. In practice, it is likely to include measures that will boost imports to the EU as well as allow EU beet sugar producers to sell more sugar within quota. This provides the Serbian sugar industry with an excellent opportunity. Not only does the EU need sugar, but the Vojvodina province in Serbia is located close to a large sugar deficit region in the EU, and Serbia will later in this decade become a member of the EU. This suggests that Serbia has a strong case to increase access to the EU market.

At the same time, higher world prices mean that markets in the CEFTA, to which the Serbian sugar industry now has duty-free access, will also offer more attractive outlets for sugar than they have in the past.

## Summary

The Serbian sugar industry became a much more efficient industry in recent years and there are still measures the industry can take to improve further its efficiency and competitiveness. At the same time, the industry's market opportunities also improved. Higher world sugar prices, duty-free access to the CEFTA and a structural supply shortage in the EU all point to the Serbian industry being able to sell more sugar at a better price.

Despite the continuing competition for land between sugar beet and alternative crops, which is a challenge for beet (and cane) processors around the world, the Serbian industry has the scope to expand sugar output. Based on existing installed capacity, an average production of around 550 000 tonnes per year is realistic. However, to achieve this, the industry and government will have to address three main issues:

- Continued improvements in agriculture, via gains in beet yields and sucrose content, as well as the lowering of production costs through further modernization of the agriculture sector. Actions in these areas will allow the sector to maximize its potential on soils that are best suited for beet cultivation;

- Continued investment in factories to improve efficiency, especially in energy use;
- Lobbying for greater access to the EU to provide market outlets for the additional sugar the industry is able to produce.

If the sugar sector can succeed in these areas, it will have the opportunity to sustain a larger, profitable sugar industry.



Questions and comments should be addressed to:  
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